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11 December 1979

USSR Report

MILITARY AFFAIRS

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ANNOTATION

The memoirs of Colonel Ye. V. Koyander, former deputy chief of signal troops, 1st Air Army, are devoted to the organization and development of communications in the Soviet Armed Forces during the Great Patriotic War. Telling about the combat activities of airmen in the 1st Air Army, the author persuasively demonstrates the great radio proficiency of the pilots and the hard, selfless labor of air signalmen, wire communication line builders, and the executive staff of signal elements and subunits. The book describes the mass heroism of air gunner-radio operators and air support controllers, and the proficiency and bravery of girls who had volunteered for the front as signalmen and made an invaluable contribution to the victory.

The book is intended for the lay reader.

FOREWORD

A number of research papers in history and memoirs thoroughly illuminating the combat activities of air commanders, political elements, and staffs and broadly demonstrating the bravery and glorious deeds of pilots, navigators, engineers, and technicians were published following the Great Patriotic War. But no works have been written devoted entirely to the selfless labor of air signalmen in the past war.

Colonel Ye. V. Koyander goes a long way to fill this gap. He has written an interesting and instructive book dedicated to signalmen of the air forces of the Western Front and 1st Air Army, to people who had taken an active part in support of a number of the largest frontal operations. This is a story about the great military labor of air signalmen, about their devotion to the motherland, and about their heroism and inventiveness in creation of stable and dependable communications between commanders and their staffs on the ground and between airplane crews and ground control posts. Using numerous examples, the author persuasively demonstrates how much command and control of the combat activities of aviation in the war years depended

directly on well conceived organization of communications and competent utilization of all of its potentials.

Running through the entire book is the quite valid notion that troop command and control would be nonexistent without communications, and that victory would be impossible without command and control. This immutable law was always considered by the air force command of the Western Front and the 1st Air Army, which showed serious concern for developing and improving communications in the formations, and for improving the occupational skills of their specialists. Nor does Ye. V. Koyander ignore cases in which certain troop commanders devoted little attention to communications, who had insufficient knowledge of its technical possibilities, and who as a result lost control of subordinates and were unable to complete their missions most effectively.

The author persuasively shows the stiff requirements the war imposed on air commanders and staffs concerning development and introduction of fundamentally new forms and methods of controlling the combat activities of aviation in the struggle for air supremacy, and concerning support to offensive operations conducted by ground troops and maintenance of close interaction with them directly on the battlefield. Here liaison officers and forward air controllers carrying their own radio sets began to be assigned to the command posts of combined arms formation commanders, set up within the combat formations of their units. The significance of radio communication to control of aircraft aloft grew dramatically. It transformed into the basic resource for controlling air groups over the battlefields. Air signalmen deserve great credit for being so tremendously helpful in quickly teaching the airmen how to use the technical communication resources, and for maneuvering these resources competently in the most diverse frontal situations.

This is demonstrated most clearly of all in the description of the combat activities of the 1st Air Army under the command of Colonel General of Aviation T. T. Khryukin. At that time I was the commander of the 240th Fighter Division, an element of that army which supported the Belorussian and East Prussian offensive operations of the 3d Belorussian Front, and I cannot recall a single case in which communication with the air army command had failed or was interrupted. Communication was always prepared in time, and it was dependable and stable.

The author's practical activities proceeded basically in the troops, among the pilots at the airfields, in headquarters of the air formations and units, and at the radio receiving and transmitting centers; he was the organizer of communications for command posts and auxiliary control posts, he was a member of the staff of the air army command's operational group, and therefore he always knew well what was going on at the front; he was personally familiar with many signalmen and pilots and with all divisional and regimental commanders, air liaison officers, and air controllers. It is owing to this that we encounter, in Ye. V. Koyander's memoirs, many known

and unknown heroes of the Great Patriotic War, steadfast, politically mature, proficient people who loved their work as the author did, and who devoted all of their effort and knowledge to victory over the enemy.

It is with a great love of man that the author reveals to readers the images, characters, interests, and morale of his comrades in arms, and their merits and weaknesses. Many of the people noted in the memoirs did not live to witness our great victory, and many departed from this life in the postwar years. In this book they all come alive as active and inspired characters working side by side with us as before.

We know quite well that complex situations of conflict, of which signalmen were also participants and witnesses, often arose in the course of preparations for operations, and especially during them. The situations they found themselves in were often improbably difficult, and the author concretely demonstrates that as a rule, the signalmen did manage to find the solutions to the most difficult situations. All of this imparts objectivity to the book and keeps it entertaining, and it will doubtlessly elicit the interest of the lay reader.

Despite the fact that the memoirs deal with the past, they force us to think about the present and future of communication because scientific-technical progress has recently led to creation of completely new military communication equipment, equipment that is more complex and which offers significantly greater possibilities for raising the effectiveness of the control of aviation in all of its organizational and structural elements. This is why I think that Ye. V. Koyander's book will be read with interest by both graying veteran signalmen and young people planning to devote their lives to communications. In this regard it is especially valuable to instructors and students at military signal schools, academy students, air commanders, specialists on their staffs, and signal troop commanders, engineers, and technicians of all ranks.

Hero of the Soviet Union
Mar Avn G. V. Zimin,
Dr Mil Sci, Prof

CHAPTER ONE

WERE THE WAR TO START TOMORROW

It was a time of last-minute preparations for May Day. Red Army soldiers and active members of the garrison women's council were finishing the whitewashing of the trunks of potted trees arranged alongside roads and sidewalks. Gilded by the soft rays of the vernal sun, the air base was brightened even more by brilliantly colored posters and transparencies.

There was not a cloud in the sky. Nor over my spirit. The division's signalmen had earned good grades in combat and political training for the holiday. I had just met with the training company's cadets. Almost all of them were Komsomol members, they studied with interest, and they persistently mastered their difficult combat occupations.

The training signal companies were not organic to the air divisions. Before, junior commanders were trained for us in training platoons, which were later abolished for some reason. Now sergeant posts began to be filled by Red Army soldiers who had worked in communications prior to being called up, or by simply the most competent and willful individuals. These were diligent people; they burned with the desire to justify the trust placed in them, but not all of them knew how to command. Moreover the level of their technical knowledge was not always higher than that of their subordinates. Special training was required for this purpose. And thus the division's signal chiefs arrived at the thought of creating nonorganic training companies.

We organized our training subunit in the fall of 1940. It trained sergeants for the division's signal company and for four air bases. This "academy" was directed as an additional duty by the signal chief of one of the air regiments, Senior Lieutenant Aleksandr Mikhaylovich Yushchenko. He had a perfect knowledge of his field, and he was extremely exacting toward both himself and his subordinates. His deputy for political affairs, Political Instructor Nikita Fomich Gustynov possessed the same qualities. They quickly set up the training process, which was centered about an immovable principle in the army of those years--teach the troops only what they need in war, only in the way it is done in war.

I first met Senior Lieutenant Yushchenko long ago: I had served together with him in Bobruysk. At that time he was a platoon commander and was in charge of the separate signal company of an air brigade. Later, following annexation of western Belorussia, when I was appointed battalion commander and he was given charge of the company, we worked out the procedures of special tactical training for air signalmen together. Alekandr Mikhaylovich actively supported me in my attempts at broadly introducing night courses. It was then that I first noted his habit of noting down remarks made by a senior chief immediately, rather than relying entirely on his memory.

And so it was that Yushchenko pulled his notebook out of his map case before I even closed the door to company headquarters.

"No Comrade Aleksandr Mikhaylovich," I said, "no notes today."

"How so, is this a holiday special?"

The company duty officer walked into the room before I could answer.

"Comrade Captain, Colonel Ptitsyn requests your presence in the instrument room immediately."

Il'ya Ivanovich Ptitsyn was air force signal chief of the Western Special Military District. I was in the instrument room in a couple of minutes. Soon letters began hastily running together into words on the tape of the ST-35 teletype machine: "Happy holiday eve. This is for your eyes alone. An order appointing you chief of division communications was signed today. It is to be published in Minsk on priority. Think about whom you would want as your regimental signal chiefs and company commander. Await an official telegram announcing your new appointment. Do you understand?"

The tape stopped. But no sign-off followed. This meant that something else was yet to follow. This "something else" raised a lump in my throat: "Well, Zhenya, are you pleased?"

Il'ya Ivanovich was a remarkable man. He harmoniously and naturally combined the official airs of a leader with comradely closeness. His announcement of the promotion was dry and impersonal, this to be followed by the friendly "Zhenya, are you pleased?" He viewed each of his subordinates first as a person, and a comrade in arms. And at the same time he was strict and exacting, he would not tolerate familiarity, and he could make stern demands of anyone and issue stiff orders.

I answered brokenly, not as would be expected of a chief: "Thank you. I will try to live up to it. I will need to transfer my party duties Thank you very much...." Il'ya Ivanovich obviously realized that he had caught me by surprise, and he transmitted: "Good. Burn the tape. Say nothing to anyone about this for now. See you soon."

The machine fell silent. I stood with the tape in my hands and upbraided myself: I had not even wished Ptitsyn a happy holiday...

The news of my new appointment made me very happy. To learn that one is getting a promotion is always a pleasure--it means you deserve it. But did I have to lose my self-control so much? It was obviously all due to the last phrase: "Well, Zhenya, are you pleased?" These words touched my very heartstrings. They were so plain, so ordinary, but they represented so much concern for the individual, a personal stake in the fate of a subordinate....

The fate of a military man.... It is not simple, and its turns are sharp. There is no guessing where, when, and to what it will take you. You are simply a little screw in an enormous army machine. Transfers from place to place are nothing unusual to a soldier. Imagine haw many times I have had to change duty locations and posts in 11 years of service--there would not be enough fingers to count them.

I ran my eyes over the tape one more time, burned it as ordered, and glanced at my watch--it was time for the division commander's meeting.

On my way to headquarters I caught up with a group of commanders and political workers. I listened in on their conversations. The anxiety I heard in the exchange of opinions was typical of those days.

"We should knock them out of the sky, that's what I would say."

"But suppose the Germans actually did get lost? Hasn't that ever happened to you?"

"Aren't all of these accidents a little too systematic?"

"How is it that the weather is perfect but they still get lost?"

"Consider also that they are flying the most ordinary reconnaissance sorties. The fascists are becoming awful impudent. We should teach them a lesson at least once."

"What they need is a hard slap...."

"Now wait a minute! What for, as a provocation? Wouldn't that be all Hitler would need, if we were to knock down one of his airplanes? What then?"

What then? This was not at all the first day this question troubled us. German fighters and bombers were invading Soviet airspace here and there. German civil aircraft were deviating from the air corridors allocated to them more and more often. Knocking down the Germans was categorically prohibited. And our pilots, showing remarkable restraint, respectfully showed the violators the way back or the limits of the corridor established for them.

The "March of the Soviet Airmen" rolled from the airfield in powerful waves:

Higher, higher, and higher
We launch our birds in the air.
And every screaming propeller
Means peace at the borders out there.

The singing came from Red Army soldiers returning from work on the materiel.

"What the hell kind of peacefulness is this?" one of the commanders walking beside me muttered.

Candidates for rewards to be announced in the May Day order were discussed at the meeting: Some were to receive honorable mentions, and others would get valuable gifts. General Georgiy Neferovich Zakharov, our division commander, did not like to resolve these delicate issues on his own. When the turn of the signalmen came up, I reported that I felt it necessary to mention, in the order, Senior Lieutenant A. M. Yushchenko, Senior Lieutenant N. I. Malinovskiy--chief of the communications center, and Lieutenant N. M. Rubtsov--commander of a platoon in the nonorganic training company.

"I don't think there will be any objections to that. The comrades are quite worthy," the general concluded. An impish glint, so familiar to us, flashed in his eyes. Imitating Babochkin in the film "Chapayev," he produced another of his never-ending droll monologues: "What sort of commander do you think I am, after all? I am not like the commander at the exercise critique who said: 'The pilots acted outstandingly. Bring me the best so that I might promote them. The tank crews attacked competently. Prepare a list of the leaders so that I might reward them with valuable gifts. The infantry displayed endurance and strength. Give 3-day passes to the best soldiers and junior commanders. The combat engineers worked excellently. Publish an order stating our gratefulness to them. The signalmen.... This time, my chief of staff, you need not punish the signalmen....' That, Koyander, is for your benefit...."

On 3 May I received my orders requiring my presence in Minsk the day after tomorrow. That did not leave much time. The party bureau held its meeting on the following day. I was relieved from my responsibilities as secretary of the divisional headquarters party organization. My comrades wished me success in my new place of work. Nor did it take much time to transfer my official duties to my successor. My wife, who had long been accustomed to my frequent transfers to new places of work, notice of which was invariably short, quickly gathered my travel things together.

"Stay here without me for a week or two, perhaps a month," I told her as we parted. "You know quite well yourself: Minsk is not Orsha--housing is a little tight there."

Who is to know that these weeks and months would mushroom into long years, years of blood and fire, of unprecedented national anguish, that they would take us through the ruins of Minsk and Smolensk, immortalize Stalingrad forever, and bring the Soviet soldier to subjugated Berlin....

I went to Colonel I. I. Ptitsyn as soon as I got to Minsk. I was surprised to meet Military Engineer 2d Rank AnatoliyNikolayevich Zhelenkov by his office. He, it turned out, was being assigned to Baranovichi, also to a newly created fighter unit.

The colonel stood up at his desk, shook our hands with his usual firmness, asked us to sit down, and paced the office silently with his arms folded behind his back. Lines of concern traversed his tired, expressive face. Poking his half-smoked cigarette into an ashtray, he fixed his gaze on us:

"Do you understand, comrades, why your divisions are being created? Not completely? Then listen. Your 59th, Captain Koyander, is assigned air cover of Belorussia's capital. It will essentially perform the missions of antiaircraft defense rather than that of frontal aviation. Your 60th division, Comrade Military Engineer, will have the same function. Both must interact in the most intimate way with VNOS [air warning] posts, antiaircraft artillery and, understandably, with each other. All of this would be completely impossible without dependable, stable communications. But communications have not been set up yet, not to mention the divisions themselves. They exist only on paper, commanders have been appointed, and only a few persons are working in the staffs. And now we can add you. That's where things stand, my recently promoted friends."

Il'ya Ivanovich sat dawn at his desk, lit a cigarette, and presented the general outlines of the mission Zhelenkov and I faced. We were to organize, as quickly as possible, communications between the division staffs on one hand and the district air force headquarters, our air bases and regiments, VNOS posts, and antiaircraft gunners on the other. The stores and apparatus necessary for this had not yet arrived, but we had to begin work without delay, and persistently seek all possibilities for organizing communications. Ptitsyn smiled broadly, flashing his gold teeth:

"And so, comrades, I can provide you with the horse collars.... It would be nice to have horses for them, but what cannot be for the moment, cannot be, forgive me for not being very helpful. Put them around your own necks...."

Il'ya Ivanovich loved to joke, to mix business with the pleasure of a good folk saying, a proverb custom-tailored to the situation. Sometimes in his conversations he did resort to some colorful Russian. But we did not mind. Ptitsyn was easily appeased, and he never raised his voice against someone without due cause. And whenever he did find it necessary to chew someone out, he did so only man to man, protecting the individual's authority in the eyes of his subordinates. Ptitsyn had become a signalman back before the

revolution. He worked as a lineman in the Anglo-Russian campaign, maintaining the Crimean section of the London-India telegraph line. In 1918 he joined the Red Army, tying his life in with it forever. A talented leader, Il'ya Ivanovich was also an excellent practical specialist: He could work well with the Morse, Baudot, and the ST-35 transmitters, and he had a good knowledge of radio communication.

Captain L. M. Parnas, Ptitsyn's assistant, walked into the office. Spreading papers out on the desk top, he thoroughly familiarized us with the delivery plans for communication equipment and stores for the new air formations, and with the order of staffing the subunits with personnel. The picture he drew was not one of the most pleasing, especially in regard to personnel. The bulk of Red Army soldiers and sergeants were to arrive in September. Only a few dozen persons were to join the divisions in May-June.

Ptitsyn noticed Zhelenkov's look of disbelief.

"And above all that, everything has to be done quickly. Time cannot wait. I will help you in every way I can."

I knew that the promise of assistance would surely be kept. Il'ya Ivanovich never said anything without meaning it. He possessed an exceptional sense of responsibility for his work, and his organizational capabilities were out of the ordinary. They revealed themselves especiallyclearly before the war when he set up communications for the air forces of the Western Special Military District.

Following annexation of west Belorussia in 1939 the district headquarters and its aviation were redeployed from Smolensk to Minsk. The airmen were located in the building occupied by the air defense headquarters and the main VNOS post, causing considerable crowding. High-capacity cables joining to the central telegraph office and intercity telephone station of Minsk were present there. The airmen managed to utilize them quite wisely to establish communications with their formations and units through the offices of the Peoples Commissariat of Communications.

But this was far from enough. We needed our own independent set-up. And we created it in record time. Through our own efforts we outfitted a telegraph and a telephone station and organized direct ST-35 telegraph communication with the divisions and individual units. Moreover the district's air force staff and most of the formations were hooked up to the government's high frequency telephone communication system. The latter permitted the airmen to conduct secret conversations not only between each other but also with various central and republic institutions.

Radio communication was set up in parallel with wire communication. The radio receiving and transmitting centers were located at Loshchitsa Airfield. Here, in former bomb storage shelters, several automatic relay transformers, RAF and 11AK radio sets, and a central radio receiving room were installed.

A compound cable was laid between the central receiving and transmitting rooms. The radio bureau was located at the communications center of the district's air force headquarters. There were connecting lines to it.

The radio centers were built through our own resources. The work was supervised by Military Engineer 2d Rank A. N. Zhelenkov, who was chief of the communications center at that time. Major N. Z. Rabinovich and Military Technician 1st Rank Ye. K. Chuvashin displayed a great deal of resourcefulness when they planned and erected the antenna field.

Unfortunately all of the previously built facilities had not been outfitted in engineering respects. In the prewar years it was felt to be unsuitable to build protected centers and lines. It was believed that military actions would occur exclusively on the territory of a probable enemy, and that our sky would be inaccessible to his bombers.

Wire communication was stable in these permanent conditions, and it fully satisfied the command. It was extensively employed by the dispatch, meteorological, and engineering services, and all rear services. But I. I. Ptitsyn and his assistants knew quite well that the existing wire link could not be sufficiently reliable in a battle situation. And they not only understood this but they also persistently increased the viability of the district's entire air force communication system. Radio-telegraph communication was set up as a backup to wire communication. It supported information exchange both within the district's air forces and with the command of the Red Army Air Force and the air force staffs of the Leningrad and Kiev Special Military districts.

Colonel Ptitsyn and the personnel under his command devoted a great deal of labor, creativity, and energy to creating our own communication system. This is where a paradox arose: Radio communication was available, but the staffs made hardly any use of it, even when wire communication failed. One of the obstacles turned out to be the fact that for some reason the cryptographic service protested against radio transmission of its own cryptograms.

Being a farsighted specialist, Il'ya Ivanovich stubbornly fought the abnormal situation that had evolved, and he persistently argued the danger of neglecting radio communication in the staffs. I recall him saying persuasively in one of the meetings:

"Radio communication will not be normal until it is constantly employed, until staff commanders learn to use it. It must be monitored constantly: This will raise the quality of the work of the radio resources, the covertness of transmissions, and the alertness of the duty radio crew. After all, water does not flow beneath a resting stone...."

Working in collaboration with Colonel S. A. Khudyakov, chief of staff of the district's air forces, in 1940 I. I. Ptitsyn managed to get the district air force staff to publish directives for special radio days during which

use of either telephone or telegraph was prohibited. But the directives did not help. Many commanders preferred to wait a day, just so that they would not have to take the trouble of encoding thier correspondence for radio transmission.

It was then that Il'ya Ivanovich decided to provide training in radio message exchange. Special coders were developed to permit regimental and formation communication chiefs to quickly compose a training cryptogram and check the correctness of its transmission and reception by the students. Now things began to move! It would be sufficient to say that in almost all of the 6 prewar months the average daily exchange of training radiograms in the district's air force troops was about 15,000 groups.

The results of the radio exchange practices were communicated to the units and formations daily. A five-point system was used to score the quantity, quality, and rate of reception and transmission. Special mention was made of cases in which someone failed to respond to a call or violated the rules of radio communication. Need I say that this spurred the regimental and division communication chiefs on to better things. No one wanted to suffer the embarrassment of mud in the face, of falling behind, of being last.

Il'ya Ivanovich Ptitsyn knew how to develop a spirit of rivalry among his subordinates in all things. He managed this by competently utilizing visuality and comparability of results, and by constantly creating conditions favoring utilization of the best experience.

I think that even now he counted a great deal on the force of rivalry when he summoned Zhelenkov and me together rather than one at a time. Evidence of this could be found in what he said at the end of our short talk:

"Put your trust in God, but don't make it any more difficult for Him by making any mistakes. And remember the time. You have none to spare...."

The Minsk headquarters of the newly formed 69th Fighter Division was deployed in a building formerly used as a military-political school. The airmen were clearly crowded here. Even the commander and chief of staff had to use the same office. Thus I had to present myself to both of them simultaneously.

"It's like being at the Kursk Rail Terminal," joked the division commander, Colonel Ye. G. Turenko. The gold star of a Hero of the Soviet Union shone on his chest.

"But at least the Kursk Rail Terminal has automatic telephone switchboards," Colonel A. V. Gal'kevich, the chief of staff, added. "We, as you can see, do not even have a single telephone for two...."

"So you see, Captain, there is a lot for you to do here," the division commander concluded.

Turenko and Gal'kevich briefly told me that all four of the division's regiments had to be manned quickly, and that not one of them had even a single warplane yet. In the near future two other regiments were to receive the latest LAGG fighters, and the other two were also to receive the latest craft--MIG's. For the time being they possessed only training airplanes--two-seater I-16's. The division was based at three airfields located near Pukhovichi, Machulishche, and Molodechno. These airfields were not all that far from Minsk, but there was absolutely no communication between them. Nor was there any equipment with which to lay temporary connecting lines to the communications centers of the Peoples Commissariat of Communications.

"I decided to bring all of the two-seaters together in Pukhovichi and hold combat training for the flight personnel there," said Colonel Turenko. "Patch me in to the airfield on priority. That is your number one task."

"That may be so, but it does not at all drop the overall task down a notch," the chief of staff elaborated. "I am referring to creating a communications system in the division which would satisfy all of the requirements of Minsk's antiaircraft defense. There can't be any delays here either...."

Setting up communications in a vacuum is nothing new to specialists, all the more so to military specialists: It is commonplace. But my morale was not exactly soaring as I left the headquarters. I was mostly concerned not with the immensity of the work to be done but by the little time in which it was to be done.

Anxious thoughts unwittingly crossed my mind. Both air divisions were being formed in haste, and they were to be used for antiaircraft defense. The regiments were receiving fighters of the latest designs. The Germans were violating Soviet airspace persistently and with increasing rashness. Their airplanes were appearing over especially important national economic and defense objectives almost every day. There could be no doubt that they were scouting, that they were taking aerial photographs.

Did this really mean war? Would the fascists really dare to attack us? What about the pact signed between the Soviet Union and German in August 1939? Of course, no agreements were sacred to the German thugs. Consider, however, that the USSR is not Poland, with its landowner class, nor is it a Czechoslovakia subservient to Western politicians. And yet anything is possible....

Military Engineer 3d Rank V. S. Kiselev, my assistant-designate, soon arrived at the division. He had just graduated from the Moscow Institute of Communications. Military Technician 1st Rank N. K. Korneyev took charge of the signal company; prior to this he had been senior technician of the district's radio center. This subunit was still only on paper--it consisted of only two junior commanders and 10 Red Army soldiers, though its manning table called for 140 specialists.

We were able to organize all three communication links in 2 weeks with these little more than modest forces. All of the links were patched together in the office of the division headquarters duty officer. There were three telephone sets on his desk: One of them was connected to the switchboard of the district's air force headquarters, the second was connected to the city telephone station, and the third communicated with the Pukhovichi Airfield. This was the entire operation.

Meanwhile, real permanent communications had to be established. We soon managed to rig up our own telephone station: We acquired a captured Polish switchboard, several telephones, and a little cable from the funded stores section. What next?

Next we had to consider technical, economic, and organizational matters, establish business ties with agencies of the Peoples Commissariat of Communications, and acquire lots upon which to build central radio receiving and transmitting rooms. A kolkhoz meeting had to be called on the land allocation question, the rayon executive committee's consent to its appropriation had to be obtained, and these measures had to be approved by the republic's Council of Peoples Commissars. And how much time would the construction itself take? It would take years for all of this.

"Years?!" exclaimed Colonel Ye. G. Turenko when I submitted my plan for construction of the divisional communications center and our ideas about leasing communication channels to link up the air bases. "There is no way we can live with that," the division commander pondered out loud. "We have to be ready to provide protection to Minsk as soon as possible. Listen, Captain, what if...."

Korneyev and I had already thought a great deal about this "what if." I thus suggested a way for reducing the time required to set up communications to the commander. First we had to try to get the land from the State Land Fund. Second we needed to build the facility basically through the efforts of military signalmen. And third, we had to convince our superiors that our personnel and technical resources had be begin arriving not in September, as Captain Parnas promised, but at the end of June and in the beginning of July.

"That's a good idea," the colonel agreed.

Our plan was approved by the district's air force headquarters. But even after this we were not able to make headway as quickly as we had wanted. By mid-June the signal company contained 3 platoon commanders, 5 detachment commanders, and 30 Red Army soldiers. We managed to hire three civilian telephone operators and one civilian telegraph operator. Signal chiefs joined the staffs of two of the air regiments. There were clearly not enough technical resources and personnel to satisfy the most pressing needs of the formation.

In order that the reader could imagine how much work we were faced with, I should obviously describe, at least briefly, the organizational

principles and the status of air communications in the district's air forces at that time.

As a rule the air division possessed two or three permanent and several field (backup) airfields. All air formations deployed within the district's territory, within its old borders (prior to the Red Army's liberation of the fraternal peoples of west Belorussia and the western Ukraine), and they all possessed communication centers. They were created in compliance with a special government decision adopted in response to a proposal by RKKA [Workers and Peasants Red Army] air force communications chief Brigade Commander G. K. Gvozdkov. These centers were well outfitted with telegraph, telephone, storage battery, and instrument stations. About half of the formations possessed radio receiving-transmitting centers and radio bureaus. The troop communication centers were patched to the closest NKS [Peoples Commissariat of Communications] offices by connecting cables and to offices farther away by multiple aerial transmission lines.

Permanent ST-35 telegraphic communication was maintained with the district's air force headquarters and with our own units in the air divisions, leasing transmission lines of the state network for this purpose. Wire communication lines belonging to the formations themselves were erected to many airfields.

Matters were worse in divisions located on the territory of west Belorussia. However, owing to the inventiveness of the communications chiefs, the diligence of the company commanders, and the hard work of Red Army soldiers, connecting lines were built to the nearest communications offices. We also had homemade telegraph-telephone and radio communications centers outfitted with organic resources. These were to be saved for the event of war.

The archives contain a document* making it obvious that on the eve of the Great Patriotic War, about 11,500 kilometers of wire lines were accounted for and appropriated during an inventory conducted by the air force of the Belorussian Special Military District. This was an extremely impressive figure for those days. I remember I. I. Ptitsyn's working map well. All transmission lines accounted for during the inventory were marked on the map in black, and those which could be erected within the next 4-5 years were marked in red. The route of the underground cable between Minsk and Baranovichi was represented by a broken line. According to the plans of the air force command this cable was to be laid prior to 1946. It should be noted that there was not a single intercity cable line in Belorussia in those years. All of this testified to the fact that the staffs and the air force signalmen were making serious preparations for the possibilities of combat activities within the district's territory.

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* USSR Ministry of Defense Central Archives (Hereinafter referred to as TsAMO), f. 208, op. 2589, d. 324, l. 11.

Our 59th Fighter Division was deployed far away even from divisions located in the republic's western oblasts. Nor was the position of the 60th any better. I often met Zhelenkov at air force headquarters, to which we traveled invariably for the same reason--to acquire wire, radio sets, and even plain nails and screws.

Once Anatoliy Nikolayevich met me with a newspaper in his hands.

"Have you read this? It gives answers to everything we have been wondering about," he said, showing me the TASS report.

It discussed Soviet-German relations: "...According to the USSR's information Germany is complying with the conditions of the Soviet-German nonaggression pact as irreproachably as is the Soviet Union, in view of which, in the opinion of Soviet circles, rumors of Germany's intention to break the pact and attack the USSR are totally groundless...."

Short and clear. But then, how do we interpret the violations of our borders and air corridors by German airplanes, which were now occurring daily? Several days before, a German transporter left the air corridor in excellent weather and assumed a course toward our military airfield in the vicinity of Orsha. General G. N. Zakharov, commander of the 43d Fighter Division, gave orders to force the violator down on his own responsibility. Pilots of the 43d Figher Division surrounded the German airplane and forced it to land. It was rumored that the general was severely reprimanded by his superiors, and that he was even punished. It had recently become known to us that Soviet reconnaissance possessed extremely accurate figures: About 2,000 warplanes of Germany's 2d Air Fleet were concentrated in a zone contiguous with our district.

"That may all be so," Zhelenkov said "but the TASS report was not written without Comrade Stalin knowing about it."

I agreed that of course he knew about it....

"How many men have you gotten?" I asked him.

It turned out that his personnel situation, not to mention his technical resources, were as in as bad a state as mine. And time was rushing on....

Colonel Turenko understood our difficulties quite well. True, he did dress us down on occasion. After all, he did not have it any better either--what sort of command and control could there be without communication! Moreover our specialists did commit their share of sins: The equipment and property received by the regiments from the airfield maintenance battalions was not always utilized right away, and as a result things did not always go on schedule. Thus we often had to visit the local subunits. Colonel A. V. Gal'kevich especially encouraged such visits.

"It is better to see everything once for yourself than to read about it in reports three times," he never tired of repeating.

One of my routine business trips took me to Pukhovichi on 21 June. I left for Pukhovichi together with the division's navigator, Captain Pavel Petrovich Revenko. His orders were to test the executive staff's knowledge of the flying area, and mine were to check and coordinate on the plan for teaching the personnel to use radio resources in the air.

My assignment in Pukhovichi was not distinguished by anything new. There was only a hint of some sort of unusual sense of urgency in it. It did not take me much time to complete it. The regimental plan for teaching the personnel to use radio resources in the air completely satisfied the requirements imposed on fighter units.

I had an hour and a half before my flight back to Minsk, and so I visited signalmen of the air base maintenance battalion (BAO). I was much more concerned with it than with the pilots. There could even be no discussion of communication in the air without properly organized ground communication. Unfortunately the regimental command continued to harbor many complaints against the signalmen, though they were not at fault in many ways. Failures in their work were basically explained by imperfections in the organizational structure.

The problem was that in the prewar years, air units did not have signal subunits organic to them. All support was provided by the signal companies of the air base maintenance battalion, which were subordinated to regimental communication chiefs only in operational respects. They could influence neither the manning of the companies nor the way their combat training was organized. The maintenance battalion commanders, meanwhile, who did not feel a personal responsibility for signalman training, overloaded the signalmen with patrols, garrison duty, and various housekeeping details, they often used the personnel out of their specialties, and therefore their training was much weaker than that of personnel in signal companies belonging to the divisions.

Fundamental reorganization of the rear services of the Red Army Air Force began in spring 1941.

Aviation base areas (RAB) were created in the western frontier military districts, one for every three to four divisions. The air bases were placed within the composition of these areas. Each of them was basically intended to support a single formation. A base possessed three or four air base maintenance battalions at a ratio of one subunit for every regiment of twin-engined airplanes or for every two single-engined regiments. The BAO commanders were subordinated to the air regiment commanders in operational respects, just as base commanders were subordinated to division commanders. Each battalion possessed one signal company.

The reorganization had not yet been completed. As in other places, the signal company in Pukhovichi was formed hurriedly; there was still almost no equipment available in June, and the people needed the most intense special training. The regimental communications chief gave me a thorough report of all of his adversities. I shared his concern fully, and promised to speak with the division commander, asking him to influence management of the air base and compelling him to relate more responsibly to the needs of the signalmen.

Captain P. P. Revenko waswaiting for me when I arrived at the airfield. We headed for the aircraft parking pads. A small group of airmen wearing parachutes walked beside us. "How about it, just for old time's sake?" Pavel Petrovich asked, obviously pulling my leg. "Perhaps you might even confirm your record."

How fast the "grapevine" works in the military! Revenko and I had known each other for only a few days, and he was already aware of even that incident, which happened to me last year.

"Tell me the details," the captain asked, "it's an interesting story, after all...."

They were refueling the airplane, and there was nothing to do, so I once again told the story about my curious record. Once our division was being inspected by Captain I. G. Starchak, chief of the district's air force parachute landing service. He asked Senior Lieutenant Bogdanov, who is in charge of this service in the division, to submit the names of staff commanders who had not made parachute jumps for a long time.

"You know, Koyander, you also need to make a jump," Bogdanov said.

I joyously agreed. I had long wanted to try it, but the opportunity never came up. After all, I had not even made a jump from the tower yet.

"Has it been long since you jumped?" Bogdanov asked.

"You should have my jump log."

"Come now, don't lecture me on what I'm supposed to be doing. You'll jump tomorrow morning, but right now go see the flight surgeon."

In the morning a U-2 airplane* took the commanders to be tested one at a time up into the air. My turn finally came around, and I sat down in the airplane. It was piloted by Major P. K. Moskovets. At the prescribed altitude he motioned me to climb out onto the wing. I climbed out. The onrushing air

* Renamed the Po-2 in 1944.

current pulled at me, bent on wresting me from the wing and tossing me to the ground. Moskovets raised his arm and lowered it abruptly: Go!

I went. Freefall. Almost instantaneously I felt a hard pull. I had heard it said that this is what an opening parachute feels like. Then it all became quiet--neither the evil wind nor the noise of the engine. I dropped smoothly and softly. I could see a black circle growing larger on the ground. I was supposed to try to land in its center. But how? I had heard that the straps had to be pulled. But which ones? This no one told me about beforehand.

The ground, which was at first far away, rose toward me unexpectedly. I touched down on it with both legs, squatting down somewhat to break my fall. I could then see people rushing toward me yelling something. Bogdanov was the first to arrive:

"Good job! Right in the middle! What luck!"

"Blind luck," I said.

"What do you mean blind?"

"I mean that you should keep a jump log.... This is the first jump of my life...."

"Oh, come on!" Bogdanov retorted in disbelief.

He doubted me for a long time, and he did not actually believe me until my 16th jump: After that first jump I was never able to land any closer than 20 meters from the outer border of the ring. Moreover during my last jump I even drifted into the underbrush.

"So how did Bogdanov react to all of this?" Revenko laughed.

"He began keeping an accurate log of parachute jumps made by all staff commanders so that, in his words, no one could slip into the air even through the rip-cord ring of a parachute," I answered, examining the bouquets of field daisies we had gathered. "Tell you what, let's take these to our ladies at headquarters...."

On returning to Minsk, Pavel and I presented our simple bouquets to our typist, Raya. She was hastily typing something, keeping an eye on the wall clock.

"Hot date tonight, Rayechka?" Revenko teased.

"The movies boys, the movies..." Raya looked at us playfully. "'The Circus' is playing in Chelyuskintsev Park tonight. Would you like to come with me?"

"Sure," Pavel answered, and for me as well: He knew that I had no plans for this Saturday evening.

After reporting in that we had completed our assignment, we went to Raya's room and left for Chelyuskintsev Park, a favorite recreational and cultural area of Minsk's residents in those days.

After the show we decided to wander about the city together. We walked the streets of Minsk and crooned the song we had just learned in the movie:

I know of no other country,
Where a person breathes so freely....

How could we know, in these carefree minutes, that we and all of our people had only a few minutes left in which to breath our peaceful air freely and joyfully?

CHAPTER TWO

THE LONG ROAD BEGINS

"Everyone up! Battle alert!" the division duty officer's cry of alarm pierced the silence of the room.

The commanders--the inhabitants of the dormitory in which other temporary bachelors such as I were residing--responded as if tumbled out of bed by a wind. Buttoning our belts and smoothing out our shirts on the run, we hurried to the classroom to get our personal weapons. On the way someone tore yesterday's leaf off the calendar. "Twenty-two June" flushed crimson on the leaf beneath. I glanced at my watch--four in the morning.

The duty officer checked off the people convened in the classroom on a list. What to do next, no one knew. Our division was still undergoing formation. The actions staff personnel were to take in response to a battle alert had not even been determined yet. Still, communication with the airfields had to be checked. I called Pukhovichi. The response was immediate. The alert had already been sounded there. That is the way it should have been: On receiving the alert signal the division duty officer was supposed to immediately inform the staff commanders and transmit the signal to subordinated air units.

"Perhaps air force headquarters is testing our alertness on a day off," I suggested.

We were sleepy, after all, we had not even managed to really fall asleep completely. In order to chase away my oncoming sleepiness I pulled my notebook out of my map case and began outlining what I had to do on Monday.

"Ptitsyn wants to see us right away," Korneyev tore me from my thoughts.

Air force headquarters was just a stone's throw away from us through the cultural and recreational park. On the way I could see solitary couples on benches here and there. Soldiers with suitcases in hand were hurrying toward us. Most of them had infantry insignias on their shirts. This meant that the alert was announced not only in aviation but also in district headquarters.

It was not 10 minutes before I was at my place. I almost collided with telegraph operator Shura Sandalova in the hallway of the communications center. She was highly agitated by something.

"What's the matter, Shurochka?"

"It's war! War, Comrade Captain!" she answered hurriedly, and her voice broke. "The Germans are bombing the airfields in Bialystok, Pruzhany, and Grodno." Shura raised a hand clutching a spool of telegraph tape: "The commander ordered me to deliver this to you personally."

War? My head was pounding loud and hard. How many years we had prepared for this terrifying and unavoidable event, and yet it began so unexpectedly, without notice, it began so suddenly!....

Military Engineer 3d Rank A. V. Kostikov, the telegraph station chief, and Major N. Z. Rabinovich, the communications center chief, were in Colonel I. I. Ptitsyn's office.

"Did you hear?" Ptitsyn asked me tersely.

"Yes."

"Then sit down and listen. You will not go back to the division. You are needed here. When we begin moving west out of Minsk, this will become the base of the air force's second echelon, and the rear district's aviation headquarters will be formed here. You will be the air force communications chief for this district. We will be leaving for the command post of the field directorate in an hour. You remain here in sole charge. Is that clear, Zhenya?"

The colonel understood that nothing was clear to me. After a short pause he explained that in compliance with a directive of the district troop commander published back on 19 June, the air force staff had created an operational group and sent it to Slonim, where the frontal command post was to be located according to the deployment plans. This group contained signalmen as well. They were headed by Military Technician 1st Rank Ye. K. Chuvashin. They possessed RAT, 11AK, and RSB radio sets, a telegraph station, and four or five ST-35 machines. But communication had not yet been established with the group, and this especially troubled I. I. Ptitsyn.

"Kostikov, two junior officers, and 30 civilian employees are placed under your command. That's all," Il'ya Ivanovich continued. "Let's go to the communications center...."

Staff workers were sitting beside almost all of the pieces of equipment in the communications center. They were hard at work gathering information on the enemy's actions and on the positions of our formations, and they called for strikes against enemy columns advancing deep into Soviet territory. Colonel P. M. Taranenko was also there as the acting district

air force chief of staff: Colonel S. A. Khudyakov was sick in the hospital. Ptitsyn approached Taranenko and told him he was ready to leave for the field command post. He expressed his doubts as to the suitability of transferring the main control post of the air formations there: We did not have wire communication resources at Slonim yet, while the present base offered wire communication with most of the divisions and regiments and radio communication with all.

"No one has rescinded the order to go to the field command post," Taranenko answered. "I think that we will soon lose our wire link with Minsk. So above all, take care of the radio."

Ptitsyn and Rabinovich left the communications center. Kostikov and I remained in the telegraph room--this for the moment was the place where communication with the formations was being maintained. We divided the personnel left to us into two shifts. In this case one telegraph operator was to service three machines, and one radio operator was to handle eight correspondents. Although we no longer had telegraph links with the staffs of air divisions deployed to western oblasts of the Belorussian SSR, our people found it very difficult to handle the work load. Thus Kostikov and I had to successively spell the telegraph operators.

The duty officer--Lieutenant Chernykh--hastily told the story of how the first messages that the war was starting were received. At dawn, civilian radio-telegraph operator Vladimir Dudar' began exchanging training radiograms with one of the correspondents, asking the others to stand by. Then he suddenly heard: "We are being bombed!" This message was transmitted from Lida according to the radio operator's procedure table. Almost simultaneously Volodya received an uncoded message from Grodno superimposed over the Lida radiogram: "Artillery is pounding the city."

The radio center duty officer immediately reported all of these messages to air force headquarters. He was ordered to monitor the airwaves more intensively, since wire communication no longer existed with correspondents in the frontier oblasts.

Major Ye. D. Timofeyev, chief of the VNOS section, supplemented the lieutenant's story. Yesterday, on 21 June, at 2100 hours all of their units and posts had received orders from the district headquarters to maximize their alertness. And there was good reason for this. At 0355 hours the main post received a message from Brest about fascist Germany's treacherous attack on our motherland. It was immediately transmitted to Moscow, where it was received by Military Engineer 2d Rank B. D. Zhuk.

"After that, such messages began to come in hot and heavy," Yevgeniy Dmitriyevich said. "Our posts began reporting not only enemy aircraft but also German ground troops crossing the Soviet state border, and the movements of enemy tanks and mechanized columns.

The intensity of the work at the communications center increased constantly. The staff of the district or, for practical purposes, the front now, ordered the air force staff not to leave for the field command post, and to recall its operational group back. There was no difficulty in fulfilling the first part of the order--no one had moved out yet. But what about the second part? We had not established communication with the operational group yet.

Pure chance resolved our problem. L. M. Parnas unexpectedly got in touch with us. He had been given a short-term leave earlier to move his family to Minsk from Kobrin. Half of the way there, in Baranovichi, he learned of the start of the war and hurried to the 60th Fighter Division's airfield. From there, he called Colonel Ptitsyn and asked him for further instructions.

"Try to get in touch with Chuvashin through the frontal command post," Il'ya Ivanovich ordered. "Tell him to return his group to Minsk right away."

Parnas managed to transmit the orders to Chuvashin, though with great difficulty, through the Baranovichi communications office. The operational group was unable to reach Minsk until the second day--the Germans were constantly bombing all of the main roads, which even without that were plugged by unending traffic jams. Chuvashin was unable to reach headquarters in his motor vehicles--wooden Minsk was already all in flames. The military technician made the correct decision: He sheltered the motor vehicles with their radio sets and equipment in the gardens of the Belorussian Academy of Sciences, and he organized their security while himself marching to headquarters with a small group of signalmen. This resulted in the preservation of valuable materiel which soon became so useful to us.

At 1200 hours on 22 June we listened with bated breath to the radio transmission of the Soviet government's declaration.

...It was very strange that not a single enemy bomber appeared over Minsk in the first day of the war. But at the same time everyone knew quite well that a raid was inevitable, and that it might occur at any moment. Inasmuch as the air division which had been assigned to the city's antiaircraft defense was for practical purposes still nonexistent, the frontal Military Council decided to redeploy General G. N. Zakharov's 43d Fighter Division to the Minsk Air Center. Its command post began to deploy in Loshchitsy by the end of the day.

"Go to Zakharov," Ptitsyn instructed me, "he needs help to quickly organize his communications."

Late that evening I rushed to Loshchitsy. The 43d's first airplane had already landed there. Major G. V. Stankevich, division communications

chief, was at the airfield together with Lieutenant Colonel Tyurin, chief of the operations branch.

"Communications, do you hear me? Where the devil are the communications?" Tyurin was querying angrily.

"But its impossible to transfer an entire signal company here in such a short time!" Stankevich responded with no less irritation. It was at this point that he noticed my presence: "What's the fastest way out, Comrade Captain? After all, you're familiar with everything here."

And in fact my knowledge of the communications system at this airfield was not bad. I had both serviced and improved it while serving as company commander at the "capital" base in 1939. I also knew the local communications specialists and their possibilities well. They are the ones who came to our rescue. With their help we set up direct telephone links with the frontal air force staff and (Machulishchami).

The ground echelon of the division's communications company arrived at midnight. The warriors immediately went to work under the guidance of their commander, Lieutenant Grinev. By dawn they had laid all of the wire communication lines needed for control, and they had deployed a radio station.

After listening to my report of assignment completion in the 43d Division, Colonel Ptitsyn issued his instructions:

"Go take a rest. But be close at hand."

It was unbearably stuffy in the room. I opened the window wide. Senior Sergeant A. A. Levin, Sergeant V. I. Babkin, and one of the Red Army soldiers from the security platoon were sitting beneath it. Levin spoke persuasively about the unavoidability of Nazi Germany's defeat. Suddenly all three stood up to attention, in anticipation of saluting someone. I chanced to look out the window. Two pilots, a major and a lieutenant, climbed out of a small truck. Another vehicle drove into the yard at the same moment. Two policemen and two civilians hopped out of it and, pointing their pistols at the pilots, commanded:

"Hands up!"

"What's the matter, comrades?" I cried.

"Spies," one of the civilians replied.

I looked at the detained officers. Beneath their opened issue coats I could see German officer's uniforms. The policemen pulled two large traveling cases out of the truck. One of them was found to contain a German radio set. Later we found out that the pilots were enemy scouts and that their mission was to deploy a homing radio station near the frontal headquarters.

We also soon learned of the detention of an enemy saboteur in Loshchitsy. There, following the departure of the principal elements of the central radio room for the field command post only a few civilian communications specialists and one duty commander remained at the central radio receiving room. The central radio room was guarded as part of the entire airfield complex, and it was not at all difficult for people in military uniform to reach it. And so a senior political instructor unfamiliar to the signalmen walked into the radio room. He asked radio operator V. Dudar' who the radio room was in communication with and how the work was coming along. Dudar' advised him to refer such questions to the duty commander. As soon as the stranger left the duty commander told Dudar' that an enemy airborne party had been landed in the vicinity of the airfield.

"Be on guard," he ordered, "lock the door from the inside and don't let anyone in without my permission."

"Well, we've already been visited by some senior political instructor," the radio operator answered. "He left...."

"What do you mean, he was here? Where did he go?"

"I don't know."

The "senior political instructor" was caught. This was one of the enemy paratroopers.

It has now been authenticated that the fascist German command, preparing for its treacherous attack on the USSR, counted a great deal on the actions of its sabotage groups, dropped behind our lines both before the war and at its very beginning. Immediately after the first shot was fired, and in some places an hour or two before the start of combat activities, the saboteurs managed to cut army-corps and corps-division communication lines in many places. Nor were aviation communications immune from these activities. However, they suffered the most serious losses from enemy bombing. In the best case the selfless attempts by the signalmen to repair wire transmission lines resulted in temporary, far from dependable restoration.

The frontal air force staff possessed only a permanent civilian communications center, which was mainly serviced by female civilians. Under the conditions that evolved, what we needed was a special unit capable of setting up connecting lines in the field, providing internal telephone communications to the staff and rear services sections, and deploying and servicing radio receiving and transmitting centers. Such a unit was foreseen by the mobilization plan. However, the events developed so swiftly that we were unable to see the plan through.

In the morning of 23 June many of the telephone and telegraph sets in our communications center fell silent. The signalmen were knocking themselves out trying to gain contact with one staff and another. The technicians

literally became hoarse checking the lines. And whenever an operable wire transmission line was discovered, it was used at maximum load to transmit and receive especially critical and important messages. This was all done best by our telegraph aces--Zhenya Pershina, Zhenya Khayutina, Anya Kravchenko, Vera Slonchakova, Galya Alennik, Viktor Babkin, Shura Sandalova, Tasya Koroleva, and Galya Zapol'skaya. They knew how to receive and transmit the maximum possible volume of information in the shortest time.

"Air raid!"

All who were not servicing the communication lines quickly descended to the basement. I was among them. The first enemy air raid of my experience, and of the experience of all signalmen of the communications center, was unusually savage and stubborn. It lasted 20-25 minutes. The floor of the basement trembled. It seemed as if the building would collapse at any moment and bury us all alive with reinforced concrete fragments.

After the all-clear was sounded we ran back to our places. The communication lines that had been working before the air raid were still operable. Only a connecting cable between the staff and the receiving center in Loshchitsi was damaged. It was no longer possible to utilize the services of the radio bureau. Now we could communicate with the radio center only by city telephone.

Dozens of enemy bombers under fighter cover participated in the first air raid on Minsk. The bulk of them were unable to penetrate to their assigned targets. They were met in time by fighters of the 43d Air Division. Savage aerial combat evolved above the city. The first fascist airplane was knocked down personally by Major General of Aviation G. N. Zakharov.

During the day the enemy attempted several massed bomb strikes on Minsk. But only small groups of airplanes were able to break through, and they dropped their bombs mainly in residential districts. Pilots of the 43d invariably met the enemy at the approaches to the city. The aerial combat raged from early morning to late evening. During the day, G. M. Zakharov's fighters flew seven to eight sorties each and knocked down more than 30 of the fascist vultures. But the division also suffered heavy losses.

Because time was short, we were unable to organize communications to permit coordination of the fighters with antiaircraft artillery. The airmen fought selflessly, sparing not even their own lives. Every new battle was more savage than the last. This required especially efficient control. General G. M. Zakharov visited our headquarters and demanded that we set up a command radio station for him in a tower erected on the roof of the building occupied by the main VNOS post.

"I would be able to see better from here," the division commander explained when some Red Army soldiers and I delivered a portable radio set to the tower.

The general tried for a long time to contact his airborne hawks by radio, but he never was successful. One-way radio communication had not been worked out yet in the air force. Moreover it could not have been very effective. At that time the I-16's were equipped with transceiving sets, but they were cumbersome, they added a lot of weight to the craft and, to make matters worse, because of poor shielding of the engines and use of metal to build the fuselage there was a great deal of interference and noise in the headphones, going so far as becoming painful. This is why the radio sets were taken out of the I-16's, and only receivers began to be installed aboard the I-153 ("Seagull") aircraft. However, these receivers were installed only in the squadron commander's craft, and in rare cases aboard craft piloted by flight commanders.

This was also the situation in the 43d Fighter Division. Thus General G. M. Zakharov had to go back to commanding his pilots while in the very thick of aerial combat. On the third day he knocked down his second enemy airplane. By the beginning of the Great Patriotic War Georgiy Nefedovich had already been credited with 85 combat sorties. A volunteer and an internationalist, while fighting in Spain he had knocked down 9 fascist airplanes on his own and four in group combat. Only 35 years old, the general had a youthful build. Radiant eyes peered from beneath thick, whitish-gold brows recalling the color of ripe wheat. His round face, with its slightly turned-up nose, was constantly ruddy from the sun and wind of countless airfields. He spoke quickly, somewhat hoarsely, in short phrases. That day he abandoned the tower on the roof with disjointed exclamations:

"The hell with it! I've got to be in the air! I'm not a spectator! I'm a commander. Thank you, captain! It's not your fault...."

In the first days of the war Georgiy Nefedovich's face became noticeably haggard and gray. And no wonder: Too heavy a burden had been placed on his broad shoulders--rather than by two air formations, Minsk and Baranovichi had to be defended by his division alone.

The situation at the front became worse with every hour. The German hoards rushed eastward in a frenzy. It was impossible to judge from reports submitted by the air formations where, at what lines our ground troops were located. The contradictory directives following one another from the frontal staff made it obvious that it was on the verge of losing orientation and control.

Use of the national network of permanent aerial transmission lines as the basis of communications placed the frontal staff in a very difficult position in the very first days of the war. The work of patching our network into the lines of former landowner Poland had not been completed yet in Belorussia following liberation of its western oblasts. This is why westward wire communication out of Minsk followed the radial principle: The lines fanned out from Minsk in a westerly direction, and they were located exclusively along highways and railroads, crossing junctions that were

completely unprotected from the enemy's influences. It was sufficient for the enemy to knock out just one of the intermediate junctions in order to cut off communication with almost all correspondents of this route for a long period of time. NKS enterprises and General A. T. Grigor'yev, the frontal chief of communications, had too little manpower to initiate any sort of effective restoration. Moreover some subunits of the frontal signal regiment were constantly on the move together with Grigor'yev in the first days of the war--they were returning to Minsk from the field command post in the wake of unceasing enemy bombing raids.

As a consequence of all of this, by as early as 22 June the frontal staff lost its wire communication with the combined-arms armies, and the air force staff lost communication with air divisions in the republic's western oblasts. It might be thought that under these conditions radio communication should have assumed the responsibilities of support and control. But it had not yet been prepared for such a difficult mission.

The air force staff was in a somewhat better position. Though we did suffer interruptions in communication, we at least had operable lines linking us to air divisions located south and east of Minsk. And, what is most important, we had radio contact with all of our formations and the air force staffs of the combined-arms armies through the training network.

Learning of this, frontal chief of staff Lieutenant General V. Ye. Klimovskikh decided on 23 June to get in touch, through us, with the command of the 10th Combined-Arms Army, which was fighting hard battles with the enemy in the vicinity of Bialystok. He rode to the radio center together with I. I. Ptitsyn. But neither the commander nor his second in command was there.

On that same day, 23 June, an uncoded radiogram came in from 9th Air Division commander General S. A. Chernykh for the front air force commander, General I. I. Kopets. We had never received such a message before: "All airplanes are knocked out. Request instructions." The message was taken by Natasha Chuvashina. At first we even doubted its authenticity. The radio operator immediately requested the password of the transmitting station and received the correct reply. Despite this, the duty officer demanded of her:

"Are you sure?"

"Now, absolutely," Natasha answered. "This is the second year I have been working with the 9th's radio operator. It's his signature...."

"Well, watch out. If anything happens, heads will roll."

"I understand."

Messages like the radiogram from the 9th Division also began coming in from other formations. The Western Front's aviation suffered very heavy losses in the very beginning of the war. In just the first half of 22 June the enemy knocked down 528 of our airplanes parked at airfields, and the Germans knocked 210 out of the air.* General Ivan Ivanovich Kopets of course understood the entire scope of his responsibility for this, and being unable to withstand such a blow, he committed suicide.

Major General of Aviation A. I. Tayurskiy, who prior to this was his second in command, assumed command of the frontal air forces. He immediately demanded to be connected to Molodechno at all costs. We managed to patch him in through civilian communications centers. The general took the telephone:

"I order you, in the name of the commander, to immediately attack enemy tanks on the road from Stolbtsy to Minsk with all of the best pilots available." Finishing his conversation, Tayurskiy turned to me: "Well, my friend, you've earned it.... This communications center of yours sure came in handy today."

On the third day of the war the telegraph lines linking us to air divisions located not only west but east of Minsk began to break down one after the other. Ignorance of the importance of communications in modern war, still encountered here and there, was at fault in some cases. Specialists were often pulled off of their main jobs. Thus on order of the chief of staff of the 12th Air Division, communications chief Major F. M. Smol'nikov spent two days with a group of his subordinates combing the forest at Vitebsk, where the enemy had made an airborne landing. For a very long time we were out of communication with the formation staffs, which were moving eastward due to the retreat of the ground troops. By 1600 hours on 24 June our telegraph station maintained stable communication only with Moscow.

And the bombing raids on Minsk never ceased. Fires raged throughout the city. The sun's rays were completely unable to penetrate the thick smoke screen. It was unsuitable for large staffs to remain in the city, and an order was received to move the air force headquarters to the vicinity of the village of Borovaya, 12 kilometers from Minsk. This was the former location of a frontier fortified area. The personnel quickly dismantled the center's main equipment under L. M. Parnas's guidance. It was left with just two telegraph transmitters, a storage battery station, and a line battery switchboard. We also left behind Military Technician 2d Rank V. V. Andreyev with two Baudot operators to support telegraph communication with Moscow. I. I. Ptitsyn hoped that we would be able to establish communication in Borovaya with the Minsk NKS communications center, which

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* See "Istoriya Velikoy Otechestvennoy voyny 1941-1945" (History of the Great Patriotic War 1941-1945), Vol 2, p 16.

was deployed in a bunker and was still functional despite the air raids and fires. By linking up with it, we could patch the Moscow telegraph line into Borovaya.

The air force staff was given two bunkers in Borovaya. A telegraph station capable of handling 10 routes was set up on the night of 26 June but, as it turned out, the people had worked for naught. General Grigor'yev was unable to allocate even a single wire to us. Nor did deployment of two powerful radio stations and a central radio receiving room justify our hopes: We were able to establish communication only with the air divisions in Orsha, Smolensk, and Vitebsk; the staffs of the other divisions were en route.

The frontal air force staffs remained for practical purposes without communications. We became depressed by our helplessness in the evolved circumstances. Everyone was edgy and bad-tempered, and arguments flared up about even the most inconsequential matters.

"What should we do, Il'ya Ivanovich?"

"I don't know, Zhenya, it should have all been done sooner. If only Grigor'yev had line and operating units assigned to specific civilian communications centers.... It would also be nice for us to have our own battalion as well. Then we would not be in such a position with wire communications. And what good is the radio? All of the chiefs understood its value before and recognize it now, but they never really learned how to use it properly...."

"Perhaps, Comrade Colonel, we could ask the frontal commander to move us closer to some local communications center?"

"No way. Unfortunately our staff is firmly tied in with the frontal staff. Wherever they go, we go. It's bad.... But there's no sense crying over spilt milk."

And then, suddenly flashing his mischievous eyes, he broke our train of thought: "Well, we seem to have gotten rather shaggy. Let's go get a shave!"

Working my razor I bitterly thought: Why didn't the military districts have special construction-and-repair and operating communications units in peacetime? The need for them was obvious. The experience of the Soviet-Finnish campaign and of the campaign of liberation in the western oblasts of Belorussia and the Ukraine showed that the combat readiness of communications must be significantly above the readiness of the staff and troops they service. Thus we found that while we had insisted that "without communications there can be no control, and without control there can be no victory," we were only stating empty words.

"Let's join the others," Il'ya Ivanovich said after he finished shaving. "Let's talk with them. One mind is good and half of one is bad, but take a hundred minds and you've really got something strong. Anyway, we need to raise their spirits...."

The colonel spoke frankly to all:

"Things are going bad at the fronts, and we are everywhere in retreat. But of course all of this is only temporary. We were not prepared to immediately repel a sudden and very powerful blow by the fascist troops. We need time to put things in order and bring up the reserves. After all, the war is being fought from the White to the Black Sea. Victory is never easy. We have much to do to achieve it. And we must not only seriously fight the enemy attacks off but we must also be bold and quick-witted. Especially we, the signalmen. In the same way that man cannot live without a nervous system, an army can't live without communications. Communications are the nervous system of war, and without them victory would be impossible. And the problem now, comrades, is that we have no communications...."

I listened to Il'ya Ivanovich, and I suddenly noticed a pair of wires stretched out over temporary poles not far from the bunker, and I called electrician N. F. Valenda over. We walked over to a pole together. Valenda climbed it, connected leads to the wires, and dropped the ends down to me. I connected a telephone set to them and shouted into the mouthpiece:

"Does anybody read me!"

"This Borisova Intercity."

Oh my God! The Borisova city office had a line that passed not for from the forward airfield. An air reconnaissance regiment was located there.

"Young lady! Hello! Dear girl give me the airfield!"

"One minute, please," the unfamiliar voice, which had come on the line so opportunely, answered just as if it was still peacetime. "Can you hear me? Please reply."

"This is 'Bobr' (Beaver)" a clear voice immediately filled the mouthpiece. "Bobr" was that regiment's code name.

"Let me talk to the communications chief," I asked him, bearly able to suppress my agitation.

"Yes sir," "Bobr" replied, and a minute later I was already talking with Lieutenant A. A. Gorchakov, the reconnaissance regiment's communications chief.

"I am calling for Ptitsyn. Do everything you can to patch in directly to us. The Borisova Intercity knows where our line is."

Gorchakov was an efficient fellow. He carried out the order very quickly. And although this accidently discovered wire link, the sole one between Borovaya and the outside world, worked for only 2 or 3 hours, owing to it the staff managed to instruct the regiment to maintain constant air reconnaissance about Minsk, and to obtain fresh intelligence. These data were used as the basis for operation orders transmitted by radio to the divisions still located in Orsha, Smolensk, and Vitebsk, spelling out who was to strike moving enemy columns, and where.

I even managed to talk with V. V. Andreyev on the unexpectedly discovered line (I later found out that it had been erected by signalmen of a tank brigade to service their training center, and it had never been plotted on any maps.

"Moscow persistently demanded to speak with the commander or the chief of staff," he reported. "I told him that everyone had left for a new place and that communications had not been established with them yet. Then Moscow ordered me to report the situation in Minsk every 5 minutes. But what do I know? I told them what I could--that the city was being bombed, and it was in flames."

"Could you connect us to Moscow?"

"No, Comrade Captain. The Center has been cut off. And there is no hope of restoring the lines...."

Colonel I.I. Ptitsyn heard our entire conversation. He took the telephone from me:

"Dismantle everything completely. Pack it all up. Be ready to leave."

CHAPTER THREE

THAT THEY WOULD NOT BREAK OUR WILL

"Take Yermachenkov with you and ride to Minsk. Pick up everything you can," Colonel I. I. Ptitsyn instructed me. "If you don't catch up to our column in time, you'll find us at Bobruysk Airfield."

I had already heard that the Military Council decided to relocate the frontal and air force staffs in the vicinity of Bobruysk. We were never able to establish control over the troops from here, from Borovaya.

The fires continued to rage in Minsk. Many of the blocks, and in some places entire streets had burned to ashes. Our one-and-a-half ton pickup made its way through an almost continuous blanket of ashes. Andreyev had already prepared everything for departure. The Red Army soldiers quickly loaded the boxes containing the storage batteries, instruments, and various stores. Artillery and mortar fire became increasingly more intense in the direction of the railroad station. We had to hurry.

According to my calculations our truck was about an hour and a half behind the staff column. This meant that we would catch up to the staff somewhere near Pukhovichi.

The Bobruysk highway was not too crowded, and so we rushed on at full speed. The driver suddenly announced that there was not enough fuel to get to Bobruysk, and so we decided to drive to Pukhovichi Airfield to fill up the truck and at the same time find something to eat.

The Pukhovichi turn-off was blocked by a barrier. A dozen trucks were lined up before it. "Could some of ours be there too?" I thought as I hopped out of the cab and made my way along the column. A group of armed men in civilian clothes and several military men were standing by the barrier. As I neared it I asked whether or not a column of staff vehicles had passed by here recently. In response one of the civilians instantly raised his pistol:

"Put your hands up!"

The bolts of two rifles pointing right at my chest clicked.

"Hands up! Quickly!"

"Here are my papers...."

But my attempt at extracting my identification was halted in a flash: My arms were immediately twisted behind my back.

"Take the spy to the commandant's office!" a short man ordered commandingly.

Back in the truck my traveling companions saw nothing of this. I was led somewhere. There were escorts in front and behind me with rifles, and with pistols on the sides.

"Keep your eyes straight ahead or we'll fire," the senior officer warned.

Ah well, its simply a mistake," I thought. "I'll just have to go along with them, and it'll all be cleared up in the commandant's office."

Fortunately everything was cleared up a little sooner. A passenger car traveling from Pukhovichi screeched on its brakes on reaching us, and Lieutenant Colonel G. N. Yakhontov, the deputy chief of the air force headquarters reconnaissance branch, hopped out of the cab. Thus I was "released." The people who had detained me turned out to be warriors of the local fighter detachment.

After refueling the truck in Pukhovichi we set off for Bobruysk. Antitank artillery positions were deployed at the approaches to the city, along the road. The gunners had cut down the brush and small trees for a better view of the terrain. They obviously expected an enemy tank attack right in this area....

At the airfield, Red Army soldiers were carrying safes, boxes, and furniture out of the building in which the BAO command had been located, and all of this was being loaded into trucks. Could it possibly be that we were leaving this place as well?

"Yes, here too," the battalion commander nervously replied to my question. "We have been ordered to relocate immediately to Rogachev Airfield. The flight crews have already flown over, and any airplanes that are still out on assignment will not return here; they'll be landing in Rogachev."

"But where is the air force staff?"

I never got an answer. The telephone rang insistently, and the commander nervously answered it: "Yes?"

And then he immediately left the office, unbuttoning his holster as he ran. I rang the telephone station.

"This is Koyander, what happened?"

"Two airplanes with crosses have landed," a very familiar voice answered. Of course, this was Nadya Dolzhenkova. She began working at the airfield's telephone station while I was still serving in Bobruysk.

"Far from the communications center?"

"Oh, about 800 meters. What should I do, Yevgeniy Valer'yanovich?"

"The main thing is to remain calm. I am coming over right now...."

By the time I reached the street about 30 armed Red Army soldiers led by the BAO commander were already running toward the landing strip. My men and I rushed after them, though of course only I was armed--I had a TT pistol.

The Germans saw us. The airplanes started to take off. The Red Army soldiers opened rapid rifle fire at them. After gaining the air the enemy craft turned and fired at the warriors with their machineguns. The commander and I hastened over to the communications center.

Meeting us, Nadya Dolzhenkova reported that all of the station's outside lines were cut. For that matter it was no longer practically necessary anyway. An MB-60 military switchboard standing there attracted my attention. Now this was a treasure! The battalion commander approved my intention to dismantle and take it along.

We drove to Rogachev in the BAO motor column. Beyond the Berezina, at a road junction, we were stopped by a signal post located here to orient the commanders of vehicles falling behind, telling them where to go next. It turned out that such signal posts had also been set up in Bobruysk. Had we not avoided the city in an effort to shorten our way, we would have reached the staff long ago, since according to the post chief it had deployed near Mogilev. Thus we found that we had taken a false step. But we were not too unhappy about it: Our mistake was more than compensated by the fact that we had acquired a much-needed switchboard.

It took about a day to relocate the air force staff in the vicinity of Mogilev. While en route, the staff column was bombed and fired upon many times by enemy airplanes. As a result some of the radio stations fell behind.

A day in war is a tremendously long time. And during all of this time the staff was out of touch with its air formations and units. Nor could communication be restored right away from Mogilev Airfield. Wire communication could be set up from there only to Orsha, Vitebsk, and Smolensk. The Mogilev telephone station was intended to serve only two regiments, but it was joined to the Mogilev Intercity Station by 10 channels. In order to be able to accept long-distance calls, we reinforced the telephone station with

the equipment we brought in, we set up a telegraph station consisting of five ST-35's and five Morse transmitters, and we deployed a Baudot transmitter. Colonel I. I. Psitsyn was already in Mogilev, organizing telegraph lines between the city radio office and the air formations.

Of course nothing good could come of locating a large staff on the territory of a permanent airfield, the location of which was quite naturally known to the enemy. But there was no other way. General A. T. Grigor'yev could not help us set up wire communication from any other place: He did not have any sort of reserves.

Captain L. M. Parnas briefed me about the entire situation.

"Is the flight mess operating?" I asked him.

The captain nodded in reply:

"Let's go eat."

Serving up the dinner, the waitress asked:

"What would you like, coffee or tea?"

"Tea, but make sure its like a girl's kiss--strong, sweet, and hot," Parnas smiled in reply.

Lev Markovich was a very interesting, cheerful person. He had graduated from the aviation school of the Military Signal Academy imeni Budennyy 2 years before the war, and he was appointed communications chief of a fighter regiment. Il'ya Ivanovich Ptitsyn recognized his outstanding capabilities and knowledge and transferred him to the post of deputy communications chief of the district's air forces. Parnas was distinguished by his tremendous diligence, and he was well versed in the organization and operation of military air communications. He did staff work, even the most boring work, quickly and accurately, he was always sociable, and he knew a wealth of sayings, proverbs, and jokes. Another very good trait of this nice person revealed itself in the very first days of the war--under no circumstances did his spirits ever fall; he knew how to remain calm and balanced in all situations.

After dinner I headed for the city on foot. It was not far from the airfield to the NKS office. There were many people I knew there, and I hoped to make myself useful to Il'ya Ivanovich. A group of General Grigor'yev's liaison officers was in the office. Ptitsyn was there as well. Together with the civilian specialists, they were ascertaining the possibilities for making use of surviving lines. Il'ya Ivanovich whispered to me that he was able to set up communication lines only with Moscow and the staffs of some of the formations. That was not enough....

G. V. Chesnokov, a very old acquaintance of mine, was the chief of the line technical center. In earlier times he had built lines for the air force and simultaneously managed repairs of civilian communication resources. We had helped him in both of his efforts, furnishing him with transportation and soldiers. Chesnokov was very attentive to our request, and owing to his help we quickly established communication on all routes offering possibilities for using local wire links, to include radio relay links.

Chesnokov was a reserve lieutenant. He was a very efficient person, a knowledgeable specialist, and a good organizer, and he could be very useful to us. On Colonel Ptitsyn's advice he was mobilized into the army and made assistant commander of a signal company in one of the aviation base areas. Chesnokov soon became a regular officer. Later, after a telegraph construction company was formed within the 1st Air Army, he made a great contribution to its organization and to successful completion of its missions.

The situation at the front became increasingly hotter. On 28 June Soviet troops were forced to abandon the capital of Soviet Belorussia.

"Yes, we are retreating. Yes, the Germans are penetrating farther and farther east," Colonel Ptitsyn said in his talk with soldiers and commanders at the communications center. "But there will be an end to this, comrades. There is no force in the world which could surmount a people led by the party of Bolshevik Leninists. Let there be no depressed spirits! He who loses his morale has already lost. We don't have time to be depressed. We have enough work to do to choke a horse. The troops need communications. Stable, dependable communications. And we must give them what they need. The enemy will not break our will for victory."

Il'ya Ivanovich knew how to influence human hearts. The people went to work, steadfastly fighting improbable tiredness and ignoring the danger. The work went on full steam day and night.

The frontal air force staff established wire communication from Mogilev Airfield with all of the air formations and even with newly arriving divisions, as well as with the famous 401st Fighter Regiment commanded by Hero of the Soviet Union, Deputy of the USSR Supreme Soviet, Lieutenant Colonel Stepan Pavlovich Suprun.

On S. P. Suprun's initiative six air regiments fully manned with military and civilian test pilots were formed in June 1941. All of these units traveled a glorious military road during the war. To our great sorrow it was all too short for Stepan Pavlovich. His life was rended in unequal aerial combat on 4 July 1941. He was soon awarded a second Hero of the Soviet Union title posthumously.

Despite the help of the troops, the city communication specialists were unable to restore the lines quickly enough. Wire communication with some air

divisions had already been absent for several days. The staff communicated with them by radio. But radio could not fully replace telephone and telegraph. The main obstacle was time: It took too much of it to code and decode the documents. After all, taking to the airwaves with uncoded text was prohibited. Using telephone and telegraph, meanwhile, one could even discuss classified information through allusions....

During one of the periodic bombing raids on the airfield all of the telegraph lines connecting us to the air formations were damaged. Without waiting for the raid to end, warriors of the air base maintenance battalion selflessly set out to repair the cable. Il'ya Ivanovich Ptitsyn worked together with them as well, inspiring the soldiers by personal example to restore communications in the shortest time possible.

During this raid the fascist bombers would have inflicted considerably higher losses upon us, had it not been for pilots of the 43d Air Division. They intercepted the enemy airplanes and prevented them from using their bomb sights effectively. The fighters were informed of the approach of the German vultures by the crew of an RAF radio station that we had temporarily assigned to the division precisely for this purpose. On receiving the appropriate command the station chief, Senior Sergeant G. I. Arkhipov, immediately transmitted the message:

"Enemy bombers are at the approaches to the airfield. You are ordered to fly to this area."

The lead group of the patrolling fighters, which had an RSI-3 radio set tuned to the RAF frequency aboard, responded:

"Roger. We're on our way. Lead us in." Then immediately followed the message: "I can see the enemy. I am attacking...."

This was the first time in the history of the Western Front's aviation that fighters were guided to enemy bombers by radio.

The bombing raid had barely ended when Colonel S. A. Khudyakov telephoned the communications center. He ordered me to find Ptitsyn immediately.

"Tell him that he is to come to me immediately with his wire and radio communications route maps," the air force chief of staff demanded. "We will be going to frontal headquarters."

I did not have to search for Il'ya Ivanovich long. He was standing beside the cable terminal block and, on noticing my presence, he showed me a heavy bomb fragment:

"Just a little bit closer, and.... Look, it's still warm. I'm going to keep it as a souvenir."

I informed him of Khudyakov's instructions.

"The frontal headquarters?" Ptitsyn asked. "What happened?"

"I don't know."

"Good.... Then let's go."

Sergey Aleksandrovich Khudyakov was already by his vehicle. Glancing at Ptitsyn, he asked concernedly:

"You're not wounded, are you?"

"I'm all in one piece, Comrade Colonel," Il'ya Ivanovich answered. "I'll just take a minute to straighten my uniform and...."

"A minute?" Khudyakov interrupted him, smiling. "What you need is to be laundered from head to toe, and I can't wait for even a minute. Let Koyander go...."

Ptitsyn gave his parting instructions to me: If the discussion at frontal headquarters turns to the location of communications, I should insist, he said, that we should be moved away from the airfield and that connecting lines should be erected to the new place through the efforts of the frontal subunits.

"You know quite well yourself, an air force headquarters should never be placed at an operating airfield," Il'ya Ivanovich concluded his instructions as the vehicle was already lurching on its way. Khudyakov winced with pain. He was clearly still ill, but he never showed it: He was always alert, neat, faultlessly clothed, and carefully shaven.

"Marshals Voroshilov and Shaposhnikov have just arrived at frontal headquarters together with a group of representatives from the Peoples Commissariat of Defense," Sergey Aleksandrovich explained en route. "Try not to get tongue-tied if they begin asking you about the status of communications. They may of course ask. There has to be a reason for telling me to come together with a signalman and the charts...."

At frontal headquarters we were taken to the commander, General D. G. Pavlov. Marshals of the Soviet Union K. Ye. Voroshilov, S. K. Timoshenko, and B. M. Shaposhnikov and the new district air force commander, General A. I. Tayurskiy, were in his office.

"Do we have communication with aviation?" General Pavlov immediately asked Colonel Khudyakov abruptly.

"I can give you a detailed report. I brought the charts and a signalman," Sergey Aleksandrovich answered.

"What sort of communication is present--telegraph or radio?"

Great and intense impatience could be felt in the frontal commander's second question.

"Only radio for the moment. All wire communications were knocked out during the bombing raid on the airfield."

"And you don't even have that much," said K. Ye. Voroshilov, glancing at General Pavlov.

"How much time would it take you to transmit this order by radio?" the commander handed a small sheet of paper to the air force chief of staff.

I read the text over Sergey Aleksandrovich's shoulder: "All Western Front air force formations are to immediately annihilate tanks and crossing resources in the vicinity of Bobruysk with all forces operating in echeloned groups. Pavlov, Tayurskiy."

"It would take a little time to code, transmit, and decode," Khudaykov said.

"That's no good," Army General Pavlov pronounced nervously and turned to Voroshilov: "Kliment Yefremovich, do we have your permission to transmit it uncoded...?"

"You're the frontal commander, you decide," the marshal answered.

The commander took the document from Colonel Khudyakov's hands and wrote on it in red pencil: "Permission for uncoded radio transmission granted. Pavlov."

Sergey Aleksandrovich gave me the radiogram signed by Army General Pavlov and ordered me to act immediately. Ye. K. Chuvashin, the chief of the central receiving room, answered my telephone call. I dictated the text of the order to him, cautioned him that it had to be sent as soon as possible, and explained that the frontal commander had furnished written instructions for uncoded transmission.

The radiogram was transmitted successively to all parties by the best radio operators, Frosya Babashko and Mariya Churilina.

When he heard about the uncoded transmission, Colonel I. I. Ptitsyn said:

"It would be a good idea to keep the radiogram for the procurator general. Looks like there's no way to avoid trouble now...."

Il'ya Ivanovich was farsighted. In a few days the procurator general did indeed demand to see the radiogram. Ptitsyn already had a photocopy of it.

What had happened? On receiving the order, the air formation commanders launched their aircraft for the mission, one group after another, disposed in depth. The bombers, to include the slow TB-3's, flew without air cover, without first scouting the targets. They encountered strong resistance from antiaircraft artillery and enemy fighters in the areas of Berezina crossings at Parichi and Bobruysk. But despite the obvious and significant superiority of the enemy our pilots selflessly broke through to the crossings, dropped their bombs, and suffered heavy losses.

Could uncoded transmission of the operation order by radio have been the cause of this regretful incident? I think that it may have been to some extent. But the main problem obviously lay with lack of organization in performing the mission. After all, the enemy would never have risked leaving major crossings such as those at Parichi and Bobruysk uncovered. This means that we should definitely have scouted the targets, suppressed German air defenses near them, and provided a fighter escort to the bombers both on the way to the crossings and during their return to the airfields. But unfortunately none of this had been done.

A special commission of the Peoples Commissariat of Defense investigated the causes of our losses at Parichi and Bobruysk. It did not find any fault with the signalmen.

We supported control of aviation from Mogilev Airfield for 7 days. During this time the branch's workers visited most of the air formations and ascertained the presence of men and equipment, and their status. Divisional companies and BAO's lost more than half of their equipment as they retreated from west Belorussia. The signalmen destroyed most of the equipment themselves--there was not enough transportation for it. However, many warriors and commanders fell behind their units while retreating, joined rifle subunits going the other way, and fought within their ranks until they could find their own.

By visiting the divisions and the BAO's we were able to personally evaluate the actions of the communications chiefs, the shortcomings in their work, and all of the good things. For the most part they proved themselves to be well trained, knowledgeable commanders, men of courage and initiative. It would obviously be impossible to describe all of these comrades. But I feel it necessary to at least acquaint readers with Captain Daniil Gavrilovich Denisenko, communications chief for the 13th Bomber Division.

Denisenko correctly evaluated the evolved situation and his possibilities in the very first minutes of the war. He suggested to the division commander, General F. P. Polynin, that he immediately relocate the command post and staff away from the airfield, on the east bank of the Berezina. That was close to the routes of the Mogilev, Zhlobin, and Roslavl' lines, and the line connecting to the Bobruysk communications center of the Peoples Commissariat of Communications. It was with the latter that communication was maintained with regiments deployed at the Rogachev and Zhlobin air bases.

The general approved the proposal, and Denisenko set up the field communications center very quickly.

At the time we abandoned Minsk in flames, there was no longer any wire communication with Bobruysk. Denisenko did not know where we had gone, and he managed to contact Moscow directly. Owing to this the air force command of the RKKA was able to ascertain the situation and turn the command of the front's aviation to F. P. Polynin, since it had deployed to his airfields.

Daniil Gavrilovich was, to put it plainly, in love with communications, radio especially. None of the district's radio operators could receive and transmit as well as he--he was one of the best radio operators in the Red Army Air Force. A sportsman-motorcyclist and a man of strong build, during the war he learned how to fly the U-2 airplane. After the air armies were created, Daniil Gavrilovich became communications chief for the 6th and later the 2d air armies. After the war Colonel (Reserve) Denisenko, who now lived in Leningrad, did not abandon his interest in shortwave radio communications, maintaining ties with ham operators on all continents of the world; he became an active DOSAAF member and an avid propagandist of radio sports....

It was when we were stationed at Mogilev that we began receiving the first reports about the heoric acts of our aerial gunner-radio operators. It was very difficult for them at the beginning of the war. While airborne, every lead plane gunner had to maintain two-way communication with his airfield from takeoff to landing.

It was not difficult for the Germans to intercept these messages and fix the routes of our bombers. This can also explain to a certain extent the fact that the enemy often met our airplanes long before approaching a target in those days. In the first 7 days of the war we lost about 40 percent of our gunner-radio operators. While some died in combat, others replaced them fearlessly. We had an overage of gunner-radio operators at our disposal. Their large number was intended to support the mobilization plan, which we were not able to implement in time.

Our radio operators fought boldly in the air, contemptuous of the mortal danger. I will always remember the heroism of two operators from Gor'kiy--Vladimir Sudakov and Aleksey Debikhin. In one of the battles a group of nine of our high-speed bombers was suddenly attacked by Messerschmitts. One of the vultures maneuvered so deftly behind the tail of the airplane in which Debikhin was flying that he placed himself out of the field of fire. But he never did get to open fire. Sudakov rescued his comrade, hitting the fascist with a well-aimed shot. In the next battle Vladimir once again came to the rescue of Debikhin by knocking down a German fighter attacking him. But the fascists did manage to put our craft to flames. A second Messerschmitt dove in to finish it off. Aleksey opened fire from the burning airplane and knocked it down. He himself was wounded, and he abandoned the craft together with the commander and navigator, jumping out with a parachute. The

air currents scattered them in all directions. It took 7 days for Debikhin to make his way back to his regiment, and after being treated for his wounds he went back to flying.

During the war each of the two friends flew about 250 combat sorties. Between the two of them, in just the first 3 months of the war they knocked down 13 enemy airplanes. Vladimir Konstantinovich Sudakov became a Hero of the Soviet Union, and an engineer-colonel.

The enemy pressed forward. But he was metincreasingly more often with increasingly stronger retaliatory blows both on land and in the air. Soviet bombers pounded his manpower and equipment with accurate strikes, gunner-radio operators won more and more victories in duels with the famed German aces, and our fighters fearlessly entered into combat with them and skillfully knocked them down.

The losses were bitter and hard to take. But every frontliner knew that these losses were not in vain, that war is never without its sacrifices. And this war was big and merciless. This is precisely what I. V. Stalin talked about in his 3 July radio speech. In our mind's eye the entire tragedy of the unfolding events materialized as we listened to his speech. Hitler's invaders had already occupied Lithuania, a large part of Latvia, and the western oblasts of Belorussia and the Ukraine.... We had entered into mortal combat with an evil and insidious enemy....

Whenever newspapers arrived, communists and Komsomol members capitalized on every free minute available to explain, to their comrades in arms, I. V. Stalin's address to the people, they explained the full danger our mother-land was facing, and they talked about the role of each Soviet citizen in the Patriotic War.

"Look how much the people have hardened, and how much stronger they have become," Il'ya Ivanovich Ptitsyn said to Parnas and me. "There you see the strength of Bolshevist truth...."

On 4 July our staff moved to the village of Dresna near Smolensk. It was no longer possible to remain at Mogilev Airfield: The Germans could break through to the city at any moment.

At Smolensk, we deployed for the first time in a place prepared beforehand. This was the location of the district air force headquarters' former central radio receiving room, which had recently been used to some extent by a bomber corps. Well before we arrived, Colonel Ptitsyn ordered the chief of the communication center to keep it in constant readiness, and under no conditions to dismantle it.

The first thing we did in Dresna was to deploy the radio sets and restore communication with the divisions. This time communication was absent for only the 10 hours required for the move. We could maintain telegraph

communication with the front's air formations and its staff by means of an underground multiple cable laid to the city. But for this purpose we first had to establish contact with city specialists. Ptitsyn immediately left for the city, taking me along.

Smolensk is a major junction of lines of communication. It was to this place that USSR Peoples Commissar of Communications Ivan Terent'yevich Peresypkin came in the very first days of the war. He helped the local specialists to place their work on a war footing, and he formed a military operations section in the communications center. I. A. Bakhrakh, the chief engineer of the oblast communications directorate, was appointed its chief and subordinated to the frontal chief of communications. Restoration brigades were created and new repair points were opened in the oblast at the line technical centers.

Bakhrakh helped us obtain wire transmission lines to almost all the formations. So with his help we were able to provide telegraph communication between the air formations as well, thus creating alternate routes for transmitting telegrams in the event that the main routes were put out of action. The staff had direct telephone and telegraph links with the operational group of the air force commander at frontal headquarters.

We had all the luck in Smolensk. It turned out that the 157th Separate Communications Battalion commanded by Senior Lieutenant I. Ye. Lipatov was lingering unemployed nearby. The subunit had been formed before the war to provide support to the administration of the 20th Aviation Base Area. Now, after it had been sent to the rear for reorganization, by decision of the frontal air force commander the battalion was placed at our disposal. Its personnel--about 200 warriors and commanders--were well trained, they were armed, and they possessed considerable equipment and motor transportation. We placed all of the employees and equipment of our communications center into the composition of the battalion, and subsequently it became the core of the 1st Separate Air Force Communications Regiment.

Colonel I. I. Ptitsyn reported the extreme need for a line subunit in his very first meeting with General N. D. Psurtsev, who replaced A. T. Grigor'yev. Soon, on 10 July, the 37th Line-Construction Company was placed at our disposal. It had not been fully hammered together yet, but it was already capable of laying cable and pole lines. This is precisely what we needed most of all. It was commanded by Captain V. I. Mal'tsev, who had participated in the battles on the Karelian Isthmus. The company remained with us for the entire war, and it did a great deal to provide stable wire communications to the airmen.

Following acquisition of the battalion and the company the total number of signalmen reached 400. With a force such as this we could now make war. We reviewed the manning tables, and we began operating the main communications center with three shifts, in such a way that one complete shift (a company) could always be assigned to the work of setting up and operating forward and rear communications centers.

The reorganization justified itself completely.

The frontal military council decided to set up a rear communications center in the vicinity of Vyaz'ma. This was the first time we worked together with the airfield and operational sections to determine the eastern airfields at which it would be suitable to relocate the air formations, where it would be most convenient to locate their staffs, and where new forward airfield complexes could be created. We worked all of this out on a map. The document we prepared served in a sense as a tentative application to the frontal staff for specific relocation sites, and excerpts from it, which were sent out to the air formations, let the communications chiefs know beforehand which NKS communications centers they should work toward in the event of a retreat.

An advance party headed by Major N. Z. Rabinovich was sent to Vyaz'ma on 13 July. It contained one communications center crew shift and a line and cable platoon. The advance party, which set up a communications center and laid connecting lines to the front's main communication routes as indicated in the plan, was able to establish communications with air force formations and staff still in Smolensk before the arrival of the first echelon.

We concurrently sent a group with two radio sets to Yartsevo to deploy an intermediate operational point. Its job was to tie itself in with the main communications center, and when necessary with the air formations--that is, to perform functions which were subsequently assumed by the personal radio stations of the frontal air force commander.

By as early as in the evening of 14 July we were completely ready to move to the new place. The command was given, and the vehicles began forming into a column of route. Then suddenly we were ordered to postpone evertyhing.

"Colonel Khudyakov gave orders to immediately restore communication with the division; we need to transmit an urgent order," Il'ya Ivanovich explained. "The chief of staff says that our superiors were a little too hasty with the move; he said that some of them were losing their nerve...."

It took almost 2 hours to redeploy. The order was transmitted by wire to five of the divisions, and we could contact the two others only by radio.

The communications center was once again packed up by midnight, and the column of motor vehicles set off for Vyaz'ma under the command of Captain L. M. Parnas. Ptitsyn and I drove to Yartsevo. There, in a large forest north of the rail station, the front's telephone and telegraph center was being deployed and our intermediate radio stations were located. We were so busy with all of the problems that we did not even notice night approaching. I was getting sleepy. I began looking for the best place to settle down and cat-nap for at least an hour or two.

But I was not to get any sleep. I had barely settled myself down by a fir tree when automatic and machinegun fire sounded at the forest edge.

"The marshal's armored car!" the major shouted, popping up from nowhere.

My sleepiness vanished as if by magic. Did this mean that Marshal Timoshenko was also here? He was now commanding the Western Front. The armored cars rushed along the forest road to the Moscow-Minsk highway, and our frontal staff vehicles, the air force radio station, and the light truck in which Ptitsyn and I were riding fell in behind them.

On the way, Il'ya Ivanovich told me that the frontal staff learned beforehand that the enemy had landed a large airborne party in the vicinity of the Yartsevo Rail Station. But appearance of fascist paratroopers near the staff's location was nevertheless a surprise.

It was completely dark by the time we reached the highway. Where the airborne troops were, no one knew for sure. Il'ya Ivanovich made his pistol ready just in case. I followed his example. After about 10 kilometers two of our tires blew out simultaneously. That was followed later by a third blow-out, and then a fourth. It took two hours and more to repair each tire. In a word, it took us a full day to get to Vyaz'ma....

CHAPTER FOUR

WE BEGIN TO TAKE SHAPE

The frontal and air force staffs located themselves in a place called Kasnya 15 km from Vyaz'ma. There was a vacation resort here prior to the war. The directorates, sections, and services found rather good quarters for themselves. The commanders were concerned, however, that there was a large pond in front of the main building. It might serve as a good reference point for enemy aviation.

State communication lines fanned out from Vyaz'ma to Moscow, Kaluga, Bryansk, Rzhev, Smolensk, Yukhnov, and Belyy. It was to these lines, at the approaches to the city, that we connected the frontal staff's communications center, setting up testing and measuring points (KIP's) on each route. Soldiers of the 159th Battalion and the 37th Company erected a permanent line of 10 conductors about 9 km long from the main KIP to the intersection of the Kasnya-Vyaz'ma road and the Moscow-Minsk highway. It was the first line built by the front's airmen during the war. Our strength had grown, and our possibilities were greater.

I will not go into the details of the way air force telegraph and telephone communications were organized out of Kasnya. What was different from before was that the frontal directorate efficiently supplied us with all of the wire we needed. Stabilization of the combat situation doubtlessly made this possible. We were able to establish dependable communications with our neighbors, to include new ones, and we also managed to establish secondary communication routes to some of the formations. Making use of a railcarful of 3-mm iron wire, with the help of the frontal construction company the subunit's soldiers managed to suspend a 90-km telephone line within a short time. This line provided voice communication with the staffs of the 43d and 47th air divisions, as well as between the staffs of these formations and the regiments subordinated to them.

The communications center created in Kasnya became our standard for the future.

Air force radio operators in Minsk, Mogilev, and Smolensk worked at civilian communication centers. But there was no permanent center in

Kasnya. Thus it had to be created from scratch. The receiving and transmitting centers were located a certain distance apart. In the jargon of communications this is called "separation" of reception from transmission. I. I. Ptitsyn and L. M. Parnas settled on such an organization particularly because our people had become accustomed to this method of work, and had assimilated it well.

The receiving radio center, which was outfitted with 12 receivers, was half a kilometer from headquarters. Two groups of transmitters were located on either side of it about 3-4 km away. They were supplied with cable lines linking them directly to the receiving center.

Radio communication based on separated reception and transmission has a number of advantages over the work of integral radio stations. Such an organization makes it possible to utilize transmitters and locate the radio operators more sensibly, to monitor their work more strictly, and to economize significantly on radio resources. We were able to organize duplex communication at two wavelengths with the 43d and 47th divisions, thus dramatically raising the productivity of communication. Moreover all of this made it possible to insure better security for the facilities.

Creation of a radio communications center in the field required tremendous labor, resourcefulness, and cleverness from the signalmen-airmen.

The front's communications directorate helped us out a great deal: The radio company of the 652d Separate Battalion, which possessed powerful radio resources and was manned by trained personnel, was attached to us. It was commanded by Lieutenant A. M. Yegorychev, a highly skilled specialist and an extremely capable person.

Now that we had been reinforced with personnel and equipment, we could somewhat reexamine the way radio communications were organized and disperse the network somewhat. It became possible to create a reserve of radio resources in case maneuverable groups had to be created to coordinate the activities of aviation with those of ground troops. Special radio operating data were also developed for this purpose. They were sent out to all combined-arms armies as well as to the frontal communications directorate.

It took a lot of hard work to locate the transmitting and receiving centers sensibly, to supply them with the best equipment available at the time, and to develop an effective radio communications system. But this could not by itself guarantee the dependability and accuracy of radio communications. What was most important was the people. They had to be highly skilled, they had to know how to surmount the deprivations of a combat zone and commonplace human tiredness, and they had to be strong of spirit, willful, and wholly devoted to military duty.

For the most part this precisely was what our signalmen were. Working long hours and sometimes forgetting to sleep and eat, they filled the airwaves with thousands upon thousands of electric signals, and they sought their

correspondents amidst the improbable cacaphony of atmospheric noises and crackling, and intense interference created by thousands of operating radio stations, both ours and the enemy's, for all appearances perceiving their barely discernible call signs with their hearts.

We had many top-class specialists among our radio and Morse operators. Mariya Churilina, Vil'ma Krumina (Krumin'sh), Aleksandra Garbuzova, Nadezhda Romanenko, Valentina Khnal'chenko, and Yefrosin'ya Babashko proved themselves to betrue aces of the airwaves in the very first months of the war. The folk saying that young does not mean green is true. These girls--they were around 18 or 19--amazed highly experienced old-timers with their work with the apparatus. I was rather good at receiving Morse code by ear, and I had many years of experience. But I never ceased to be delighted by the capability that radio operators had for instantaneously perceiving barely audible signals differing from incidental signals only in tone. Not everyone is able to do this. I called it a special gift,a talent.

One of the most important tasks of all military communication organs and officials was that of selecting, training, and indoctrinating radio operators. In the prewar years, the significance of radio to strengthening the country's defense capabilities and the responsible and interesting nature of the work of radio operators were broadly related to young men and women in schools and tekhnikums, at enterprises, in institutions, and at kolkhozes and sovkhozes. Once in 1938 we were recruiting for district air force radio-telegraph operator courses. One of the commanders suggested the children's homes. The command gave its approval to this idea. Commanders A. S. Zvyagintsev and Ye. K. Chuvashin were sent out to the children's homes. They gathered together adolescents not below seventh grade and told them of the goal of their visit. The young boys and girls gave a welcome response to their appeal. Of course the air force uniforms of our representatives played a certain role here. Soviet young people were literally entranced with aviation in those years.

The cream of the crop was selected for the courses--those with good health, an ear for music, good handwriting, discipline, and active social graces. Komsomol members Vladimir Dudar', Sergey Dosov, Semen Tsyrin, Aleksey Kravtsov, Yefrosin'ya Babashko, and Vil'ma Krumina successfully completed their training. They were immediately accepted as civilian employees by the district's air force communications center.

The tremendous persistence of the young people in assimilating the occupation and their unusual individual capabilities permitted them to soon attain the ranks of the best specialists. They knew radio to perfection, and they even learned to type out the text of radiograms they were receiving. This was thought to be a great achievement.

As soon as the war began the former children's home students did not ask to be taken into the army as volunteers: They demanded this. The command satisfied the request of the young patriots, and it did not make a mistake: They all became a strong support to the managers of the communications center, maintaining radio communications in the most improbable conditions.

Frosya Babashko, a tiny and skinny girl that looked no older than 16, was typified by the most remarkable diligence and accuracy of Morse reception; when need be--and the need constantly arose--she could work for several shifts with the most important, the most critical radio routes.

Once during the battle of Moscow Frosya experienced a somewhat curious incident. She had finished her second successive shift. She was not permitted to remain for a third, and she was told to go rest. Frosya went to the dining hall, placed a bowl of already-cold soup in front of her, and immediately fell asleep. Meanwhile the load at the communications center increased, and audibility dropped sharply on some routes. Company commander Senior Lieutenant P. L. Bugleyev gave orders to call Babashko back. They ran to the dining hall and found her there sitting at a table, sleeping with her head on her arms. They shook her, but she would not wake. Then they raised Frosya to her feet and told her that the commander wanted her immediately. She roused herself, stretched her arms, and returned for another shift.

Inspecting the shift, Bugleyev overheard that Moscow had started transmitting with the warning signal "Vozdukh" (Air). This meant that the radio message was to be received and delivered to its adressee at the highest priority. Frosya sat by the receiver, dozing with her eyes open and fixed on one point. There was no time to waken her. Bugleyev, a top-class radio operator, took the radio message himself. Then he touched the young girl's shoulder and started to read her down. She looked at the senior lieutenant with a certain aloofness and said:

"I remember it all. I was not asleep. Here, let me...."

Frosya took a clean sheet of paper and quickly wrote down eight groups of digits that had just been transmitted from Moscow. Bugleyev was dumbstruck by his amazement--he had never seen a person memorize, by some sort of unusual sense, a bunch of numbers while half asleep.

But a fact remains a fact. Later on we had many opportunities to persuade ourselves of Babashko's remarkable capability for memorizing up to 10 groups of numbers. How she could do this, even she could not explain.

Warrant Officer Ye. Babashko served in the communications regiment throughout the entire war. She was invariably given the hardest work, and she did it faultlessly. After the Great Patriotic War Yefrosin'ya Babashko, who became a famous air force radio operator and earned a number of government awards, worked for many years in Aeroflot.

Following in Frosya's footsteps, warrant officers Vladimir Dudar', Aleksey Kravtsov, Sergey Dosov, Semen Tsyrin, and Vil'ma Krumina became veteran frontal radio operators. They were among the first in the battalion to rise to the 1st class radio operator rating, and they were decorated several times.

During exceptionally savage battles at Moscow Volodya Dudar' was ordered to support air reconnaissance with radio communication. In the course of the week he accurately received reports transmitted from aboard scouting aircraft, and he learned not only the "signatures" of his correspondents in the air but also the tones of their "voices" and the particular features of their transmitters. During this time the inquisitive young man noted that they all "wandered" somewhat around their transmitting frequency, and therefore the tone and loudness of reception varied constantly.

On the eighth day of duty, after receiving several reports, Dudar' suddenly became suspicious--the transmitter he was listening to at that time was working stably, and the correspondent transmitted calmly and clearly. "No, this is not coming from an airplane," Vladimir decided, and immediately reported his suspicion. The obtained data were analyzed in the reconnaissance section, and it was established that they were transmitted by the enemy in order to mislead the Soviet command.

Following demobilization from the army Vladimir Semenovich Dudar' took employment as a radio assembler in one of Moscow's enterprises. He worked hard, he earned the Order of Lenin, and in 1976 he was elected to the Moscow Oblast CPSU Committee and the 25th CPSU Congress.

These lads and girls "warred" in the airwaves excellently and proficiently. In 1943 warrantofficers A. Kravtsov and S. Dosov became chiefs of aircraft guidance radio stations right at the forward edge. Warrant Officer S. Tsyrin retrained into radio intelligence. He helped organize and participated in interception of German weather reports.

The high qualifications of the radio operators permitted the radio duty officers and the shift chiefs to react efficiently and effectively to various complications in the work of both centers. Knowing the individual capabilities of their subordinates, they assigned transmission of especially important documents to the most experienced people, those having a good hand (signature) and being able to work in a broad range of speeds. Whenever reception of reports from correspondents became difficult, a stand-by receiver was connected in, and a highly trained radio and Morse operator backed up a less-experienced comrade. Such paired work of two radio operators with one correspondent guaranteed complete reception of radio messages and insured their reliability. I need not prove how important this is in a quickly changing combat situation.

Moreover, the working radio operators could always be helped by their supervisors, which was yet another guarantee that reception and transmission would be correct. Each communications commander, no matter how high his post, felt that it was his direct responsibility, his military duty to have a perfect mastery of the technical resources. The personal example of supervisors mobilized the subordinates to surmount difficulties steadfastly. Because commanders taught the warriors according to the principle "do as I do," the specialists improved quickly.

Once in the first days after arriving in Kasnya I dropped into the frontal communications center. We shared a main distribution frame with it. I saw an unfamiliar general working with the Baudot transmitter. He was working quickly and evenly, missing not even a single stroke.

"Who's this?" I asked the people working there.

"The front's new communications chief, General Psurtsev."

The general finished his exchange, and he noticed me.

"How are things, air force?" he asked cordially.

I introduced myself as required by the regulations, and I replied that radio communications were tolerable, but our wire link to Kalinin, where several air units were deployed, left much to be desired. Moreover these lines were very poorly covered, and they could fail completely in the first air raid.

"Hm, yes," Nikolay Dem'yanovich nodded vaguely, "let's go to my place."

In a little room serving as the general's office he spread out a map showing the front's telegraph and telephone network, and after a short period of thought he summoned the directorate's chief of the operational-technical section, to whom he gave the following orders:

"Set up communication with Kalinin through Moscow, on the main wires, for the airmen. Look, it can be done." Psurtsev quickly ran his pencil along the variously colored threads coursing their way across the map. "Keep the ones there now as a reserve."

I had earlier seen Nikolay Dem'yanovich Psurtsev only in passing at Smolensk. Not even his face remained within my memory: The situation was very critical then. Now I could not help growing to like this person. A man of forty, of more than average height, with a wide open face and a high forehead, his chin jutting slightly forward. The general's gentle gaze seemed to beckon one's trust and encouraged mutual human benevolence.

Finishing his official conversation, he turned to me with questions about the way the signalmen were trained and how their personal conditions, diet, and leisure time were organized. Answering these questions, I said that the people were very angry that they had no possibilities for corresponding with relatives and close friends, and that the availability of newspapers was very irregular.

"Tell your comrades that we've started on field postal communications," the general said. "Major Kosov, my deputy for the military field postal service, is in charge."

Organizing military field postal communications turned out to be a tough nut to crack. It was revealed at a specially convened meeting of the communications chiefs of the air formations, to which Major V. A. Kosov was invited as well, that not a single one of us had any real facility with such a concept. We had not done anything in general about such issues before the war, and so things did not go right.

The deliveries of newpapers and letters would suddenly cease at times in one division and at other times in another. Field postal stations set up at these divisions as well as in the aviation base areas were managed by the postal communications branches of the ground armies. Depending on the evolving situation the airmen often changed their bases, leaving the areas serviced by these branches. It took much time to forward the mail, and transportation for it was not always available. Relocations of the airmen were frequent and always of short notice, making it impossible for the communications section of the frontal air force to dependably monitor the work of the post offices relocating together with the formations. Moreover there were even times when we could not inform our combined arms headquarters of such relocations in time.

Relatively clear proposals on organizing military postal communications in aviation were not submitted to frontal and air force headquarters until May 1942. At that time a special branch to which all of the post offices of the formations were subordinated was formed under the headquarters communications section. Captain I. G. Orekhov was appointed branch chief, and Captain M. N. Baygushev was appointed his assistant. They were sent to us from the Peoples Commissariat of Communications. They both had considerable experience in postal work, they were very diligent, and they got things organized rather quickly.

Though they were important, in July 1941 the postal problems were naturally not the main ones. The air force signalmen directed all of their main activities at establishing dependable wire and radio communication with the formations and higher staffs. Priority, quite naturally, was placed on supporting combat activity.

The war had now been going on for a whole month. The fascists were frantically rushing toward Moscow. But in Kasnya we felt relatively safe. Fascist vultures did fly over our position from time to time, but they did not even seem to notice the presence of our rather noticeable health resort. This seemed a little strange to us: Did the enemy really fail to surmise that some sort of major headquarters might be located in it?

And then on 22 July, at about ten in the evening, an air alert was sounded at frontal headquarters and then in our headquarters. German bombers were flying toward Moscow directly over Kasnya. Soon the telegraph operator at the air force communications center reported: "We're being bombed."

The Germans bombing the capital? It was hard to get used to this alarming piece of news, and it would not allow anyone to sleep even a wink

throughout the entire night. But communication with Moscow was never broken for even a minute, and this made us feel a little bit better. In the morning we learned that the fighters and gunners of the capital's air defense forces had met the enemy bombers in time. Only a few aircraft managed to penetrate to the city.

What joy we felt! It was as if we were the ones who had fought back the enemy raid. I would have to say, though, that the signalmen of the Western Front did leave their mark, informing Moscow of the approaching enemy aircraft in time. The enemy airplanes were tracked by an RUS-2 station near Vyaz'ma. It was the first radar station used in the support of the Western Front. Its commander was Lieutenant K. I. Volkov, and its political instructor was A. M. Gurevich. A telephone link connecting the company VNOS post in Vyaz'ma to the Main Post of the Moscow Air Defense Corps had been allocated earlier. The personnel of the air warning post were the first to inform Moscow of the danger threatening the capital.

Between 22 July and 1 October our front's VNOS service warned Moscow of approaching enemy airplanes 36 times.

Raids by enemy aviation on the capital raised the concern of all soldiers about its fate. More and more signalmen began requesting transfers to forward positions, into the assault troops and partisan detachments, so that they might destroy the German monsters with their own hands. Their requests gushed forward as if out of the horn of plenty.

The command and the staff party bureau, of which I was a member, understood completely the noble patriotic feelings of the people, but we quite naturally were unable to satisfy their petitions. Thus we had to explain to our comrades that each of them was at their place, and that the defeat of the hated enemy sometimes depended on them to no less degree than on the automatic rifleman or sniper.

An open party meeting was held in the communications battalion. Active Komsomol members were invited to it. The communists discussed and outlined the ways for improving the viability of communications, and they determined the forms and methods of explaining its exceptional importance in modern war.

Effective decisions, proper placement of active party members for implementation of the decisions, and the ability communists had for influencing the hearts and minds of the people made it possible to direct the patriotic energy of the soldiers into the needed channel, and to mobilize their efforts for faultless execution of service responsibilities.

I cannot help recalling, with kind words, Senior Political Instructor A. A. Motyl'kov, the battalion deputy commander for political affairs. He managed to have a heart-to-heart talk with everyone desiring to transfer to the forward edge, and to persuade his comrades of how extremely necessary their presence here in the communications center was.

"When you strike the keys of the telegraph apparatus," he said, talking with one of the resting shifts, "you are striking the enemy. Rapid transmission of orders and messages and error-free exchange of radio messages are equivalent to annihilated fascist tanks and guns, enemy airplanes knocked out of the sky, and hundreds upon thousands of dead German invaders...."

It even took publication of orders to prevent some of the people from transferring out of our unit. Dudar' as an example, was all ready to be dropped behind enemy lines. On learning of this, Colonel Ptitsyn quite simply issued an order requiring him to remain at the communications center. Vladimir suffered terribly for this denial, but he continued to work as faultlessly as before, turning many of the new soldiers into excellent specialists.

But in the end we were not able to retain all personnel desiring to join the fighting troops. On learning that a Lettish rifle division was being formed near Moscow, Vil'ma Krumina managed to get herself transferred to her fellow countrymen's unit. But the young girl was not to fight for long. She died early in 1942 right at her radio set, while transmitting an operation order.

Senior Sergeant Grigoriy Chugunov prevailed in his desire to join the airborne troops. Following numerous appeals, we finally had to part with Military Technician A. I. Tsvetkov and sergeants Pavel Korneyev and Igor' Moiseyev. They underwent special training and were dropped behind enemy lines as part of a sabotage detachment commanded by air force Major A. D. Latyshev. After completing its assignment the detachment joined partisans, commanded by Rayon Executive Committee Chairman M. V. Gur'yanov, in the vicinity of the Ugodskiy Plant. The soldiers attacked the rear headquarters of a German corps together with the national avengers. More than 500 Germans, 80 trucks, 50 passenger cars, 4 tanks, several armored cars, and 2 ammunition and POL dumps were annihilated in this battle. Tsvetkov, Korneyev, and Moiseyev did not return from the operation. Participants of that operation later told us that Korneyev and Moiseyev died heroically while covering the withdrawal of their comrades. Tsvetkov, meanwhile, accidently blew himself up while tossing grenades at the Germans.

The front became relatively stabilized in July-August. But a lull at the front does not mean a vacation. All days and even the nights were filled with hard work. The air force command had long been troubled by the problem of obtaining reliable information from air reconnaissance quickly. Now an opportunity finally afforded itself for tackling the communication problems of reconaissance aviation head on.

The Pe-2 was the principal air reconnaissance airplane. Only the gunner-radio operator was permitted to use the radio set carried by this airplane. But while transmitting reports by radio-telegraphy he had to interrupt his observation of the rear hemisphere, and this created a serious danger to a plane flying alone. Moreover, while working with the telegraph key the gunner-radio operator could not hear signals from the onboard siren transmitted by the navigator or crew commander.

Specialists of the communications section developed the circuitry permitting the navigator access to the onboard radio set through the SPU--the aircraft intercom system. Thus the navigator could now communicate with the ground from his workplace by radio-telephone.

The very first combat sortie demonstrated the suitability of this innovation. The navigator was able to transmit reconnaissance data through a throat microphone at a range of up to 150 km. Meanwhile the commander observed the air and the ground in the forward hemisphere while the gunner-radio operator observed the rear. The commander and the air force chief of staff of the front gave a positive evaluation to the proposal of the efficiency experts, and they ordered the engineering service to alter the radio circuitry of all scouting airplanes on priority. Colonel I. I. Ptitsyn sent me to the 38th Separate Reconnaissance Squadron in order to monitor the progress of this work together with specialists of the engineering service.

We flew to the location of the scouts. We noticed a German J-88 airplane on the outskirts of the airfield. We learned how he got there from the staff of a fighter regiment also based there. It turned out that the fascists had landed on our airstrip themselves.

Together with many others, I examined the captured Krauts with curiosity. The Germans behaved arrogantly, provocatively, and they answered questions through clenched teeth. They had taken off from Smolensk to take aerial photographs of Yaroslavl', but after completing their assignment they strayed from their route due to failure of the radio compass and, having used up almost all of their fuel, they landed at the first airfield that came up, feeling certain that it was occupied by the "valorous troops of the Fuhrer." Whenever the translator asked the Nazis questions concerning German aviation, they invariably shot their arms up in a Nazi salute and automatically shouted: "Heil Hitler!"

After preliminary interrogation the prisoners of war were sent to the frontal intelligence directorate. The German airplane was transformed into a training exhibit. The pilots studied its vulnerable places, and they determined the safest approaches to it in the air. The engineers were interested in the design features of the wing, the layout of the engines, and the design of various special equipment. I must confess that I very much wanted to remove its radio set, but I was denied permission to do so: An order was published to transfer the J-88 to the Red Army Air Force Scientific Research Institute.

The engineer I was traveling with and I examined all of the reconnaissance squadron's Pe-2's. The radio circuits were being rewired correctly and on schedule. After making certain that the command assignment was being completed on schedule, we flew back.

Subsequent combat experience showed, however, that using an SPU to transmit reconnaissance information by microphone was only part of the solution.

In comparison with the telegraph mode, the range of radio-telephone communication decreased by almost a factor of two, and on occasion messages dispatched from the air failed to reach their addressees on the ground. Thus gunner-radio operators generally had to fall back on the telegraph key.

Another more-radical examination of radio communication with scouting airplanes was stimulated by Supreme High Commander I. V. Stalin's judgement of air force actions in the western sector aimed at halting the advance of the enemy's 2d Tank Group from the vicinity of Roslavl'. His telegram, sent to the commander in chief of the western sector, stated: "Aviation acted well, but it would have acted better, had the scouts called for bomber support quickly and by radio, rather than after returning to their landing places. I wish you success. Regards to all the pilots."*

The goal was clear. But how to achieve it? Specialists of the communications section and the engineering service wracked their brains over this problem day and night. Major N. Z. Rabinovich conducted numerous experiments in mobile aircraft repair shops with the purpose of increasing the power of the RSB-bis radio set installed aboard the Pe-2's.

It took time, and there were difficulties, but nevertheless the radio communication range was increased by almost two times by employing an amplifier in the intercom system. The new set-up made it possible for the pilot, the navigator, or the gunner-radio operator to communicate through the SPU. Such experimentation was also performed in other fronts. Generalizing the experience accumulated in the troops, the Air Force Scientific Research Institute published instructions on rewiring the radio equipment aboard Pe-2's and Pe-3's.

In general, efficiency experts in the signal troops were truly indefatigable, inquisitive, and capable people. Working with mechanic Lyudmila Shapchits, technicians V. V. Andreyev and S. G. Golovin of the communications battalion modified two civilian Baudot transmitters for military use. While in former times it took 5-6 hours to assemble the transmitters and hook up the circuits, now the transmitters could be operated immediately after the electric power was turned on and they were attached to the transmission lines; they also became less cumbersome and easier to transport.

Baudot transmitters were especially valuable. Their productivity was high, and it was practically impossible to intercept messages transmitted with them. Only the staffs of the fronts, armies, and some air corps had these transmitters. The Baudot system was used for command communications and for communication between Moscow and the air force staffs of neighboring fronts.

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* TsAMO, f. 208, op. 33766, d. 65, l. 44.

Under the guidance of Lieutenant V. K. Yermachenkov and Warrant Officer I. P. Leonov the soldiers installed a powerful battery charging station in a ZIS-5 truck. Thus it was no longer necessary to reserve a building for storage batteries, to connect all of the batteries together, or to lay wiring. As a result the time needed to deploy a charging station dropped dramatically. Such a station was now always ready for work and for relocation.

It was in about this time that we were joined by a team of workers from one of the Moscow plants with the purpose of installing armor plating on motor vehicles carrying the RSB radio sets. This armor plating dependably protected the crew from bullets and small fragments. The only problem was that the gross weight of the mobile radio stations increased by almost a ton as a result. We simply had to live with it.

The armored vehicle-mounted radio stations were placed in the charge of Sergeant Ivan Mel'nikov and Senior Sergeant Sergey Babarov (presently Engineer-Colonel, Candidate of Technical Sciences). These radio stations were used whenever it was expected that enemy fire would be intense. Babarov had to work many times in the face of enemy bombing. In the fall he joined General I. V. Shcherbakov's group fighting at Uvarovka, and he successfully provided communications to this group under enemy fire.

While at Kasnya we also managed to get our documentation system in order; in particular, we worked out an addressing system. In order to keep troop control covert, all formations and units and all officials had to have particular code names. These names had to be changed periodically, and never repeated. The divisions tried to select words which they felt to be the most sonorous and beautiful--for example "Orel" (Eagle), "Sokol" (Hawk), and "Berkut" (Golden Eagle). So many "eagles," "hawks," and "golden eagles" appeared that it became difficult to tell them apart.

A group of workers from the communications center and the communications section were given the job of creating a new table of code names. I was appointed group chief. Inasmuch as we needed very many code names--for formations and units, rear services, commanders, and pilots--we decided to select them in such a way that we could immediately determine the sort of correspondence from the particular sort of code names. We decided to give rear units the names of fishes, airfields the names of insects, and pilots the names of birds. Here as well we ended up with nothing but a bucket of worms: There were simply not enough appropriate words. Moreover we had to find those which are easily pronounced and which can be clearly understood by ear. Our experience suggested that words having the "r" sound were the most preferable. They are perceived very well by both radio and telephone. No matter how hard we tried we were unable to find a sufficient quantity of suitably sounding words. We finally arrived through common effort at the so-called index principle. Assume that a division has been given the code name "Rubin" (Ruby). This code name was also given to

all of the pilots, though each of them had his own binary index: "Rubin-01", "Rubin-22", "Rubin-55", and so on. This proposal was accepted. The chief of staff gave his approval to the table. Its code names were subdivided into four groups, each of which was changed at a particular time. Members of the Military Council were given arbitrary family names, the latter being assigned by the frontal staff and used at the frontal level of control and higher.

It seemed as if everything had been worked out well, but problems still arose. Somewhere at the end of 1942 the commander--S. A. Khudyakov had gained this post by this time--could not resist joking about our code names during a conference of division commanders.

"Were we to believe them," he said "then Baranchuk is a 'cap', Filin is a 'pipe', Podgornyy is a 'health resort', and Andreyev* is 'glory'."

Thus we had to rewrite the table. And not just one more time. The Red Army Air Force Headquarters was not able to publish the book of code names until the middle of the war. Strictly specific sections of the book were assigned to the air armies. We ourselves distributed the words they contained among the divisions, units, and rear services. This resulted in a well organized and convenient system for addressing telegrams, for calling particular telephone stations, and for conducting radio conversations with pilots in the air. However, some air force generals would in no way part with the "dragons," "eagles," and "hawks" they had gotten used to, and they continued to use them, which naturally was not in keeping with covert troop command and control.

There was an air communications squadron assigned to the frontal air force staff. It furnished communications representatives, orders, and various documents to subordinated staffs and to interacting staffs. The command and the directorate and section commanders used its airplanes for transportation purposes. In turn, the divisions also used airplanes to deliver messages. There were no flying schedules for these airplanes at first. They flew whenever the need arose.

In July our section presented its ideas to the command on how to make more sensible use of the U-2 liaison aircraft, suggesting that the squadron be subordinated to us. The command did not go along with this. All the section got was a flight from a Civil Air Fleet detachment. I was given the job of organizing regular air communication between the air force staff and the formations; Lieutenant L. M. Beylin, a well trained engineer and a diligent individual, was assigned to me as my assistant.

Colonel S. A. Khudyakov gave his approval to our proposals. Message collection points were set up at the headquarters of the different divisions. The central

* The family names of the air formation commanders.

point was at air force headquarters. These points did not have a special staff. They were serviced as an additional duty by a clerk familiar with the handling of secret documents, the dispatch clerk, and the messengers. The airplanes flew according to a firm schedule--once a day. They landed at each message collection point irrespective of whether or not they had messages addressed to them aboard. Unscheduled flights were also foreseen for urgent correspondence. Whenever an airplane was to make an unscheduled flight, a code word alerting the addressee was transmitted beforehand by telephone or radio.

The regular trips justified themselves. The Civil Air Fleet pilots were able to handle their responsibilities well. They helped us out many times when wire communication resources were cut off for long periods of time. But one flight was clearly not enough. Therefore we were soon given the 127th Separate Squadron, possessing nine U-2's. The possibilities of air communications broadened significantly. The pilots began to deliver letters and newspapers as an incidental service.

The command and the political section capitalized on the lull at the front to gather information on acts of heroism committed by the airmen, and to publicize the mass heroism of the motherland's defenders. Whenever the section's workers visited the troops, Colonel I. I. Ptitsyn told them to mandatorily acquaint themselves with the actions of gunner-radio operators in the air, and to meticulously study, generalize, and disseminate their combat experience. Owing to this all of the front's airmen soon learned, in particular, of Ivan Tupikin's selfless act.

This happened on 15 July. Nine airplanes of the 60th Bomber Division were given the mission of striking a tank column discovered in the vicinity of Yel'na. The medium bombers flew without fighter escort. Sergeant Tupikin, the gunner-radio operator in Lieutenant Vasiliy Naumkin's crew, spotted Messerschmitts approaching from far away to intercept our group. He immediately informed all of his comrades in arms of this and prepared to meet the enemy.

The fascist fighters were too late to keep our pilots from dropping their bombs on the column. But they did attack as the group of nine turned away from the target, at a time in which it was in an extremely unfavorable position for repelling an attack, all the more so because the Germans were diving down on the group in the rear hemisphere. The group suffered losses. But the Germans lost several airplanes as well. One shell broke a vane tie rod aboard Lieutenant Naumkin's airplane. The bomber became uncontrollable, and it began to lose altitude quickly. The gunner-radio operator immediately realized what was wrong, he grabbed the ends of the tie rod, and through tremendous effort he managed to join them. Feeling a load on the vane, the pilot leveled the airplane, rejoined the group, and returned to the airfield. Neither Vasiliy Naumkin nor his navigator, Gennadiy Zimin, knew that all the while they were flying to the airfield, Tupikin was holding the ends of the broken tie rod together with his hands. His hands became so cramped from the improbable tension that he was unable to open them without the help of his comrades.

During the war Communist Tupikin flew 265 sorties, personally knocked down five enemy airplanes, and destroyed several in group battles. He was the first gunner-radio operator in the regiment to earn the Order of the Red Banner, and he was also awarded the Order of the Patriotic War, 2d Degree, the Order of the Red Star, and many medals.

Several new commanders were placed at the disposal of the frontal air force communications chief. They included lieutenant colonels Dmitriy Nikolayevich Morozov and Ivan Ivanovich Morozov. Ptitsyn had known both for a long time, and he was very happy at their arrival. D. N. Morozov was known to many military signalmen. He had served in aviation back during the Civil War, and in subsequent years he worked as a senior instructor in the communications department of the Air Force Academy. A highly educated specialist, Dmitriy Nikolayevich had published a work on radio beacons, and he had been awarded the Order of the "Badge of Honor." He was appointed Il'ya Ivanovich's assistant for radio affairs. L. M. Parnas and I. I. Morozov became air communications chiefs of combined-arms armies.

We quickly becamed friends with Lieutenant Colonel D. N. Morozov. He generously transmitted his extensive knowledge and highly rich experience to his fellow servicemen. I. I. Ptitsyn invited him into our tent as its third "tennant." Incidentally, we once discovered a surprise in this tent of ours: Two excellent white mushrooms had grown up beneath trestle-bed on which the colonel slept. Just about all of the staff officers dropped by for a look. *Boletus* mushrooms were more than abundant that summer in the forest around Kasnya. They were a good supplement to our frontal ration, and some resourceful homemaker commanders even prepared the mushrooms for a profit, drying and salting them.

Although this was the time of nothing more than minor local battles on the front, everyone knew that the storm was gathering. In addition to performing numerous routine tasks, during those days the air force signalmen did a great deal of work to comply with the requirements of the 23 July 1941 order of the Peoples Commissar of Defense. This order blamed unsatisfactory troop command and control on neglect of radio communications. The Peoples Commissar of Defense demanded commanders of all ranks and all staff workers to persistently learn how to use the radio, and to teach subordinates the art of controlling troops by radio. Frontal, army, and formation commanders were given personal radio sets.

The objective of the order was to combat so-called radiophobia. In the first months of the war, as I had mentioned earlier, there were many cases in different staffs where control by radio resources was cautiously limited due to the apprehension that the enemy might be able to gain a fix on the operating station, determine the locations of the control points, and bomb them. This is why an attempt was always made to place radio stations farther away from headquarters, which seriously reduced the efficiency of their use.

The air force staff held a party meeting. Colonel S. A. Khudyakov gave a report. He described what fear and understatement of radio communication could lead to, he gave examples of why staff workers were unable to assign missions to formations and units by radio or receive needed messages from them; and he sharply criticized the cryptographic service, which was not much help at all in creating simple signal tables and other documents required for covert control that would be resistant to interception. Sergey Aleksandrovich noted that air force signalmen had done a great deal of work to introduce radio communication, and it was now time to improve it as a system and to transform it into the principal control resource in mobile forms of combat.

Many staff and rear commanders spoke up at the meeting. They levied a number of justified complaints against our work. In particular, Colonel Ptitsyn turned special attention to radio communication with ground troops and the branches of aviation.

Il'ya Ivanovich had good reason to talk about communications support to coordination. This was a very acute problem. Only the coordinated actions of all arms and services could lead to success on the battlefield in the war. Therefore we began showing more concern for such communication, and seeking ways to improve it and afford logistical support to it. Later on I will go into the fact that organization of communications in support of coordination between aviation and the ground troops turned out to be a very serious problem for us, one which was not to be solved for a long time.

The Baudot transmitters of the frontal communications center were operated by Red Army men, while our transmitters were worked by young girls. Many of them began working for us as civilian employees before the war. General N. D. Psurtsev often visited our instrument room. He immediately noticed the high quality of the work done by the woman telegraphists.

An especially large number of women came to work for us in July 1941. At that time, enlisted men and sergeants serving in the rear units were sent to the rifle and airborne troops by decision of the frontal Military Council. About 800 signalmen were reassigned from the air force. They were replaced by an equal number of young women who had volunteered for military service. We managed to gather 180 specialists, former employees of the NKS, together into a reserve regiment. These remarkable people labored at our communications center throughout the entire war, and together with the girls that had worked for us in peacetime Minsk they made an invaluable contribution to the development and support of dependable air communications.

Many, occasionally excessive burdens were laid on the frail shoulders of the women during the war. The telephone operators, dispatch clerks, telegraphists, and radio operators, most of whom were only 18-20 years old at that time, worked extremely diligently, accurately, and efficiently. Not to discredit the men, the female communications specialists worked better and with better quality. They were more courteous and concentrated, and

their soft, perpetually even voices were to the liking of the pilots--they had a relaxing action in combat.

"Imagine approaching a target, with antiaircraft shells bursting about and deadly fire raging all around, and suddenly hearing a pleasant, calm, down-home female voice calling 'Orion-05', 'Orion-04'," I recall one pilot telling me. "And suddenly you begin to feel more confident, and your self-control improves...."

The new complement of signalmen worked itself in relatively quickly. One needed only to announce the family name of the commander or chief required, and the telephone operators would immediately find the needed comrade or an assistant. They knew where the offices of the staff workers were, who their neighbers were, and the sections they usually visited in their official duties. Thus they were able to connect a party even to persons who were not at their workplaces at the needed moment.

Once Supreme High Command General Headquarters liaison officer Marshal of the Soviet Union B. M. Shaposhnikov, who was visiting Kasnya, and frontal commander Marshal of the Soviet Union S. K. Timoshenko had an urgent need to talk with the General Staff. General N. D. Psurtsev decided to use one our telegraph operators to service this important communication. He came to our communications center and asked Anya Kravchenko, the shift chief, to choose the best and boldest Baudot operator. She sent Raya Khmelevskaya.

Shaposhnikov dictated the text, and Raya repeated his every word after him, which helped the marshal to word his sentence further. Boris Mikhaylovich often called out the name of a rifle corps or a rifle division. Khmelevskaya did not transmit these words. She used the abbreviations adopted for them--sk, sd.

The marshal noticed this immediately, and he also began using the abbreviations. This made it possible to conduct the conversation in less time. On finishing it, Boris Mikhaylovich heartily thanked the Baudot operator:

"You, my little pigeon, are not only a good girl but also a smart one. Thank you for your competent work!"

Raya was in high spirits when she returned to the air force instrument room, happy with the marshal's praise and the gratefulness expressed by General Psurtsev. One of the commanders asked her what the conversation was about.

"Oh, I completely forgot already," Raya replied unconcernedly, "and I left the tape back there at the frontal communications center."

As with all of our young girls, she knew how to keep a secret.

The appearance of a large number of women at the communications center added considerably to the troubles of the command and staff. Pains were taken to

house them in clean and warm quarters, to always provide at least the elementary comforts to them, and furnish everything they needed for a normal woman's life.

Our female signalmen, with blue patches on their shirts, also naturally elicited even greater concern in relation to the tremendous amount of selfless work they had to do. But war is war, and the front is the front. The young girls courageously endured the difficulties and inconveniences which they nevertheless often had to deal with.

I do not know that a monument has ever been erected in our country to the military labor of the female communications specialists of the Great Patriotic War. I do not think we have one. But there should be one. The heroic labor of the military female signalmen, which was brim-full of heroism and brilliant proficiency, was an invaluable contribution to the Soviet people's victory over German fascism.

We found out at the end of September that the Germans were preparing for a general offensive on Moscow.

By this time we had completed construction of shelters for the air force and frontal staff and for the communications centers. On 29 September we moved all telegraph and telephone resources into the shelters.

The enemy went over to the offensive against the Western Front on 2 October. And on the second day, at 1600 hours, the Luftwaffe made a hard strike against Kasnya. Three groups of 14-16 airplanes each participated in the raid. In their first runs the enemy bombers destroyed the building in which the Military Council, the main directorates and sections of the frontal headquarters, and the communications center had been housed just a few days before. The Germans also savagely bombed the forest surrounding the Kasnya health resort, in which the shelters of both staffs and their communication resources were now located.

Lieutenant Colonel D. N. Morozov and I were on the way to the central radio receiving room when the bombing began. There was not a trench or dug-out to be found anywhere nearby. The soul-rending scream of falling bombs could be heard above. We dropped to the ground beside the fallen trunk of a thick birch. There was a explosion of great force. I was showered by heavy chunks of earth from head to toe.

It was hell all around. Ancient trees were uprooted and toppled. The sky was blanketed by thick black smoke. The ground shuddered from the numerous explosions. Bomb fragments whizzed by with a penetrating and evil whistle. Add to this the agonizing roar of the bombers....

The bombing seemed to go on forever. But it only lasted 3 or 4 minutes. It became quiet in the forest, and the sky fell silent. I jumped up with the intention of running to the communications center.

"Don't be in a hurry," Morozov stopped me. "They might still make another pass. There might even be a second wave of airplanes following the first."

And in fact the air raid signal sounded once again from the observation point set up in a tall tree. Morozov and I lay down in a crater. It was about 25 meters from the birch tree next to which I had just been lying.

On taking shelter, I unwittingly though about Red Army soldier Ivan Baturin. It was his day to work the observation point. If he sounded the signal once again, that meant that he had been there during the entire raid. Imagine the sort of courage one must have in order to not abandon such a dangerous combat post in the face of such hellish bombing!

The force of the second pass was no less than the first. This time the Germans dumped their entire bomb load on the shelter area. I felt relatively safe in my crater--it is said that gunshells and bombs never hit the same point twice. I recalled the apprehensions expressed by the commanders following our transfer to Kasnya about the large pond and the main building of the vacation resort, so noticeable from far away. Our airmen had photographed the headquarters location from the air back in August. Even the wire transmission lines that led into the forest and did not lead out of it could be seen distinctly on the photograph. Now was the moment of payment for our carelessness: The enemy made a bomb strike against the headquarters on the second day of his new offensive.

We subsequently began to relate more responsibly to what aerial photographs showed of the disposition of the headquarters. Steps were taken to improve camouflage, or we changed our location. In a word, the lesson of Kasnya did not go unheeded.

In Kasnya, meanwhile, the enemy did a great deal of damage. All the lines were destroyed. Wire and radio communication was temporarily cut off in all directions. Soldiers of the battalion and of the 37th Company went to work restoring wire communications. Military Technician 2d Rank A. Pashutin was seriously wounded. Luckily no one else suffered. The connecting line to the radio center was repaired in an hour and a half. The radio was back on the line with full power. In 5 hours the signalmen managed to repair the wires to Moscow and to two air divisions, but not for long. The enemy struck the lines of communication again and again. The line subunits could not keep up with the damage.

CHAPTER FIVE

WITH MOSCOW AT OUR BACKS

The enemy broke through our defenses. His powerful groupings advanced eastward unstoppably. Names of population centers familiar to us since childhood peppered the summaries of the Soviet Information Bureau: Chiplyayevo, Yershi, Milyatino, Boryatinskaya, Kozel'sk....

The Luftwaffe savagely bombed cities and towns in the combat zone, and their outskirts. Enterprises of the Peoples Commissariat of Communications and the telephone and telegraph lines suffered massive destruction. Between 3 and 5 October wire communication was maintained with air divisions for only 4-5 hours a day. The remaining time was devoted to restoration.

Back before the Germans went over to the offensive we reinforced the communications company of the 43d Fighter Division with a small detachment headed by Senior Sergeant F. A. Devochkin, a telegraph mechanic. The warriors reoutfitted the division's telegraph station, transforming it into an auxiliary station, to which the lines of all frontal units connected. Before abandoning Kasnya the staff transmitted a coded message to the troops. This message spelled out the subsequent deployment sites of frontal aviation. It was received and decoded by the 43d Division. But the message was also intended for the front's regiment deployed by Temkino, communication with which had already been cut off for several hours. No matter how hard the senior sergeant tried, he was unable to make it through to Temkino--the line was experiencing intense current leakage. Devochkin never left the transmitter. Then suddenly his hand felt weak oscillations from the armature of the electromagnet. Turning the line to maximum battery voltage, the senior sergeant grabbed the key and began to transmit slowly: "If you read me transmit dots to me for half a minute, and then release the key for the same amount of time. I have an important telegram for you!"

Keeping his hand on the armature, the signalman perceived a series of dots. This meant that they understood! The party at the other end of the wire did everything he asked them to. Devochkin transmitted: "Attention. Telegram follows. Do not interrupt. I will repeat three times. Stand by."

The senior sergeant transmitted the complete text of the coded message. This saved the airmen based at Temkino. In the morning German tanks broke through to the airfield. But it was already empty....

Fedor Alekseyevich Devochkin was an excellent specialist. He was especially distinguished by a deep sense of responsibility for his work, indefatigability, and diligence. Sometimes he slept right in the telegraph station, draping himself as he could over the instrument boxes.

After the war Fedor Alekseyevich became a lecturer at the Timiryazev Agricultural Academy and a Doctor of Sciences.

On order of Lieutenant General of Aviation F. G. Michugin, the new frontal air force commander, we quickly set up a rear communications center and prepared a deployment site for the staff in the village of Krasnovidovo, 15 kilometers from Mozhaysk. On 5 October a forward detachment of the 159th Battalion under the command of V. K. Yermachenkov deployed a telegraph station there, laid the necessary connecting lines, and prepared the radio equipment for operation.

But in view of the situation evolving at the front, the command ordered us to relocate our staff not in Krasnovidovo but rather in Shakhovskaya, near Volokolamsk. Colonel Ptitsyn transmitted instructions to Yermachenkov to pack up all equipment and move to the new place. He immediately sent the 37th Line-Construction Company there as well.

"Fly over to Krasnovidovo, Zhenya," Il'ya Ivanovich said to me. "Give Yermachenkov a hand. We have to move the communications center to Shakhovskaya as quickly as possible."

Yermachenkov did not need any help. He himself dismantled the communications center quickly, loaded the equipment into his vehicles, and set off. The pilot and I discovered his column beside the rail station in Uvarovka.

The pilot landed right next to the road.

"So how are things?" I asked Yermachenkov on getting to the column.

"Bad, Comrade Captain. We're crawling like turtles."

It was not more than 50 km from Uvarovka to Shakhovskaya. That meant just an hour on a good road. But there was no telling how long it would take in this time of the fall thaw, and, moreover, in panel trucks loaded to the limit with heavy radio sets.

I sent the airplane off to Kasnya and remained with the column. It took us around 16 hours for the rest of the journey. The people knocked themselves out, falling from tiredness.

But even after we reached Shakhovskaya we could not allow the people to rest. On finding the frontal signalmen that had reached the town before us and on learning from them where we were to deploy, we immediately began setting up the communications center and laying the wires.

By the morning of 6 October everything was ready. I went to the frontal communications center. I was literally dumbfounded there: I was given orders to immediately pack up all of the equipment and go back to Krasnovidovo.... The soldiers, over half of whom were women, were digging trenches and camouflaging the vehicles and lines. "Can there be a limit to their endurance?" the thought crossed my mind. "After all, they are barely able to stand up, they have spent so much time without sleep, they have only been able to down dry rations hurriedly, and still they keep on working.... And there are more difficulties still ahead of them, more exhausting work." I gave orders to halt all work, to dismantle the communications center, and to prepare for relocation. Military technicians V. K. Yermachenkov and S. G. Gologin looked at me in disbelief.

"Those are the orders," I replied to their mute but crystal-clear question.

The Red Army soldiers once again went to work. They worked silently, with concentration. There was no need to urge them on, despite the fact that their strength was wearing down to the limit.

"Finish loading and then give the soldiers a couple of hours to sleep, especially the drivers," I said to Yermachenkov, taking the responsibility on myself.

While the Red Army soldiers rested the military technicians and I worked out the return route. We found out at the very last moment that the Germans had bombed out the bridge across the Lama River at Volokolamsk and that the Moscow road was unusable.

We thus had to travel over our previous country roads, once again laying mats over marshes, filling deep ruts with brushwood, and reinforcing bridges and culverts. We arrived on time. The staff operational group was already in Krasnovidovo. It was idle for the moment--the main communications center was still en route from Kasnya. The staff communicated with the air formations through an intermediate radio center deployed 30 km northeast of Gzhatsk,* in the village of Gryaznoye.

We managed to establish wire communication from Krasnovidovo with only three divisions, since the frontal directorate could not allocate more than a single wire to the airmen. The 38th Company was also on the march, and it was not expected until the following day.

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* Presently the city of Gagarin.

The frontal and air force staffs spent 3 days in Krasnovidovo. During this time the air formations were controlled for practical purposes only by radio--most of them had redeployed to new airfields. The radio operators literally worked without sleep and rest. Dozens of radio messages backed up on some communications routes. They contained a hundred or more groups each, and they were all marked urgent and important. The radio duty officer could not determine which to send first. The messages were coded, and their contents remained a mystery to the duty officers.

Our signalmen did find a solution, though of course it did not improve things much: Many radio messages were delivered to their addressees together with other correspondence by airplane. Their could be no discussion of any sort of efficiency here. But we simply could not see any other solution at the time.

Soon one more complication arose. We had to allocate some of the radio equipment for creation of another communications center, once again at Volokolamsk. Whether we liked it or not, we had to enlarge the radio network.

Enemy tanks broke through the defenses of our troops in this area as well. The communications center received orders to makes its way immediately to Golitsyno, where the frontal staff had begun concentrating.

The enemy pushed forward with no consideration for his losses. More and more cities and villages went into his hands. Kaluga fell on 13 October.

Kaluga was my home town.... How greatly it pained my heart when I found out that it had been captured by the German thugs. I was born in Kaluga, and I went to school there. I still remember well the meeting in April 1923 during which I was accepted into the Russian Young Communist League. The chairman read the recommendation from V. M. Orlov, a party member since 1905, and A. A. Afanas'yev, secretary of the party cell of the Kaluga Sewing Factory. After this I was asked to relate my biography. But what sort of biography could a 15-year-old boy relate? It took me only 2 or 3 minutes to tell my story: "Before the revolution my father worked for the Syzran'-Vyaz'ma Railroad as a ticket-collector, following the revolution he served in the Workers and Peasants Inspection Office, and in January 1922 he died from typhus. My mother participated in the revolutionary movement, in 1905 she worked as a messenger in the Moscow organization of the Russian Social Democratic Workers Party, and at the moment she is working in the railroad administration. I have three brothers. Aleksandr and Vladimir are in school, and Georgiy goes to nursery school I am the eldest. I am now in seventh grade. I worked for 3 months in a timber-rafting expedition. I will work again this summer."

Timber rafting was the starting point of my work biography. We in Kaluga had an entire team of young boys who earned money taking apart the timber rafts. We created it on the advice of Uncle Misha, a former Baltic seaman. The oldest of us was 17 years old, and the youngest was 12. We shared all of the team's earnings equally, as brothers.

Uncle Misha spent a lot of time with us and he gave us fatherly advice on how to work better and ease our labor. He told us many interesting things about life at sea and about the profession of military radio-telegraphist, and once he said to me:

"You, Zhen'ka, have good hands for telegraph."

The stories of the ex-seaman infected my spirit with an interest in communications. In April 1925 the Komsomol cell received an order from the rayon committee to choose one Komsomol member for a 1-year course for communications supervisors. I immediately volunteered for the training. And it was me they sent. From that time on, my entire life became inseparable from construction, maintenance, and organization of civilian and military communications. My home town, Kaluga, one of the most beautiful Russian cities on the wide Oka was the starting point of this life.

And now the fascists were in Kaluga.

The front never did manage to allocate wire lines to us at our position. The radio communication system was clearly unable to handle the ever-increasing load. On 20 October we were left without our liaison airplanes: The command was forced to use them temporarily for air reconnaissance in the complex meteorological conditions. The pilots not only gathered information about the enemy, but they also clarified the locations of our troops. Thus our squadron never returned to the signal troops. Later we were given the 203d and then the 33d squadrons.

The situation, which was constantly growing more complex, demanded that we create our own wire communication center and obtain the wires we needed to link us to the division staff as quickly as possible. Any delay was lethal.

We were now located only a few dozen kilometers from Moscow, the country's main communications center. From it, a dense network of wire transmission lines fanned out in all directions. The lines belonged not only to the NKS but also the Peoples Commissariat of Railways, Aeroflot, Mosenergo, the river fleet, and other organizations. The frontal headquarters did not fail to capitalize on this widely branched network in its own behalf.

It was not found to be difficult to determine which lines we needed and especially the midpoints of the telephone circuits. What was harder was trying to find the owners of these lines. We immediately rejected the principle of searching "from top down"--that is, from the center to periphery. We would have lost a great deal of time on this. We assumed the reverse course--we ordered the communications chiefs of the air formations to themselves establish who owned the wires leading to their locations. Thus determining the owners, they negotiated to transfer the wires to us and to switch them to the communications center via the city cable network.

But things did not go so smoothly everywhere. In addition to our staff and the frontal staff, troops of the national air defense forces and the Supreme High Command Reserve, and formations and even regiments subordinated to the front did not delay in making use of Moscow's suburban transmission wire system. Thus it happened that some unit "hacked out" a small section of an important trunkline for itself and would not part with it for anything. Others comandeered wires already in operation and gave no thought at all to the interests of their owners.

A special order published by the Peoples Commissar of Defense played a great role in organizing the use of wire communication and insuring a possibility for maneuvering the main wires. According to this order all lines of suburban Moscow, irrespective of their departmental ownership, were placed at the disposal of a special offical. The first to be assigned to this post was Military Engineer 3d Rank Iosif Solomonovich Ravich. No staff had the right to connect itself to any wires without permission; the wires were apportioned out only on the basis of orders from the armies.

We must give due credit to I. S. Ravich and his subordinates. Order was restored on the line, and orders from the airmen were always satisfied efficiently.

The wires allocated to us met our needs completely. But unforeseen difficulties arose with the use of the midpoints of the telephone circuit: The transformers used to create them could not be found anywhere. Military Engineer 3d Rank G. I. Gitel', the battalion deputy commander for technical affairs, came to the rescue. He was sure that there had to be a plant in the capital which could manufacture these articles, which were not all that complex. This was found to be true. Several hundred transformers were built for us in short time by the Moscow Electromechanical Plant.

"For all I know," Il'ya Ivanovich Ptitsyn said when the first lot of transformers arrived, "these same midpoints could also have been the last point for us, after which we would have been done in...."

I think that I should explain what these midpoints are to the uninformed reader. A special "Pikaro" transformer is connected to a double-conductor telephone circuit. A conductor is secured to the middle of this transformer's linear winding. This conductor is called the midpoint. A telegraph transmitter is connected to it. The transmitter can work simultaneously with the telephone. One does not hinder the other in any way. Thus use of midpoints increases the capacity of wire communication. During the war, telegraph communication structured according to this principle made up about 60-70 percent of all communication routes.

I cannot fail to recall one interesting incident that occurred while installing the transformers. This happened back in Kasnya. A new division arrived, and telegraph communication had to be established with it on priority. For this purpose we had to add a "Pikaro" transformer to the working circuit between the communications center and the Vyaz'ma control

and testing point. Senior Sergeant I. M. Sasov was in Vyaz'ma at this time. I sent him a messenger with orders to find two "Pikaro" transformers in the city and deliver them to the staff immediately. Sasov displayed remarkable promptness: He brought in two woman bakers from the Vyaz'ma bakery. The fault for this mistake lay with the messenger--he confused "Pikaro" with "pekar'" [baker]. Still, the bakers remained with us, for which the messenger was thanked many times over by the chief of the quartermaster section.

But I digress. Extensive development of Moscow's suburban wire communications made it possible to establish two communication routes for many air formations and separate units. Considering the constant enemy bombing, this considerably raised the dependability of the work of telegraph and telephone equipment.

In addition to obtaining long-distance links, we needed a large number of direct links in Moscow with a number of interacting staffs--with the VI Fighter Corps of the Moscow Air Defense Zone, with the antiaircraft artillery and long-range aviation staff, with the air force of the Moscow district, with the central airfield, with the Civil Air Fleet, and with other organizations.

At one time the radio receiving and transmitting center of the frontal air force was located in the capital's Izmaylovskiy Park (the vestiges of engineering works around the communications center have been preserved near No 6, Parkovaya Avenue).

Several telephone links following different routes were organized for communication between the staff and the radio center. They were all borrowed from the city network.

Analysis of the organization of wire communications around Moscow persuaded the command that it would be suitable to deploy the main communications center of the frontal air force in the Moscow suburbs. It went into operation on 22 October.

We outfitted an auxiliary communications center in Moscow, which concurrently provided communications between the rear headquarters and all of the headquarters of the aviation base areas.

The frontal headquarters soon relocated itself in the village of Perkhushkovo. It was only 30 km from here to Moscow.

The dense conifer forest covered the position of the headquarters well. Natural camouflage was reinforced by a number of specially implemented measures. Only the most indispensable persons were located in Perkhushkovo. Entrance of all forms of transportation into its territory was categorically prohibited. Wire transmission lines coursed along trenches. Communication was maintained with the front air force staff by telephone and telegraph,

as well as high-frequency telephone. Several communication routes were used in this case, which significantly raised the stability of communications.

The Western Front was commanded by Army General G. K. Zhukov in those exceptionally hard and exhausting days of Moscow's defense. He gave orders that an air force operational group must constantly be present in Perkhushkovo. This group consisted of an operations officer, an intelligence officer, an officer from the cryptographic section, and a signal officer. For the first while the group was headed by General F. G. Michugin. But he soon fell ill, to be replaced by Sergey Aleksandrovich Khudyakov.

We were housed in two small rooms. One contained several desks outfitted with telephones, and an ST-35 telegraph transmitter. The other contained about a dozen beds. But they were hardly ever slept in. A tremendous influx of information from subordinated and interacting formations had to be processed, the combat activities of these formations in support of the ground troops had to be organized, coordination had to be achieved on the most diverse problems concerning interaction with the Moscow Air Defense Zone, and the situation at the front had to be monitored.

Strictly speaking, the front was right next door. Artillery, mortar, and even machinegun fire could be heard distinctly day and night. Some commanders amused themselves by trying to determine the calibers of German guns firing at the forward edge. Sometimes it happened that individual groups of enemy scouts penetrated almost as far as the front command post. Once the security regiment and the composite detachment of staff commanders had to enter into combat with a German subunit that had broken through. Major A. D. Latyshev, one of our operators who had recently been awarded the Order of Lenin for his participation in sabotage missions behind enemy lines, distinguished himself in this fight.

Nevertheless the headquarters remained in Perkhushkovo, providing troop command and control.

The air force operational group transmitted all of its directives to the air formations through its headquarters in the Moscow suburbs. An additional direct telephone link was organized and the commander's personal radio set was used for this purpose. We could use the latter at any time to contact each of the air divisions one at a time, or to call all of them together for a conference call.

Sergey Aleksandrovich Khudyakov, who actually performed the duties of the commander, often had to travel to headquarters, fly to the regiments and divisions to determine what was going on locally, and issue instructions right during combat activities. He always returned tired, silent, and sullen. But then one day, on 6 November, we were barely able to recognize our chief. Flinging the door wide into the workroom, he loudly queried:

"Have your heard?"

All of us stopped in our tracks and looked at the general in disbelief. And he, unusually excited, was already turning the tuning knob of the receiver:

"Listen! The solemn meeting is beginning right now in Moscow!"

The solemn meeting in honor of the anniversary of October? In Moscow? But the enemy was at the very walls of the capital!

This meeting was in fact held, as in all previous years. I. V. Stalin gave a report. He analyzed the course of the war against the German invaders in the past 4 months, and he asserted that Hitler's hopes for a "lightning war" had been shattered, he revealed the causes behind the temporary failures of our army, he bared the true face and misanthropic goals of fascism, he talked about the inevitable defeat of German imperialists and their armies, and he formulated the tasks of the Soviet people and their armed forces in the Great Patriotic War.

But one event that occurred on 7 November agitated us even more. The Red Army troops held their traditional parade on Red Square in Moscow!

I am not a psychologist and I am not especially observant, but I can still remember the faces of the people that were listening to Moscow radio in those terrifying and memorable days, and that read and reread newspapers carrying reports of the meeting and the parade. Faces which had previously been concentrated and stern were now shining with inspiration and an unyielding faith in victory.

The tension of the combat situation at Moscow increased with every day. Aerial reconnaissance began reporting that the enemy was bringing in new forces, and thattank and motorized troops, infantry, artillery, and many transport vehicles were moving on the roads in the direction of the front. The second phase of "Typhoon"--this was the name the Germans gave to their plan for the Moscow offensive--was beginning.

Day and night merged into a single blur for us. The air force commander constantly concentrated the forces of aviation in order to hit the enemy as hard as possible in the most important, most dangerous sectors of the front, especially his tank wedges, the areas of concentration of reserves, and ammunition, fuel, and food dumps. Each day the regiments were left with fewer and fewer warplanes. Under these conditions only wise and swift maneuvering of the warplanes could insure effective help to the ground formations.

Sometime in the second half of November S. A. Khudyakov returned from the frontal commander's office at three in the morning. I was the operational group's duty officer at that time.

"I'm going to go lie down for a while," Khudyakov said. "If the Kremlin calls, wake me up right away."

Not even an hour had passed when the high-frequency telephone began to ring. I picked up the receiver:

"This is air force operational duty officer Major Koyander."

"Stand by, I have a call for you," answered a thick male voice.

I. V. Stalin was on the line. Usually--the signalmen knew this--he picked up the receiver only after the assistant setting up the call had made sure that the party he requested was on the line. This time the Supreme High Commander began talking right away. He asked me where Khudyakov was. To be honest, I lost my composure, and rather than immediately calling Sergey Aleksandrovich to the telephone I answered that he had just laid down to rest.

"Can you tell me where our night aviation is operating and how many sorties it has flown?" I. V. Stalin asked.

All of the data were at hand: This evening, together with long-range aviation and the air forces of neighboring fronts, the air formations of the Western Front bombed 20 enemy airfields. I reported:

"Frontal night aviation is operating against the airfields at Smolensk, Seshcha, and Borovskaya. Seventy-five sorties were planned. Fifty were flown. All airplanes that completed their combat assignments have returned to their airfields. The rest are still in the air. The weather is good."

"Good, carry on. Give my regards to Comrade Khudyakov," I. V. Stalin said, and then the telephone fell silent.

It took a long time for me to regain my composure: After all, Khudyakov had ordered me to awaken him as soon as the Kremlin rang. But it all happened so quickly that I was simply unable to do so, and when I. V. Stalin identified himself, it was already too late to call Khudyakov. When I told him about what happened, Sergey Aleksandrovich gave orders that I was never to serve as operations duty officer again....

This was an interesting person, and his life, which was rended tragically in 1950, was remarkable and inspirational.

Sergey Aleksandrovich was born in Nagornyy Karabakh. His father was a peasant, and he died before Sergey was 5. Until he was 14 years old the boy was raised by his grandfather, after which, following his fourth year in primary school, he went to work in Baku as a fitter's apprentice. In 1918 the young boy joined a Red Guards detachment; later he served in the regular Red Army, participated in the Civil War, and on graduating from the

Tbilisi Cavalry School he became a Red commander and joined the party. Khudyakov commanded a cavalry platoon, he was an outstanding rider, and he was distinguished by his bravery and expert swordsmanship.

As with many cavalry officers, in the 1930's Sergey Aleksandrovich gave up his horse for an airplane; later he graduated from the command school of the Air Force Academy, and in just a year later he was appointed chief of the operational section of the air force staff of the Western Special Military District. He was later given command of the air force rear services in that same district, and in 1939 he was appointed chief of staff of district aviation.

Sergey Aleksandrovich was an Armenian by nationality, and before joining the Red Guards detachment he carried his fathers name Khanferyan, and he was called Armenak Artem'yevich. He adopted the name Khudyakov in the Red Guards detachment, taking the name of his deceased commander, whom he felt to be closer than his father. His Russian was pure, without any accent. It became evident only when he became agitated.

General Khudyakov was always distinguished by faultless military bearing, and he took great care in his personal appearance. He did everything for himself. Even on becoming a marshal of aviation, he would not allow his aides (his wife in former times) to sew on his undercollars or to iron his trousers.

There was yet another remarkable trait possessed by S. A. Khudyakov. He was the same in his relations with both chiefs and subordinates, he never raised his voice, and he was always tactful and respectful. At the same time he possessed iron will, and he never vacillated in his decisions. He sometimes had to make them literally on the move, especially in Perkhushkovo. After all, our troops were barely able to hold back the onslaught of superior and fresh enemy forces.

After Khudyakov barred me from duty in the operational group, on Colonel Ptitsyn's orders I flew to population centers in the vicinities of which rear communications centers would be set up for the frontal and air force headquarters in the event of a retreat. My heart became very heavy from just the thought alone that we were preparing control points east of Moscow. Moreover I persuaded myself from my on the spot inspections that things would go very badly with communications. We had to build major lateral lines to intercept the wire trunklines fanning out from Moscow. But they were not being built--there were not enough men or equipment. After my return Ptitsyn reported this unpromising situation to Khudyakov. The chief of staff said:

"We will have to learn to control troops by radio. Anyway, let's hope that we will not have to retreat any further."

Educated by the events of Kasnya, in addition to rear communications centers, we also prepared a reserve center for the air force and frontal staffs. Our

main communications center was relocated together with the staff closer to the capital back on 13 November, and into Moscow on 19 November. We changed the staff's location in order to protect it from enemy bombing raids.

The intensity of radio traffic grew constantly, and its potential decreased almost proportionately. The problem was that the regiments, divisions, and the air force staff were using radio sets employing generator tubes of a particular type. There were not enough of these tubes to go around. Enterprises manufacturing communication equipment, including electronic tubes, were evacuated to the east and had not yet set up mass production. One set after another fell silent. We were able to procure only five of the radio tubes we needed to supply all of the units. An R-5 aircraft had to be specially dispatched to deliver them.

"This all so funny I forgot to laugh, Nikolay Dem'yanovich," Ptitsyn muttered in this regard to General Psurtsev.

"There is nothing I can do," the general spread his arms out in defeat. "There won't be any more tubes for the next half year, use what you have sparingly...."

An order to utilize the life of the radio sets carefully was sent out to the units. Air force headquarters dramatically reduced its use of radio equipment. Radio sets were used only as receivers on those routes where wire communication was stable. Our radio operators became bored. The following joke made its rounds among them. A commander ordered a radio operator to transmit a message by radio on priority. The operator replied "I can't, we've lost emission." The commander exploded in anger and gave his orders: Punish the guilty and fine them three times the cost of the lost emission....

One joke followed another, but "lost emission" hunters were found. Major N. Z. Rabinovich and Military Engineer 3d Rank I. A. Bakhrakh took on this job. The supply dumps had sufficient reserves of other tubes used in bomber radio sets. The efficiency experts created an original printed board which was used to connect from two to four tubes in parallel. The Rabinovich-Bakhrakh invention replaced the scarce generator tubes, and the radio stations returned to life.

The difficulties with radio communication made it necessary for us to show more concern for wire equipment. N. D. Psurtsev established strict standards for correcting faults in the transmission lines. Whenever damage could not be repaired within 2 hours, the problem was reported to him personally. Such stiff standards did have a realistic basis. The line control and testing posts were up to 10 km apart. Linemen from both neighboring points had to walk the line to find and correct the damage. Thus each one had to travel 5 km. A soldier could run this distance in 30-35 minutes. Moreover there were emergency repair teams furnished with motor transportation at the key control and testing points. These teams were used to repair the most serious damage. An exceptional effort was made to satisfy the established standards.

CHAPTER SIX

WE ATTACK!

It was a deep dark night. An icy wind raged through the streets. The wind moaning in the pipe of the heating stove made the skin crawl. I could not fall asleep. An hour previously I had returned from Podol'sk, the location of the headquarters of the 77th Air Division, which was attached to us as reinforcement. All of the airplanes asked for were there, and the full complement of pilots, gunner-radio operators, aircraft technicians, and motor mechanics was present. But only a negligible quantity of communication equipment was available; moreover the radio operators had been trained to work only with the microphone.

Thus we were compelled to say some unpleasant words to the formation's communications chief and its chief of staff. They had not only failed to bring in civilian specialists to the formation's location, but they also had not organized training yet for soldiers assigned to the communications subunit. Their own manpower was unable to keep communication with the frontal air force headquarters working for even a single shift.

When I reported all of this to Colonel Ptitsyn, he interrupted me before I got very far at all:

"Do you think its any better in the 28th and 38th? They don't even have radio sets. There are only one or two signalmen in the companies. The commander has issued orders to immediately form a communications company for the 77th, and to supply radio sets to the 28th and 38th...."

But the very fact that new formations were joining us was cause for joy. This meant that our motherland was still strong! A few days later another four divisions, the directorates and personnel of the 13th and 56th aviation base areas, arrived. The new air formations went into action immediately, and they did much to halt and defeat the German hordes at the capital's approaches.

Fresh formations and even major formations also began joining the ground troops. News of this made its way quickly up the grapevine. Everyone was

aware that these fresh forces were not being accumulated for just defense alone.

"We will soon begin attacking, Yevgeniy!" Il'ya Ivanovich thundered joyously when I returned from one of my routine trips to the 77th Composite Air Division.

"When?"

"Well, aren't we curious! Too much knowledge makes you grow old faster."

The colonel informed me that we had just been furnished 200 male signalmen from the Siberian Military District. They had all been trained as linemen, and many had worked before as electricians. But what we needed most of all were telegraphists and radio operators. However, this physically strong male complement was not superfluous. These soldiers were attached as reinforcements to the line subunits. Later the Siberians became the core of an army telegraph line construction company.

Supplying the new troops with radio sets turned out to be the most complex problem. Industry could still not satisfy the sharply increasing demands of the army. Nevertheless we did find a solution. Someone recalled that RSB radio sets had been removed from damaged airplanes at various times. About 20 of them were found at the dumps. But to make them work on the ground we needed high-capacity storage batteries, small engines, dynamos, and motor vehicles. A group of specialists was sent by the section to Moscow. Executives of the capital's enterprises were more than willing to help the frontliners, furnishing them with the dynamos and the engines and the storage batteries. Our rear services chief--Colonel V. D. Uspenskiy--managed to scrounge up some ton-and-a-half panel trucks. In 8-10 days their bodies were rigged up at the aircraft repair shops and 15 radio sets were installed in them.

The forthcoming offensive posed many new, urgent tasks to the signalmen. Control of large masses of troops on the broad front had to be insured. At that time, major ground formations and aviation did not as yet have a corps level of control, which significantly increased the total length of the lines of communication and necessitated excessive expenditure of men and equipment. It was a cold and snowy summer. There was a lack of motor transportation, fuel, and the most diverse technical equipment. Nor was there a reserve of trained people. Another important problem was that we had never had experience in organizing communications for offensive operations. Nevertheless the air force signalmen passed their tough examination in their first major offensive.

Organizing radio communication for the offensive, we were concerned by its capacity, especially in relation to radio networks which higher headquarters used for radio exchange with individual correspondents. A special order of the front commander was published in this regard: The message volume

was pared down, and the order and schedule for transmitting the messages at each level of authority and processing and delivering them to cryptographic organs and the command were spelled out. Army General G. K. Zhukov demanded that operation orders and fragmentary orders be transmitted only by qualified radio operators.

This order compelled staff workers and service chiefs to eliminate the wordiness of their orders, and to transmit only that information which was in fact very urgent and important. All other messages and orders had to be sent by mobile resources. We adhered to this system until the end of the war.

The radio operators themselves also made a sizable contribution to increasing the capacity of radio communication. The concentration of radio equipment grew more and more at the front. The airwaves became increasingly more crowded. The radio operators had to invariably ask correspondents to repeat groups missed during reception, and to retransmit them to confirm the received radio messages. All of this required twice as much time and reduced the efficiency of the work.

Radio-telegraphists 1st class Sof'ya Shaban and Nadezhda Romanenko suggested making copies of the radio messages. After reception was completed, one copy could be sent immediately to the cryptographic service, and the radio operator could continue working with the other--confirm the wording, correct mistakes, and fill in gaps. Meanwhile the cryptographic service would already be working on the obtained document. If there were some sort of inaccuracies in reception, the cryptographer would take them into account on receiving the second, confirmed copy from the radio operator.

The very simple innovation considerably decreased the time of radio message transmission and decoding. After a few days this method was put to use in many divisions and units. It was used throughout the entire Great Patriotic War.

On 6 December 1941 troops of the Western Front went over to the counter-offensive in coordination with neighboring fronts southwest and northwest of Moscow. Frontal aviation and the Supreme High Command Reserve made powerful thrusts against enemy strongpoints. The enemy could not hold, he was pushed out of his positions, and he was forced to first draw back and then run. Aviation immediately transferred its effort to the enemy's retreating tank, motorized, and infantry columns, and it bombed and raided his rear bases and airfields.

On 13 December the Soviet Information Bureau reported our victory at Moscow and the failure of the fascist plan for capturing our motherland's capital. The air force headquarters once again moved from Moscow to Uspenskoye, and the rear headquarters moved to Arkhangel'skoye. It only took 2 days to modify the communications centers. By as early as 21 December the Uspenskoye communications center was ready to maintain communications with all of the

air formations and units. The Arkhangel'skoye center went into full operation on 28 December. During this time, the work of relocating staff communications together with the formations did not stop for even a minute, even despite enemy bombing of Izmaylovskiy Park, where our radio center was deployed.

I recall that time, and I cannot help but be amazed by how just a single battalion could service such a quantity of wire and radio communications operating simultaneously in Moscow and east of the capital. The communications centers in the Moscow suburbs were also kept at full combat readiness. For the first while the battalion also had to support General Ye. M. Nikolayenko's air assault group, created to support General P. A. Belov's I Guards Cavalry Corps.

Technicians S. G. Golovin, V. K. Yermachenkov, and others would not leave the communications center for days on end. The radio operators were, so to speak, in their second wind. One incident at the telegraph station comes to mind.

S. A. Khudyakov, who was now the frontal air force commander, had to transmit an urgent operation order to the 77th Composite Air Division. The communications duty officer, Lieutenant F. A. Zinenko, knew that Zina Gomoreva had already been working for 16 hours straight. But he did not have the power to replace the telegraph operator. Who was there to replace her, moreover? Everyone else was just as tired. To make matters worse, Gomoreva was one of the best specialists.

Khydyakov came in, greeted the telegraph operators in his usual manner, and began dictating the text of his order to Zina. He soon noted that she could barely keep her head from dropping onto the transmitter. The commander quickly scanned the tape with his eyes. On it, the words "column of tanks" were substituted by "column of airplanes." Sergey Aleksandrovich took the young girl by her shoulders:

"Hang on, Zinochka. You are almost finished. Transmit this and go take a rest right away."

"Oh, excuse me, I'll get on it right away." Zina shook her head several times, took several deep breaths, and continued working.

S. A. Khudyakov went straight from the telegraph office to Colonel Ptitsyn.

"Il'ya Ivanovich," he began. "Something has to be done. We can't go on like this. We'll wear out the young girls completely."

"You're right, they're being pushed to the limit. What we need is a communications regiment, not a battalion. I don't see any other solution."

Incidentally even the battalion might have been taken away from us. Some zealous chief [illegible] the Red Army Air Force Mobilization Organization Directorate

came up with the notion that the frontal aviation staff should be serviced by the frontal communications center. It was suggested to us that we pare down the battalion to the size of a separate company. S. A. Khudyakov was forced to personally report everything to the Red Army Air Force commander, and to insist on keeping the battalion.

"We'll make our needs known," Sergey Aleksandrovich agreed, and then he asked: "How are your teeth doing?"

"They're getting loose," Il'ya Ivanovich waved his hand in despair.

It is true what they say, that misery loves company. Extreme tiredness and poor diet were being compounded by scurvy. Physicians call this disease "ulcerous stomatitis." The gums bleed, and the teeth come loose. But of course, no one could even think of hospitalization or of being released from work.

Thanks to the physicians and quartermaster service, a real battle against this disease was initiated. We rinsed our mouths with a pine needle brew, and we rubbed our gums with carrots and onions. Later our 100 gram frontal vodka ration was substituted by an alcoholic beverage called Tarkhun, which contained a large quantity of vitamins. It was also sold at the base exchange.

We managed to surmount the scurvy. After this it never visited us again.

On 20 December Colonel D. M. Morozov and I were at Ryazhsk to receive units coming in as replenishments. During the very peak of the work we were called over to the Morse transmitter. Ptitsyn was transmitting: "Both of you are to return to headquarters immediately, before dark."

"Whatever for?" I wondered.

"Perhaps they have finally agreed to our request to send us behind enemy lines as paratroopers," Morozov suggested joyfully.

The first person we met at headquarters was Il'ya Ivanovich. "What's this, is he going to the theater?" flashed through my mind when I saw the colonel. His boots were shined, his trousers and shirt were immaculately ironed, and his face was graced with a long-forgotten childishly happy grin. He would not listen to our report; instead, he hugged us both and exclaimed:

"Congratulations, brothers! We're off to the Kremlin. Mikhail Ivanovich will award our orders himself.

Orders? For us? Kalinin himself? Words cannot express what I felt in response to such news. There was joy and agitation, pride and a sort of embarrassment, a feeling of greater responsibility, and the desire and readiness to move all mountains!

We raced to the Kremlin in a car. For some reason we were all silent. The day of 23 February 1924 came to my mind. It was then that I had the fortune to see the national hero for the first time. He had come to Kaluga to participate in the celebrations of the sixth anniversary of the RKKA, to make a speech in the theater to the soldiers of the 81st Rifle Division and the city's laborers. Mikhail Ivanovich spoke quietly, but it was so silent in the hall that we could hear every word distinctly.

In his short speech M. I. Kalinin appealed to the warriors and commanders to master military affairs, and to the laborers of Kaluga to enwreath their Red Army with love, deep attention, and concern for it. Mikhail Ivanovich said: "Everyone of our Red Army soldiers is highly hopeful of earning a marshal's baton. And if he has the military talents, nothing will block his way."*

Six years later I was called into military service and assigned to the 81st Rifle Division. The commanders and political workers often told us about M. I. Kalinin's speech, and they retold his words about military duty and about the possibilities offered to every Red Army soldier and commander for career advancement. His words were effective and true. More than half of the people I was called up with became regular soldiers. R. Ya. Malinovskiy, battalion commander in the 243d Rifle Regiment, and artillery division chief M. N. Chistyakov, both of whom were present for M. I. Kalinin's speech, subsequently put on marshal's stars. I. S. Konev, who had worked for some time as the 81st Division's chief of political affairs, also became a marshal.

There were about 30 people in the Kremlin hall. The general that met us cautioned us not to shake hands too hard with Mikhail Ivanovich on receiving the award.

The boxes containing the orders and citations were brought in. Mikhail Ivanovich entered the hall. He was somewhat round-shouldered, he had very kind eyes, and he wore a wedge of a goatee. When Kalinin began speaking it seemed to me as if he was continuing that memorable speech in Kaluga--his voice was quiet and even, and his words were distinct, clear, and pithy. M. I. Kalinin heartfully congratulated each of us on receiving the motherland's high award, and he presented the Order of the Red Star to I. I. Ptitsyn, D. N. Morozov, and me.

Other servicemen in the battalion also received government awards. The "For Valor" Medal was given to telegraph shift chief Ye. N. Ryabtsev. The "For Combat Service" Medal was given to radio operators M. Churilina and Ye. Zavadskaya. Both of them were specialists 1st class by this time. Class

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* Materials of the Kaluzhskaya Oblast Archives, F. 85, d. 1363, l. 46.

ratings were introduced for radio operators in the Western Front in December. This was highly influential in upgrading their qualifications. Moreover, 1st class radio operators were awarded the warrant officer rank, 2d class operators were awarded the senior sergeant rank, and 3d class operators were made sergeants. After a while, class ratings were also established for telegraphists.

Presentation of orders and medals to the signalmen, introduction of class ratings and, to an even greater extent, the successful advance of Soviet troops at Moscow and liberation of a number of oblasts from the invaders inspired all of the warriors and commanders for even more selfless labor.

Wire communication lines damaged by the enemy were restored and new ones were built immediately behind the advancing troops. The work was in and of itself hard, and snowfall was exceptionally intense that winter; to make matters worse there were various organizational misunderstandings. Disputes concerning the distribution of wire transmission lines arose between signalmen of different branches of troops. The arguments even extended to matters as trivial as who was to suspend the wires, and where they were to be located on the poles.

Colonel Ptitsyn sent me to the 14th Aviation Base Area to help local specialists prepare communications for westward-moving units of the 28th Air Division, and to organize restoration of wire lines on liberated territory.

I came across some pleasant news in the division: The mobile assault group created by 50th Army commander General I. V. Boldin had broken through to Kaluga at dawn on ~~21~~ December! Each day I tried to find something out about the situation around my native city. But the situation was fluid there. The 50th Army's rifle divisions had fallen behind the mobile group headed by General V. S. Popov. Its flanks were exposed. The enemy did not delay in capitalizing on this. He brought in two infantry divisions to Kaluga and cut the group off from the army troops.

For 10 days the encircled groups and units of the 50th and 49th armies approaching as reinforcements stubbornly fought for the city. On 30 December they pushed the Germans out of it for good.

I could not wait to visit my home town. After all, I did not even know whether or not my family had been able to evacuate. The interests of service do not always coincide with personal wishes. But fortunately they did in this case. Someone had to determine the extent to which communication lines had survived on liberated territory.

I flew to Kaluga in a U-2 with pilot F. A. Morozov. We hugged the ground as we flew toward the city along the Oka channel, covering ourselves by its high banks. The lumber mill and the electromechanical plant soon appeared.

All that was left of them were the half-destroyed frames of the brick buildings. We noticed a pair of U-2's with red crosses on their sides next to a railroad fill. Morozov dropped down to land. Several shells exploded noisily a couple of hundred meters away. The pilots of the air ambulances swore at Morozov:

"Get out of here! There are still Germans in the village of Anenka. Just 4 kilometers away. They've gotten a fix on you...."

On their advice Morozov taxied his airplane right up to the railroad fill--there was no danger of being struck by shells there.

My father-in-law lived not far from the place we landed. Morozov and I headed for his home. The door was opened by an emaciated old man with tearful eyes who exclaimed:

"Zhenya, is that you?"

I recognized Aleksandr Alekseyevich only by his voice. He told me that my wife and children had abandoned Kaluga a day before the invaders arrived, and that where they were now, he did not know. We talked till midnight. The terrible story I heard chilled the soul. The Germans committed terrible atrocities, they shot and hanged civilians for no reason at all, and they spared neither the old nor the young. They burned down the theater, the post office, th shopping district, and many homes, they destroyed all monuments, they leveled the K. E. Tiolkovskyy Home-Museum, they annihilated the Tiolkovskiy Archives, and they broke up and carried away the rocket models. This last act tore at the heart especially--Konstantin Eduardovich taught in our school, and I knew him well.

In the morning Morozov and I left to inspect the city. Civilians and servicemen were erecting defensive reinforcements across the streets with whatever materials available, and they set up gun positions in brick houses. The front was still next door....

Morozov and I did not walk the streets of Kaluga long, and we saw enough. The fascists had shamed its very heart--Lenin Square, so greatly loved by Kaluga's citizens and created in the city center in the 1930's at the site of the former market square. A memorial to Vladimir Il'ich was erected there, hundreds of lindens were planted,and in the summer the place was flooded with flowers. The Germans located their cemetery here, dotted by birch crosses.

In less than a century and a half Kaluga had twice experienced the hardships of an enemy invasion, and twice it witnessed the defeat of enemy hordes. Grateful to their liberators, Kaluga's residents erected a memorial in the city after the war. The motherland's indestructibility is represented by two guns--one an 1812 model and the other a 1942 model. The following was inscribed on one side of the monument: "Here passed troops that had defeated

the French Army in the Patriotic War of 1812." The other side read: "Here in 1942 passed Soviet troops who had defeated the fascist German hordes at Moscow." An excerpt from a letter written by M. I. Kutuzov to the city's residents was also reproduced on this monument: "It is my pleasant duty to inform the residents of Kaluga that the enemy of the Russian people has been put to flight.... You are entitled to call yourselves worthy sons of the fatherland.... Know that in order to be a victor, you need only be a Russian!"

The successful offensive of our troops made it necessary to move the air formations westward. S. A. Khudyakov, who had now been promoted to general, ordered Colonel Ye. I. Blokhin, the chief of the airfield section, to determine the locations of future airfields, and he told Colonel I. I. Ptitsyn to determine the possibility for providing communication to them. The commander advised in this regard that my services be contributed to the work--he was aware that I knew Kaluga and the area surrounding it like the back of my hand, and that I had worked there as a civilian communications specialist and later in the communications company of the 81st Rifle Division.

Yevgeniy Ivanovich Blokhin pored over a large-scale map far past midnight, and we determined the most suitable tracts of land at Kaluga, Kozel'sk, and Mosal'sk. I named only the bridges that I knew well, and I recalled the origins and destinations of wire transmission lines passing near them. Blokhin plotted all of this on the map. Reconnaissance performed later established that the old lines were indicated accurately, and that all but one of the suggested tracts of land were suited for year-round use. Our staff also received information on the forward airfield network from the air forces of the Moscow Military District, though the communication lines were not indicated.

Forward airfields in Kaluzhskaya Oblast were not far from roads, and they were contiguous with forests. The forests made camouflage easier. Aircraft revetments were built at the forest edges, dummy highways were laid across the landing strips, and all airfield facilities were camouflaged with brushwood. Dummy airstrips were also set up, and scrapped airplanes and movable mock-ups were located on them.

The Western Front's aviation operated from the Kaluga airfields for about 2 years, flying dozens of thousands of combat sorties. During all of this time enemy bombers raided our bases only twice. The French Normandy Fighter Regiment was based for a long time together with our regiments at airfields of the Kozel'sk airfield complex.

The places for redeployment of air formations in the center and on the right wing of the front were chosen just as successfully. The local public took an active part in preparing the airfields.

Communication with the forward airfields was restored simultaneously with construction of the former. Unfortunately we did not have any reserves

of wire, insulators, and hooks during the initial stage of the offensive. We had to make do with what had survived on the poles, and whatever equipment we managed to capture.

In January 1942 Major General of Aviation Khudyakov traveled to Kaluga in order to find a place to deploy an auxiliary control point. He took Major M. A. Brodinov (an operator) and me along on his trip. We visited the frontal hospital on the way, in Maloyaroslavets. The commander visited all of the wards, he talked with the wounded pilots, technicians, and junior aviation specialists, he asked them how they got their wounds, whether or not they had been decorated, and where their families were, and he asked questions about the enemy's aerial tactics.

This visit made the airmen very happy, and many turned to the general with personal requests. What they asked mostly was to be returned to the same units after their recovery. Some of them were worried that they would not be able to fly any more. Sergey Aleksandrovich countered their fears with the example of Major I. G. Starchak, whom absolutely all pilots knew. Returning from behind enemy lines, Ivan Georgiyevich was wounded and his legs were frostbitten. The paratroopers had to carry their commander out. But now one of his pilots [illegible] in the hospital, and he, the commander, had already visited him twice.

"The surgeons wanted to amputate both of Starchak's legs," the general told the casualties. "But he refused. He is now on his way to recovery. They say that he will soon put on a parachute once again. That's the way it should be! But let your courage fall even a little, and you'll have to kiss the sky goodbye."

In one of the wards Sergey Aleksandrovich called me over to one of the casualties:

"This is one of yours, a signalman."

It was Sergeant Razin, a radio station chief. He was wounded during a night bombing raid. The general ordered me to make sure that the sergeant had been decorated. Incidentally, after Razin recovered he was sent to a military school, and then he returned to our army and ended the war as a company commander with the rank of senior lieutenant.

Before leaving the hospital S. A. Khudyakov met briefly with the medical personnel. One of the physicians asked him about the possibilities of a second front.

"You know yourself that this second front is still nonexistent," the general replied. "It's a long road for the English and Americans from promises to any sort of military actions of real substance. And when they will open it up, we don't know. But I do know that we will soon begin receiving airplanes, radio sets, and cross-country vehicles from the Allies. All of

this will be also be useful to us. And some medical supplies will fall your way as well...."

S. A. Khudyakov also stopped in Medyn', where he inspected the damage caused by the actions of our aviation during the offensive and talked to many of the local residents. He was highly displeased: The bombers could have done much more.

"What we need is confirmation, good photographic confirmation," he told commander Major Brodinov as they climbed into the vehicle.

We could not take the direct route from Medyn' to Kaluga because the enemy was shelling the road. Thus we had to return to Maloyaroslavets. Our airfield was located beyond the city, not far from the Moscow-Kaluga highway. A German airplane had landed on it the day before. Khudyakov decided to inspect the captured craft, and at the same time to find out the details.

How many chance occurrences there are in war! The story of this fascist vulture's landing was too ridiculous to be true.

The airfield was being prepared to receive a fighter regiment. The signalmen of the air base maintenance battalion laid the cables that were needed and set up a telephone station. Senior Sergeant Posypay, the station chief, telephoned for a weather report at dawn, but the weather station would not answer. "What on earth would make someone want to damage the cable!" the senior sergeant muttered as he went to check the line. It coursed along the landing strip. Suddenly he heard noise from the engine of an approaching airplane. The craft circled a few times, and then it launched a series of green rockets. Seeing that the crew could not land yet because it was still dark, the signalman decided to help. Oily rags had been dumped near a revetment. Without a second thought Posypay grabbed the rags, lit them, and scattered them in several places near the landing strip.

The pilot saw the flames, oriented himself on them, turned on his landing lights, and made his landing approach. Excited and happy that he had helped the pilot, the senior sergeant rushed toward the stopping aircraft. He ran over--and stopped dead in his tracks: There was a yellow-and-black cross on the side, and a swastika on the tail fin. Two Germans, both carrying automatic rifles, hopped out of the craft at this moment. But Posypay had no weapons with him. One of the Germans demanded:

"Is this Gzhatsk?"

The senior sergeant knew a little German, but he did not know what to answer. He muttered something incomprehensible and nodded. The Germans took this for an affirmation.

"Where's the Headquarters?" the next question followed.

Posypay pointed in the direction of the hut in which the technicians and mechanics were huddled. Certain that he had landed at his own airfield, the commander of the fascist airplane apparently took the signalman for a local resident working at the airfield: He was wearing a fur jacket, a muff cap without a star, and felt boots.

The Germans hung their automatic rifles on their shoulders and followed the senior sergeant, discussing something loudly with one another. Posypay led them to the technicians in the hut. When the Germans realized their carelessness it was too late to resist, and both subserviently raised their hands. In a little while the third member of the crew--the mechanic--was also led to the hut.

Sergey Aleksandrovich laughed so hard on hearing the story that tears rolled from his eyes.

"Can you imagine," he said as he calmed down, "alone, unarmed, bringing down an enemy warplane. He took the airplane with a match, like a fisherman catching a pike with a puney bluegill. Smart man, that Comrade Posypay! Let's decorate him with the "For Valor" Medal, though what he really deserves is to be punished for violating the uniform regulations and walking the line unarmed."

We finally got to Kaluga. Together with the area chief and Major M. A. Brodinov the commander set off to inspect the airfields, ordering me to remain behind and choose buildings for the auxiliary control point and to clear up some communication problems.

I began with the latter. The frontal VPU already had a communications center in the city. I got together with Lieutenant V. E. Zholi, the commander of the headquarters platoon of the RAB communications company, to study the wire communication network. We persuaded ourselves that we could get wires leading to Peremyshl', Lozel'sk, and Medyn'. We asked the local signalmen to help us restore transmission to several forward airfields, and to place 10 pairs of wires in the urban and the suburban networks at our disposal. The directors of the NKS city office--Ya. I. Vil'menko, N. P. Yashakov, and L. I. Ovchinnikov, responded readily to our request and went to work with us.

Before the commander's return I managed to contact Colonel Ptitsyn by telegraph, to whom I reported the existing possibilities for deploying wire communications. From my point of view the communications of not only the air force headquarters itself but also the formations, to include General Ye. M. Nikolayenko's air assault group, had to be based at the Kaluga communications center. Il'ya Ivanovich agreed with me. It took only 2 days to do all of the work. Credit for this belongs to the very efficient and knowledgeable linemen assigned to me as my aides--Lieutenant V. E. Zholi and mechanic Senior Sergeant A. N. Yeneykin.

The staff of General Ye. M. Nikolayenko's air assault group located itself at the VPU in Kaluga. Its mission was to support the advance of I Guards Cavalry Corps in the vicinity of Vyaz'ma in the direction of the XI Cavalry Corps operating as part of the Kalinin Front. A maneuvarable radio network was created to provide communications to airmen interacting with the cavalry units. This network was placed under the command of I. A. Bakhrakh. Radio operators were prepared to be dropped together with paratroopers in the enemy rear, where General Belov's corps was operating. This landing was managed by I. A. Bakhrakh and A. S. Zvyagintsev. The warriors studied the "Sever" and RSB radio sets and the order of using their personal codes, and they practiced firing automatic rifles and grenade throwing. There, behind enemy lines, communication of the cavalrymen and paratroopers with the main forces would depend completely on their occupational and combat skills. The time of arrival of transport aircraft and the signal permitting or prohibiting landing of airplanes at forest airfields or the dropping of cargo from them could be coordinated upon and timely transmission of orders and reports could be insured only by radio.

The radio operators of the communications center who were to maintain communication with the Red Army soldiers to be dropped in the enemy rear also practiced with the latter. We selected the cream of the crop for this highly important work: Vladimir Dudar', Valentin Khnal'chenko, Aleksandr Garbuzov, and Aleksey Kravtsov.

The airborne assault forces were dropped in support of the I Cavalry Corps in the period from 18 to 22 January. The assault forces took off aboard Civil Air Fleet airplanes from Vnukovo Airport. A group led by Major General of Aviation N. F. Naumenko controlled the operation. The airport's permanent communications center maintained communication with the airplanes in the air. Lieutenant Colonel D. M. Morozov was responsible for all problems associated with radio communication.

The first airplane landed in the enemy rear on the night of 18 January 40 km south of Vyaz'ma. He delivered a launcher detachment and signaling resources there. The wireless operator immediately entered into two-way communication with the command post of the group in Vnukovo and transmitted that the situation favored the takeoff of the assault forces.

This was a very frosty night. The thermometer read about -40° C. The cloud ceiling was low, making ground orientation difficult for the crews. This is why radio communication was maintained with each aircraft separately. The decisions for subsequent takeoffs were made only on the basis of their messages. The transmissions were made in accordance with a radio signal table prepared by the frontal air force staff with D. N. Morozov's active participation.

After they landed, it was not until dawn that Plotnikov's, Surzhik's, and Soldatov's assault groups established two-way communication with the frontal staff. Their low-power "Sever" radio sets could be used only

during the day, from 0900 to 1700 hours; they were unable to reach the main forces at night.

Supporting the airborne operation, military and Aeroflot radio operators worked extremely hard. A new airborne operation was conducted in May-June to deliver reinforcements to the IV Airborne and I Guards Cavalry corps. Upon General P. A. Belov's insistence, Colonel I. K. Samokhin, commander of the 215th Fighter Division, was sent to Belov's command post to organize coordination between aviation and the cavalrymen and assault forces in the enemy rear.

It was foreseen in the planning of the January operation that our high-power radio stations would advance within the composition of the cavalry corps' operational group. However, for a number of reasons the stations broke away from the cavalrymen while en route and remained on our territory together with members of General Belov's group. "Sever" radio sets dropped to the corps would not support around-the-clock communication. We had to organize such communication at all costs, and to prepare, and deliver to Belov, a packable modification of the RSB radio station with a well trained crew.

Many volunteered to fly behind enemy lines. The choice fell on Military Technician 2d Rank A. Shablenko. He was a bold and decisive commander, an experienced radio technician, and a excellent Morse operator.

Our section created a maneuverable radio network. It included high-power radio stations, which were located at the command posts of the air force and the 215th Fighter Division, and RSB and "Sever" radio sets operating at general Belov's headquarters. The network operated around the clock. Extensive information on the actions of Soviet soldiers in the enemy rear was transmitted to the frontal, air force, and division staffs. Despite frequent relocations of the cavalrymen and the continuous battles, our radio group, which was headed by Shablenko, always entered into communication with the main forces on schedule. During one of the bombing raids the station was severely damaged, but the military technician and his subordinates spent not more than 3 hours to repair the station and take to the airwaves once again.

We received the last radio message from behind enemy lines at 0242 hours on 10 June. Vladimir Dudar' was able to receive only four code groups from his friend, Grigoriy Chugunov: "Surrounded by the enemy, and destroying radio equipment...." This was immediately followed by a quickly and inconsistently transmitted uncoded text: "Fascists. Crew dead. Destroying radio set. Farewell." This was transmitted by Shablenko himself.

The radio operators of our communications center monitored Shablenko's wavelength for 5 days. But he had fallen silent forever. We all suffered terribly for the loss of the glorious combat crew. Many comrades began requesting assignments in the enemy rear to replace those that died. But

there was no longer any need for this. General P. A. Belov's corps had rejoined the main forces. The RAT set with which we had maintained communication with Shablenko was named after the latter.

But I have somewhat digressed from the chronology of the events, getting ahead of myself a quarter of a year.

All of the preliminary work of preparing air force communications in Kaluga was completed. I returned to headquarters. Hearing my report on the completed assignment, Colonel Ptitsyn handed me a thin file:

"Here, read this. And be joyful. It's been approved."

The file contained the conclusion drawn up by the Peoples Commissariat of Defense concerning our report on organizing and operating air force communications in the first half year of the war. We began drawing this report up back in September. The report, which was illustrated with diagrams and graphs, was sent to Deputy Peoples Commissar of Defense I. T. Peresypkin and Red Army Air Force Communications Directorate Chief General G. K. Gvozdkov. This was the first document generalizing and critically analyzing the combat experience of air force signalmen and spelling out our viewpoints on the organization of the signal troops and their logistical support. Its authors--I. I. Ptitsyn, D. N. Morozov, and I--were rewarded with personalized silver watches. It was suggested that the report be studied by all organs of military communications, and our concrete proposals were submitted for examination to the Red Army Air Force Headquarters.

The conclusion on the report indicated that the latter was incomplete in its discussion of communication provided in support of the interaction of aviation and ground troops on the battlefield. What's true is true. In the initial period of the war coordination between aviation and ground troops was operational in nature. It did not exist at the tactical level. The overwhelming majority of the fighters and attack aircraft, as the reader already knows, did not possess onboard radio sets. Only one or two airplanes in some regiments were outfitted with transmitters, and the rest, though far from all, carried receivers.

At the start of 1942 the front began to form air units with the mission of correcting artillery fire. They were furnished with R-5 and U-2 airplanes, which in general did not possess onboard radio equipment. Thus RSI-3 and RSI-4 aircraft radio stations pulled out of the reserves had to be mounted specially in them. In order to satisfy the most rudimentary needs of spotter aircraft, we were forced to remove radio sets from warplanes. After all, there could even be no discussion of aerial correction of artillery fire without communication.

The RSI radio sets installed aboard the R-5 operated at a range of only 45-50 km, while the range of those aboard the U-2 was up to 25 km. It was very hard to work with them--noise and crackling arising in the headphones

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was painful to the ears of the artillery spotters. This was especially true with the U-2, and we finally had to abandon the idea of installing radio sets aboard this aircraft.

This, then, was how things stood with radio communications in air formations coordinating directly with the ground troops.

In March 1942 we began an operation to encircle the enemy's Riga-Sychevka grouping. The main air forces of the Western Front were concentrated within this sector. They were controlled and coordination was maintained with armies on the front's right wing from the VPU organized in the 31st Army. The operational group was headed by General S. A. Khudyakov. It included operator Major M. A. Brodinov, a scout, myself from the communications section, a cryptographic specialist, and a meteorologist.

As we know, combat in the Riga sector assumed a protracted nature. The enemy forced our troops to go over to defense. Capitalizing on the resulting lull, General S. A. Khudyakov invited the operational group to his headquarters. Briefly describing the situation that had evolved at the front, he shared his ideas with us on improving the organizational structure of the air force.

"The war experience shows," Sergey Aleksandrovich said, "that dispersal of aviation among the combined-arms armies and the existing composite air divisions makes maneuver difficult and precludes mass use of air forces in the most important sectors. The Germans, meanwhile, have brought everything together into air fleets. Such centralization is precisely what makes it possible for them to create a powerful aviation fist in the main sectors, with which they can effectively help the ground troops punch holes in our defenses."

The commander was certain that we could and should create a better air force structure, one that would allow for the conduct of an air offensive. Without centralized control of aviation, the latter was impossible. In such an offensive we should be able to suppress enemy aviation, cover our own troops, and push them on through the German centers of resistance.

Thus we were essentially discussing the creation of air armies.

The general also talked about the structure of the air force rear. He believed that the aviation base areas should be maintained in their existing composition, but that the manning table of the air base maintenance battalions should be augmented by an engineering service responsible for operation of the aircraft fleet, one which should make it easier for the regiments to maneuver among different airfields.

"So, comrades," Sergey Aleksandrovich said. "All of these ideas need to be documented in a couple of days. Begin right away, add your own suggestions, and for the time being don't say anything to anyone about this. I want to submit our plan personally to Comrade Stalin at a meeting of the frontal air force commanders."

It was not long before S. A. Khudyakov was summoned to the Kremlin. He returned 2 days later and once again brought us together.

"Well, lads, we prevailed!" the general joyously reported. "Our plan was recognized to be the best. Comrade Stalin examined it very attentively. He ordered all of the commanders to prepare for reorganization. After the meeting he approached me and said: 'You have this well thought out. And so it will be your job, Comrade Khudyakov, to implement this plan. I am appointing you chief of staff of the Red Army Air Force'."

We were all pleased by this news. True, it was hard to part with Sergey Aleksandrovich.... After all, we had become very much used to him, we had learned to work together, and he was a wonderful person....

A few days later S. A. Khudyakov was summoned to Moscow.

On 5 May 1942 formation of the air armies began.

Lieutenant General of Aviation T. F. Kutsevalov was appointed commander of the 1st Air Army, which united the air forces of the Western Front. True, he did not occupy this post for long. After him, S. A. Khudyakov was placed in charge of the army. Need I relate how happy this made us: Sergey Aleksandrovich was once again with us! The burden laid on his shoulders was not an easy one--that of reorganizing the frontal air forces.

This great and important work reached full steam with General Khudyakov's return. The air force directorates of the combined-arms armies were disbanded, and their men and equipment were used as the basis of creating the staffs of seven air divisions containing signal companies. The composition of the 1st Air Army now included six new air formations and eight separate air units.

The air army became an impressive and mobile force, and the aerial assault force of the frontal command. The air army rear services consisted of seven aviation base areas, each of which possessed its own signal company. The airfields were serviced by 38 BAO's, the signal companies of which contained 50 men each. In some places these modest forces provided communications simultaneously to two or three regiments, even though they were intended to support just one. It was especially difficult for the signalmen when units belonging to different formations were based at a given airfield. Wire and radio communication had to be maintained with several staffs at once.

A serious discrepancy evolved between the demand for communication and its possibilities. The number of fighting air units increased by a factor of two, but the manning and equipment of our units and subunits dropped by the same proportion following a number of reductions--also by a factor of two. We had just a little more than half of the radio stations we needed, and only one-fifth of the authorized number of receivers. The subunits also had only

half of the required quantity of telephone sets and field cable. Only telegraph apparatus was available to us in its full complement.

No matter how much we petitioned various levels of authority in regard to this problem, we were unable to alter the evolved situation--industry was still barely able to satisfy our needs. Thus we had to seek the solution in maneuvering the existing men and equipment.

Through the insistence of the staff the 1st Separate VNOS Radio Company was added to our army's composition. Its mission was to inform fighter units and the staffs of the air divisions and armies on the aerial situation, and to guide fighters to enemy airplanes. The need for having our own subunit of this sort was argued by the fact that the frontal air warning system had been disbanded during the battle of Moscow and its functions were transferred to the Moscow Air Defense Zone. Following the successful offensive the capital's VNOS posts found themselves deep in the rear, and there was a considerable delay in reporting the appearance of the airborne enemy to our airfields; moreover they did not possess radio equipment with which to guide the front's fighters.

The company was manned by rated radio operators. It was placed in the charge of a willful and bold commander, Captain I. M. Korostelev. It began its combat activities at the end of June with five RSB and five 5AK radio sets.

The VNOS posts were located 7-8 km from the forward edge, and they were spaced 20 km apart. Several of the posts located within the zone of one PAB were united into a zonal radio network. Post chiefs were chosen from among pilots of those units which were operating in the given sector.

Each post had a signaling area. A large ring with a diameter of 60 meters and a thickness of 3 meters was placed in its center. A movable 40-meter pointer 3 meters wide was secured in the middle. The ring was then broken down into degrees. The post number was marked next to the ring. In order that all of this could be seen well from the air, the rim of the ring and the number were marked on the ground with chalk or lime, and the pointer was also painted white (black in winter). It was with this pointer that the post indicated the target direction for the pilots. Information on the altitude, time, and range was transmitted to them by the posts with special strips of fabric. It was with such primitive resources that airplanes unequipped with radios were guided to the targets. Arriving in the area of the post, by various sorts of turns of the craft the pilot transmitted an identification signal, the post launched a rocket of a particular color in response, and if it possessed information on the enemy it put its cumbersome "machine" into action.

Fighters and attack aircraft having radio sets aboard queried the posts for information on discovered targets and immediately went to battle, certain that the ground would always be capable of coming to their aid, informing

them of all changes in the aerial situation. But at that time we had too few such aircraft. And so we had to resort to the pointers and the strips of fabric.

All radio signals transmitted by the air warning posts were received by the RAB and by airfields located within its zone. They were transmitted from here to the radio center of the army headquarters. At our location the signals were processed and read by an announcer over the headquarters broadcasting network. It took from 4 to 5 minutes for a signal to be transmitted from the front line to headquarters.

Of course the visual observation posts were not sufficiently effective in guiding fighters to targets, but nevertheless their creation was a start in the effort to inform pilots on the situation in the air over the battlefield and to permit its generalization by the army's main post.

Incidentally the circles on the ground and the post numbers were quickly found to be beneficial by our army's navigator, Lieutenant Colonel L. V. Vinogradov. Checking out the forward edge from the air, he could distinctly see the numbers marked on the ground. Each pilot knew where the posts were located. Consequently, Leonid Vasil'yevich decided, the posts could be used as beacons for successful orientation in flight.

German pilots also quickly noticed our structures, they began to appear over them frequently, and soon they began firing at them and bombing them.

The air warning posts remained in existence in unchanging composition, together with all of the ground equipment, for more than a year, until such time that most of the warplanes were outfitted with radio sets.

I can recall two funny incidents. Some of our warning posts were deployed together with VNOS crews of the Moscow Air Defense Zone. The latter possessed cumbersome and generally primitive sound detectors making it possible to hear the roar of an aircraft engine somewhat before it was possible to do so "with an unaided ear." Once during an inspection of the warning service I had to spend the night at one such post in the village of Il'inskiy. It was commanded by Senior Sergeant Pereverzev. I asked him whether or not the device worked reliably.

"Oh, it's all right," the senior sergeant replied. "But the dog is better."

"The dog?"

"Yep, it's a stray that walked in on us one day. It hears the airplanes 2 or 3 minutes before we can with our sound detector. Zummer, come here!" Pereverzev commanded.

A shaggy dog came to the call, wagging a friendly tail. As a joke, one of the Red Army soldiers decorated his chest with several German orders and medals.

"We form up to decorate the dog every time he detects an airplane," the senior sergeant smiled.

Well, I thought, they were bored, and playing circus amused them. The young girls at the communications center play with dolls, and the boys amused themselves with the dog, dreaming up various war stories. I did not believe the sergeant at that time. Soon after the war, however, when I was serving in Azerbaijan, I was inspecting the air warning service together with Colonel N. P. Sionskiy, an air defense liaison officer. We arrived at one of the posts. There was not a soul either in the tower or in the trench in which the sound detectors were mounted. There was only a shaggy dog lying beside the dug-out, wagging his tail in greeting. I entered the dug-out. The command "Attention!" was given. The crew jumped to its feet, and the senior sergeant, whom I immediately recognized as Pereverzev (after being wounded at Moscow he was left with a very identifiable scar on his right cheek), reported:

"Comrade Colonel, the post is combat ready."

My fellow traveler was about to read the commander down, but the dog began barking persistently at this moment. Pereverzev commanded loudly:

"AIR!"

The soldiers took their places with lightning speed: the observer in the tower, the sound detector operator at his device, and the telephone operator at his station; the latter called the battalion post and reported:

"AIR, we can hear an engine."

In couple of minutes the detector operator also sensed the sound of the aircraft, and he reported its approximate course. A minute later we saw the target ourselves.

Thus we found that the dog--this was the same Zummer--reacted much faster than the operator. The senior sergeant had kept the dog with him throughout the entire war. Zummer was always able to inform the crew of an airplane's appearance. Nor did Pereverzev part with his four-legged friend when his unit was transferred to Azerbaijan.

Colonel Sionskiy was very interested in this unusual fact. He was taken by the thought of using dogs on an extensive scale in the air warning service, and of having them trained by professional trainers, and even scientists. But he never did get anywhere. Zummer turned out to be one of a kind.

The troops of the Western Front advanced westward more than 120 km along the entire breadth of their sector during the fall-winter offensive. The air formations redeployed in areas liberated from the enemy. Our lines of communication grew long. The frontal staff moved to the vicinity of the Obninskoye.

We moved there as well on 1 June. Our staff first located itself in a home at the Obninskoye rail station, and then we moved into the forest by the village of Dobroye. The move was only 4 kilometers, but it caused a great deal of trouble, especially in regard to laying lines to the communications center. As usual, we did not have the wires we needed in reserve. General N. D. Psurtsev had to transfer the entire reserve of copper wire to the airmen. He made Colonel Ptitsyn give his word that he would replace it with iron wire at the first opportunity.

This copper wire caused a great deal of trouble for soldiers of the 37th Company. Wires suspended from the poles sagged. They had to be tightened periodically. And the total length of the copper lines was rather considerable--180 kilometers!

The communications center set up at Dobroye had 26 telegraph links, 20 of which were serviced by ST-35 transmitters. Seven telephone circuits connected it to frontal headquarters. The radio was placed in the vicinity of the Ugodskiy plant for the purposes of camouflage. It had direct telegraph and telephone links to the headquarters. In the event that the radio center were to break down or communication with it were to be cut off, the headquarters possessed two deployed radio sets in constant readiness. In memory of the paratroopers that died in this area, we named the radio communications center after Tsvetkovskiy, and the crew shifts after Moyseyev and Korneyev.

While at Dobroye our signalmen began operating an all-wave radio center manufactured by our efficiency experts. They were encouraged to do so by the fact that our communications center had only six receivers, which was clearly not enough to service a major staff. Moreover these transmitters did not cover the entire range of wavelengths used by our RAF, RSB, and RAT radio sets, and the shortwave radio center we employed did not possess an outfit of telegraph transmission devices.

Thus a group of experts thought up the idea of creating an all-wave center through their own efforts. The work began while we were still in Moscow. It was supervised by Military Engineer 3d Rank G. I. Gitel'. The efficiency experts were rather successful at installing 13 receivers in a ZIS-8 bus. The storage batteries were located outside the vehicle, in a specially fabricated compartment. The charging unit, which had a capacity of 5 kw, was housed in a tent set up 100-150 meters from the bus. Each receiver had its own antenna. It was suspended from a cable stretched between two extendable 8-meter masts.

Gitel' and his helpers called their original invention the RUV-13, which stood for "all-wave 13-receiver radio center." It could be used for remote control of eight transmitters up to 5 kilometers away. In parallel with the mobile RUV-13, the efficiency experts created the stationary RUV-16, which was good for buildings and dug-outs. The equipment of each radio operator--a receiver and a telegraph key--was stored in a trunk, which transformed into a work table when deployed. The center was powered by a

battery charging installation mounted within the motor vehicle. It was transported by a single ZIS-5. It took only 3 hours to make the RUV-16 ready for operation. These homemade units became a significant help to us in maintaining continuous radio communication, especially whenever we had to move.

The wire and radio communication centers at Dobroye made it possible for the staff to successfully control the air formations during the summer offensive operations of 1942. By this time the signalmen had gained rich combat experience, and our material base had grown stronger.

CHAPTER SEVEN

WITHOUT PAUSING FOR BREATH

On returning from the commander, Colonel I. I. Ptitsyn summoned the section's executives.

"Things are beginning to come together," he declared. "We will be attacking."

Il'ya Ivanovich explained that the Western Front did not presently have enough men and equipment to conduct major offensive operations. Therefore the Supreme Headquarters ordered a number of partial ones. Their goal was to contain the enemy reserves and prevent their transfer to the Stalingrad sector. The mission of making a thrust in the direction of Bryansk was posed. Nine air divisions were being concentrated in support of the ground troops.

"The commander ordered us," the colonel continued, "to maintain the following communication links: with the combined-arms armies by ST-35 telegraph, telephone, and radio; with the air division staffs by telegraph, telephone, and radio; we are to make broad use of liaison airplanes. We are to be fully ready by the morning of 5 July."

Ptitsyn spread out a small sheet of thick paper on his desk. A diagram of the communications network for the forthcoming operation had been sketched on it by General S. A. Khudyakov. Kaluga was the starting point from which the army commander had drawn lines leading in almost all directions.

"Fly to Kaluga," the colonel ordered me. "Take charge of the center's preparations."

Our Kaluga communications center was operable. It did not take very much equipment or time to make it completely ready. But will the reserve company transferred to us from the Red Army Air Force be able to operate such a large communications center? It did not have enough personnel and, moreover, the qualification level of the soldiers was not very high. I reported my doubts to Ptitsyn by telephone.

"See what help you could find locally, go ahead and reinforce the company yourself," Il'ya Ivanovich instructed, and he added: "Remember that the commander will be flying to your center on the fourth of July. You'll be driving with him to the combined-arms armies, and there you'll settle all of our interaction problems...."

By 4 July all wire transmission lines indicated by General S. A. Khudyakov in the diagram went into operation. Radio communication was also completely ready for work. There were also two telegraph links to Dobroye. Thus anyone of the air formations could definitely be contacted from Kaluga. But in what way was I to help the attached company? It turned out to be impossible to find "local resources." There was nothing to do but report the evolved situation to the army commander when he arrived at our location.

"Summon Ptitsyn here," the general ordered. "There's nothing for him to do at headquarters right now. Let's drive over to the 16th Army."

While en route I continued with my report: We tried working with the ground troops several times from our VPU, but they do not respond to calls very well; in all probability their radio operators are poorly trained, such that we would hardly be able to achieve any degree of efficiency.

"I could send my own people to the infantry, Comrade Commander, but I don't know where I could dig up a radio set."

"When we become richer," Sergey Aleksandrovich uttered thoughtfully, "we will provide radio sets not only to all of the combined-arms formations but also to mobile groups and the assault groups, which will be aided by air force liaison officers. For the moment, however, we will have to do with what we've got."

I immediately "went over to the attack" on meeting the 16th Army's communications chief, Colonel P. Ya. Maksimenko:

"I tried to call you by radio for several hours last night, but the radio operator invariably replied the same thing--that you could not be called to the radio. Why?"

"Because the radio set is not exactly next door," the colonel replied unperturbed.

It turned out that the radio set intended for coordination with aviation had been placed by Maksimenko in the second echelon, 20 km from the staff's assault echelon.

"Such a powerful set has to be kept farther away," Maksimenko explained. "Otherwise the Germans can get a fix on it, and they might surmise that wherever there is a radio set, there is also a headquarters."

This issue had to be resolved by the higher authorities. A special item was included in the coordination plan, foreseeing that a radio station would be set up right at the command post of the 16th Army for communication with the air force VPU, and that we would deploy a radio set to call up and guide fighters within the main offensive sector of the assault grouping.

It took about 5 hours to coordinate the plans. Saying our farewells to the combined-arms soldiers, we headed for our vehicle. Two Messerschmitts were circling in the air, at an altitude of 1,000-1,500 meters. They attracted General Khudyakov's attention, and he began observing the flight of the fighters. The enemy airplanes would at times come together and at other times fly apart a rather considerable distance, performing a maneuver having the pattern of huge open scissors; they exchanged places while in flight, and they took turns diving. In all probability something in this area attracted the Germans, and they were meticulously inspecting the ground, and possibly even photographing it.

"Now that's coordination!" Sergey Aleksandrovich uttered. "That's possible only when the leader and follower have radio contact. Our signalmen, unfortunately have still not taught the pilots how to use the radio properly in the air."

The general looked at me. His gaze offered an unconcealed reproach.

"The signalmen, Comrade Commander, don't have anything to do with it," I parried the unjust reproach. "The army chief engineer is responsible for outfitting the airplanes with radio sets, but isn't doing much about that and no one is holding him responsible."

"Well, it didn't take much to get your goat," Khudyakov teased without malice. "But rather than looking for someone to blame, what we need to do is take some effective steps. The absence of radio communication constrains maneuver of the air groups, especially fighters. As soon as we finish this operation we'll tackle this problem head-on."

I returned to Kaluga in the evening. The operational group had already settled itself at the VPU. The commanders of the different communication routes were gathering the information they needed from the units by telephone and transmitting the latest data on the situation. But things were not gelling with the telegraph transmitters: The telegraph operators of the attached company worked unconfidently. The staff officers were nervous and irritable. Once again I had to tell I. I. Ptitsyn about the abnormal situation at the communications center.

In the morning he himself flew over, and he persuaded himself that we would be unable to perform our mission with such personnel. Il'ya Ivanovich gave orders to send all free airplanes of the communications squadron to Dobroye and bring the most experienced specialists back to the VPU.

Telegraph operators Anya Kravchenko, Zhenya Khayutina, Tanya Alekseyeva, Galya Zapol'skaya, and Zhenya Pershina, radio operators Marusya Churilina, Sonya Shaban, Frosya Babashko, Nadya Romanenko, Marusya Demina, Marusya Babayeva, and Vasiliy Leshchenko, and two technicians, senior lieutenants V. V. Andreyev and V. K. Yermachenkov, were brought in from Kaluga.

"You should have done that a long time ago, rather than placing some sort of greenhorns at the transmitters," said operator Major Yepanchin when the young girls took their places.

The army signalmen always worked diligently wherever they were stationed, oblivious to the time. They worked fabulously themselves, and concurrently they transmitted their experience to the young telegraph operators from the attached company. RAB signalmen--Technician-Lieutenant V. E. Zholi and Sergeant A. N. Yeneykin--provided a great deal of help in deploying the communications center.

The offensive began. General S. A. Khudyakov tried to make massed use of army aviation, sending large groups of airplanes in the direction of the main thrust. On 5 July our bombers and ground-attack aircraft literally hung over the battlefield. Heated battles with enemy fighters went on constantly in the air. The balance was clearly in favor of Soviet aviation in this sector of the front during the first days of the offensive.

But there was a "but"--the fighter control post failed to serve its purpose. It was located too kilometers from the forward edge, not far from the 16th Army's command post. Khudyakov's assistant, Colonel L. G. Kuldin, was there. The overwhelming majority of his attempts at guiding the fighters to the targets failed completely. It sometimes seemed to Kuldin, as he related later, that the pilots were intentionally avoiding communication with the radio guidance station, and that they performed maneuvers diametrically opposed to those asked for.

Only pilots of the 18th Guards Fighter Regiment responded correctly to commands from the ground. The group leaders responded punctually to the calls for assistance, and they quickly entered into communication with the radio guidance station. The secret was simple: A third of the regiment's airplanes possessed transceiving radio sets, and half possessed receivers. Supplying other units in this way could only be a dream for the moment....

Colonel Kuldin spent 2 days at the control post. Realizing that he was not doing any good at all, he returned to headquarters. He levied an abundance of fully grounded complaints against both the chief engineer and the communications section.

Nevertheless the combined-arms command gave a high evaluation to the actions of aviation as a whole in the first days of the offensive. General Khudyakov discussed this in my presence on a Baudot system with General A. A. Novikov, commander of the Red Army Air Force.

"I became persuaded," Khudyakov dictated, "that 700-800 airplanes could be concentrated within a narrow area of the front and used within the main sector of the advancing troops. For the first time in the war we were not ashamed of our presence among the troops at the front. Aviation literally hung over the enemy and punched a path clear for the infantry. The fact that the planned objective had not been attained in the first day of the operation was no fault of aviation. The enemy managed to bring in his reserves, the destruction of which was not within the means of the attacking forces. I will continue to insist on a policy of massed use of aviation. Help us, Comrade Commander, to furnish the fighters and ground-attack aircraft with onboard radio sets faster. I feel that this is now the key."

Leaving the instrument room, Sergey Aleksandrovich approached the open window, listened, and asked:

"'Tourists' again?"

"Yes, Comrade Commander," answered operator Major M. A. Brodinov, who was accompanying him.

"Mm, yes, we didn't choose a very good place, did we?" the general said, and then he headed for his office.

The appearance of a large number of air force commanders here, many of whom were high-ranking, immediately raised the curiosity of the local public. Moreover, who could guarantee that a few German accomplices and spies might not still be in the city? Regimental Commissar V. N. Petrov, the staff commissar, was especially insistent on changing the location of the VPU.

Thus we had to abandon Kaluga. The VPU was moved close to the rail station of Azarovo. The city's civilian signalmen helped us quickly switch the lines to that point. General S. A. Khudyakov declared his gratefulness to their leaders, N. P. Ushakov and K. I. Ovchinnikov, in an army order.

The 203d Communications Squadron worked very hard during these days. Its airplanes made three trips daily in all air formations. Besides the 203d, the 1st Squadron of the 713th Night Bomber Regiment was brought in to support communications. Its pilots had learned to fly at night and in complex meteorological conditions. What they did for the most part was to ferry staff commanders to the troops.

At that time the communications chief of the 713th Regiment was Lieutenant I. I. Zarubin, who had been temporarily grounded due to a wound. There were not enough flight crews in the unit, and feeling that his health was improving, the lieutenant began flying as a "pinch hitter." In the beginning of July he flew to the Belev airfield complex together with the army rear services chief of staff, Colonel A. V. Karpelev. In the vicinity of Belev they were attacked by two Me-110's. Maneuvering competently, Zarubin successfully evaded the enemy's fire. But the Germans did manage to force

our airplane over occupied territory. Antiaircraft gunners began shelling it. Zarubin skillfully utilized folds in the terrain and, breaking over the forward edge, escaped the fighters. The last shell fired by the Messerschmitts exploded in the rear cockpit. The burst damaged the landing gear. Colonel Karpelev received a serious wound, and Zarubin was wounded as well. Judging from some sheets drying beside a large building, the lieutenant surmised that there was either a hospital or a medical battalion in the village. Zarubin managed to land on a single wheel. The pilot was not mistaken: A field hospital was deployed in the village. The physicians offered the assistance both casualties needed. Colonel Karpelev underwent treatment in Moscow for a long time, but Zarubin was already flying again in a week. Following his recovery, Karpelev flew many times with Zarubin, and they became very close friends.

Lieutenant Zarubin was awarded the Order of the Red Star for the bravery and resourcefulness he displayed, for saving the life of Colonel Karpelev, and for saving the warplane.

The battles within the sectors of the 16th and 61st armies assumed a protracted nature. These armies were only able to crowd the enemy a little; they did not have enough strength to advance further. On 10 July both armies went over to defense. The signalmen continued to work as they did before, during the battles, without taking a breath. There is no such thing as rest for communications at the front.

On returning from the VPU to the headquarters, which was still in Dobroye, the army commander immediately tackled the problems of organizing radio communications within a formation of fighters, and of controlling them over the battlefield. A flight of three airplanes was the principal tactical unit in our fighter and ground-attack aviation at that time. Having no communication among one another, the pilots flew in compact formation, wingtip to wingtip, they could constantly see the flight commander, and they attentively watched his actions. It was he who controlled his subordinates in the air, following the "do as I do" principle. Such a formation constrained maneuver, it made constant observation of the situation in the air impossible, and it limited initiative in repulsion of enemy fighters.

On order of General S. A. Khudyakov one squadron of each fighter regiment was completely outfitted with onboard radio sets. Pairs of airplanes--a leader and a follower--replaced flights as the principal tactical units in these subunits. The army staff drafted a statute on the combat actions of pairs involving extensive use of radio equipment, and it developed the pilot training procedures. The communications section set up a simplified radio signal table, with the help of which typical commands could be given: "Turn," "Change places," "Return to airfield," "Cover me"--10 commands in all, which each pilot had to know from memory.

Transceivers were installed aboard the lead aircraft. Inasmuch as there were not enough of them, many of the follower aircraft had to be satisfied

with just receivers. In such cases, following takeoff the leader checked communications by asking the follower: "If you can hear me, drop your wings," or "If you can hear me, zoom." The latter responded with the appropriate maneuvers, tuned his receiver as best he could, and while in flight, in combat, he strictly followed his commander's instructions as they were transmitted by radio, trying to never lose sight of him. If visual contact was lost even temporarily, the pilot could not confirm whether or not a transmitted command had been received.

The situation was entirely different in the pairs in which both airplanes had transceiving radio sets. There, the pilots acted more confidently, they flew significant distances apart, and they constantly oriented one another in relation to clouds, altitude, course, and other aerial navigation data. When necessary they approached each other quickly to perform a particular combat maneuver, and each was confident that his comrade would immediately come to his aid and cover him against the enemy.

The pilots learned to fly in pairs and in groups consisting of pairs. This progressive method was tested many times in combat, and it immediately revealed its advantages over the actions of the flights of three airplanes. The first airmen to master the pair tactics in our army were those of the 18th Guards Fighter Regiment. All of this regiment's airplanes possessed onboard radio sets, and the pilots learned to use them correctly. Great credit for this belonged to the regiment's communications chief, Guards Captain F. T. Kir'yanov.

The year 1942 was one of the birth of a new tactical unit in fighter and ground-attack aviation, one soon to become the principal unit--the combat pair. It recommended itself excellently in combat, and it gained a firm foothold in all units of the 1st Air Army. Moreover pilots began to devote more attention to maintaining communication with ground radio stations, and they learned how to seek homing stations with radio compasses and request the course to the airfield from ranging stations. The ground helped them to find the enemy faster in the air, and to assume a position that was more advantageous than that of the enemy's. And if a certain pilot was victorious in combat owing to directions or suggestions transmitted to him by radio, he immediately became a radio enthusiast, actively helping the communications chief to introduce radio and put it to use.

"The radio and the machinegun are equal in combat," once declared Hero of the Soviet Colonel S. P. Danilin, commander of the 287th Fighter Division.

The pilots did not at all learn to fly in pairs and use the radio equipment in a relaxed, training situation. The pilots had to train and fight simultaneously. I would say that by making war, they learned to make war better. And the staff, meanwhile, prepared itself for a new offensive operation--the Rzhev-Sychevo operation. We were to interact with the 5th, 20th, and 31st ground armies of the Western Front and the 3d Air Army of the Kalinin Front.

On 20 July we received an assignment to organize communications. At first we intended to locate the VPU in a sovkhoz village by Mozhaysk. For this purpose we would have had to build two lines with the total length of 13 km and suspend about 200 km of permanent wire on them. But neither we nor the front had the men and equipment necessary for this yet.

As in Kaluga, once again we were forced to deploy the VPU and the communications center in the city center, within a kilometer from the frontal communications center. This made it possible to significantly reduce our lines of communication and create better conditions for stable, high-quality operation of wire resources. Moreover Major Ya. M. Dubkov, chief of the communication route leading to the 5th Army, furnished the airmen with several telephone circuit midpoints on his own initiative, which made it possible to organize a number of much-needed telegraph channels.

The wire communication equipment at the center was supplemented by radio, which was loaded to its full capacity. The radio operations were the same as at the staff's main communications center. The only thing added was a network to provide coordination with combined-arms armies. Air formations sent their radio sets to the ground troops. Communication with the 3d Air Army, a representative of which was present at our VPU, was maintained with a Baudot transmitter.

We installed a high-frequency telephone at the Mozhaysk VPU for the first time in the war. There were special regulations governing the use of government high-frequency channels. Bonze wire characterized by low attenuation was allocated to them. Whenever they were damaged they were replaced by others, and channels bypassing the damage were sought. As a rule the high-frequency wires were suspended from the upper parts of the poles, and they led into separate telephone stations. Speech scramblers were installed in these stations. Thus the command could converse openly without the apprehension that enemy agents or persons who should not know the content of these conversations would be able to hear.

Government communication was a resource of the Supreme High Command General Headquarters, and it provided a link to the frontal and army staffs. It could be used only by members of the frontal military councils and army commanders. Conversations having to do with operations were conducted by high-frequency telephone through the appropriate stations of the center not only between armies of the same front but also between armies of different fronts, and with party and government organs at oblast level and above. High-frequency communication was not subordinated to the frontal and army communications chiefs, but they were still responsible for its maintenance. Thus, frankly speaking, it was a great deal of additional trouble to frontal and army signalmen. The best units and the most experienced executive specialists always had to be assigned to its organization and maintenance.

The Western Front's Rzhev-Sychevo operation kept the enemy from transferring troops to Stalingrad, where the decisive encounters of the Great Patriotic

War were evolving at that time. Several dozen population centers were liberated from the German invaders.

The 1st Air Army flew about 15,000 combat sorties. Pilots knocked down 305 enemy airplanes in aerial combat, and antiaircraft gunners knocked down 236. One of the most important problems of aviation control was worked on persistently in the course of the missions--that of having ground troops call directly for fighter support over the battlefields. Our liaison officers, who were present in the combined-arms armies together with their own radio sets, could insure the arrival of airplanes in the area of combat 9-10 minutes after the request for support was transmitted. This was important in encouraging the Supreme High Command General Headquarters to agree to permit radio control of combat with open text, coding only the population centers and the names of the units. The actions of aviation right over the battlefield were managed by representatives of the fighter divisions, present at the radio stations of the army VNOS radio company. They informed the pilots on the aerial situation, having two-way communications with them. But such cases were unique--most airplanes still did not have radio equipment, transmitters especially.

After the Rzhev-Sychevo operation the army VPU returned once again to Azarovo. The communications center in Mozhaysk was left operating as a second, auxiliary center. The Azarovo center maintained control over air formations coordinating with the 61st Combined-Arms and 3d Tank armies advancing on the front's left wing after being committed to the break-through. General S. A. Khudyakov located his command post at an airfield complex where two ground-attack divisions were based. He had his own radio station, owing to which he enjoyed stable radio-telephone communication with the operational group of the commander of the 3d Tank Army, and with the VPU in Azarovo.

It was at about this time that we received a directive from the Red Army Air Force Commander stating that the State Defense Committee had adopted a decree requiring that presently one out of every *five, and later one out* of every three new fighters and ground-attack aircraft produced would be equipped with transceiving radio sets and with receivers. It now became fully possible to use radio to control fighter aviation and guide it to its targets, and to allow fighters to communicate with attack aircraft and bombers during joint operations and when interacting with ground troops. The commander ordered: "Augment the role of air regiment communications chiefs as the organizers of radio communication, exempt them completely from the official duty rosters of the command post; make it their mission to achieve perfect control over the radio stations and perfect organization of radio communication with fighters and attack aircraft; take steps to man air regiments with radio mechanics."

We had long awaited such a document. The scarcity of onboard radio equipment in fighter and ground-attack units gradually led to a situation in which the latter began to view their communications chiefs as people having nothing to

do. Many of them attempted to organize courses in radio use for the personnel, but for practical purposes nothing of this ever came about. The pilots though such study to be a total waste of time, with which even the command agreed to some extent. For the most part the regimental communications chiefs had undergone flight training, mainly as navigators, and they were well versed in staff work. And so they were assigned more and more to such work. Some were even appointed staff commanders and regimental chiefs of staff. They were replaced by poorly trained people--it did not matter, they said, for there were no radio sets and there was no telling when they would get them. As far as duty at the command post is concerned, it literally becam a constant responsibility of the signalmen.

We had the fortune to visit the 3d Air Army in September. Communications were managed for our neighbor by Lieutenant Colonel I. I. Morozov, and his assistant for radio affairs was L. M. Parnas, who was now a major. He also greeted the directive of the Red Army Air Force commander with joy. The war persistenly argued in favor of outfitting fighter and ground-attack aviation with radio equipment. It was obvious that it would not be long before this problem was solved. Radio industry was working at full capacity in the east, and its production potentials were growing from one month to the next. Owing to the selfless labor of the workers, engineers, and technicians of the radio plants, transceiving radio sets began to be installed aboard all fighters and attack aircraft within just a year.

In September we received yet another directive from the commander of the Red Army Air Force--a radio engineer post was introduced into the manning table of the air army communications section. His responsibilities included monitoring the organization of aerial communications and the use of aircraft radio apparatus, checking the shielding provided to engine ignition systems and the airplane's metal parts, and generalizing and publicizing advanced skills in aerial radio communication.

The directives made it considerably easier to prepare the fighter and ground-attack units for extensive introduction of radio communication, they raised the role and authority of communications chiefs in the regiments, and they obligated all commanders to intensify the training afforded to personnel in the use of radio equipment in the air.

On 25 November we began a new offensive in the Rzhev sector. Our VPU was deployed in the village of Ryl'tsovo, 8 km east of the city of Zubtsovo. We deployed in the same place with the frontal control point, for which the communications organizer was General A. I. Leonov, who was subsequently promoted to marshal of signal troops. Our frontal comrades gave us the telegraph lines we needed. A radio-telephone network servicing all of our divisions and the headquarters was organized with the frontal VPU at its center. This network also included the radio stations of the ground troop formations in which air liaison officers were serving.

Fighter cover to the battlefield was thought to be especially important in this operation. The fighters were based 15-20 km from the VPU. Airplanes on

alert arrived in their designated areas 8-10 minutes after receiving a request for support from air liaison officers or from the control point. Nevertheless they were often late: For the most part the Germans made their bomb strikes against the assault echelon of our advancing troops, after which they immediately returned to their territory.

A separate radio network including the radio sets of the army VPU's, the airplanes, and the forward air controllers was created to control fighters over the battlefield. Bombers and ground-attack aircraft communicated with escort fighters on another wavelength. In order to contact them, the fighter guidance stations had to switch to another frequency. The bombers and attack aircraft were called to action by wire communications resources or by radios in the radio-telegraph network, via the air army headquarters.

On reaching their designated area, the fighters immediately requested information on the situation in the air. In this case they invariably used the true names of their air liaison officers or forward air controllers, and they in turn referred to the pilots by their true names. I tried to correct this violation of the rules of radio transmission, but General Khudyakov advised:

"Let them work the way they want to. They'll become more confident in the radio equipment and in the fact that the people watchfully observing them from the ground are their friends."

Some recordings of radio exchanges made at that time between pilots of the 203d Fighter Division and the air force ground radio stations have been preserved in the archives. Here are a few of them:

27 November 1942
1213. "'Tri Volny' (Three Waves), this is 'Orekh' (Nut). Go right. Further right! Good, now you're on. Attack at close range."
1221. "'Tri Volny', this is 'Orekh'. Five J-88's behind you to the left, do not break formation, come in out of the sun, attack them all together."
1223. "Look out, there's a J-88 right in front of you. Hey, what are you, nearsighted or something? Make another pass! He won't go away. This is 'Orekh', Nazarenko."
1450. "'Dve Volny', this is 'Orekh'. Look left, there are three J-88's there, and one's leaving. Attack from a dive."

17 December 1942
940. "'Vozdukh' (Air), this is 'Orekh'. Quadrangle 1772, four Heinkels are making a bomb run under the cover of two Messerschmitts."
1057. "This is 'Volna-16' (Wave-16), what's the situation?"
1058. "This is 'Orekh', Nazarenko. Keep on the same course. 'Humpbacks'* are working out there, cover them."

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* He was referring to IL-2 ground-attack aircraft.

1507. "'Tri Volny', this is 'Zarya' (Dawn). Look, Messerschmitts are harassing 'Humpbacks' forward and to the right of you. What are you waiting for, let's get bolder!"
1607. "'Volny' (Waves), assume course 90. Eight enemy bombers at 3,000 meters. Act decisively, approach them closer."

As we can see from these excerpts, most of the communication was one-way. Few fighters were equipped with transceiving radio sets yet, but the number of airplanes outfitted with receivers began to grow noticeably. However, this did not at all guarantee dependable reception, by the pilots, of all commands transmitted from the ground or by group leaders.

All restrictions were removed from using radio when the offensive began. Thousands of shortwave ground, aircraft, tank, and other radio sets took to the airwaves simultaneously. The radio section of the front's communications directorate undertook attempts at distributing the frequencies among the arms and services in the best possible way. The radio operators worked with up to 400 fixed wavelengths in the shortwave range, each of which occupied specific frequency bands in the radio range. In order to increase the quantity of wavelengths available the radio section began cutting these frequency bands in half and distributing these "halves" among the formations and units. However, this was self-deceiving: Mutual interference could not be reduced--radio stations tuned to "half" waves did in fact occupy a band much greater than 25 kilohertz due to the instability of the master oscillators.

Radio communication was organized at all control levels mainly according to the radio network principle. Had all radio sets possessed quartz master oscillators and receivers characterized by high tuning precision, it would have been simple and reliable to use them in radio networks. But we did not have such radio sets and receivers at that time. Ground set operators and pilots had to constantly adjust their tuning, seeking the required correspondents. On finding one, they lost others. Thus pilots in the air were often unable to establish two-way communication with their air liaison officers or forward air controllers, and even with one another.

Something had to be done quickly to tune radio sets operating in the aerial networks more precisely. It became known to us that some air formations had experience in achieving stable tuning of onboard and ground radio equipment. In particular, aircraft radio sets were tuned in the 6th Air Army, in which the radio service was headed by Engineer-Major R. S. Terskiy, with the help of an RAT station, which was typified by stable frequencies. On learning of this, our radio service also began transmitting tuning signals with the RAT under the guidance of Lieutenant Colonel D. M. Morozov. Receivers were tuned at the command posts of the formations and units, the guidance points, and in the airplanes themselves according to a sliding schedule, and transmitters were tuned with the help of these receivers. All of this work was done under the personal supervision of the air regiment communications chiefs and the special equipment engineers. Our section strictly monitored this very important work.

This brings to mind one instructive case. Once the transmitter of a standard RAT failed. Morozov did not go ahead and replace it, deciding to see how the units would react to our silence. Except for Major A. A. Gorchakov, the communications chief of the 303d Fighter Division, everyone began clambering right away: Why were there no signals?

Gorchakov was called to the telephone, and he was asked how the tuning went that day.

"There's something I can't understand," the Major replied. "Two airfields reported that they had not heard anything from you, and a third said that everything seemed to be in order and that they had tuned five stations."

"Our RAT did not operate today," replied Lieutenant L. V. Ustinov of the army section.

A. A. Gorchakov would not tolerate dishonesty, and he strictly punished the regimental communications chief that had deceived him. And rightly so. Deceit is intolerable in general, and in war it is criminal.

Centralized tuning of ground and aircraft radio sets made it possible to dramatically raise the reliability of aerial radio networks. Later, when airplanes began to be furnished with new RSI-4 radio sets, which worked at six fixed wavelengths in a narrow frequency band, the situation with tuning radio sets aboard fighters and attack aircraft became better. Moreover these wavelengths were reserved for aviation alone by a directive of the deputy peoples commissar of defense, and all other correspondents were categorically prohibited from using them.

Pilots knocked down 18 and damaged eight enemy airplanes with the help of radio guidance in the battle of Rzhev. Captain A. S. Nazarenko was especially successful in this battle. A fighter pilot himself, he competently guided his comrades in arms to their aerial targets with his radio set, code-named "Orekh-1" (Nut-1), he quickly reacted to the slightest changes in the situation over the battlefield, and he kept airmen in the air above it efficiently appraised of the situation. Captain Nazarenko's experience was broadly utilized when the Red Army Air Force staff wrote up the instructions for forward air controllers of fighter aviation.

During the Rzhev operation we conducted tests on a device intended for remote control of radio sets. It was invented by Captain A. S. Zvyagintsev. The latter installed, in a trunk of moderate size, US-1 and RSI-4 receivers, a loudspeaker, a microphone amplifier, a telegraph key, a microphone, a telephone set, and an extendable antenna for the receiver, which could be substituted by a remote antenna. The mode switches, volume controls, and other control knobs were mounted on the cover. In another trunk the captain placed dry cells for the receiver, connecting cables between the trunks, and an outfit of spare tubes. The remote device was connected to the radio set by two pairs of conductors which could support operation with the microphone

or the key, and it foresaw in-house telephone communication for the radio station crew.

The first model of this device, manufactured in the army workshops, was set up for the army commander. With its help, S. A. Khudyakov maintained contact with all divisions operating at Rzhev and with air liaison officers in the ground troops.

Sergey Aleksandrovich liked A. S. Zvyagintsev's invention very much. He gave orders to supply the remote devices to all air formations. The workshops made another 15 outfits. Frontal deputy communications chief Major A. I. Leonov, frontal deputy chief of staff Lieutenant General A. P. Pokrovskiy, and then the chief of staff himself, Colonel General V. D. Sokolovskiy became interested in it as well. They did everything they could to introduce Zvyagintsev's innovation into the troops as quickly as possible.

The Soviet troops went over to an offensive of monumental proportions in the vicinity of Stalingrad. We, meanwhile, enjoyed a strategic pause. During it, we made a maximum effort to improve troop control and generalize the accumulated combat experience. The commander ordered a number of the staff commanders to prepare articles for the overt and classified press in relation to the problems of controlling aviation over the battlefield and coordinating with the ground troops. I was instructed to write an article on the topic "Radio Communication in the Air Force Offensive Operation." It was published in 1943--in the third issue of the journal VESTNIK VOZDUSHNOGO FLOTA.

Because the Western Front was responsible for a front many hundreds of kilometers long, auxiliary control points had to be organized for the combined-arms armies and the aviation groupings.

Organic operational groups containing the VPU deputies of the frontal communications chief were created at our frontal auxiliary control point. At the end of 1942 our army introduced the post of deputy communications chief for the auxiliary point, and a special subunit to service it was formed at regimental level. The first to take charge of communications at the VPU was Captain S. G. Grudskiy.

Reorganization of the VPU's as organic control units secured their existence as permanent entities, which meant that the personnel could learn to work together well. By the end of 1942, with the front's help we were able to organize telegraph communication among the VPU's. This significantly increased the overall viability of the entire communications system, and for the VPU's it transformed into the main nerve controlling aviation on the battlefield and maintaining coordination with the ground troops.

I had mentioned earlier that whenever we visited a VPU we established two telegraph links with the air army staff using ST-35 transmitters. Acquisition of the second conductor required for this was always associated with great difficulties, and it invariably meant that some air formation

had to sacrifice one of its own. Thus a viscious circle was created--the better it was for us, the worse it was for certain of our subordinates. We were able to extricate ourselves from it with the help of senior technician-lieutenants V. K. Yermachenkov, V. V. Andreyev, and S. G. Golovin and mechanic Master Sergeant L. G. Shapchits. They manufactured an ST-35 attachment which made it possible to maintain reception and transmission simultaneously with a single wire. Two instruments were connected to the wire--one for transmission and the other for reception. Thus the productivity of the telegraph wire was doubled. Owing to the use of especially sensitive relays in the attachments, the ST-35 transmitter could work with lines typified by poor insulation characteristics, and in terms of its traffic capacity it competed with the Badout system.

Duplex communication routes required a special knack and high coordination between each pair of telegraphists. The first to master this work were Zhenya Pershina, Klara Yefremova, Anya Kravchenko, Zoya Zautinskaya, Dina Ryabsteva, and Zhenya Khayutina. These remarkable specialists, whose hands transmitted tens of thousands of words of combat information, made a tremendous contribution to control of the air formations. In mid-1943 they were among the first to earn the "Outstanding Signalman" badge.

1942 was coming to an end. By this time the headquarters of the 1st Air Army was already deployed at a place called Alabino. On its transfer to the new point, the wire lines of communications became longer, the radio communication distance increased, and the length of the routes taken by mobile resources grew. This made the work of the signalmen more complicated and temporarily reduced the reliability of our overall communications system.

This is why I cannot but recall, with kind words, the tremendous amount of work done by frontal signalmen under the charge of General N. D. Psurtsev. Engineers of the telegraph-telephone section--P. N. Voynov, A. A. Zakhar'in, and A. Sh. Bogdanov--and others managed to set up dependable and widely branched wire communication within the front's sector. All lines leading from the frontal and air army staff passed through alternate centers. The staffs could themselves deploy at these centers whenever the need arose.

While at Alabino we were able to obtain electric power from the Moscow power network. The communications center was set up by the recently formed 1st Separate Air Force Communications Regiment, which was placed under the command of Major Ya. M. Dubkov. The center's best specialists--senior lieutenants V. K. Yermachenkov, S. G. Golovin, V. V. Andreyev, and M. A. Klokotskiy--managed the work of locating and installing the apparatus. Outstanding work was done by soldiers of the line subunits commanded by Lieutenant P. D. Pal'shin and Junior Lieutenant I. M. Sasov, as well as by the radio battalion's soldiers under the command of A. S. Zvyagintsev, A. M. Yegorychev, and K. D. Kashavin. Good organizational capabilities were displayed by technical affairs chief Engineer-Captain G. I. Gitel' and by workers of the communications section--lieutenants V. E. Zholi, L. V. Ustinov, and S. F. Bavarov.

Our operational group moved from the vicinity of Rzhev to Alabino on 16 December. Near Rzhev, in the village of Ryl'tsovo, we left our third permanently operating VPU communications center.

As always, the work was intense in the communications section. Senior Lieutenant M. V. Ubortsev and lieutenants V. E. Zholi and L. M. Beylin labored over the plans for new lines. Lieutenants L. V. Ustinov and S. M. Livitin and Junior Lieutenant S. F. Bavarov prepared new radio operating data. These specialists carried the burden of all of the section's day to day work, and we must give them credit, for they handled it fabulously.

I did not remain at headquarters for long; I was soon sent back to Rzhev to monitor the condition of communications during the New Year celebrations. General A. I. Leonov, the frontal signalman, was already there. His mission was the same. It was through Ryl'tsovo that the front and the air army communicated not only with subordinated formations but also with the adjacent Kalinin Front.

The general and I lived in the same hut. We devoted entire days to checking the operability of the lines, monitoring the course of radio communications, settling various problems, and visiting the units.

Before midnight on 31 December, following my routine, I inspected the radio stations, looked into the radio receiving room, visited the aircraft parking pad, and on the way back I checked in on the frontal signalmen. There I came across General A. I. Leonov, and I reported to him that everything was completely in order with the airmen, and the off-duty soldiers were preparing to meet the New Year.

"Before meeting the New Year, it is a common practice to see off the old," one of the commanders noted and extended a mug in my direction.

The general nodded--why not, he seemed to say, if that's the tradition? Then Leonov and I headed for our telegraph station. We opened the door to the hut and stopped dead in our tracks in surprise: The middle of the hut was graced with a bushy little fir decorated with multicolored flags, garlands, and homemade toys. There was a sign on it with "Down With Hitler!" written in large letters. Tat'yana Aleskeyeva, the shift chief, reported to A. S. Leonov:

"Comrade General, the personnel are on combat duty. The communication links are working normally on all routes. We are celebrating the New Year."

"Well, carry on," Leonov said.

"Won't you join us too?" Tat'yana pointed to a modestly decorated table with hors d'oeuvres and aluminum mugs.

We accepted her invitation. Soon after some frontal signalmen wound their way over to us from their dug-out with an accordian. Free and sad Russian songs

began to flow forth. Toasts were raised to the New Year, to friends in war, and to our victory, and all departed. Neither dancing nor songs nor wine could relieve the heavy burden on the soul, the burden of war, the concern everyone felt about their work, about their contribution to the victory over the enemy which, judging from everything, was still to be long in coming.

CHAPTER EIGHT

WE BECOME SEASONED

We, the air force signalmen, learned of events on the fronts sooner than was reported by the Soviet Information Bureau: Air intelligence summaries for the entire theater of military actions were transmitted regularly to the air armies. And those of us who were permitted to do so were often present at the Badout transmitter at the times of their reception. Every day we read more and more good news on the telegraph tape: "Column of motor vehicles and tanks moving toward Kalach on Vertyachiy-Sokarevka road.... Accumulation of infantry and tanks in vicinity of Abganerovo, fire battle observed in city's vicinity.... Two lanes of motor transport traffic on Kletskaya-Perelazovskiy road...." This meant that the Germans were giving it up!

And soon, new red flags began to crop up on the large-scale staff map. The trail they created advanced westward unceasingly. The offensive started on 19 November 1942 by the Voronezh, Southwestern, and Stalingrad fronts was proceeding successfully.

We held a party meeting in mid-January. The single topic of discussion was the Stalingrad offensive and our missions. The army commander gave a briefing. On discussing the briefing, the commanders arrived at the idea of visiting the airmen of the 8th and 17th air armies--participants of the Stalingrad offensive--and acquainting themselves with the experience of their combat activities.

General S. A. Khudyakov gave his support to the communists. He sent two groups of officers to Stalingrad. General A. K. Bogorodetskiy--the deputy commander, operator Lieutenant Colonel N. P. Solov'yev, rear services liaison officer Major N. V. Chernyak, and I were sent to the 8th Air Army, which was commanded by General T. T. Khryukin.

On the eve of our departure S. A. Khudyakov summoned us to his office. After spelling out our assignments he inspected each of us in somewhat ironic fashion and said:

"This won't do, comrades. How can you represent the 1st Air Army looking like this? No, it won't do...."

We exchanged bewildered glances. But Sergey Aleksandrovich continued:

"Change into everything new. And make sure you put on your shoulderboards!"

The new rank insignias and the uniform change were introduced into the Red Army on 15 January 1943. The order had been announced to us, but neither shoulderboards nor new uniforms had been issued yet. The AKhO [administration and supply section] chief rubbed the bridge of his nose in thought when we approached him:

"Mm, yes, let me see now.... I can dress you up right smart. And I can issue you the shoulderboards. But I have not received stars for senior commanders yet. How about pinning on the small kind? Eh? No one at Stalingrad has seen the new uniforms yet anyway...."

Naturally we could not go along with this. The quartermaster had to get the stars for us from Moscow which, opportunely, was nearby. But the AKhO chief turned out to be right--no one had yet seen the new uniform in either the 8th Air Army or at airfields at which we had to land on the way to Stalingrad.

We stayed with the Stalingrad troops for about a month. We acquainted ourselves with their experience right in the course of combat, first hand as they say. Eighth Air Army communications chief Lieutenant Colonel A. D. Stepanyan and his deputy for radio affairs, Captain A. F. Prislonov thoroughly described their work and afforded us a possibility for acquainting ourselves with the way things were set up in the divisions and regiments, and at the VPU.

On returning to our army we reported our impressions and the experience of our Stalingrad colleagues to the command and our fellow servicemen.

The communications organization adopted in the 8th Air Army was similar to ours. During penetration of enemy defenses General T. T. Khryukin controlled aviation from his own command post, which was located together with the frontal commander's command post. VPU's were created to coordinate with the ground troops. They were headed by the commander's deputies. During the offensive the auxiliary points were moved together with the command posts of the combined-arms armies being supported. They maintained communication with their staff and the forward airfields. Communications officers were present in all ground formations. They provided information on the situation in the air, and they indicated the targets the infantry wanted suppressed. Once the offensive began, all communication switched to radio. Radio signal tables and coded maps were used extensively in this case. The air army commander had a receiver at his workplace, and he could constantly monitor the combat activities of fighters covering the troops.

I, for example, was very interested in a special control point set up in the vicinity of the settlement of Verkhnetsaritsynskiy. It was located along the so-called air bridge created by the Germans in an attempt to supply surrounded troops at Stalingrad. Owing to presence of this point, fighters of the 8th Army knocked down fascist transporters. This experience could come in handy for us. Therefore I visited Verkhnetsaritsynskiy, where I tried to learn all of the details of aerial observation and of calling for and guiding fighters to airborne targets by radio.

In general, the Stalingrad troops placed their main reliance on the radio during the offensive. Wire communication, meanwhile, was clearly not used enough. Line subunits were not prepared in time to lay wires behind the advancing infantry, and the reserve of wire, fittings, and poles was low. The Germans had long sacrificed all poles on liberated territory for firewood.

"This should be a lesson to us," I said, concluding my account of the trip. "Even though Russia's central regions are not the steppes of Stalingrad, even here the Germans might cut the poles down during their retreat."

"Those poles of yours sound like a personal problem," one of the officers interrupted me. "It would be better for you to tell us a little about Stalingrad, what's left of it?"

"We never did get to visit Stalingrad," Lieutenant Colonel Solov'yev answered for me. "We did, however, manage to fly over it on our way back. There is no city there, comrades, only ruins, as far as the eye can see...."

Our group was visiting the 8th Air Army at the same time that the Soviet troops were concluding their liquidation of the fascist German grouping surrounded in the vicinity of Stalingrad.

"So you have no personal impressions to offer," Colonel I. I. Ptitsyn said.

Immediately our stopover in Gumrak, on the way to Stalingrad, came to mind unexpectedly. Captured German airplanes, J-52 transporters for the most part, were parked here and there at the airfield. Bluish smoke curled upward from many of them. General Bogorodetskiy asked the officer meeting us what was going on.

"Oh that, Comrade General," the latter answered, "the infantrymen have adapted the broken-down airplanes as warming points. They've installed homemade heating stoves in the fuselages, cut holes above for the pipes, and now they're camping out...."

When I told this story, General S. A. Khudyakov broke out in rolling laughter:

"What will our warriors think of next! Can you imagine, turning an airplane into a warming hut. Really, now...."

General A. K. Bogorodetskiy's group wrote up an official report on its visit to the 8th Army and described the actions of the airmen in the major strategic operation. Then we wrote up a plan of measures to introduce this experience into the troops of our army.

The Western Front initiated its offensive in the Bryansk sector on 12 February. Our air formations supported the 10th and 16th combined-arms armies. The operational group situated itself in direct proximity to the troops, in the former Shamordino Monastery, northeast of Kozel'sk. The deployed communications center possessed a telegraph station servicing 15 communication routes and a telephone station servicing 60 parties. The radio communications center at the VPU could provide maximum support to the staff. It had a duplex ST-35 telegraph link with army headquarters. The telephone could also be used to contact all air formations participating in the operation.

During the entire offensive--it lasted until 5 March--the commander's radio-telephone network operated extremely reliably, and the audibility was good. In addition to the stations of the formations, this network included the communication resources of the air liaison officers. At the forming-up place, the latter were located within 50 km of our operational group.

As in previous battles, the air warning and guidance radio sets were located 3-6 km from the forward edge. They were serviced by crews of the VNOS radio company and the ZOS (ground aids to navigation) service. This time a common wavelength was used for communication with airplanes over the battlefield. This improved coordination among the different branches of aviation and made it easier to organize communications with the limited quantity of equipment allocated by us to the ground troops: We were still not strong enough yet to provide them with sufficient radio equipment. As before there were not enough onboard radio sets for the fighters and ground-attack aircraft, and the ratio of transmitters to receivers carried by them was only 1:4. As far as bombers are concerned, they operated in large groups, they spent a very short time over the battlefield, and as a rule they were present there only when ground-attack airplanes were idle. This precluded confusion on the airwaves to some extent. Only the scouting airplanes had their own radio wavelength.

Following the experience of the 8th Air Army, during combat in the Bryansk sector we obligated the group leaders to report mission accomplished to the army commander. Loudspeakers in the rooms occupied by the operators and scouts were connected to the output of the commander's receiver. The officers were constantly aware of the aerial situation on the forward edge, and they promptly prepared data for subsequent combat decisions. It is indicative that out of 360 aircraft groups, only 11 were unable to report completion of their combat assignments.

The first time a large group of ground-attack aircraft were guided to a target by radio occurred in February. Captain Boyko of the 289th Ground-Attack Air Regiment, the group leader, was instructed by guidance station "Pal'ma (Palm) 5" to make another run over a target at which the enemy had survived. Boyko immediately replied: "I'm going for the target a second time. Give me cover. I'll be using up all of my ammunition." Receiving their orders, fighters immediately gave cover to the ground-attack airplanes returning to the target. The captain and his followers did an excellent job on the mission which they had received by air. Such cases of controlling ground-attack aircraft over the battlefield by radio were extremely rare at that time. After all, the forward air controllers focused all of their attention mainly on the fighters. Successful two-way communication between a ground radio station and a group of attack aircraft persuasively demonstrated that ground-attack aviation can and must be controlled directly from the infantry combat formations as well.

Combat actions became more and more stubborn from day to day in the Bryansk sector. The enemy had well-prepared defenses in this area. Our troops could not penetrate the full depth of these defenses for a long period of time.

Meanwhile the Germans began withdrawing troops facing the front's center and its right wing. Falling into a trap in the vicinity of Vyaz'ma and Rzhev, they feared that they might suffer the same fate as Paulus' army. The 1st Air Army was given a new mission: Without weakening its blows against enemy troops defending in the Bryansk sector, it was to aggressively attack the enemy's withdrawing forces, inflicting maximum losses on them.

By the end of March our troops advanced 130-160 km. After the Vyaz'ma salient was liquidated the length of the front decreased by almost 300 km. In some days the rate of advance attained 20-25 km per day. It was entirely natural that this complicated the work of communications organs and subunits considerably, all the more so because the fascists, who had prepared for the retreat beforehand, thoroughly destroyed the highways and railroads, as well as the communication lines. They annihilated the trunklines completely. Therefore, as with the Stalingrad signalmen, we were initially forced to place our main reliance on radio and on mobile communication resources during westward redeployement of the formations. Relocating divisions were taken out of the existing radio network and attached to particular radio routes. Liaison aircraft flew at night as well. They landed at airfields illuminated by truck headlamps. Night flights were flown especially successfully by 203d Air Squadron commander Major M. G. Kiselev and flight commanders senior lieutenants N. V. Kursakov and I. N. Narchuk.

Understandably we could not get by with just these resources alone for a long period of time. We had to create dependable wire communication at all costs. Colonel I. I. Ptitsyn ordered me to visit all landing strips we had created in fall 1941 and which were now being liberated from the fascists.

"Take a look," said Il'ya Ivanovich, "maybe there's something left...."

He turned out to be right. During our withdrawal at the beginning of the war, we built our interairfield lines parallel to the forward edge of defense as a rule. The Germans did damage them considerably as well, but some sections did survive, and this meant that wire communication could be restored much more quickly.

Centralized use of the line-construction platoons of the aviation base areas allowed us to complete our mission rather quickly. By 1 April we were able to set up wire communication between all redeployed air formations and their units, and between the RAB's and their air base maintenance battalions. In sum total, we restored 500 km of transmission lines in 20 days. And consider that this was done in spring when the roads are impassable, and in the face of frequent scarcities of gasoline and materials! Rather than authorized wire, time and again we had to hang furnace wire, strands from unbraided high-voltage electric power transmission cables, and even barbed wire. The latter was removed by the soldiers from German entanglements. It would not be difficult to imagine how hard this work was. The people tore their clothing and hurt their hands, but they stubbornly suspended the barbed wire from the poles. In some battalions it was simultaneously used as a means for barricading the airfields.

At the end of April the headquarters of the 1st Air Army moved near Yukhnov, by the village of Dubrovka. A communications center had been set up here earlier under the guidance of Senior Lieutenant S. G. Golovin and Senior Sergeant S. P. Shchebnev. The communications center at the previous place of deployment, in Alabino, was temporarily transformed into an auxiliary center. The radio receiving and transmitting rooms were located 3 km from the staff. Transmission by these radio rooms was prohibited for about a month. Radio communication was checked one-way: The subordinated staff made the call, and the response to it and an evaluation of audibility were transmitted by telegraph. This was done in order to mislead the enemy's radio reconnaissance effort and keep him from discovering the staff's relocation. Radio exchanges with the formations were simulated out of Alabino, where we left some of our equipment specifically for this purpose.

During this time our army was operating against fascist airfields in Bryansk, Seshcha, Shatalovo, and other population centers. The pilots were prohibited from using radios until they were at their target approaches. Nor was the commander's radio set used in transmission mode; the air formations monitored their radios only in reception mode. All of this insured surprise in the bombing strikes.

Devoting constant attention to radio camouflage and deception, we at the same time intensively improved radio communication support to interaction between bombers (ground-attack aircraft) and covering fighters in the vicinity of targets, during encounters with enemy fighters and during the return flights. Each group of bombers and attack aircraft knew the code names and numbers

of the covering fighters. On the eve of the combat sorties, while still on the ground the pilots played out the order of communication with one another and of rendezvousing in the air.

Meanwhile the Germans began trying to blockade our airfields from the air. A pair of Messerschmitts would fly to the vicinity of an airfield and begin observing us from an altitude of 2,000-3,000 meters. And when the fascist pilots noticed our aircraft taxiing for takeoff, they immediately dove and opened fire on the aircraft. After all, at this time, the airplanes were practically helpless. The enemy did manage to do damage to us here and there, sometimes even preventing groups from taking off on their missions.

The commander ordered the commander of the 303d Fighter Division, General G. N. Zakharov to take steps to remove the blockade from the airfields. On receiving this mission Georgiy Nefedovich immediately went to Colonel Ptitsyn.

"Help me out, Il'ya Ivanovich," the division commander said. "Nothing could be done here without efficiently communicated warnings."

"We've given this some thought," Ptitsyn answered. "I'm sending you Koyander and Chuvashin, and they'll help you out at your place."

General Zakharov's division contained three of our regiments and the French Normandy Separate Fighter Regiment. The units were based at four airfields about 50-70 km apart. It took 3 days for Major Ye. K. Chuvashin and me and for Major A. A. Gorchakov, the air formation communications chief, to organize dependable and efficient communications among them. Observation towers were erected at each airfield. They were linked by telephone with the operational duty officers of the regiments, and the latter were linked to remote radio station control devices. On receiving a report from the observer that enemy fighters were coming in, the duty officer turned on the radio set and transmitted an arbitrary signal at the division's wavelength. The numbers he transmitted signified the number of enemy airplanes and their altitude. The plan written at division headquarters clearly spelled out which neighboring regiments were to launch fighters to deblockade a particular airfield. And in order to insure dependable microphone communication between the airfields, we reinforced the BAO's servicing them with powerful radio sets. Thus the time it took for warning signals to reach their destination was decreased. Previously they had been transmitted first from the airfield blockaded by the enemy to division headquarters, and from there to the appropriate regiments. Now division headquarters, all regiments, and pilots in the air and on alert at the airfields learned of the appearance of fascist vultures immediately. That commander who was to respond according to the plan immediately launched his airplanes.

This at first glance simple innovation significantly raised the battleworthiness of the 303d Air Division. Attempts by the fascists to forestall our sorties by their blows no longer were successful.

I can cite many interesting and brilliant examples in this regard. But I will only describe one. Chuvashin and I were with the Normandy Regiment. Pilots that had received their combat assignment were already sitting in their cockpits when a pair of Messerschmitts appeared over the airfield. The unit duty officer, Senior Lieutenant R. P. Yantovskiy, transmitted the arbitrary signal "Akula (Shark) 2" by radio. This meant that there were two enemy fighters over the airfield.

The signals were transmitted into the air, and the Germans continued their standing patrol over us. Major Ye. K. Chuvashin anxiously glanced at me:

"Why aren't they here yet?"

Hearing the question, Yantovskiy calmly said:

"They'll be here any minute. Don't forget that their airfield is 50 kilometers away...."

And in fact in just a few minutes we spotted a flight of fighters on the horizon. These were pilots of the 20th Fighter Regiment, hastening to the aid of their French comrades in arms. They knocked down one Messerschmitt at the first approach. The second sped beyond the front line with afterburners on. Immediately after that the Normandy Regiment took off. It completed its mission successfully, and without losses.

One had to see how Yevgeniy Klavdiyevich Chuvashin reacted to all of this. He was almost dancing with joy, and he even planted several kisses on the duty officer.

Major Chuvashin managed our radio receiving room at the beginning of the war. Then he was sent to the 224th Ground-Attack Division as its communications chief. I. I. Ptitsyn transferred his executive army specialists to the troops, validly believing that this would permit the men to comprehend the tasks and practice of aerial radio communications better and more fully, and to gain experience in organizing such communications. At the end of 1942 Ye. K. Chuvashin was once again returned to us, though now at the post of deputy communications chief for radio. He replaced Lieutenant Colonel D. N. Morozov, who was appointed communications chief of the 17th Air Army.

In order to raise the reliability of communications among airfields of the 303d Air Division even higher, we asked General N. D. Psurtsev to allocate 5 tons of railroad wire to us. Nikolay Dem'yanovich immediately satisfied our order. In short time Senior Lieutenant P. I. Shmonin's company built wire transmission lines linking the division's airfields. General Zakharov was much pleased by the help given him by the army's communications section, and he even made special mention of this to his commander.

It did not take long before a warning system such as that of the 303d division was created in other fighter formations. The system was constantly improved and simplified. The time for transmitting signals to deblockade airfields decreased from minutes to seconds.

It is no accident that I refer to General G. N. Zakharov's division more frequently than others. The fact is that in many respects it was the army's best, including in regard to communications. I often visited the 303d, and each time I brought back with me some new experience requiring dissemination among other formations.

During one of my trips to General G. M. Zakharov I was fortunate to observe capture of an enemy Heinkel-111. He landed at our forward airfield in late evening. The technicians even mistook the craft for one of ours. And when one of the soldiers on the ground demanded to know from the pilots why they had turned off their engines without taxiing to the parking pad, a machine-gun began chattering from aboard the airplane. Then the Germans began jumping out of the aircraft and, covering each other with fire, they ran toward bushes adjacent to the landing strip. However, the fascists were quickly surrounded, and they surrendered.

As it turned out, the enemy airmen were flying reconnaissance in our rear. Antiaircraft gunners damaged the aircraft, and the crew made a forced landing--not at an airfield, the pilot asserted, but in a large forest clearing. This fact of the airfield's meticulous camouflage itself merited the most widespread publicity. But this was the not the main point in this case. On being interrogated at army headquarters, the Heinkel commander revealed that he had a good knowledge of aircraft radio equipment and of the communications service of the Luftwaffe. He thoroughly described the radio equipment with which the principal German warplanes were outfitted. In particular we found out that the Me-109 carried a (Fuko)-3 shortwave radio set with an effective range of up to 100 km, while the Me-110 carried two sets: one long-wave set with a range of about 300 km, and a second shortwave set with an effective range three times smaller. J-88 bombers had a more-powerful FUG-10 radio, which could maintain communication to a range of 400 km.

The prisoner also informed us that the Germans had designed a shortwave radio set, the FUG-17, with which airborne pilots could patch themselves into the telephone network and talk with any commander, even if the latter is in his own quarters. At the end of the interrogation the pilot said that radar sets intended for aircraft detection were soon to reach the Eastern Front.

On the whole the information we acquired was of certain value. After all, the more you know about the enemy, the better you can fight him. This is, of course, a commonplace truth, but it must be remembered constantly in war.

Even without the testimony of the prisoners of war, we did possess some information on the state of communications in the German Army. In particular we knew that the Germans had laid a compound cable in the central section of the front from the Warsaw area to Gzhatsk. The cable was intended to connect Berlin to Moscow. They had the same sort of cable from Kishinev to Rostov. The Wehrmacht began using radio relay stations during its offensive in the Caucasus and at Stalingrad, and it was by means of these stations that Paulus' encircled grouping was able to maintain communications with Hitler's staff. The enemy made broad use of multiplexing and amplifying telephone apparatus, and he regularly recorded all conversations going on.

After the Germans were taken away Colonel Ptitsyn slammed shut his battle-worn notebook, in which he recorded the interrogation proceedings, and he said:

"That was a good little bird General Zakharov sent us."

"Incidentally, he did manage to test out the Heinkel," Chuvashin added. "Yes.... The technicians got the plane on its feet, and the general first taxied about on the airfield and then took off. You could imagine the anxiety our antiaircraft gunners felt...."

After the interrogation of the German we came up with the idea of requesting the front's intelligence directorate to send us testimony by prisoners of war concerning communication-related matters, and of beginning to intercept radio conversations conducted by the crews of enemy airplanes. After all, this could be an additional source of information on the situation in the air over the Luftwaffe's airfields. We were soon able to acquire a few captured aircraft receivers, and so we began to regularly monitor the airwaves with interpreters, and to study German radio operation methods and the rules followed by the Germans in radio communication.

Radio interception was an extremely effective resource, one permitting us to gain a rather complete picture of the situation in the air. It became obvious that this service should be organized with a permanent staff: A special radio interception platoon needed to be created within the communications regiment or in the army VNOS radio company. Other armies submitted similar proposals. Unfortunately, however, we were unable to implement them until 1944.

Redeployment of army headquarters in Dubrovka, at the center of the air force's battle formations, and significant reduction of the width of the front due to the Rzhev-Vyaz'ma operation made organization of communications much easier. We located the communications center in a well-built underground shelter that could withstand the impact of 250-kg bombs. We gradually erected wire transmission lines to VPU's, to the combined-arms armies, and to new air formations joining the army. We were very much pleased by the arrival of General A. S. Blagoveshchenskiy's II Fighter Corps. All airplanes of his divisions were fully outfitted with transceiving radio sets.

When we were told of this by the corps communications chief, Lieutenant Colonel D. S. Kompanets, we did not believe him. Even I. I. Ptitsyn had to hear it again:

"Radio sets in all the airplanes?"

"Yes, Comrade Colonel, in all of them," the lieutenant colonel replied crisply.

"Now we're finally getting someplace!" Il'ya Ivanovich exclaimed. "A completely radio-equipped corps! Now that, comrade, is power!"

On hearing the same news from General A. S. Blagoveshchenskiy, General S. A. Khudyakov said to staff officers in his presence:

"The folk saying goes that the first swallow does not make the spring. But with such a swallow we can begin fighting for air supremacy. Consider also that this first swallow will be followed by others carrying radio sets on their wings."

The frontal air defense directorate furnished the corps with an RUS-2 aircraft detection radar. Unfortunately it was poorly employed at first, and adequate attention was not afforded to the information it provided. Moreover, due to poor training the combat crews submitted imprecise reports which sometimes misled the air unit commanders. To make matters worse the army communications section devoted little attention to this new equipment and failed to make the formation communications chiefs responsible for its use.

Well, it sometimes happens in life that people are unable to properly evaluate the merits of certain innovations right away. The airmen did not grow to trust the possibilities of radar detection of airborne targets and fighter control immediately. The fact that both the equipment itself and its purpose were classified top secret played a mojor role here as well. Only a few key radio specialists in air force communications knew about the RUS in 1943.

And yet scientific research on aircraft detection by radio waves began in our country back in the early 1930's. The first device, given the code name "Reven'", was designed by Military Engineer 1st Rank D. S. Stogov in one of the scientific research institutes. The device was only capable of getting a fix on an airplane when it crossed an arbitrary line between two radio stations 100 km apart.

In parallel with the "Reven'", this institute also planned other apparatus jointly with the Leningrad Physicotechnical Institute. This apparatus was based on the use of pulse technology. The work was headed by engineer Yu. B. Kobzarev. The device was given the name "Redut". I. A. Naydenov,

the RKKA communications chief at that time, became very interested in it. The device was tested in fall 1938 during air defense exercises of the Kiev Military District and the Black Sea Fleet. Rather hopeful results were obtained. The apparatus could detect flying airplanes up to 150 km away. Its operation was demonstrated to Peoples Commissar of Defense K. Ye. Voroshilov, and he suggested to Naydenov that he write up a draft government decree on manufacturing an experimental lot of the "Redut" devices.

The decree was adopted. The responsibility of producing the devices was laid on Military Engineer 1st Rank D. S. Stogov. When it came time to introduce the equipment into the army the problem of what to call it arose. K. Ye. Voroshilov invited suggestions from B. M. Shaposhnikov, I. T. Peresypkin, I. A. Naydenov, and D. S. Stogov in this regard. Many names were proposed, but none of them pleased the peoples commissar.

"What about christening them 'RUS'--aircraft detection radar?" Voroshilov suggested. "It sounds good, and it has a touch of the old Russia in it."

And so the decision rested. It was with this name that the Soviet radar went into production and then reached the front. "Reven'" became RUS-1, and "Redut" became RUS-2.

I. V. Stalin devoted very much attention to them. He personally monitored fulfillment of the orders for production of the apparatus. Owing to the concern of the Communist Party and the Soviet government the country had 45 RUS-1 outfits and 30 RUS-2 outfits in its air defense system by the beginning of the Great Patriotic War. Subunits outfitted with detection radar intended for long-range detection of airborne enemy airplanes began to be created in the VNOS troops. It was not until 1943 that frontal aviation began to receive such radar. Prior to this time such systems were only temporarily loaned to fighter formations by frontal air defense groups, for the time of individual important operations. In our army, Captain P. K. Mel'nik was given the main responsibility for assimilating the RUS-2. Young and energetic, and one of the best air regiment communications chiefs, he took over Major Rabinovich's post as radio engineer when the latter was transferred to the 204th Bomber Division. Mel'nik did very important work together with the engineering service to improve control of onboard radio sets. Before, sets aboard fighters were turned on by means of a tumbler switch on the instrument panel. While in combat, pilots often forgot to switch their sets from reception to transmission mode or vice versa, and for a certain time they unwittingly lost communication in the air and created interference. On Mel'nik's proposal the radio switching device was moved to the aircraft control stick. The tumbler switch was substituted by a button with a release spring. Pressing the button placed the radio in transmission mode, and its release placed it in reception mode.

Prokopiy Karpovich had it difficult with introduction of the RUS. The device's top secret classification was especially bothersome. Mel'nik

chose the 309th Fighter Division as the place to begin. There, together with formation commander Lieutenant Colonel V. N. Vuss and communications chief Major A. I. Antonov, the captain acquired his first experience in radar guidance of fighters to enemy airplanes.

On 24 October 1943 the enemy subjected the division's command post to intense artillery fire. The radar devices, a number of pieces of radio equipment, and some communication lines were damaged. Several signalmen were killed, to include Major I. A. Antonov. We lost a fabulous person and an outstanding specialist.

Within very short time P. K. Mel'nik repaired the damage suffered by the RUS-2. It once again went back into operation, and owing to the device many fascist airborne pirates breathed their last over Soviet soil. The captain was much to the liking of Colonel Vuss. Vuss requested that the captain be appointed to the post left vacant by Major Antonov's death. The command satisfied his request. Mel'nik, who was soon promoted to major, managed the 309th Division's communications until the end of the war. In the postwar years he received a second academic degree, became a candidate of military sciences, he was promoted to colonel, and he served as an instructor at the Air Force Academy imeni Yu. A. Gagarin.

Without a doubt the first radar devices were far from perfect. For example they could not tell us who the aircraft belonged to--whether it was ours or theirs. The range of the devices depended on the target's altitude, and it equaled the length of the line of direct visibility between the target and the radar antenna. An airplane flying at 1,000 meters could be detected at a range of 100-120 km, while an airplane flying at 100 meters could be detected at a range of 40-50 km.

Despite their shortcomings, radar sets had a significant influence on aviation tactics in World War II.

In June 1943 Lieutenant General S. A. Khudyakov was once again appointed chief of staff of the Red Army Air Force. Prior to his departure Sergey Aleksandrovich warmly thanked the army staff officers for their fruitful joint work, visited the communications center, and said warm farewells to the soldiers and officers.

"Signalmen do not shoot at the enemy, and they do not kill him," he said in parting, "but every day, every hour they do a tremendous amount of work without which it would be impossible to control troops or to annihilate the enemy and emerge victorious over him. The role of communications will grow constantly, and I wish you all success in this work."

Hero of the Soviet Union Lieutenant General of Aviation M. M. Gromov, a world-famous test pilot, took command of the 1st Air Army for about a year. During this time the Western Front conducted a number of offensive operations with the active participation of the the 1st Air Army. During their preparation and conduct I often had to visit the commanders of the ground

armies, the mobile formations, and the air divisions, and I always noted the constant tactfulness and respectfulness with which Mikhail Mikhaylovich dealt with his subordinates, his ability to listen to their opinions attentively, and his lack of haste in making decisions.

And it was just our luck that an extremely unpleasant incident occurred with us in the very first days that M. M. Gromov was our commander!

A number of air formations were to make a massed strike against enemy airfields at Bryansk, Seshcha, and Orel. Preparations for the operation were going on covertly, and only a few generals and officers knew about it. For some completely unclear reason neither the army communications section nor the communications chiefs of the air division were asked to participate in the preparations. Army chief of staff General A. S. Pronin summoned I. I. Ptitsyn just 30 minutes before the airplanes were to take off on their combat assignment and he ordered him to "personally check out" the wire communications within the next two hours. This had never happened to us before.

The results of this negligence--of understating the importance of communication to control of aviation--revealed themselves immediately. The units failed to receive either their code name or the indexes of the group leaders, and no one organized communication to support interaction among bombers, ground-attack aircraft, and fighters that were to make joint strikes against enemy airfields.

The Germans detected our air groups in time, and they placed a fighter screen across our paths. The formations suffered significant, not at all justified losses in the vicinities of the targets.

This incident was investigated by a special commission of the Peoples Commissariat of Defense. The commission found no cause for complaint in relation to us, despite the fact that some staff executives were not beyond transferring the entire blame to communications.

The commission indicated, to the army staff, the need for informing communications executives beforehand about the actions to be taken by the formations, and of assigning the appropriate tasks to communications ahead of time.

Though not right away, the lesson of June was put to good use. The staff began devoting more attention to the signalmen. In any case our mission was never announced half an hour before the start of combat activities.

As with the case of the mentioned strikes against enemy airfields, the 1st Air Army's actions in June 1943 were all in a sense preparations for operation "Kutuzov", which became what might be termed the prelude to the historic battle of Kursk, the battle that placed the fascist German Army on the brink of inescapable disaster. Troops of the Western Front's left wing, supported from the air by some of our army's forces, participated in this operation in addition to the Bryansk Front.

In June we set up two high-capacity auxiliary communications centers at a VPU north of Vyaz'ma (next to the village of Alferovo) and 2 km south of Kozel'sk, near which the frontal control point was located. An additional air force VPU was formed in the village of Koshelevo, 25 km from Mosal'sk, at the headquarters of the 49th Army. It also contained a wire and radio communications center. The point had to be created because, according to intelligence information, the enemy was concentrating sizable forces here with the intention of going over to a counteroffensive.

During one of my air trips to Koshelevo I was unable to recognize the landing strip. While still in the air we noticed two fighters ready for takeoff and, at the forest edge, slightly camouflaged airplanes and motor vehicles; we could easily make out marks on the landing strip made by the wheels of taxiing airplanes, and a folded landing marker. Strange: Why had we not been told of the existence of this new airfield, or of the air units relocated there? Nor had this site submitted any requests for communications.

When we landed, a thick-set master sergeant with dashing grey mustaches ran up to the airplane and reported:

"Comrade Major, dummy airfield chief Master Sergeant Krapiva reporting. What are your orders?"

So that's what it was. I congratulated the brave master sergeant on his excellent stage set and asked him whether or not the Germans were nibbling the bait.

"Yes, sir. We've had two bites already. Scouts have appeared overhead. They are very much interested in my set-up, and I'm just waiting for the 'play' to begin. If another scouting aircraft appears while you are here about your business, may I have permission to have your U-2 take off and land a couple of times?"

I told the pilot, Fedor Morozov, to fly as required by the master sergeant, and I set off for the communications center, which set up shop at the edge of the clearing. Senior Lieutenant P. L. Bugleyev, a company commander from the communications regiment who was there at the time, spoke apprehensively about the center's proximity to the dummy airfield. He validly suggested that the communications center should be moved away.

"I have already sought out a new place and planned the move," reported Petr Lavrent'yevich.

"You've decided correctly. Go ahead."

I had just finished saying this when a siren began to howl from the direction of the landing strip. The U-2 took off. Children appeared from somewhere. Straddling rakes, they began to race about the "taxiways", raising such a dust that it appeared as if several aircraft engines were working.

It turned out that a scout had once again flown into the area, and the master sergeant put his entire stage set into action. Krapiva himself, wearing a helmet and pressing an automatic rifle to his chest, issued crisp orders to his "troops," which included the driver of a ton-and-a-half truck and the children.

The "play" began at dawn on the following day. The landing strip was bombed by 20 bombers under fighter cover. After dropping their bombs they fired at the "parking pads" with their machineguns. Our U-2 also suffered from a tree toppling on it. Two large craters gaped at the place where the radio station stood and people lived in tents previously. Need I say more? Bugleyev moved the communications center just in time!

In the movie "Restless Business," actor M. I. Zharov brilliantly portrays a master sergeant heading a squad operating a dummy airfield, a sergeant very similar to Krapiva. Perhaps it was he whom Mikhail Ivanovich copied. After all, Zharov often visited units of the 1st Air Army.

The compact disposition of the air units permitted us to use American STsR-610A ultrashort-wave radio sets for internal communications at the forming-up place. There were 10-12 such sets in our army, and they were always present within the air corps of the Supreme High Command General Headquarters Reserve. The radio sets operated within the radius of "direct visibility" of the antennas and they provided dependable telephone communication for a range of 15-20 km. To increase the range of radio communication we had to position the antennas on belltowers, tall trees, and specially built towers.

The commander ordered us to organize control of spotter aircraft from breakthrough artillery command posts with the help of these sets. The work was assigned to Major A. S. Zvyagintsev and Engineer-Major V. Ye. Dudashvili. They placed the STsR-610A's and storage batteries for them in the cargo holds of a U-2, and they secured telescopic antennas along the right side. The controls were mounted on the inner side wall of the rear cockpit. When flying at an altitude of 100 meters, the pilot could maintain dependable communication with the ground to a range of 40 km, while at 1,000 meters this range increased to 70-80 km.

Radio-outfitted aircraft of the spotter air squadron began to fly in the vicinity of artillery targets at night. Capitalizing on light provided by illuminating bombs, the gunnery officers successfully corrected fire from their batteries by radio.

Experience accumulated in the use of radio by the spotter squadron was later utilized in the 213th Division. Its crews flew night reconnaissance missions. Flying at an altitude of 1,500-2,000 meters, they transmitted information to staffs located within 100 km of the reconnaissance objectives.

Operation "Kutuzov" began on 12 July. From his command post, which was located in the same place as the frontal command post, General M. M. Gromov

maintained communication with the VPU of the air army by telephone and ST-35 telegraph. The commander's radio station and a high-frequency telephone were also present at the command post. Communication with the VPU was left the same even when the command post was moved, and all that the men and equipment of the frontal communications chief had to do was to lengthen the lines.

Another step in the development of communications in support of interaction between aviation and mobile troops was made during this operation. An operational group representing the 224th Ground-Attack Division was created at the headquarters of the IV Tank Corps, commanded by General M. V. Sakhno. In addition to V-100 and RSMK radio sets, it received a vehicle-mounted RSB station. The radio coordination network included the tank corps, the ground-attack division, the II Fighter Corps, and the air army VPU. Between 12 and 22 July aviation flew 69 times over the battlefield at the request of the tank troops, completing 552 sorites. The radio wavelength reserved for the ground-attack airplanes was also used to request fighter cover for the advancing tank troops. Fighters were called 37 times, mainly when ground-attack aircraft and bombers were operating in the vicinity of a target.

Air liaison officers located themselves in the combat vehicles of the tank brigade commanders. This permitted them to efficiently control the attack aircraft, and to swiftly and effectively retarget them while in the air.

I will discuss only two examples. On 14 July a group of airplanes of the 996th Ground-Attack Division arrived over the battlefield and immediately received instructions:

"Do not bomb Yagodnoye, strike south of it." The airmen executed this order right away. On 16 July a group of ground-attack aircraft led by Senior Lieutenant Demidov received a radio order just as it was approaching the objective of a ground attack: "Do not hit Ul'yanovo--our troops are there. Bomb your alternate target."

I could cite many such cases. The pilots confidently accepted radio re-targeting commands. Only once did ground-attack airplanes ask the controller for the password. This can be explained by the fact that the airmen had learned to recognize their forward air controllers and air liaison officers by their voices.

I had already mentioned that the operational group from the 224th Division was given a vehicle-mounted RSB radio station, the chief of which was Senior Sergeant V. S. Dudar'. She worked for the air liaison officer, Captain M. A. Baklazhenko, the division's deputy chief for communications, and she traveled together with the forward detachment of the tank corps. The Germans managed to halt the advance of our troops in this sector, and then to push them back 3-4 km. Baklazhenko and the radio station crew did

not have enough time to fall back with the tank troops, and they found themselves in the enemy rear.

But the brave soldiers kept their heads. Senior Sergeant Dudar' ordered the crew to camouflage the radio set more reliably. Captain Baklazhenko continued to maintain radio communication with the commander's command post for a day, transmitting his observations of the enemy and of the actions of our airplanes. They did not turn on the engine when transmitting, powering the radio sets only with the storage batteries: The enemy was right next door.

When our troops repelled the Germans the forward air controller immediately assumed control of airplanes over the battlefield. Captain M. A. Baklazhenko, Senior Sergeant V. S. Dudar', and all members of the radio station crew were decorated for their resourcefulness and bravery in combat. Their act of heroism was reported in the army newspaper STALINSKIY PILOT.

Operation "Kutuzov" conclusively confirmed the practice and methods of radio guidance of both fighters and ground-attack aircraft directly from within the battle formations of the advancing troops.

Formations of the 1st Air Army operating on the left wing of the Western Front flew 11,238 sorties in the battles of June and July. Two-way radio communication was maintained by the group leaders with ground command posts and air liaison officers in every flight. Our pilots knocked down 200 fascist airplanes in aerial combat, 28 of them with the help of guidance information from posts serviced by the army VNOS radio company.

While radio communication underwent successive improvements, army wire communication did fall behind in its development. One could converse by telephone from each VPU with any person of the command and staff of the armies, corps, divisions, regiments, and rear services. When in the course of combat we were transferring the XI Composite Air Corps and the 224th Ground-Attack Division to the 15th Air Army, Lieutenant Colonel K. F. Prokof'yev, the army's communications chief and old friend of mine with whom I had served in the air forces of the Belorussian Military District, at first would not believe in such possibilities. Our Kozel'sk communications center and the entire branched airfield wire communication network on this territory was placed at his disposal. Examining the prepared paperwork for the transfer, he smiled at me devilishly and asked:

"Are you padding?"

"What do you mean, 'padding'?" I asked, failing to understand his question.

"I mean the way some documents are sometimes padded. You know, you exaggerate the number of poles and fittings, the number of nonexistent wires you've suspended, even quoting the cross section to make it look real...."

There was nothing to do but take the lieutenant colonel to the communications center. He himself telephoned many parties by his own choice, and his disbelief vanished completely. It was replaced by keen interest in how we had been able to do all of this: After all, the air armies did not have organic communications construction units.

"Ours doesn't have them either," I answered Prokof'yev, "but we do have our own builders. And General Psurtsev and officers of the frontal headquarters communications directorate help us out a very great deal."

My friend listened with interest to the story of how we gathered together and outfitted the construction subunits literally crumb by crumb, and how we stubbornly taught the people to build wire transmission lines in the complex conditions of offensive combat.

"I can recognize Il'ya Ivanovich's mark in all of this," Prokof'yev said with approval. "As soon as I return I'll talk with my chief of staff about this. Thanks for the lesson, comrades."

CHAPTER NINE

ON ANCIENT SMOLENSK SOIL

It was the last third of July. The communications chiefs of a number of air formations in the central sector of the front unexpectedly began submitting orders for their own transmission lines. What could this possibly mean? Colonel Ptitsyn turned to General Pronin for an explanation, and he received an extremely evasive reply:

"You'll know when the time comes, you'll get your orders."

Meanwhile General N. D. Psurtsev, the front's communications chief, recommended that we begin concentrating construction subunits within the 33d Army's sector, forewarning us that a major offensive was to be conducted in the center of the front.

"Why is our headquarters being so secretive?" Major Chuvashin asked in frustration.

"We need to report this immediately to the commander," I advised Il'ya Ivanovich. "After all, this may be a repetition of the recent bitter lesson."

Strange as it may seem, it happened again. While in June we had been given only half an hour before the beginning of combat activities to organize communications, this time we were given just 3 days notice concerning the preparations for the offensive. And yet the senior flight surgeon, we found out later, was informed of all this 9 days previously.

Once again communications--the nervous system of all combat-- had been reduced to secondary importance. Due to a lack of time the airmen were unable to create their own VPU in the central sector. On General N. D. Psurtsev's recommendation we asked the headquarters of the 33d Army to allocate part of its communications center and some of its wire links with the forward airfields to us.

And so we located ourselves at its headquarters, next to the village of Zinov'yevo. The frontal VPU was 20 km away from us. That was, of course far away. As an experiment the frontal construction company laid a

captured four-stranded field cable. But the signalmen had not yet learned to operate such a cable well, and the telephone and telegraph communication it provided, especially high-frequency communication, was poor. We quickly replaced the cable line by a permanent line of four pairs of suspended conductors. It was built together with frontal specialists, they working toward us and our units working toward them. The work took 2 days. One cannot imagine how many reproaches and reprimands, and even threats, we heard during this time from our command! And yet no mention was ever made of the fact that the command had clearly dragged its heels in posing our mission to us. In a word, the key executives were the ones really to blame.

It took a lot of hard work to organize direct telegraph communication between the Zinov'yevo VPU and the formations. On the eve of the Smolensk-Roslavl' operation three air corps joined the 1st Air Army--II Ground-Attack, VIII Fighter, and II Bomber. Communication with the RKKA Air Force, with neighboring air armies, and with the RAB had to be maintained from the old communications center in Dubrovka. There was simply not enough time or manpower to move it to a new place.

As the saying goes, misery loves company. What's true is true. Bringing in tank divisions from other sectors, the enemy offered the most stubborn resistance to our troops within the sector of the 33d Army. The 10th Army, meanwhile, which was operating on an auxiliary axis west of Kirov, broke through the enemy defenses and began advancing successfully.

The commander of the 1st Air Army immediately assigned the 231st Ground-Attack and 309th Fighter divisions to interact with the advancing ground troops. They were placed under the operational management of his deputy, General I. G. Pyatykhin. A VPU had to be created for him on a rush basis. Colonel Ptitsyn sent me as one of the members of the operational group.

Time would not wait, the offensive went on, but there was still no communication. We had to ask General Pyatykhin to turn to the combined-arms command for help. I. G. Pyatykhin was an extremely conscientious person, and he was extremely embarrassed by the negligence displayed in the work of some staff officers. He maintained a very good relationship with signalmen, believing us to be his right arm in supporting the combat activities of the pilots, and he knew quite well how precious time was to signalmen.

The general immediately responded to our request. But he did not have to turn to the army commander for help. Assessing the situation, on their own initiative our colleages in the combined-arms army set up a telegraph station for us and allocated an 11AK radio station together with maintenance personnel to us. I must take this opportunity to kindly mention army communications chief Colonel D. T. Kulyupin and his deputies, lieutenant colonels G. M. Sychev and V. F. Tsukanov.

We made use of the equipment and specialists allocated to us by the ground command for 2 days, until our own equipment and people arrived. But these 2 days meant a very great deal to maintaining control over aviation in the progressing offensive. After all, any let-up would mean serious complications in maintaining coordination with infantrymen and tank troops rushing toward Smolensk.

Here is at least one example. On 15 August a pair of our fighters took off for free "hunting" over enemy-occupied territory. The pilots noted a German armored train traveling toward the front line on the Kirov-Roslavl' railroad. They immediately reported the train to General Pyatykhin. The latter ordered four ground-attack aircraft flying a standing patrol above his VPU at that time to attack the armored train, and he told the fighters to cover the attack airplanes. The armored train never had a chance to fire even a single shot at our troops. Had we lacked communication, it might have offered serious resistance to our infantry.

The offensive in the Smolensk sector was distinguished by great stubborness and savagery. The lack of roads and the presence of marshy forests added considerable complexity. Aggressive combat activities began in mid-September.

This time fighter control was organized somewhat differently. An independent fighter VPU was formed in the main sector. It was headed by the communications chief of the VIII Fighter Air Corps, Colonel L. N. Kurnosov. The post possessed three RUS-2 devices positioned at a radius of 20 km. They provided three overlapping sectors of observation within the main area in which the troops required cover. The aircraft detection radar revealed enemy airplanes within 40-50 km of the forward edge. Each station had direct telephone communication with the VPU.

There were two high-power radio sets at the control post for communication with the airfields. A separate medium-power radio set was used to talk with airborne fighters. Requests for air support to the battlefield were received directly by the airfields, and flights on alert took off in response to a signal flare. On gaining altitude the flight commander contacted the VPU and received a concrete mission from the latter. All of this significantly reduced the time it took for the fighters to reach their prescribed area, and it promoted their most effective use in behalf of the advancing infantrymen and tank troops.

Incidentally an unofficial post intercepting the radio conversations of fascist pilots was operated during these days at the fighter VPU. And I should note that the experiment was successful: Reports from the interpreter-radio operators made it possible to update our information on the enemy and arrive at a fuller impression of the fluid situation above the battlefield.

The ground-attack aircraft control points were located at the command posts of the 21st and 33d armies. Organizationally they were identical to the

fighter VPU's. They were created out of the men and equipment of the II Ground-Attack Air Corps, in which communications were managed by Engineer-Lieutenant Colonel L. A. Moskalev. Bombers were controlled by the staff and the command post of the air army. On approaching the front line the group leaders called the commander's radio station and reported their readiness to go on with their assignment, and after making their bomb strike, they reported target destruction and their losses, and they transmitted incidental intelligence.

Our bombers operated mainly near the forward edge in these battles. The situation changed often here, and the airplanes had to be retargeted often. Whenever the group leaders received orders to change their bombing objective, they necessarily asked the transmitting radio station for the password, since the enemy often transmitted deceptive commands on our wavelengths.

The fighting was hard in the Smolensk sector. The fascists had organized very strong defenses here. They consisted of four or five highly fortified zones. Concentrating its main attention on insuring uninterrupted and stable communication with the operating air formations, the army's communications section at the same time tackled its own construction problems with vigor.

Preparation for redeployment of our headquarters at Aleksino Sovkhoz, about 20 km from Dorogobuzh, were started in mid-September. The place was good. The buildings had survived for the most part, and the surrounding forest offered good concealment for transportation, approaches, and transmission lines. But there were no permanent transmission lines nearby. The closest were not less than 15 km away.

Once again we had to build from scratch. But this time we had some manpower to do the job, and we were able to assign 10 platoons to the work. In 6 days they built 50 km of lines, suspending about 400 km of permanent conductors. The new communications center provided telegraph links with all air formations and the RAB.

The construction platoons commanded by lieutenants I. Ya. Vovk, G. I. Kutuzov, S. Khayrutdinov, A. I. Gorbunov, and G. B. Chesnokov performed their construction work especially successfully. The warriors not only maintained a high work pace, but they also worked on into the pitch-dark autumn nights. Liberated by the Red Army from fascist oppression, the local public provided considerable assistance to the soldiers. The people--women and adolescents for the most part--were indescribably joyful with the expulsion of the invaders, they readily tackled any job, and they labored with enthusiasm and, I would say, self-oblivion.

Nor did the soldiers forget their debt. Whenever the opportunity arose they patched up peasant huts, mended stoves, repaired roofs, and cleaned

out wells. The command gave horses and motor vehicles to resurrected kolkhozes for work in the field. Whenever possible, the warriors plowed the land, worked private plots, and even built homes. Moreover, how could a Soviet soldier not come to the aid of the kolkhoz farmers, kindred spirits of his, on seeing women and even children harnessed into plows and harrows! I recall these pictures of long ago, and my heart overflows.

Help provided by the soldiers in restoring farms and peasant homes destroyed by the fascists elicited a burning desire among the peasants to be as useful as possible to their liberators. Frankly, sometimes their help was extremely important. So it was, for example, during construction of permanent transmission lines near Aleksino.

In a word, the operational group managed to complete its task in time. I inspected all of the new communication network together with Senior Lieutenant V. E. Zholi and Lieutenant L. M. Beylin to determine whether or not everything had been finished.

"Everything seems all right, Comrade Major," Beylin said. "The center's completely ready for work."

"Well, what can I say," I answered. "Thank you, comrades. And now let's all get to work. The staff will soon be coming and it'll be asking for communication right away."

"We have it, and we'll have it," Zholi promised.

But it, created through such hard work, was soon not to be. In the night of 24 September the weather turned worse than had ever been witnessed in these regions. Storm winds up to 25-30 meters per second uprooted huge ancient trees that fell across the wires, destroying transmission lines built along forest roads. The radio remote control lines also experienced serious damage.

Thus the army staff found itself without communications on moving to Aleksino. U-2 liaison aircraft were unable to take off due to the storm winds. To make matters worse the airplanes even had to be tied down securely to the ground.

A headquarters without communications is dead. Without a headquarters, a commander cannot lead his troops. Moreover the offensive was still going on. This necessitated aggressive actions by aviation and efficient and continuous control over it. But operation orders were not racing over the wires, and combat reports were not hastening over them in response. The wires themselves no longer existed for practical purposes. Their fragments, coiled into improbably complicated tangles, lay useless on the ground here and there.

We committed all of the army's and front's signalmen to restoring the lines. The officers and warriors stretched wire from pole to pole in pitch dark.

The wind all but tore the warriors from the poles with improbable force, but the people went on, clenching their teeth, straining every nerve, and concentrating their will.

The signal officers left for the air formations in motor vehicles at dawn. But ground transportation alone is not enough to provide communications to as large a control organ as an air army staff.

"Radio, I want radio now!" General A. S. Pronin demanded more and more insistently.

All of our transmitting radio sets were furnished with excerpts from the radio operating data of those networks which they were to support. This made it possible to quickly establish communications in the staff's general circular radio networks. But they could not completely satisfy the demand for communications. We had a little too many correspondents by this time.

On orders from Colonel I. I. Ptitsyn we began laying a field cable between the radio receiving and transmitting rooms on a priority basis. Not only linemen but also radio operators, drivers, and electricians--all without more important things to do--were put to work. The radio remote control lines were laid in truly record time. Radio communication was returned to full capacity, and it assumed the entire load of information exchanged with the air formation staffs.

This did not mean a breathing spell in the restoration operations. They went on with their previous stubborness and intensity. I inspected the sections one after another as they were made ready for operation. Their number increased with every hour. Wherever it was impossible to hang new wire on the poles, we laid a field cable, which the signalmen called "jerry-rigging." But doing this in bad weather was sometimes no easier than putting up permanent conductors. Carrying a heavy coil on their shoulders, the men forced their way one kilomenter after another through improbable havoc caused by the storm. Everyone was tired beyond belief. The work went on almost around the clock. The men had to keep on working while eating their dry rations. And not even a minute of sleep was to be had.

"Comrade Major, Comrade Major!" Someone's agitated voice resounded from above.

I raised my head. Soldier Vedenin was on the pole with a telephone.

"We're getting through, Comrade Major!" he shouted.

All at once my tired legs gave way, weariness collapsed on my shoulders with unbearable force, I sat down on a mossy thickset stump, took the telephone receiver, and called Ptitsyn:

"Communication is restored, Comrade Colonel!"

"I know.... All links are now working. Thank you...."

The Aleksino communications center became a long-lasting memory for all of us. As with great joys, great difficulties impress themselves in the memory firmly. It was when we were in Aleksino, on 2 October, that we learned with tremendous joy that our troops had liberated ancient Smolensk and Roslavl'. Units of the II Ground-Attack Air Corps, the 303d and 309th fighter divisions, and the 3d Guards Bomber Division distinguished themselves especially in the stubborn battle of Smolensk. They were all named in honor of Smolensk.

In behalf of the service and the officers of the army communications section Colonel I. I. Ptitsyn warmly congratulated the formation communications chiefs--Engineer-Lieutenant Colonel L. A. Moskalev and majors A. A. Gorchakov and N. Z. Rabinovich--on their great combat successes. They were awarded orders.

We on our part were able to congratulate Il'ya Ivanovich himself on his promotion to Major General of Aviation. He became the first general among air army communications chiefs and section executives in our staff.

The son of a logger, I. I. Ptitsyn was born in 1897 in Yaroslavl'. He had formerly been employed as a mailman, a telegraphist, a lineman, and a telegraph mechanic, and in 1920 he joined the Red Army, tying all of the rest of his life in with it. Starting his career as a common mechanic servicing high-speed apparatus, Ptitsyn went on to successively occupy the posts of military telegraph station chief, assistant commander, and then commander of a signal company and battalion. In 1937 he joined the party while serving as communications chief of an air brigade. Then Il'ya Ivanovich took charge of communications for the air forces of the Transcaucasus Military District, and just before the Great Patriotic War, as the reader already knows, he was communications chief of the ZOVO [not further identified] air forces.

Not everyone is able to experience such a distinguished career. To do so, one must love one's selected profession very much, and know it perfectly. Il'ya Ivanovich could not think of life apart from communications. He knew it inside and out. His daughter Alya, who did splendid work in our communications center, was also a telegraphist 1st class. Her father never treated her any differently from the other telegraphists. Following the war, Alevtina Il'inichna became a candidate of biological sciences and went to work in one of the Khar'kov institutes.

On being promoted to general, Il'ya Ivanovich changed only on the outside--different shoulder boards on his tunic and stripes on his trousers. Inside, in his mutual relationships with friends and subordinates, he remained a simple and cheerful person with a kind and open spirit, a responsive and demanding individual who put his all into his work.

There were never any breaks in the work of signalmen at the front. While after a particular operation the pilots were able to enjoy some sort of breathing spell, we could not even think of something of the sort. After the taking of Smolensk we immediately began preparing a forward communications center in the vicinity of the city of Krasnyy in Smolenskaya Oblast. The headquarters was to be moved there subsequently. Over 20 tons of 3-millimeter wire and fittings had to be moved on priority to the new place, the village of Usokhi. The task was completed by the army's airlift regiment, which was equipped with Li-2 and Si-47 airplanes. To make matters worse, all of this weight of wire and fittings had to be suspended from poles which needed to be procured from the surrounding forests.

We worked around the clock. By the end of the 4th day we had hung 432 km of wire and built 25 km of new lines. This was the first time we had ever achieved such a rate. Nevertheless due to a number of mistakes made by the reconnaissance group leader, by the time the staff arrived half of the air divisions could be serviced only by radio.

I remember that day well--13 October 1943. The advance echelon of the headquarters was to arrive at any moment, and we were not completely ready, meaning that we would have to take our lumps once again.

The field post office was among the first to arrive at Usokhi. After unloading his vehicle, its chief, Captain Ya. F. Tutubalin, walked over to the communications center with a bundle of recent newspapers under his arm and several letters in his hand.

"Oh, Comrade Major, you're just the person I wanted to see!" he exclaimed as he extended several envelopes toward me. I immediately recognized my mother's handwriting on one of the envelopes. The letter was very short. My mother wrote:

"Dear Zhenya! I have sad news for you. We received a message that Volodya had died in battle at Slavyansk. Words cannot express my grief.... The war has already taken two of my sons away. I am trying to be strong, but that is not always easy to do.... The bitterness of war has visited every home. Please take care of yourself as best you can. Kisses, your mother."

Vladimir was my third brother. In 1940 he participated in the war against the White Finns as a volunteer, commanding a skiing reconnaissance detachment. At the battle of Slavyansk he was commander of an automatic rifle company. And now he was no longer alive....

My brother Aleksandr was declared missing in action back in winter 1942, during the Red Army's offensive at Lozovaya. It was not until after the war that he was found. It turned out that his unit had been encircled and destroyed. Aleksandr was captured, and he survived many fascist death camps.

I talked with my friends and gave orders, but Vladimir constantly remained before my eyes, alive and smiling.

"Why so blue?" General Ptitsyn asked, immediately noticing my depression after arriving in Usokhi. "It's not your fault that you didn't have enough time to set everything up right. Don't worry, we'll straighten things out...."

I extended the letter toward Il'ya Ivanovich. He read it, sighed heavily and, placing his hand on my shoulder, uttered sympathetically:

"It's war, Zhenya.... You know yourself that you can't bring your brother back. For those that fall, it's rest in peace. But the living must fight on, and fight on hard. Be strong, my friend. The wires must start humming on all lines...."

And in 2 days they did in fact begin to hum on all communication routes. By this time, however, four air corps that had been temporarily attached to us operationally had already left. The load on communications dropped, but the work volume increased anyway.

One could sense that there was to be a lengthy pause in active operations on the front. We had to capitalize upon it immediately, and to bring signal troops and equipment scattered from Yukhnov to Krasnyy closer to the front. Moreover Usokhi was not the best location for the headquarters: The rather exposed terrain made camouflage difficult, and the road leading to frontal headquarters was very poor. Thus we were faced with another move to a new place.

We relocated ourselves in the large town of Syrokoren'ye, which had survived the war well. The communications center was set up in such a way that it could be expanded quickly. We built connecting lines leading to the front's trunklines. These connecting lines offer considerable opportunities for further development. Wire communication was organized on the basis of the principle of extending telephone circuits to fighter and ground-attack divisions and using their midpoints for telegraph communication.

The center's installation was managed by Major A. A. Rechenskiy. He completed his mission well. This communications center was one of our most powerful and developed ones. By the end of the year it had 22 operating telegraph links and a telephone station servicing 110 numbered parties, government telephones, and the Kremlin Automatic Telephone Exchange.

Even now I can still see Sergeant Dmitriy Ignat'yevich Frolov, a participant of three wars--World War I, the Civil War, and the Patriotic--walking about near the radio station.

"Not since I was born have I ever seen such a monstrous set-up," the veteran radio-telegraph operator said with elation.

I must confess, however, that we did have our problems. Intense frosts hit us in November. The telegraph station had to be grounded well. Senior Technician-Lieutenant S. G. Golovin was responsible for this. An indefatigable inventor and efficiency expert, he decided to use a well near a hut for grounding purposes. He found a 50-liter milk can, and with the help of Master Sergeant A. A. Levin, an electrician, he soldered a copper wire to it. He lowered the milk can into the well, and connected the other end of the wire to the instrument room.

According to the technical rules a telegraph station must have "three grounds"--that is, three input leads from three grounding circuits. But Golovin felt this to be superfluous, feeling certain that the "well-can" circuit would be fully reliable.

But this "efficiency" let Golovin down. Once a group of guidance officers was transmitting instructions to divisions assigned to them. And suddenly, as if on command, the transmitters began interfering with one another. The experienced telegraph operators knew immediately that the grounding circuit had been broken. They ran to the well. The can was lying on the ground beside the well. They immediately lowered it to the well's bottom. Communication returned to its previous efficiency and faultlessness.

"Whoever did it, I'll tear his arm off!" Golovin raged.

The search did not take long. A young warrior from the security company was to blame. He happened to be passing by when the can was being lowered into the well, and he decided that they must have been lowering wine or beer into the well to chill it. The Red Army soldier could not resist: No one would see him at night. But he found the can to be empty. The soldier was strictly punished. Golovin was also reprimanded--efficiency is good if it is not contrary to strictly established technical rules.

In October we received a directive forming the 333d Separate Telegraph-Construction Company for us. Personnel were transferred to it from the construction platoons of the RAB's communications company. Captain A. A. Vorob'yev was appointed its commander, and Senior Technician-Lieutenant G. V. Chesnokov was appointed his deputy commander for technical affairs. Lieutenants P. I. Solntsev, G. I. Kutuzov, and I. A. Guzov, and I. Ya. Vovk were appointed platoon commanders.

We had long intended to unite the small scattered construction subunits into a separate unit, and we often submitted written proposals for doing so to higher levels of authority. And finally we received such a formation, a highly productive and mobile one capable of conducting major construction operations. Though they were brought together into a company, the platoons concurrently maintained a certain degree of independence, which permitted them to handle sizable jobs even when separated from the unit for long periods of time.

Of course we had to work hard to get this far. Many of the enlisted men and sergeants required further training, and they needed to master associated specialties. Moreover the company received a totally untrained complement. We decided to transform this unit into a construction training center, to be attended by signalmen from subordinated formations as well.

The training was organized according to the experience I had with a team of seasonal workers before fate brought me into the army. At that time I was working as a lineman for a Kaluga communications enterprise. I was ordered to set up a construction column containing 25 persons.

Seasonal workers of the village of Kudrinskiy, not far from Sukhinichi, had many years of experience building and repairing communication lines. It was there that I went. And it was there that I found a bona fide training ground. Poles of different heights and equipped in different ways stood in an area next to the church. Some of the poles were embedded in rail foundations, and they were secured with attachments, supports, and guy wires. Wires of different diameters made from different metals were stretched over the insullators. There were samples of wire bundles and splices, and "classical" pits for installing poles with the least excavation gaped before me.

It was on this training ground that I. Yashin, an experienced veteran lineman who permanently headed the village artel, trained his fellow villagers for seasonal jobs on the line.

I shared my recollections of this with Captain A. A. Vorob'yev. He liked the idea of setting up a "Kudrinskiy training ground" in the company. The company commander regularly set up such training bases all the way until the end of the war, and he always achieved high results in personnel training. But training had to be reinforced by real work in combat conditions; through the latter, the Red Army soldiers would be able to understand its practical, instantaneous value and need, and feel themselves to be not only students but also warriors actively promoting the enemy's defeat.

Sometimes we even had to make up such tasks. There were times when the 333d Company was ordered to suspend wires in some sector or build a new line to a particular facility, and behind it the 37th Cable-and Pole Company removed these wires and dismantled the just-completed line. General I. I. Burov, the frontal communications chief, also resorted to this method of builder training.

The daily army newspaper STALINSKIY PILOT provided active assistance in signalmen training. It regularly published notes describing our best soldiers, the experience of using radio communication and operating equipment in different times of the year, and the most suitable methods for laying wire transmission lines. For the most part the authors of these newspaper articles were signalmen themselves. Senior Sergeant I. V. Petrov, an outstanding telegraphist, was one of the most active military correspondents.

A former kolkhoz farmer from Kalininskaya Oblast, Ivan Vasil'yevich Petrov saw the war begin as a student in a training company, in which he was learning to be an air force signalman. When in 1943 Petrov joined the party before the start of the Smolensk operation, it was I who gave him his recommendation. After the war he became a professional writer, and he wrote a number of books. One of them--the novel "Bud'te krasivymi" (Be Beautiful)--is devoted to the selfless labor of soldiers in the communications regiment of the 1st Air Army.

By the end of 1943 the separate construction company was already a battle-worthy independent unit. Nor did the 37th Cable-and-Pole Company fall behind it. Personnel of the army regiment also enjoyed new successes. Efficiently supporting all operations with communication, the soldiers untiringly improved their skills and upgraded their qualifications. By the new year, 1944, all telegraph operators in the regiment had class ratings, and almost two-thirds of them were specialists 1st and 2d class. Eighty-eight percent of the radio operators had class ratings. Half of the warriors of the airwaves were specialists 1st and 2d class. Many of the soldiers earned government awards. The army command gave a high evaluation to the work and the personnel of the communications section. General I. I. Ptitsyn, Major Ye. I. Chuvashin, Captain G. S. Grudskiy, and I were awarded orders.

During a modest New Years Eve reception held by air army commander General M. M. Gromov the latter raised a toast in honor of the air force signalmen. Praise from the mouth of this famous Soviet pilot gave us joy, and it obligated us to many things. We knew quite well that harder work was still ahead.

CHAPTER TEN

ON THE EVE OF THE GREATEST OPERATION

It was now 1944. Troops of the Western Front were not engaged in aggressive combat activities, and they were holding on to strong defenses. Such a lull could not last for an especially long time. Everyone knew this quite well. Therefore the staff used every day and every hour to prepare for offensive combat in the future. The scouts consistently studied the forward edge and the enemy rear. The airfield network underwent expansion. Forward airfields were created 10-15 km from the front line. The communications section sought the best ways to connect them to the army's general wire communication system.

All of this was doubtlessly very important work for us, but it was far from all that we did. The army communications section had to have a great deal of raw data with which to plan communications for the entire depth of the proposed offensive operation. We had to know the fundamentals of the commander's concept, and we needed information on the men and equipment to be brought in, the estimated rate of advance of our troops, the expected enemy resistance in the air, the order of movement of staffs and control points, subsequent relocations of air formations and air force rear services, the condition of roads and bridges, and the nature of the terrain. In order to correctly answer all of these rather complex questions, the communications chief and the officers of his section had to know and correctly evaluate the operational situation, and to quickly and correctly adjust previous decisions in accordance with the changes in the situation, which could assume the most diverse variants.

The art of a military signalman servicing as large an organization as an army or frontal headquarters lies precisely in the fact that he can effectively and economically utilize his men and equipment in different stages of the operation, assuming that he is aware of the commander's concept and of the fine points of the evolving situation, and assuming that he is able to predict the course of development of the events. Hence it follows that the communications chief and the executives of his officer staff must have good operational training, they must constantly improve it, and they must study the accumulated experience deeply and thoroughly. Otherwise they may

transform into mediocre executors incapable of making a creative organizational or engineering-technical decision.

General I. I. Ptitsyn surrounded himself with executives who knew how to correctly analyze the situation evolving at the front and predict its further course. He diligently transmitted this ability to his subordinates. Together with the section's officers, Il'ya Ivanovich periodically played out all of the possible variants for disposing the communications forces and equipment during particular stages of an offensive, and in numerous situations that could arise during an operation. In this case his senario inputs were always maximally close to the conditions of real battle.

At the beginning of 1944 we underwent such training especially intensively. After all, the Ukrainian fronts had already liberated almost all of the Ukraine and had reached the USSR state border in a number of places. Before us was Belorussia, where Soviet people were still in agony beneath the fascist yoke. We knew that it would soon be our front's turn to strike an annihilatory blow at the enemy, to defeat him on the western strategic axis, and therefore we prepared ourselves stubbornly in both practical and theoretical respects: We laid new lines, and we played out different decision variants on the maps.

Intense preparations for the operation conducted in parallel with performance of everyone's own routine responsibilities required a great exertion of effort on the part of the officers. Sometimes we would return from some division, tired and frozen to the bones in the drafty U-2, and immediately the duty section officer would announce:

"Everyone is to go to the general's office. Map games in 5 minutes."

Much additional work also had to be done by the section's "female subunit"--administrative officer Lena Lebedeva, draftswoman Vera Dolgushina, and Klavdiya Petrovna Yevdokimova. Vera and Lena were 19-year-olds from Moscow. Prior to the war Vera worked as a draftswoman, and Lena was employed as a secretary in a design office. As soon as they came of age the Komsomol members began stubbornly demanding acceptance into the regular army, managing to become students in our regiment's training company; after that they were promoted to sergeants, and specialists 2d class. And finally the young girls were transferred to our section.

Klavdiya Petrovna worked first as a civilian employee, and then she mastered the telegraph transmitter, and she was awarded the rank of a sergeant. A very quiet person, this modest 24-year-old woman enjoyed the respect of all in the section, and among the women she was respected as being the oldest and most experienced.

Presence of women in the section somehow ennobled the officers right away. We began to change our undercollars more often, and to shave and press our uniforms regularly....

Once I came into the section and found Vera in tears.

"What happened? Who hurt you?"

"I can't work for you anymore," the young girl sobbed. "I'm supposed to finish a whole pile of drawings, and everybody needs them right away. And now the general calls, and he orders me to draw this." She showed me a sketch drawn hastily by Il'ya Ivanovich. "And all of it must be done by morning, for the commander's briefing. No, I can't.... Send me back to the regiment, Comrade Major. I could be more useful there...."

Yes, her "taskmasters" had clearly overloaded her; it was more than enough for two.

"Calm down, please," I told Vera. "Tears won't make the work go any faster. Here, let me get some help for you...."

By morning, Dolgushina finished all of the drawings ordered with the help of two free specialists from the communications center.

Vera became an excellent specialist. She was often brought in to prepare diagrams for the operational section, and to plot the situation on the command chart. She even taught many of the officers to draw diagrams well, to arrange them correctly, and to write numbers and letters clearly. Senior Lieutenant V. E. Zholi provided her a great deal of help by making a plexiglass ruler and templates for various map symbols.

All of this had an immediate effect, raising, as we say, the staff's culture. We not only learned for ourselves; we also taught others to fight, those who were still undergoing training in the military academies. A group of students from the Leningrad Air Force Engineering Academy underwent a period of apprenticeship in the section in early 1944. On being sent into the operating army, all of the officers supposed that they would be immediately assigned to the forward edge, to the operational airfields. And in fact they were placed at the disposal of the army's chief engineer. But General I. I. Ptitsyn managed to intercept the apprentices, arguing to the command that the young engineers should first get their feet wet in the army communications section.

"All we need now is a bunch of students," some of the comrades muttered on learning of this. "We've got more than enough to do even without them...."

Naturally, work with the apprentices imposed additional responsibilities on each of us, and it inevitably meant more trouble. In the same way that visits by various officials from higher headquarters to the army meant more trouble. Of course, it was only at first that we treated them with suspicion; we later persuaded ourselves that the visits by officers from Moscow were for the common good.

For example Colonel Mikhail Petrovich Koval', section chief of the Red Army Air Force Communications Directorate, spent more than a month with units of the 1st Air Army. He gave tests to fighter and ground-attack pilots interested in obtaining radio communications ratings. At the time Mikhail Petrovich inspected the section's documents, noted a number of omissions and inaccuracies in them, and provided a great deal of administrative advice. He took a direct part in maintaining air force communications during the battle of Kursk, and he readily shared the experience of organizing them with us.

Colonel Aleksandr Nikolayevich Mal'tsev, chief of the same directorate's radio section, also provided considerable assistance to us. He delved deeply into our needs and was able to quickly resolve many problems by talking directly to the air force communications chief.

Contrary to the apprehensions of the pessimists, the apprentices from the Leningrad Academy also became our good helpers. The time of their arrival in the army coincided with the time we received American communication apparatus, to include a sizable lot of ground shortwave and ultrashort-wave radio sets.

The STsR-399 radio set turned out to be the most acceptable for control of air formations, and the STsR-284 was best for airfield operations. They were simple and reliable, and the truck bodies into which the apparatus was installed could be easily reinstalled in vehicles of different brands. However, the technical description of the sets and their operating rules were all in English. We naturally found enlisted men and officers who could read and even speak a little English. But translating technical text was beyond their abilities.

It was here that the apprentices came to our aid. They had an excellent grasp of English, they were well versed in radio engineering, and on their own initiative they began translating the technical documents accompanying the American radio sets. Mikhail Nikolayevich Prussov played the main role in this regard. The officers simultaneously taught crews formed to operate the transoceanic equipment.

In some unknown way, assimilation of the American radio sets began to be called, of course with intentional mockery, the "second front". At first Prussov and his comrades did not grasp the concelaed meaning here, and they felt insulted, but later they came to share the common opinion, which boiled down to the well known Russian folk saying: You can't eat promises.

The apprentices visited almost all of the army's formations, and wherever they went, they helped the signalmen to master the new American radio equipment.

Representatives from the communications department also visited the army from the academy: Military Engineer 1st Rank G. M. Artemenko, who subsequently

wrote a training manual on organizing communications in an air army, and Lieutenant Colonel S. F. Mart'yanov, who later became a candidate of military sciences. Sergey Filippovich helped us to reveal shortcomings in our work, and he became a good teacher in the use of radar and in the maneuvering of radio equipment during the Belorussian offensive operation. He wrote a very thorough account of the organization of communications in this operation.

The radio equipment from across the ocean caused a great deal of trouble in regard to its assimilation and introduction, even though it did not have decisive significance to air force radio communications. And yet the electric power plants we received did come in very handy: We set up our own power station. Its operation was the responsibility of master sergeants Levin and Leonov. Their station always worked without a hitch. They themselves procured distilled water for the storage batteries, prepared and changed the electrolyte as the seasons required, charged the batteries, and between the two of them they serviced the entire power network of the headquarters and the communications center.

Curiously enough, Ivan Pavlovich Leonov had only a primary education, but he was still a superior expert on internal combustion engines, and he had some sort of special instinctive knack in this area. No matter what might happen with the motor or the dynamo, Leonov was able to determine the cause of failure correctly and immediately correct it. I recall one situation in which rather serious complications arose with the small engines--new ones were rarely available, and the old ones for the most part had outlived their life, breaking down more and more frequently. Then Il'ya Ivanovich Ptitsyn summoned Leonov and said:

"The engines require overhaul. I'm thinking of giving this job to you."

"Don't worry, I'll do it, and you'll be pleased." Leonov always answered in this way when receiving an assignment.

And in fact he did complete his task in an outstanding manner. Taking over an engine shop in the army communications repair shop, Ivan Pavlovich quickly repaired the engines, and the "preinfarction condition" at the communications centers was eliminated.

Electromechanics A. Levin, S. Kotov, Ye. Korostelev, and others were also good experts. Owing to their proficiency and diligence, the communications centers were supplied power without interruption.

In April the Western Front was reorganized as the 3d Belorussian Front. This meant a change in the demarcation line on its left wing, and thus we transferred all of the communications centers and lines south of Krasnyy, Monastyrshchina, and Pochinok to the 4th Air Army, which was placed within the composition of the just-formed 2d Belorussian Front. Our neighbors also got all of our communications units that had serviced the air formations transferred to them.

"That's not a bad system I'm getting," Colonel S. A. Lebedev, communications chief for the 4th Air Army, thanked General I. I. Ptitsyn as he signed the transfer document. "But when did you ever manage to build such a large number of lines?"

In half a year we did in fact manage to extensively develop the wire communication system along the entire front with the help of frontal signalmen. But now much had to be built anew once again. Following transfer of a number of formations to our neighbor, the staffs of the 3d Belorussian Front and the 1st Air Army found themselves situated at their own left wing. The command made plans to relocate at Rudnya, where an area was reserved for the airmen by the village of Stai.

A high capacity auxiliary communications center was set up in Stai. On 20 May it began to operate in parallel with the old center, and in the event that the staff were to relocate, it could replace the old center immediately and provide full support to control of aviation in the offensive.

Meanwhile the time for the offensive to begin was clearly coming closer. Air reconnaissance became more active from day to day. We established direct telephone and telegraph links between the frontal and army reconnaissance sections, foreseeing a possibility for enlarging the links to permit communication directly with reconnaissance regiments.

Air reconnaissance did work in behalf of the signalmen as well. Senior Lieutenant R. K. Boldyr'kov, who had formerly served in the army communications squadron, flew for the reconnaissance regiment. He understood our work well. And it was he who was instructed to take low-altitude aerial photographs of the wire trunklines on occupied territory. Rostislav Karpovich did an excellent job. Interpretation of the photographs showed that the Germans were basically using low-capacity lines containing from four to six wires. By transposition we determined that these lines consisted mainly of copper or bronze wire. In all probability the lines were multiplexed by apparatus making it possible to conduct several telephone conversations simultaneously with one pair of conductors. Trunklines containing numerous conductors, meanwhile, were found only along railroads.

On returning from one of his reconnaissance flights, Boldyr'kov reported to me:

"I was hedgehopping along the Orsha-Chausy highway when I saw barbed wire hung from the poles...."

"Are you sure?"

"Absolutely, I noticed the barbed wire for the first time yesterday, and today I convinced myself that it was."

Rostislav Karpovich had envious vision. After this region was liberated we did in fact find barbed wire on the poles. This meant that the Germans were

having supply difficulties, that their reserves were dwindling, and that they were unable to replenish their losses. Such amazing changes: We used barbed wire in 1942-1943, and the Germans were doing so now. We relayed Boldyr'kov's report on presence of sections of barbed wire lines on enemy territory to all of the front's communication route chiefs, so that they would not count on presence of good conductors in these regions during the offensive.

Insuring trouble-free communication during air reconnaissance, which was very intensive, was an extremely important matter. The command ordered our section to take extreme care in maintaining the operability of the communication link to the 10th Separate Air Reconnaissance Regiment, which was principally responsible for studying the forward edge and the enemy rear. And so it happened that an unforeseen problem arose on the very route which the section kept under special scrutiny.

On the night of 18 May, after the duty officer of the reconnaissance section called the regiment's chief of staff to the telephone in order to give him his combat mission, ST-35 communication was cut off. The communications duty officer suggested to the reconnaissance officer that he use the radio, but the latter would not agree, deciding to wait until the line was restored. This resulted in great unpleasantness--the airplanes were unable to take off on their reconnaissance mission.

General A. S. Pronin demanded that the communications chief of the regiment be punished for his negligence. I was ordered to investigate the incident, and so I flew to Smolensk, where the regiment was located. I was rather well acquainted with the communications chief, Captain Nikolay Kononovich Korneyev, from working with him before joining the army. He was an experienced specialist and a conscientious officer. I could not believe that he was to blame for all of this.

Everything became immediately clear when I landed. Just at the moment when the reconnaissance officer summoned the regiment's chief of staff to the telephone the enemy made a bombing strike on the airfield, the railroad station, and the city. The connecting lines and the frontal control and testing point in Smolensk were put out of action, and the connecting line between the receiving and transmitting points suffered as well.

Paying no attention to the bombing, Captain N. K. Korneyev and his wife Nadezhda Korneyeva, a radio operator, ran from the receiving room to the radio station and quickly contacted the army headquarters. Through a messenger, the captain reported to the regiment's chief of staff, Lieutenant Colonel P. M. Bartosh, that radio communication was still intact. We received the first radio message from him at 0317 hours, and the second at 0545 hours. However, the army cryptographers were unable to decode them promptly, and so General A. S. Pronin was kept in the dark.

There was nothing to punish Korneyev for. On the contrary he was fully deserving of reward. This is what I wrote in my report, concurrently noting the

selfless actions of Nadezhda Korneyeva and the radio station's electro-mechanic, Ivan Ageyev, during the bombing.

Wire communication was fully restored with the regiment by 1000 hours. On receiving their assignment, several of the crews flew beyond the front line. By midday the reconnaissance information obtained from them was already being processed by army staff officers.

The 10th Air Regiment was basically responsible for operational reconnaissance. The crews usually flew alone at high altitude, and as a rule without fighter cover. The role of the gunner-radio operators, who were selected from the bomber units and ground radio subunits, increased especially under these conditions. They underwent a special training course in an air training brigade. In the regiment, Captain N. K. Korneyev personally made the gunner-radio operators ready for action. He often flew in the unit commander's crew on the most difficult assignments, and he always completed his task brilliantly. His personal example played an important role in training and indoctrinating the young gunner-radio operators.

Reconnaissance missions were complex and risky work for the entire crew. But the gunner-radio operator suffered the greatest danger in the air. He was the first to be fired upon by enemy fighters, and it was he who was responsible for producing a fire screen for his aircraft. However, no matter what the situation the gunner was also obligated to maintain continuous communication with the ground while flying. Gunner-radio operators of the 10th Reconnaissance Regiment performed all of these tasks faultlessly. Moreover they themselves performed active visual air reconnaissance while flying at low and moderate altitude. During the war they discovered thousands of barely noticeable camouflaged targets such as tanks, airplanes, gun positions, the locations of enemy headquarters, and approaches to them.

Senior Sergeant N. Makarov flew more than 200 combat sorties aboard a Pe-2. His radio set never stopped operating. The senior sergeant personally knocked down two German fighters, and he earned five orders and several medals.

Gunner-radio operator V. Fomin was credited with over 100 reconnaissance sorties. He was awarded the Order of Glory three times. Senior Sergeant Solodkin, sergeants Minayev and Petrunovskiy and many other soldiers displayed high proficiency and heroism in the air. They contributed many glorious lines to the combat history of the 10th Air Reconnaissance Regiment and the battle chronicle of the entire 1st Air Army.

Preparations for the Belorussian operation were going on full steam.

Our army accepted a new commander--Colonel General of Aviation Timofey Timofeyevich Khryukin. He was only 32 years old at that time, but he already had a tremendous amount of combat experience behind his back. A participant of encounters in Spain and China, General Khryukin displayed truly outstanding capabilities as a major air force military leader in the battles of

Stalingrad, Mius, and the Crimea. While working in aviation, Timofey Timofeyevich traveled a road from cadet of the Voroshilovgrad Military Pilot School to deputy commander in chief of the air force. And all of this in just 10 years!

T. T. Khryukin transferred to us from the 8th Air Army together with chief engineer General I. I. Bondarenko, deputy chief of staff Colonel N. P. Zhil'tsov and, somewhat later, Major General of Aviation Ivan Mikhaylovich Belov, who assumed the post of army chief of staff. Relying on his old fellow workers, General Khryukin quickly introduced his method and style of work into the troops and staff.

Timofey Timofeyevich began acquainting himself with the army executive staff by listening to reports from each of them. General I. I. Ptistyn reported that our headquarters had ST-35 telegraph communication and radio communication with all of the formations and separate units, and that in addition we were capable of conducting telephone conversations with all fighter and ground-attack divisions at any time.

"This sort of communications will be organized with all formations brought in to reinforce the army," Ptitsyn concluded his report, and he added: "On the condition, of course, that they would accept our recommendations as to the places of deployement of the headquarters and control posts on the battlefield."

The possibility for conducting telephone conversations with all formations and, consequently, between all formations apparently amazed the commander. He said:

"I'll soon be flying to all of the divisions, and I'll see how much your words correspond to reality. And I will wholly support your demand of coordinating the deployment sites of staffs and auxiliary points with the signalmen."

The commander ordered General Ptitsyn to personally write up the communications plan for the forthcoming operation, cautioning him that his command post would be deployed together with the frontal command post, in the main sector, not far from the advancing troops. He showed the place from which he intended to control aviation on a map. General Ptitsyn was happy to receive such clear instructions for the signalmen, and it seemed to me that he immediately gained respect for the new commander.

Telling us about this interview, Il'ya Ivanovich reported that Khryukin had given orders to transfer the riding horses which M. M. Gromov, an amateur horseman, had raised to the communications regiment. The horses were very useful to us, since the air force signalmen did have animal transportation in those days as well.

T. T. Khryukin personally visited all of the air formations, and wherever he went, he was persuaded of the truthfulness of General Ptitsyn's report. He

did find certain shortcomings, of course, and he demanded their immediate correction, though sometimes this was beyond our strength and possibilities....

I remember when Colonel G. V. Zimin, commander of the 240th Fighter Division, complained to the commander that one of his regiments did not have direct telephone communication with the airfield at which the ground-attack aircraft he was supposed to cover were stationed. Khryukin ordered Ptitsyn to organize such communication. There could even be no discussion of obtaining permanent wireš from the frontal network for the entire length of the link: They simply did not exist. A 50 km cable line was laid on priority, and Morse transmitters were connected to it. But this was not good enough for Zimin. He demanded specifically a telephone link between the fighters and the ground-attack aircraft. Captain P. P. Volokhov, communications chief of the 240th Air Division, managed to find, I know not how, buzzer-equipped telephone sets pulled off of troop armament, and he connected them to the telegraph line. There was of course no acute need for all of this. But every order is an order.... When the occasion permitted, however, General Ptitsyn asked the commander to eye requests from the formations more critically. After all, he said, we had to create reserves to support the operation for the entire depth of the offensive, and here we were beginning to use them while still at the forming-up place. Timofey Timofeyevich was able to accept the communications chief's request with an understanding of his error.

My first personal encounter with General T. T. Khryukin occurred in the 303d Fighter Division. The formation was given the mission of preventing the enemy from observing the regrouping and concentration of the frontal troops from the air, and of combating his reconnaissance airplanes. The army communications regiment placed an RUS-2 radar station at the disposal of the 303d. While introducing himself to the division the commander decided to check the operation of the aircraft control point as well. He requested an officer of the army communications section to be there, and General Ptitsyn sent me.

Tall, exhibiting excellent military bearing, Timofey Timofeyevich made a good first impression. His tight-set lips were thin, his hair was cropped short, his brows were bushy, he had a long, straight nose, and a high forehead. The general's eyes were greyish blue and penetrating; they seemed to drill right through whomever he was talking to. Somewhat sullen and quiet, Khryukin seemed hard and inaccessible. His appearance belied unbending will and inflexible decisiveness.

The commander attentively listened to what Lieutenant N. P. Sveshnikov, the commander of the radar platoon, had to say about the technical possibilities of the RUS-2 and about the methods used to guide fighters to airborne targets with its help. The general also talked with the division's communications chief, Major A. A. Gorchakov, who at this time was in charge of the aircraft control point, where he had to inform the pilots of the location of enemy airplanes in the air essentially on his own.

The commander was very displeased with the fact that control of the fighters had been delegated to the signalmen, and he ordered General G. N. Zakharov to assign only navigators or experienced pilots to this work from now on, insisting that they not only inform the fighters on the situation in the air but also maintain command over them and indicate the course, speed, and altitude at which to intercept the enemy.

"And why isn't the communications section interested in the problems of combat control?" T. T. Khryukin asked me.

I told him that radar was something new, and that it was being assimilated with difficulty. The RUS-2 system had been transferred to the 303d Division not too long ago, and it was just beginning to be assimilated. Moreover the pilots were still not trustful of this equipment. However, the crew had already gotten a fix on several of the German forward airfields, locations of which were confirmed by air reconnaissance.

"This is not what is required of a control point," Khryukin replied in irritation. "Stay here and put things in order," he ordered me, and he advised Zakharov: "If you are going to raise the confidence the commanders have in the reliability and accuracy of the station's readings, you'll have to conduct demonstration radar-controlled flights for the division's executives."

The flights were conducted on the following day. The first to take off was Lieutenant Colonel K. A. Pil'shchikov, commander of the 523d Fighter Regiment.

"Can you see me?" he asked the radarmen on flying out of sight of the command post.

"We can see you," the station replied. "Your course is Three Hundred Sixty."

A minute later the lieutenant colonel asked:

"What is my speed?"

"About 400 kilometers," the correct answer once again followed.

Then the pilot changed his course to 180 degrees. The station immediately detected this change and reported it to him. Such experiments were performed several times. Pil'shchikov remained pleased with the crew's work. Taking off after him was his follower, Guards Lieutenant Colonel A. Ye. Golubov, commander of the 18th Guards Regiment. He entered into two-way communication with the ground, but he did not have enough time to test the radarmen completely in the way he had planned. The command post informed him that a real airborne target had been detected. The RUS-2 could not show the target's altitude at this moment, but the experienced crew was able to determine it rather precisely from the way the target entered the

detection lobe. A J-88 scout and two Messerschmitts covering him were flying at 3,000-4,000 meters.

A. Ye. Golubov had been in many fights with the enemy, and more than once he emerged victorious from the mennacing sky of war. The reports from the ground helped him to spot the enemy quickly and he dove into the attack, dependably covered by his follower. One of the Messerschmitts was immediately knocked down. The Junkers and the second covering aircraft turned sharply and began heading for the front line. Golubov charged after them in pursuit. Some well-aimed gunfire, and the fascist scout, engulfed by flames and smoke, went into his last dive....

Golubov's location was transmitted to him from the command post, and his course to the airfield was announced.

In a word, the experimental training sortie unexpectedly turned out to be a combat sortie. News of the competent work of the RUS-2 crew, and of the new victory for Guards Lieutenant Colonel Golubov quickly spread to all of the army's air units. Lieutenant N. P. Sveshnikov, the commander of the radar platoon, and the station's radio operator, Sergeant Ivan Sviridov, were awarded the Order of the Red Star by the command, while Lieutenant Colonel A. Ye. Golubov earned the Order of the Red Banner.

From this time on, things went better and better for radar. The psychological barrier of mistrust in the new equipment was surmounted. The pilots became convinced that the devices provided reliable readings, and that they could be depended on. In order to dependably cover the territory occupied by the frontal troops, the army commander decided to begin launching alerted fighters from airfields on the basis of data obtained from the RUS stations.

This was basically the mission of the 303d Air Division. Insuring efficient operation of the control point and the radar station became one of the daily concerns of the division commander, General G. N. Zakharov. We, the army signalmen, tried to help him as best we could in this work, which was complex for those days.

Once Georgiy Nefedovich decided to visit the station himself and get to know its people. It was located about a couple of kilometers from the division command post. There were several telephone cables stretching toward it. Orienting himself on these cables, the general headed for the station on foot in the early morning. He was wearing a leather jacket without shoulder-boards, and he had a flying helmet on his head. Zakharov went up to a Red Army soldier chopping wood near a hut, and asked:

"Where is the RUS?"

The soldier interpreted this question in an unexpected way, taking the general for a German spy. After all, the Germans do call the Russians "Rus".

He aimed a raised axe at the commander and shouted:

"Hands up! Help!"

Armed soldiers flew out of the hut, and before he knew it the general had several rifle barrels pressed against his chest. Georgiy Nefedovich sensibly surmised that there would be no explaining who he was here, and so he allowed himself to be led to the platoon commander's hut under escort; the latter met the "prisoner" with a crisp report:

"Comrade General, allow me to introduce the station crew...."

In a word, the incident ended with friendly laughter, and G. N. Zakharov laughed harder than them all. Turning to the soldier that had detained him, the general declared his gratefulness for his alertness and decisiveness.

The 303d Division assimilated radar rather quickly. Credit for this belonged mainly to Major A. A. Gorchakov and Engineer-Captain S. M. Levitin.* Prior to this, Levitin had worked in our section, he learned the new equipment in short time, and he did much to promote its fast introduction into all of the units.

The signalmen of the 303d were in general our best. Moreover they had to work in harder conditions than those experienced by others. After all, their division contained the French Normandy Regiment, which could compete with an air formation in regard to the number of aircraft it possessed. Its pilots did not know Russian very well, which was a serious interference to radio communication.

On the request of the French we gave them their own RSB radio station. It was placed under the command of I. I. Lunichkin, its radio operators were P. Serdyuk and V. Nikol'skiy, and V. Fedorov and A. Semenov served as the electromechanic-drivers. Being communists and outstanding specialists, they soon attained a rapport with the French. And the chief of staff of the Normandy Regiment, Major I. V. Shurakhov, learned French and was able to converse rather freely with his foreign friends. Shurakhov and Lunichkin worked a great deal to teach the regiment's personnel our radio operating rules.

The French turned out to be understanding students. Their knack for using radio equipment and their ability to maintain rigid radio discipline were often noted by the command. Of course they were guilty of one little sin: They would not observe their prescribed code names, constantly referring

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* The reader may be interested to know that Engineer-Colonel S. M. Levitin's daughter, Irina, became one of the most prominent Soviet chess masters.

to themselves as "Rayaks".* We tried to put a halt to this practice several times, but we finally gave up in the end. After all, our regular changes of code names could not in any way serve as a dependable guarantee of covert control for the French. They spoke in their own language both on telephone and by radio, and the Germans knew this quite well.

With time, A. A. Gorchakov even took pride in the code name "Rayak". He said:

"As soon as I hear 'Forward, Rayaks' or 'Follow me, Rayaks!' on the radio it immediately becomes clear to me that the Krauts were getting it from ours...."

Gorchakov and his subordinates did a lot of work to prepare the personnel for their radio communication rating tests. A class rating was awarded to 80 percent of the pilots.

Division commander General G. N. Zakharov and his deputy, Colonel K. D. Orlov were the first in the army to receive the 1st class rating in radio communication. At that time, this was so important an achievement that pilots who received a rating and had accrued the appropriate flying time were given government awards.

We did not know yet when the offensive would begin. But it became more and more obvious that we would not have to wait long. Therefore the section's officers checked and rechecked the readiness of communications, locally for the most part, in the corps and divisions.

On returning from the 6th Guards Bomber Division, Major Ye. K. Chuvashin reported with satisfaction to General I. I. Ptitsyn that everything was completely in order there: Both the people and the equipment were fully ready for their forthcoming mission. He had many good things to say about Major B. P. Belous, the division's communications chief. In the recent past Belous was nothing more than a civilian specialist, and now he flew as a gunner-radio operator in the division commander's crew.

All officers visiting the troops came back with reports that the signalmen were fully ready for the offensive. Therefore the commander's orders to immediately put communications in order in the 240th Division were a bolt out of the blue.

Taking me along, General Ptitsyn went to the division right away. Its commander, Colonel G. V. Zimin, a stately, tall person with a characteristic strong chin and wise, dancing eyes, was in a small peasant home. There were five or six telephones and one ST-35 transmitter in a room serving as his office. A telephone operator and a telegraphist were on duty there. Captain P. P.

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* Rayak--the name of an air base in Lebanon where the bulk of the regiment's personnel were stationed prior to their arrival in the USSR.

Volkhov, the division's communications chief, was also present. Inspecting all of this equipment, Il'ya Ivanovich said to the colonel:

"It looks like a commander's personal communications center."

"It's my own," Zimin smiled. "I used to be a signalman in the past, I worked as an electrician at the Kaluga Machine Building Plant."

"So why, my fellow Kalugan, are you causing trouble for communications?" I wanted to ask the colonel.

We waited impatiently for the division commander to state his complaints against us. But he was in no hurry, inviting us to first have lunch.

"They made us study communications hard in flight school," Georgiy Vasil'yevich began his story at the table. "I memorized forever that communications are structured from top down and from right to left. Expalining this, the instructor always crossed himself to show how easy it was to memorize this--after all, you cross yourself from top down and from right to left." the colonel's smile melted away. "Our communications are not organized badly from top down, but from right to left--well, things are not jelling. No one knows who must do what...."

Ptitsyn and I glanced at each other--what was he leading us toward? Zimin stopped his joking and settled down to business. It turned out that in his report to the commander concerning the division's readiness for combat, the colonel did not forget to mention the signalmen; he reported that the communications equipment was fully deployed at the forming-up place, but that he did not have any men or equipment with which to organize communications at a subsequent deployment site, after the division moved forward. And so he asked Khryukin to attach, to the division, a subunit from the main command's reserve communications battalion, which was working for the army headquarters.

"And how do you know that we have such a battalion?" Il'ya Ivanovich asked.

"That's why I have a communications chief, Comrade General," the division commander replied.

"Your communications chief is not very good if he can't make do with his authorized resources," Ptitsyn said with displeasure. "Particularly in the conditions you have here."

And in fact, in comparison with other formations the 240th Fighter Division was enjoying a rather favorable situation. The regiments were all close together, each had the transmission lines it needed, and army signalmen had laid lines intended to support interaction with ground-attack aircraft. And still they wanted more, a subunit from the reserves.

"Many new formations have recently joined the army, and if all of them began demanding such reinforcements, rather than wires it would be our nerves we'd be stretching between the poles," Il'ya Ivanovich said with sour humor.

"But don't chew Volokhov out too badly," the division commander said. "He's a hard worker, and he takes all reprimands from his superiors very badly." For some reason Georgiy Vasil'yevich thought this was funny, and he laughed. After lunch we went to the communications center. We were met by Captain P. P. Volokhov and Senior Lieutenant B. R. Boltyanskiy, the commander of a separate communications company. Ptitsyn gave the captain a hostile look, and he asked sternly:

"Have you read the tale about the fisherman and the fish?"

"Yes, I have, Comrade General," Volokhov responded crisply, not at all thrown of balance by the unexpected question.

"Such a person could hardly experience spiritual trepidation before superiors," I thought.

"But you didn't get the moral of the story," Il'ya Ivanovich said. "With your appetite, you might just find yourself with nothing left but that old ramshackle hut. Try to make do with what you have, the way your colleagues in other formations do."

Ptitsyn inspected the communications center with a fine-tooth comb. It was maintained in exemplary order. Everything--the apparatus, the wiring--was in ideal condition. It was pleasant to look at the signalmen--their under-collars were all white as snow, and their boots were shined to a chrome finish. There is no way one can arrive at such order at short notice, for the benefit of a visiting superior. This means that this order had long become the daily rule.

We noticed some sort of uncommon trunk at the flight dispatcher's station, with a microtelephone receiver secured to its lid.

"What's this contraption?" Il'ya Ivanovich asked.

"A terminal telephone amplifier," Volokhov reported as he pointed to B. R. Boltyanskiy. "He built it himself."

Before the war B. R. Boltyanskiy worked as an engineer in one of the planning institutes, and while at the front he never tired of playing with various technical improvements. He attracted many soldiers in his company to efficiency work. They skillfully adapted captured telephone multiplexing apparatus, a multistranded cable, and "Torn" radio receivers for their own needs.

A beautiful young girl was sitting at the dispatcher's desk. Well proportioned with an officer's belt buckled tight around her waist, and wearing a well

fitted and ironed uniform with a medal pinned to its breast, she immediately stood out from all the others. The operator worked quickly, and all of her movements were calculated and economical. She never uttered unnecessary words, her diction was excellent, and her voice had an imperative tone. Sometimes she spoke into two telephones at the same time, nimbly resting one receiver between her shoulder and cheek and taking notes or tuning the amplifier with her free hand.

"Senior Sergeant Aleksandra Atamanova, flight dispatcher," Captain Volokhov introduced her. "She can reach any army airfield, even if she has to go through a good dozen switchboards."

The general was pleased with his inspection of the center, and with the state of communications.

"So what is it you lack?" he asked the captain.

"Well, one always tries for the better, and at the moment I do not have a sufficient reserve of men and equipment."

"True, savings have a way of dwindling away," Il'ya Ivanovich laughed.

"What's true is true, Comrade General," the captain affirmed, also with a smile, "it's hard without a reserve."

After we returned to our headquarters Ptitsyn said:

"That division has some very good people. And the division commander is a smart one; he'll obviously climb high in his career. What can I say, I'll have to help him out with radio equipment during the offensive...."

During one meeting Il'ya Ivanovich endearingly called Volokhov the Great Blackmailer. He was rather overwhelming with his various request and claims, but he did always manage to get at least part of what he wanted.

Efficient, provident, and a good organizer, Captain P. P. Volokhov maintained communications in exemplary order, and he competently supported combat control in the division. He was singled out many times as an example to other formation communications chiefs. The separate communications company subordinated to him following the Belorussian operation was recognized to be the best in the army, and it earned the Order of the Red Star.*

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* TsAMO, f. 240 iad, op. 673969, d. 1, l. 16.

CHAPTER ELEVEN

HELLO, BELORUSSIA!

And so, all divisions and all communications centers had passed inspection. Everything was ready for the offensive. The communications plan for the operation had been written. This time it was based on a sound foundation: All bombers, ground-attack aircraft, and fighters were outfitted with onboard transceiving radio sets. They were absent only from Po-2 night bombers. An additional 10 high-power radio sets installed in Studebakers were allocated to the army communications regiment. Six of these vehicles also carried ST-35 transmitters with RST-1 attachments for printing radio-telegraphy. Radio guidance stations were installed in 10 jeeps. Each radio set had a remote device making it possible to control the receiver and the transmitter from a distance of up to 75 meters. The radio sets could also be worked while the vehicle was in motion.

The possibilities of wire communication equipment also grew immeasurably. Our line subunits--the 333d and 37th companies--were capable of laying lines over great distances. They possessed enough wire and fittings for 750 wire-kilometers. The plan called for one platoon of the 37th Company to service the lines, and for two others to support communication for the staff upon its relocation. These subunits possessed 30 kilometers of double-stranded cable, 25 kilometers of heavy field cable, and 20 kilometers of light field cable. In a word, the reserves of wire communication equipment were even somewhat greater than the estimated demand.

"We lectured Volokhov, and now we're not beyond hoarding a little extra either," Il'ya Ivanovich laughed as he examined the equipment roster. "It is true what they say, that a burden of your own choice is not felt."

As was required, the communications plan for the operation was submitted to General I. I. Burov, who had recently replaced N. D. Psurtsev after he was transferred to the General Staff. Prior to this, Ivan Ivanovich was the front's deputy chief of communications.

Thick-set and no longer young, General Burov never hurried, and he always managed to maintain an air of calmness. Whenever things did not go right or the situation became dramatically more complex, his internal anxieties revealed themselves only through tense cheek muscles and tightly pressed lips. A participant of the Civil War and an old communist,Burov had an iron character and an unbending will, and at the same time he was a fascinating person. He knew wire communication like the back of his hand, and he managed it firmly and competently.

Radio communication was managed at the front by General N. L. Gur'yanov, one of the Red Army's oldest signalmen and a prominent expert in radio engineering. He was I. I. Burov's assistant, and he competently supplemented him in his area.

General Burov approved our plan and acquainted us with his concept for restoring and building lines behind the advancing armies, and with the proposed construction of lateral communication lines and organization of control and testing points. Every permanent telegraph wire and every telephone circuit was given a serial number in order to make their maintenance easier. I asked the general what the numbers of our wires were to be.

"Well, let's see," Burov smiled. "You're supposed to have 16 lines in your main artery. So why not use number sixteen-sixteen for your network? And the rest could be numbered in increasing order, even for telephone and odd for telegraph."

And so it was through Ivan Ivanovich's simple act that our main artery, No 16-16, marched from the Smolensk village of Syrokoren'ye to Frishes-Khaff Bay in East Prussia.

After advising us to paint insulators supporting air force wires blue on all control and input poles and at trunkline intersections to make them easier to find, Burov asked how things were going with the use of radio sets possessing printing attachments.

This apparatus came to us from the Red Army Air Force Scientific Research Institute. Its designer, Engineer-Major I. M. Malev, and a group of military engineers came to the army as well. When mated with the ST-35, the apparatus was called the RST-1.

Malev began designing the RST-1 while at the front with the 8th Air Army, but he was unable to finish his work because the conditions were wrong. With the active support of General G. K. Gvozdkov Malev was transferred to the scientific research institute, where he quickly manufactured an experimental lot of the attachments.

The attachments shipped to us were installed by the communications regiment. Engineer-Major V. Ye. Dudashvili, Senior Lieutenant M. A. Lavrent'yev, and Technician-Lieutenant G. I. Arkhipov took an active part in finishing the work on the RST-1 and preparing it for operation.

The attachment produced fully satisfactory results in tests. The only disadvantage was that it could not be used efficiently to transmit coded messages. This is precisely what troubled General Burov.

"There's a great deal of distortion," reported Il'ya Ivanovich. "Moreover its operating speed is not much different from Morse transmission by 2d class radio operators."

"Were I in your place," Burov replied,"I would tell the army command that it would be suitable to go ahead and transmit uncoded messages by printing radio-telegraphy during an offensive. All we would need to encode would be the names of the population centers, the units, and the commanders. This is all new, and by the time the Germans figure out what's going on the transmitted information would already be obsolete, and no longer valuable...."

General T. T. Khryukin avidly supported this proposal. But he would not take it on his own authority to permit uncoded transmission right away. The permission was not granted until 3 days later.

Printing radio-telegraphy was organized on communication routes servicing three air corps. During the offensive it substituted to some extent for wire communication. Engineer-Major I. M. Malov and the officers in his group were awarded orders.

Troops began to concentrate within the zone of the forthcoming offensive. As an effort at operational camouflage and deception the frontal staff staged transfer of units to the left wing. The airmen created a network of dummy airfields there. Specially organized dummy radio networks were put into operation. They were managed by Major V. M. Aleksandrov.

On the eve of the offensive the army commander held a meeting of the formation commanders, in which he acquainted them with the plan for the air offensive in interaction with ground troops. He laid especially high requirements on communications. General I. I. Ptitsyn briefed the commanders on his plan for organizing communications during the entire offensive. Wire communication afforded a possibility for controlling the formations at the forming-up place both from the command post and from headquarters. From his command post, the commander could talk via high-frequency telephone with the command of the ground armies and with the air liaison officers serving with them, with his staff and the staffs of neighboring air armies, and with Moscow; he could use a conventional telephone link to talk with most of the air formations.

"Never before had we had such a highly developed system of wire communication," emphasized Il'ya Ivanovich.

Radio communication appeared no less solid. There were three high-power radio sets at the army command posts. One serviced the network used to call for air support over the battlefield, and it was the commander's

personal radio set. The two others were intended for separate control of bombers and ground-attack aircraft. Fighters were to be controlled at the wavelengths of those formations which they were to cover.

There was enough radio equipment at army headquarters and at the headquarters of the air formations to support control of the troops in the event that wire communication resources failed.

This meeting was attended by a liaison officer from the Supreme High Command General Headquarters, Marshal of the Soviet Union Aleksandr Mikhaylovich Vasilevskiy. He said the following in his statement:

"The mission of aviation is to support the successful advance of infantry and tanks, to isolate the battlefield from enemy fighters and bombers, and to offer cover to ground troops against them. Air strikes must be effective, and the actions of the fighters must be bold. The enemy must be sought out and annihiliated. Well organized control and communication is a guarantee of successful action on the part of aviation. The General Headquarters and Comrade Stalin are certain that aviation will be able to handle the missions assigned to it...."

There were only a few days left before the offensive. The commander ordered General Ptitsyn to personally check the readiness of communications at the command post. Il'ya Ivanovich took me along. Captain A. S. Zvyagintsev was responsible for communications at the command post. He was given Lieutenant S. F. Bavarov as an assistant.

The command post was located on Hill 206.6, which was 200 meters north of the Moscow-Minsk motor highway. The front's engineering subunits had built shelters for the personnel and revetments for the special vehicles on the hill's back slopes. Communication trenches connected the shelters to the observation point set up on the ridge of the hill. The forward edge could be seen well from it. Artillery optical instruments were present there. They could be used to observe the enemy defenses. All engineering structures and the concentrated equipment were covered with camouflage netting. Special obstacles covered the enemy's view of those areas within his line of vision. Movement in the vicinity of the command post during the day was strictly limited, and it was controlled by the headquarters provost service.

The telephone station set up at the command post could be used to talk with all fighter and ground-attack corps and divisions, both directly and through the army headquarters switchboard, which possessed direct and round-about links--both telephone and ST-35 telegraph. The radio stations were located behind revetments, and they were furnished with remote devices installed in the commander's shelter. Their control could be switched to the observation point.

General Ptitsyn inspected all communications facilities and talked with the people. As we were driving to the command post Ptitsyn smoked one cigarette after another, clearly anxious. Now, on the way back, he rubbed his hands in satisfaction.

"There is not a hair out of place," Il'ya Ivanovich said. "Did you see how high the morale of the people was? They'll do anything, move mountains even, just as long as we keep on attacking, attacking, and attacking!"

We decided to visit the operational group's shelter. Gunshells began to thunder just as we were descending down the steps.

"Could it be they've found us out?" Ptitsyn asked concernedly.

"Not a chance, it's just a chance raid, just for insurance," one of the operators assured him.

Chance or not, but one of the shells made a direct hit on the radio station. Senior Sergeant V. P. Pospelov and Private 1st Class A. V. Pogorelov were killed, and Senior Sergeant N. A. Polyanin was wounded. It was such a pity to lose these remarkable people. We buried the dead and sent the casualties to the hospital. We called out replacements.

"Let's send Beylin to the command post also," Ptitsyn decided. "There'll be more than enough to do here. I'm not worried about the radio--Bavarov will be able to manage. But Zvyagintsev is going to find it hard."

I shared the general's concern completely. Captain Zvyaginstsev was a fabulous radio specialist, but he was not sufficiently experienced yet in wire communication and in the problems of coordinating with signalmen of the front and the combined arms -armies. Lieutenant L. M. Beylin, on the other hand, was well versed in all of this.

At 0600 hours on 23 June our artillery opened annihilatory fire on the enemy. The ground troops rushed forward after the powerful bout of artillery preparation. The greatest operation of 1944--the Belorussian operation--began.

On that memorable morning the weather was not in aviation's favor. Nevertheless the airplanes did take off. The airmen operated in small groups made up out of the best crews. The air group operating in the Bogushevsk sector was first controlled by deputy commander General A. K. Bogorodetskiy, and later by General Ye. Ya. Savistskiy, commander of the III Fighter Corps. The signalmen were commanded by Engineer-Major A. A. Rechenskiy. He was appointed to my post just prior to the offensive, and I was promoted to Army Deputy Chief of Communications. General V. A. Ushakov, commander of the I Guards Bomber Corps, took charge of the air group operating in the Orsha sector. Responsibility for the operation of communications here was assigned to Major S. A. Korotkov, this corps' communications chief.

As we know, the offensive developed swiftly during the Belorussian operation. Under these conditions the radio had to assume the greatest load in aviation control. Air force officers traveling with the ground armies and the mobile troops maintained constant communication with the bomber and ground-attack group leaders. It often happened in the swiftly changing

situation that a target, a population center, had already been liberated by infantrymen or tank troops by the time the airplanes were approaching it. Any delay in retargeting could mean striking friendly troops. But times were completely different now. Air controllers communicated with ground-attack aircraft and fighters no longer by performing zoom maneuvers or rocking their wings, but by means of the living human voice. Ground-air-ground radio communication insured reliability and high efficiency for control of aviation over the battlefield.

Let me cite just one example. On 26 June the commander of the II Guards Tank Corps had the air force liaison officer order ground-attack aviation to strike enemy artillery positions in the vicinities of Dyatlovo, Verkhov'ye, and Baran', and to support the crossing of tanks over the River Obrov. But the tanks, which did not meet significant enemy resistance, were able to cross the river without aviation's help. The danger that the Il's would hit them arose. Captain I. P. Voskoboynikov, a signal officer of the III Ground-Attack Corps, retargeted the airplanes to Kokhanovo, against withdrawing enemy columns. This was compounded by the fact that another eight air groups of 10-12 airplanes each from different regiments had to be retargeted! This necessitated exceptional proficiency and efficiency.

It would not be difficult to understand how well the air liaison officers and forward air controllers had to know the situation on the ground and how efficiently they had to control aircraft groups in the air.

Major I. D. Kapustin, an officer from the 1st Guards Ground-Attack Division, displayed his outstanding capabilities in the extremely hard battles. He knew the pilots not only by their names but also by their voices. In turn, he was known not only by airmen of his division but also by personnel of units operating within his sector. Kapustin had a very original way of working. Indicating the target number to the crews, he immediately described the significance of the target to the advancing tank troops or infantrymen. And whenever the target was extremely important and an accurate strike from the air would insure swift forward movement of ground subunits with the least losses, the major invariably radioed to the pilots:

"Give it your best, kind sirs, the tank troops beg of you!"

In the most critical moments of combat, when the airmen had to destroy a target at all costs, even their own lives, Kapustin's words of inspiration resounded in the air:

"For the motherland! Hurrah!"

After the target was destroyed, the airplanes would assume their return course one after the other.

"Good lads, my hawks!" the forward air controller transmitted to them. "The tank troops thank you."

But sometimes it also happened that an air raid did not produce the needed results, that the pilots had been inaccurate, and that the enemy's fire resources survived. At those times Kapustin, this modest and well-balanced individual, could not contain his displeasure, and his coarse reproaches and his unflattering appellations pursued the ground-attack aircraft all the way back to their airfield. Perhaps it was on his initiative that we adopted the practice of assessing the combat activities of the airmen immediately after the mission. Reports by forward air controllers played a definite role in these assessments. They and words of gratefulness from the ground command were included in the unit's combat reports and entered into the flight logs.

Working with the group leaders, Major I. D. Kapustin was able to consider the busyness of the airwaves, and whenever they were overloaded he never permitted himself to employ extra words in his commands. Owing to his great combat proficiency our pilots successfully cleared a victorious path for infantry and tanks. He earned deep respect from commanders of ground units, and the glory of being the best controller of the air army.

The major looked into the face of death many times. And in his fight with it he invariably emerged the victor. I remember an incident at Mariampol' as if it had just happened. On that day Kapustin occupied a small dug-out from which he guided his ground-attack aircraft to constantly appearing new targets. Master Sergeant I. F. Kozlov, the radio station chief, was standing beside him. Kozlov spotted suspicious-looking tanks advancing on the highway and firing eastward. The master sergeant raised his binoculars to his eyes and clearly saw German crosses on the vehicles. It was perhaps not more than 700-800 meters to them from the dug-out.

"Comrade Major, fascists!" Kozlov exclaimed.

Kapustin, glancing quickly at the approaching tanks, immediately ordered an approaching group of nine Il's to hit them.

"Do you read me?" he said calmly to the flight leader. "The pigs have broken through. Give it to them good, or they'll make a mess of things...."

Of the 25 vehicles, the Il's destroyed 15; retreating, the others fell under the fire of tank destroyers. Another two tanks were put to the torch. Only eight of the enemy vehicles managed to break out of the fiery hell.

"Good lads, you've done well!" Kapustin praised the leader of the attack aircraft group, and then he began guiding the next group of airplanes.

"You just about called fire on your own position!" the major's fellow servicemen delighted in his actions.

"What do you mean, on my position?" disagreed Kapustin. "The tanks were still a whole 300 meters away....."

For his bravery and steadfastness displayed at Mariampol', General T. T.Khryukin awarded a unique title to Major I. D. Kapustin--"Chief Forward Air Controller of the Air Army". The crew of the radio guidance station, which was commanded by Master Sergeant I. F. Kozlov, was rewarded as well.

Incidentally this crew was rightfully referred to as the best in our army. The station they serviced never failed. And yet it was almost constantly at the forward edge. Kozlov and his subordinates were distinguished not only by irreproachable occupational proficiency but also invaluable boldness and resourcefulness. The following incident comes to mind. After German defenses were broken, General N. S. Oslikovskiy's mechanized calvary group was thrown into the breach. I. F. Kozlov's radio guidance station traveled together with its advance guard. The calvarymen halted on crossing the Orsha-Vitebsk Highway for a combined breakfast, lunch, and dinner. The signalmen hid their truck in the bushes. Gathering together the pots, the driver, Private Grigoriy Pyzhenko, went to the kitchen. At this very moment the Germans opened concentrated artillery and mortar fire against the village near which the forward calvary subunits had settled down. The calvarymen quickly abandoned the village, withdrawing with the main forces.

Kozlov and his comrades rushed to their vehicle. A quick look made it quite clear that it was not going to go anywhere--the gasoline tank had been punctured by shell fragments, and the storage battery had been damaged.

The signalmen camouflaged their vehicle with branches knocked down by the artillery strike, and they made preparations to defend themselves. Luckily our tanks came to their rescue. The Germans hastily abandoned the village. Unable to restrain himself, Kozlov emptied his clip at them.

Pyzhenko ran back with the pot full of food.

"I saved the food, but it's completely cold," he said as he went to the vehicle.

"There's nothing we can do on our own," the master sergeant said pointing to the spilled gasoline. "We'll need to ask the tanks for help."

The tank troops did not deny them. Pyzhenko patched the gasoline tank and replaced the battery. The forward air controller once again had a mobile and dependable radio station at his disposal.

Advancing together with the command of the ground armies and the mobile troops, air liaison officers were constantly aware of the situation, owing to dependable radio communication they called for air support over the battlefield promptly, and thus they had a most active influence on the progress of the offensive.

Representatives of the air formations received information on the situation from the forward air controllers, who possessed the most recent information, being able to see the way events were developing on the battlefield with their own eyes.

Air liaison officers in the combined-arms and tank formations and major formations as well as the commander of the air army, located in his forward command post, were all in the same radio network controlling ground-attack aviation, and owing to this they could receive messages directly from the forward air controllers, from the forward edge itself.

What did this mean for practical purposes? Imagine the following situation. Assume that infantrymen or tank troops have liberated some population center. Usually a report of such an event is transmitted through the chain of command: battalion-regiment-division-corps-army-front. It takes time to transmit such a report, and sometimes a great deal. Or at another time a certain regiment might surrender a village to the enemy; its commander waits to send the message, hoping that he could still knock the enemy back. Thus not only the army or the corps but also the division is totally ignorant of the event....

A forward air controller having his own radio set was entirely oblivious to chain of command. He personally reported changes in the situation right to the air liaison officer. His transmissions were always monitored by the air army's command post, and the commander personally heard all of these conversations, sometimes amazing the frontal command by his awareness of the changes occurring at the forward edge. Army General I. D. Chernyakhovskiy, commander of the 3d Belorussian Front, many times asked General T. T. Khryukin to clarify the situation in some particular sector of advance through his forward air controllers. Moreover he wanted not a general report but one on a particular region right at the present time.

The air liaison officers and forward air controllers were the most important element insuring close coordination between aviation and advancing ground troops.

All of the reins for controlling the combat activities of the air formations converged at the command post of the air army. From here, the commander made corrections in the plan for using his forces, and he concentrated their efforts in the decisive sectors. Large air groups, bomber groups especially, were often retargeted from the command post as well. During the second day of the operation, Engineer-Colonel S. F. Bavarov recalls today, he was ordered to make radio contact with airplanes of the 6th Guards Bomber Division flying against an important strongpoint already occupied by our troops, and to direct them to one of the targets. Bavarov had barely finished his task when the commander gave him another one--that of retargeting all air groups of the I Guards Bomber Corps and the 3d Guards Bomber Division to the western outskirts of Bogushevsk. The

problem here was that the airplanes were all en route to the target already. Listening to the radio with literally baited breath, Bavarov managed to feel out the bombers in time and transmit the commander's instructions to them.

In the Belorussian operation, radio communication became the main, unfailing nerve controlling the combat activities of aviation.

No matter how well a radio network is organized to control bombers above the battlefield, in the end it would be entirely helpless without the gunner-radio operator. All efforts by forward air controllers, air liaison officers, and commanders of all ranks would be for nought in a combat situation, were it not for the presence, in the air, of someone to quickly and accurately receive the commands from the ground, and to serve as the main link within the great and complex system of controlling aircraft in combat.

The tasks of the gunner-radio operator were spelled out clearly immediately upon creation of this organic post. A member of the combat air crew, he was obligated to defend the airplane against enemy fighters and maintain stable communication with ground radio stations and with airplanes participating in the combat sortie.

It all sounds short and sweet: Shoot straight and use the onboard radio set well. But these responsibilities provide only a general picture of the work of a gunner-radio operator during a combat sortie. To understand their essence, we would first have to imagine his cockpit to ourselves. Take as an example the Pe-2, one of the principal bombers of the Great Patriotic War.

The gunner-radio operator sat behind the pilot and navigator, beyond the fuel tank. There were two hatches on the floor of the cockpit--one permitting entry into the cockpit from the ground and egress from the air, and the other intended for the lower ring mounting of a large-caliber machinegun. A hatch on the top of the fuselage, which was covered by two curtains, permitted a view of the upper hemisphere. The lower part of the back hemisphere could be seen through the machinegun hatch, which was opened in flight, and through a periscope sight. Side windows on the fuselage permitted a view to the right and left. There were holes in the windows for the barrel of the lateral machinegun. During aerial combat the machinegun was moved by hand from one side to the other.

The gunner defended the airplane from the left, from the right, and from the lower part of the rear hemisphere. The upper part of the airplane was defended by the navigator with a large-caliber machinegun, and the forward part was protected by the pilot, who fired two fixed forward-aiming machineguns. Toward the end of the war we began installing two grenade holders, each with a capacity of five grenades, in the gunner-radio operator's cockpit. A small parachute deployed when the grenades were released, and they dropped slowly to the ground. After 3-5 seconds the grenade exploded and its fragments struck attacking fighters operating below and to the rear of the aircraft.

The gunner-radio operator's cockpit contained the transmitter, the receiver, a control panel with a telegraph key, a power block, and the aircraft intercom. Later we also installed the automatic IFF transponder in there as well.

As you can see, there was a considerable amount of equipment. And it all had to be controlled, efficiently controlled, without mistakes even in the most complex aerial situations.

As soon as the pilot and navigator took their seats in the airplane the gunner-radio operator began observing the air and the ground in the rear hemisphere, raising himself out of the cockpit shoulder-high. By this time he had already tuned his receiver to the ground radio station. He attentively monitored the airwaves so as not to miss any commands from the airfield.

To observe the sky during takeoff the gunner-radio operator had to stand up with his shoulders resting against the side of the upper hatch and the back of his head pressing against the open canopy. After takeoff the gunner-radio operator of the group leader made contact with the ground station, and the followers listened constantly to him.

After the group formed in the air, the gunner-radio operator of the leader reported takeoff for the assignment to the ground by code. He made both machineguns ready for combat at this time, such that an airborne enemy could be met with fire immediately, and in the future he kept the radio only at reception mode, so as not to reveal the location of the group on its way to fulfill its assignment.

As a rule the bomber groups of the 3d Belorussian Front flew with a fighter escort. The fighters established two-way communication with the bombers. This did not require too much extra time, assuming that no deviation from the plan occurred while in flight. But if it happened that fighters had taken off but the bombers had not met them yet or if the fighters were not going to provide escort, the radio operators had to spend some anxious moments clarifying the reasons and firming up the assignment. And during all of this they were obliged not to interrupt observation of the sky around them. Enemy fighters could appear at any moment and from any direction.

Communications attained their greatest intensity as the front line was approached. First the airplanes had to gain contact with the command post of the air army commander or with the air liaison officer and report the target assigned to the group. The situation changed rapidly on the ground during an offensive, and as the reader already knows, bombers did have to be retargeted to some extent. Orders to bomb alternate targets were transmitted openly as a rule, but the order had to be confirmed with a password. After confirming the retargeting order the gunner-radio operator of the group leader reported this to the group commander and to the escort fighter leader. In such cases the targets were usually located close to the front line, and the radio operator needed to be highly proficient if he was to inform the entire group about the changes in the mission literally in a few seconds, before it began assuming its formation for the bombing run.

Communication was broken off just prior to dive-bombing and during the diving itself, and the crew communicated internally with the intercom set. This most critical moment of the combat sortie meant a great deal of trouble and highly unpleasant sensations for the gunner-radio operator. Just prior to its dive the aircraft experienced negative transverse acceleration, and the gunner could "float" out of the craft through the upper hatch, since he was in a state of weightlessness. Therefore he had to lie down on the floor of the cockpit and hold on firmly to the handles of the hatch machinegun, pressing his legs against the front wall. It was a good thing that the open hatch and the machinegun's periscopic optic sight provided a good view of the rear hemisphere. The gunner's horizontal position made it easier for him to withstand both the negative acceleration just prior to a dive and the positive acceleration immediately after the dive. He was able to fire his machinegun and observe the bombing result. Whenever the aircraft left the target without turning, neither the pilot nor the navigator could see where the bombs fell and what the results were.

Roughly speaking, the gunner-radio operator flew the entire mission backwards. Such an orientation in relation to the direction of flight required a certain amount of training and adaptation, so as to avoid airsickness and disorientation in space. Both were totally impermissible. The crew's success in combat depended wholly on the endurance and preparedness of the gunner-radio operator; I could even say that this was true for interaction between aviation and the ground troops as well.

I am indebted to the personal memoirs of Aleksey Alekseyevich Kuznetsov, a professor of the Moscow Aviation Institute, for the possibility for making such a detailed description of the work of a gunner-radio operator during a combat sortie. Guards Master Sergeant A. A. Kuznetsov fought in the 135th Guards Bomber Regiment as a squadron communications chief. A participant of the battles of Stalingrad, the Don and the Ukraine, Belorussia, Lithuania, and East Prussia, during the war he flew 190 combat sorties, he was wounded, and he was awarded many orders and medals. Aleksey Alekseyevich has very warm things to say about his crew commander, Guards Captain T. L. Makeyev and about the navigator, Hero of the Soviet Union Guards Senior Lieutenant M. A. Lashin (subsequently Lieutenant General of Aviation, USSR Distinguished Navigator). They were all fearless warriors, and they never knew defeat in combat. I learned of their successful combat sorties while at the front. I also learned of the high proficiency of many gunner-radio operators in this regiment--G. Zlobin, A. Ryabov, V. Igoshin, and other heroes of the frontal radio waves.

Guards Master Sergeant Grigoriy Zlobin, nicknamed Batey in the regiment for some reason, had about 100 combat sorties under his belt. He could comprehend Morse code by ear better than anyone else in the unit, and he was a proficient machinegunner. Guards Senior Sergeant Anatoliy Ryabov, nicknamed Levitan for his faultless diction, was a zealous agitator and an active assistant to the political workers. And in battle he distinguished himself by endurance and envious powers of observation, and he had perfect mastery of the onboard radio equipment. V. Igoshin flew high-speed bombers

A man of pacific and firm character, he never succumbed to tiredness in the air or on the ground, and he did everything calculatedly, efficiently, and with love. And most of all he loved to fly, to fly in combat....

Aerial combat is swift, but it is also highly intense. The gunner-radio operator has it especially hard whenever enemy fighters attack. He must maintain communications and defend against the enemy at the same time. This necessitates a combination of proficiency and fearlessness. After all, the Germans attacked our airplanes from the tail as a rule. And they directed all of their fire mainly at the gunner-radio operator. For a moment he was on a one-to-one basis with the enemy. One can imagine the sort of braverv he needed to direct his machinegun toward a rain of enemy lead and open fire in response. Concurrently he also had to inform the commander without fail that enemy airplanes had appeared, and he had to report their number and the direction of the attack.

In our army, A. I. Debikhin, the gunner-radio operator whom I introduced to the reader earlier and who subsequently became communications chief of a squadron in the 122d Guards Regiment, 3d Guards Bomber Division, was a famous master of aerial combat. A participant of 150 combat sorties, he personally knocked six German fighters, and he helped knock down another one in group combat.

"If Debikhin is in the air," K. G. Stroilov, the regiment's communications chief usually said, "we can rest easy, for everything will be in order."

Major Stroilov, formerly a navigator, was himself an excellent sniper of air communications. He trained and indoctrinated dozens of outstanding gunner-radio operators. Communications always operated reliably and efficiently in this regiment. After the war K. G. Stroilov graduated from the academy and devoted himself wholly to training and indoctrinating cadets at the Khar'kov Aviation Signal School.

I hope that the reader would forgive this digression from my description of the Belorussian operation, but I simply had to mention something about the combat activities of gunner-radio operators. Risking their lives in every flight, they not only maintained communication but also heroically annihilated enemy airplanes, destroying the invaders both on the ground and in the air.

In the second day after the offensive began, on 24 June, Moscow, our motherland's capital, saluted the valorous troops of the 3d Belorussian Front, which had successfully penetrated the enemy's extremely strong and deeply disposed defenses in the Vitebsk sector.

If the offensive were to develop decisively, air base maintenance battalions had to be thrown into the breach together with the air force signalmen right behind the mobile troops. By the time I flew from Syrokoren'ye to the army command post our construction subunits were already on liberated territory. Captain Zvyagintsev reported that everything was basically going according to plan, the only exception being that Lieutenant I. Ya. Vovk's platoon was held up at the previous forward edge for some reason.

I flew along the Minsk highway aboard a Po-2 piloted by F. A. Morozov in search of Vovk and his men. We did in fact find them at the forward edge. The wire transmission lines were completely destroyed here. New ones could not be built because the combat engineers had not yet cleared mines from the area.

"And that means that we have to clear the mines ourselves," the lieutenant said.

"Yourselves?"

"Yes. It's not all that complicated. We learned from the combat engineers. It's a pity that we don't have even a single mine detector. We have to search for them with probes." The lieutenant climbed into his truck, brought out two mines and began explaining matter-of-factly: "This is an anti-tank mine, and this is an antipersonnel mine. We've also come across spring-mounted mines...."

"Enough!" I interrupted the officer. "I order you to avoid the mined areas. You can patch in wires after they are cleared by the combat engineers."

"I understand," Vovk answered. "But...."

"No 'buts'. That's an order."

I then thought: "It's a good thing that they hadn't run into any problems; after all, two of the frontal signalmen had been blown up in this way already." At the same time the initiative of the lieutenant and his soldiers gave me an idea: What we needed to do was teach our people to remove mines, since this problem would probably come up again, and the construction subunits contained many desperate lads who would prefer doing anything other than sitting about idly waiting for the combat engineers to arrive.

We began the training immediately after the Belorussian operation. Out of the total number of volunteers we had, we created one detachment of mine-clearing specialists each for the 333d and 37th companies, and two such detachments for the signal regiment.

Issuing the necessary instructions to Lieutenant Vovk, Morozov and I flew on along the Minsk freeway as far as its intersection with the Orsha-Vitebsk Highway. The staffs of the front and our army were to be deployed in this area.

I was pleased by the fact that the transmission lines had for the most part survived in an area of about 40 km on a side. The front's line subunits were already working on the damaged sections. The work was also at full steam at the future location of the staffs: A wire communications center was being set up, and a lateral line linking us to Orsha and Vitebsk was being restored. Lieutenant I. A. Guzov's platoon was putting up wires to our headquarters in the vicinity of the village of Mukhanovo. Two other platoons, commanded by lieutenants P.I. Solntsev and G. I. Kutuzov, were sent to the airfield to

restore wire transmission lines extending to the front's control and testing point at Orsha. Company commander Captain A. A. Vorob'yev was with them.

On finding all of this out, I made preparations to take off for Vorob'yev's position. But suddenly a Jeep turned off the highway in our direction. General I. I. Burov climbed out. This meeting with him turned out to be quite opportune. We quickly reached agreement concerning which wires could be used when by the airmen, and what we had to do on our own. The general cautioned me at this time that the staffs would not stay there long, and that we already had to begin making preparations for the next move forward.

I sought out Vorob'yev at the airfield where I had served prior to the war. The captain organized the work faultlessly, and the line restoration operations were coming to an end. Therefore we decided to leave just one detachment here and to get the rest working toward Lieutenant Vovk under Lieutenant Solntsev's command in order to help the former restore the telephone artery faster.

I was impatient to take a look at our former garrison post. But the captain's report of the trophies he had captured overpowered this impatience. An entire rail car full of 2-millimeter zinc-plated wire, crossarms, and line fittings! It was not until I inspected all of these riches that I headed for the post. Almost all of the buildings were burned and damaged. Only a heap of bricks was left of the Red Army Home. But the building I had lived in survived. There was a board hanging at the entrance with a warning written on it: "Mines!"

I could not help thinking about May Day 1941. The beautiful park lanes, the whitewashed tree trunks, and the buildings decorated with flags and transparencies. And now there was nothing but ruin all around....

But there was no time to think about the past. We flew on to Mukhanovo. The communications center was located here in one of the barracks built by the Germans for one of their staffs. The center was already servicing a number of communication links. The radio receiving-transmitting room was also ready for work. A landing strip had been prepared for the communication squadron. The 37th Company reached this place after a 60-km march. The people had not slept for 2 days, but they were all burning with desire to get to work as soon as possible.

I visited the forward airfields of the 1st Guards Ground-Attack and the 240th Fighter divisions, and by the evening of 2 July I reached the village of Nacha, near Krupok, where the staff was soon to be deployed. Here, in a spacious house, the signalmen had just deployed a telegraph station. I thanked them for their excellent work and ordered them to tear off the German newspapers and posters that completely covered the walls.

The work piled up more and more. Our troops liberated Minsk on 3 July. Officers that had been there said that almost nothing was left of the city . In addition to the main communications artery in the Sukhanovo-Nacha section, No 16-16,

another artery was being laid--16-18. We began folding up the communications center in Syrokoren'ye in order to create a reserve of equipment for subsequent movement forward. The 333d Company was restoring the front's communications artery, and on 5 July it reached Borisov.

The army staff began preparations to move to the village of Machuzhichi, 35 km northeast of Minsk. From Machuzhichi it moved to Mikhnevichi, and then to Tsvetniki. And wherever it went we had to be right up with it, organize the work, help the specialists working at the locations themselves, and explain the situation to the communications chief.

The rate of restoration and construction of the communication lines corresponded to the rate of advance of the ground troops. Tremendous credit for this belonged to the 333d Telegraph-Construction Company and its commander, Captain A. A. Vorob'yev. It distinguished itself especially at Machuzhichi. We did not have any hope of supporting air control with wire communication resources from that point at the required time, since this point was to the side of the communications artery. However, General I. I. Ptitsyn ordered Vorob'yev to build the line at all costs. The company's soldiers created it in 2 days. Local residents helped them a very great deal in this. One elderly peasant did an especially great service by informing us that there was a pile of telegraph poles procured by the Germans not far away. This unexpected finding made the work much faster. Finally, more that 100 rural residents took part in this work, contributing two dozen horses and wagons.

Captain Vorob'yev competently utilized the help of the liberated people, and this permitted him to complete his mission very quickly. General I. I. Burov recommended Vorob'yev to us as company commander. And he had not erred in his judgement of this officer. An outstanding organizer and a qualified specialist, A. A. Vorob'yev knew how to inspire the soldiers, by personal example, to surmount the hardships and adversities of the front. He was also an indefatigable efficiency expert. In particular the captain suggested winding wire from the lines into coils with the help of a truck. For this purpose one of the rear wheels was removed from the vehicle, its body was jacked up, and the axle was used as a shaft to rotate the wire spool. He also manufactured a drill with which to dig pole pits.

Captain Vorob'yev's company halted for a short rest at a farmstead not far from headquarters. From this point the front's communications artery was to detour around Minsk to Molodechno, Smorgon', and then Vil'nyus. It was with this in mind that Vorob'yev and I began planning our subsequent construction work.

At this moment someone commanded: "Alert! Germans!"

The soldiers immediately occupied their defenses. A line of fascist automatic riflemen was moving in our direction over a marsh. They were not more than 400 meters away. Captain Vorob'yev ordered his men to open fire on the enemy. Several of the Germans toppled to the ground as if tripping over roots. But the line kept moving forward. The enemy opened fire with the automatic rifles. The company drivers, who had dug in at the forest edge, struck his flank with a light machinegun.

There was no sense in fighting with a pistol at this range. I took the rifle from the soldier lying next to me and, aiming carefully, I began to fire at the approaching riflemen. I think I managed to drop two of them....

We then heard rifle fire coming from the direction of the headquarters. It was the communications regiment's soldiers hastening to our aid under the command of Captain S. G. Karaush. Young girls were among them as well.

The fascists were unable to hold, and they turned back to the marsh. But three of them, two enlisted men and an officer, managed to reach our rear unnoticed by stealing from one house to the next. They attacked Vorob'yev. Soldiers next to the captain shot the enlisted men point blank, but the officer was able to rattle some frenzied shots off at Vorob'yev with his pistol. It would have been over for the captain then, had it not been for Lieutenant Guzov, who came out of nowhere and downed the German with his rifle butt.

The enemy attack was warded off. We had three casualties. They were quickly bandaged by medical instructor L. V. Vorob'yeva. A tense calm set in. We were not ready to believe that the Germans would not resume their attempts at breaking through to the farmstead.

I telephoned Machuzhichi, reported the encounter with the enemy automatic riflemen to the army chief of staff, and told him that we were running out of ammunition and that Captain Vorob'yev was forced to send soldiers out into the marsh to collect the German weapons and ammunition.

"Vorob'yev did the right thing," General Pronin replied. "I'll send you ammunition right away. And keep in mind that if the Germans break through the staff's location, there will be no avoiding a court martial for you...."

Instead of building the communications artery Vorob'yev's company was forced to hastily dig trenches. The signalmen defended the headquarters for about 2 days. However, the Germans never reappeared by the homestead. Fighting off their attack, our Red Army soldiers annihilated 82 Germans, to include six officers.

There were many incidents in which signalmen had to fight the enemy with fire during the Belorussian operation. Attacking swiftly, the units and subunits would not slow down to mop up isolated groups of Germans remaining in the rear. The latter, which varied in their numbers, caused a great deal of unpleasantness to rear services and troops of the second echelon.

I remember a time when the engineering battalion and the air base maintenace battalion had to fight off Germans breaking through the front one night at Minsk, near Slepyanki. Signalmen took part in the battle as well. The soldiers kept the Germans away from the airfield, where airplanes were parked in revetments without fuel.

Despite the encounters with the fascists, the signalman-builders kept moving forward according to plan. By 10 July both companies had concentrated in the vicinity of Smorgoni, near Mikhnevichi. The regiment's forward detachment began deploying a new communications center. On 11 July it went into operation, and it supported army communications for almost a week. By this time, the new communications center located in Tsvetniki, 12 km west of Vil'nyus, assumed most of our communications load. But even there we did not remain long. On 1 August the staff moved to the town of Butrimantsy. There were only two transmission lines leading to the town, and the number of conductors was clearly not enough for us. At least another 20 wires had to be hung in a 5-km section. But we had expended almost all of our reserves in Tsvetniki. There were almost no staples or insulators left. The efficiency experts suggested that we secure the wires to the poles with strips of tire material, and the insulators be installed on just every tenth pole.

This proposal was affirmed, and the work proceeded at full steam. However, we did miscalculate grossly here. Following an intense rain the homemade insulators began losing their electrical properties. Current leakage began to have an effect. Only the sun could save us. But it never came out, and the rain continued to pour. Communication was cut off on almost all of the routes. Meanwhile our aviation was supporting the ground troops as they crossed the Neman, a large water obstacle. Thus radio and liaison aircraft had to take on the entire burden of aviation control. It took 2 days to get the section of the line with the homemade insulators working again. Later in the war, we often recalled this obvious mistake by the efficiency experts.

Our army had two communications squadrons--the 33d and 203d. They were commanded by Captain N. N. Romanov and Major M. G. Kiselev respectively. Beginning with the Belorussian operation Captain I. G. Orekhov,chief of the field postal communications branch, managed all mobile communications equipment, to include the air squadrons.

The 33d squadron possessed 14 Po-2 airplanes. It contained 15 pilots and six navigators. It delivered secret mail at the forming-up place and with the beginning of the offensive 2 to 3 times a day according to a sliding schedule. During each trip the aircraft stopped at five or six delivery and pickup points in its round trip. When the staffs of the air formations began moving forward the number of pickup points serviced by the airplanes in one trip decreased. In some cases it was necessary to perform flights on call. Our Po-2's flew not in a straight line over liberated territory, but rather along the routes of movement of the ground troops. This guaranteed flight safety--after all, surviving German subunits were still present in the rear. Moreover, the couriers were informed beforehand of the locations of communications centers and control and testing points. Therefore in cases of forced landing they could land in a reliable place, and the crews could quickly report what happened to headquarters.

In addition to the Po-2's flying regular routes, we constantly kept two or three airplanes for priority flights. Moreover the communications section had three craft with pilots assigned to them at its disposal. They were employed by officers organizing deployment of communications as the offensive proceeded.

Usually I flew with Senior Lieutenant F. A. Morozov, a former fighter pilot. He was wounded in aerial combat, and the physicians categorically prohibited him from flying in high-speed warplanes. Fedor became a Po-2 pilot.

I became close friends with Morozov, and we worked well together. I often instructed him to check up on communication lines being laid on his own. Morozov patiently taught me how to fly an airplane in the course of 2 years. As a result I mastered the technique of taking off and piloting a Po-2, and I managed a few solo landings.

Two woman pilots served in the 33d squadron--junior lieutenants Anna Vasil'yevna Chizhenkova and Nadezhda Mikhaylovna Stefanenko, who had worked prior to the war as aeroclub instructors and volunteered for the front in 1941.

Chizhenkova and Stafanenko flew hundreds of risky flights, they ferried hundreds of communications officers to the ground troops, and they flew many missions behind German lines, to partisan detachments and for reconnaissance purposes.

The fearlessness and high proficiency of these pilots became widely known to us at the time of the defeat of the Germans at Moscow. During one foul day at that time, the frontal commander demanded to know the location of retreating German units in the vicinity of Maloyaroslavets. Anna Chizhenkova took on this complex and dangerous assignment.

Flying not far from the Warsaw highway, Anya noticed several guns with their barrels turned eastward in a certain hamlet. The fascists spotted her airplane and opened hurricane fire at it. They hit the Po-2's ailerons and damaged the controls with a heavy machinegun. But Chizhenkova managed to limp to her airfield anyway, and to report her intelligence to the command.

Soon the need arose for another reconnaissance flight. It was snowing, and visibility was almost zero. Nadya Stefanenko volunteered for this assignment. She crossed the forward edge without incident, and she reached the required population center. Here she was met by intense fire from anti-aircraft machine guns. The damaged engine began to lose power. Nadezhda turned the craft around, and the navigator was able to drop five antitank grenades on the Germans.

But Stefanenko was unable to fly all the way to our forward edge. The engine failed. She landed in no-man's land. The Germans charged towards her landing place on horses right away. The pilot and the navigator pulled out their pistols. But subsequent events took an unexpected turn for both them and the fascists--soldiers from battle outposts came to the aid of the airmen. They not only put the enemy group to flight, but they also dragged the airplane to a safe place, from which it was subsequently taken to the airfield.

Reconnaissance flights were the domain mainly of pilots of the 203d Air Squadron, especially when high-speed aircraft could not perform such flights due to complex meteorological conditions. Vladimir Aleksandrov, a self-trained

pilot, participated in them as well. In the past he had been an aircraft technician, and he began his flying career completely by chance. This is how it happened. During our retreat from Kasnya in 1951 Aleksandrov was ordered to finish repairing a certain airplane; the pilot was to come for this airplane later. He was instructed in this case that if the danger arose that the Germans might capture the craft, he should destroy it.

The repairs took almost a full day. In the early morning Vladimir and the mechanic assisting him lay down beside the landing strip to take a rest while waiting for the pilot, when suddenly they heard the roar of approaching motorcycles. The Germans were riding down a country road passing not far from the landing strip.

"The pilot will never get here in time, " Aleksandrov said to the mechanic. "Let's try flying it away ourselves."

They started the engine. Vladimir stepped on the gas. The aircraft moved, it began gaining speed, and then it separated from the ground gently, as if all by itself. By the time he was in the air Aleksandrov noted that a large column of German tanks was approaching the landing strip he had just left.

And so Vladimir Aleksandrov completed his first and "forced" flight. He made a perfectly normal landing in the new location of the squadron, and after that he began to study flying persistently. With time, he was made a pilot. He also serviced his own airplane.

The homely Po-2's did a great service during the Great Patriotic War. The Germans feared them very much, and they developed a great hatred for them. Night bomber formations outfitted with these aircraft would not let the Germans sleep peacefully; the airplanes glided silently to enemy objectives and subjected them to accurate and, what was most important, unexpected bombing strikes.

An interesting incident that occurred at Kaluga was described in the army newspapers. Our fighters knocked down a German Me-110 scout. Its crew--a pilot and a navigator--parachuted out and landed right in the middle of the communications squadron's location. They were immediately surrounded and disarmed by soldiers commanded by Senior Lieutenant A. P. Trefilov. As the prisoners were being led to headquarters they passed airplanes on the parking pad, and the navigator nudged the shoulder of his pilot:

"That's a U-2! Number Nine!"

During their interrogation the Germans were asked why this airplane caught their eye. The navigator explained:

"It is a very harmful aircraft. Our command pays good money for any U-2's knocked down. We hunt for them also. And this one, the one with the number 'Nine' on its tail, we've already met in the air; we thought that we had knocked it down, and we were even rewarded...."

"Ah, so that's who they are!" the pilots present at the interrogation gave out with friendly laughter. It turned out that these were the same Krauts who had tried to knock Senior Lieutenant A. P. Trefilov out of the air a few days previously. They broke the control rods of the airplane's rudder, pulverized the tail unit, shredded the percale covering the right wing into rags, but they never did manage to destroy the crippled craft. Performing entirely improbable maneuvers, Trefilov got away from them and reached his own landing strip.

And thus the Germans were captured at the landing strip where that same Po-2 with the Nine on its tail was standing ready for further flying. Moreover they were captured by the same pilot who, as if by magic, survived their fire and was now standing before them, alive and indestructible.

Senior Lieutenant A. P. Trefilov was one of the best pilots of the communications squadron. He flew to partisans and cavalrymen operating in the enemy rear 62 times, and he bombed the forward edge of enemy defenses 11 times. He served with us until the end of the war, rising to deputy commander of the squadron. A. P. Trefilov clocked thousands of hours in the air.

Two hundred twenty-four guns gave off 22 volleys in Moscow on 1 August at 2200 hours. The motherland marked the successful conclusion of the Belorussian offensive operation with a salute of victory. An order from the Supreme Commander in Chief to Army General I. D. Chernyakhovskiy, published on 2 August, named the signalmen commanded by Major General of Aviation Ptitsyn among those who had distinguished themselves in the liberation of Kaunas. This was the first order in which I. V. Stalin made mention of air force signal troops.

All signal units and subunits of our army held meetings and the soldiers accepted the praise for their military labor with great inspiration, promising to complete their sacred duty of defeating the fascist German invaders to the end.

A large group of our signalmen, executives and common soldiers alike, were awarded orders and medals for their support of communications in one of the greatest operations of the Red Army, which ended with the liberation of Belorussia and almost all of Lithuania. Award recipients in our section included I. I. Ptitsyn, Ye. K. Chuvashin, A. A. Rechenskiy, A. S. Zvyagintsev, I. G. Orekhov, L. V. Ustinov, L. M. Beylin, and S. F. Bavarov.

Almost all communications chiefs of the air corps and divisions earned government awards. They included lieutenant colonels G. N. Khodun, V. T. Kravchenko, D. S. Kompanets, and S. A. Korotkov, majors A. A. Gorchakov, B. P. Belous, V. I. Taratura, V. M. Aleksandrov, and I. I. Golovin, captains P.P. Volokhov and N. K. Korneyev, and others. Orders and medals were given to many officers of the army communications units: Major M. V. Ubortsev, captains A. A. Vorob'yev, I. M. Korostelev, and M. I. Fen', senior lieutenants I. I. Yakhin, V. K. Yermachenko S. G. Golovin, P. D. Pal'shin, K. A. Kashavin, I. N. Verbitskiy, and G. I. Arkhipov, and lieutenants F. A. Zinenko, K. M. Galakhov, I. Ya. Vovk, Salakh Khayrutdinov, and G. I. Kutuzov.

Unfortunately I am unable to list all of the sergeants and enlisted men who distinguished themselves in the Belorussian operation. But the cream of the crop, those who made the greatest contribution to insuring timely and satisfactory exchange of all forms of information, I can name. Here they are: Captain Serafim Glinskiy, master sergeants Mariya Churilina, Yefrosin'ya Babashko, Ivan Dubinets, and Aleksey Kravtsov.
senior sergeants Lidiya Baranova, Vera Dolgushina, Yelena Poluyanova, Yevgeniy Korostelev, Yelena Litvinenko, Antonina Gorkavenko, Yevgeniya Pershina, Antonina Kartashova, Zinaida Gomoreva, Nikolay Veyde, Klara Firsakova, Valentina Lushakova, Yevgeniya Khayutina,Galina Zapol'skaya, Nina Vasilevskaya, Dar'ya Zaytseva, Mariya Soldatova, Yevgeniya Trukhanenkova, Zoya Zautinskaya, and Raya Khmelevskaya, and communications center technicians and mechanics Sergey Urutyunov, Fedor Devochkin, Ivan Sasov, Sergey Shebnev, Lyudmila Shapchits, Aleksey Lyudnik, and Viktor Babkin.

This rather decisive defeat of the Germans was followed on our front by a lull. On 28 August the army headquarters redeployed in a forest by the hamlet of Bol'shiye Zoryushki northeast of Mariampol'. The communications center left at Butrimantsy began to play the role of an auxiliary station. There was a small operational group of staff officers there. It controlled the air units located at what were now the rear airfields.

We remained at Bol'shiye Zoryushki until 6 November. By this time the headquarters communications center possessed 25 telegraph links, and its telephone station communicated with all headquarters of the army's formations and separate units.

In a word, the signalmen made extremely effective use of the operational pause. In 2 months we prepared ourselves in every possible way for a further push westward, for support to control in the forthcoming offensive.

CHAPTER TWELVE

INVASION

Returning from the chief of staff, General Ptitsyn summoned the officers of the section.

"It's back to war again, folks," he said, calling us over to a map laid out on his desk.

One short glance was enough to see that only the right wing of the front was going to advance.

"Six air divisions will be fighting here," Il'ya Ivanovich continued. "Control over them is being organized from the 39th Army's VPU [auxiliary control post] and from the staff's main location. An operational group is being assigned to the VPU. General Nikolayenko is in charge of it. I designate Major Koyander in charge of communications."

The general went on to explain the essence of the forthcoming partial operation--its objective was to improve the positions we occupied and to feel out the strength of German defenses at the German border, and he spelled out what the commander needed from communications in the different phases of the offensive.

"The chief of staff cautioned us to turn special attention to the accuracy with which the names of German population centers were transmitted," Ptitsyn said in conclusion.

After General I. M. Belov became army chief of staff, the relationship to communications changed dramatically. We now began to receive our assignments well ahead of time. Moreover our capabilities and needs were always accounted for. Ivan Mikhaylovich never signed a single fragmentary order, account, or summary before it was coordinated upon with the communications section. The army chief of staff's concern for the signalmen, which was supported by the army commander, did not go unnoticed by important staff officers or the air formation and unit commanders.

General I. M. Belov worked calmly, he never raised his voice, and in his conversation he was sparing of words but thorough. He was distinguished by an exceptional degree of organization and high proficiency in staff work, and he persistently imparted these same qualities to his subordinates.

The combat activities of the airmen in the offensive operations were successfully supported by communications under the leadership of the new chief of staff. No misunderstandings of any sort of significance ever occurred, and conflicts never arose. Deeply understanding the role of communications in troop command and control, by the force of his authority, and sometimes by the force of his position, Ivan Mikhaylovich gained respect for the signalmen. He also imposed stiff requirements on us. His main one was that communications must operate without interruption and efficiently support control of aviation on the ground and in the air in all combat situations, no matter how complex.

These requirements applied at all times, and General Belov did not like to repeat them. In each separate case he simply filled in the details, as he did so this time: Do not get the names of population centers wrong when transmitting them by means of technical communication resources.

On 2 October the operational group arrived at the VPU, which was located in the village of Girtakol'. We were placed in two masonry buildings that had been considerably damaged by artillery fire. The communications center was deployed in one of them. A squad from an army regiment commanded by Senior Lieutenant F. F. Vistunov set it up and maintained it. Platoons led by lieutenants P. I. Solntsev, I. Ya. Vovk, and Salakh Khayrutdinov were brought in to build permanent and cable-and-pole lines.

The observation posts of the ground troops and aviation were located on a hill near Girtakol', about a kilometer from the forward edge. The enemy positions could be seen reasonably well from here even with the unaided eye. But we did have a stereoscopic telescope, and so I took a look. The enemy's camouflage was excellent. But I was not interested in it at the moment. The observation post was a good point from which to determine the most sensible location of the radio station and the paths the cables connecting to it were to take. These lines were laid in the first night we were there by a team of warriors lead by Senior Sergeant S. P. Shchebnev, an experienced specialist. We used different colors of cable, and we suspended it on pegs along communication trenches. The radio operators spent two nights digging shelters for the stations, and they dependably concealed them from aerial observation.

It was known that the operation was to be short but quick. Thus it was dedided to hold a short meeting for representatives of the operational and reconnaissance sections and the communications chiefs of the air formations. We convened in the village of Surmonty, in which the staff of the 213th Night Bomber Division was located. In addition to Captain I. I. Golovin, this formation's communications chief, this meeting was attended by majors B. P. Belous (6th Bomber), Yevsikov (1st Ground-Attack), and A. A. Gorchakov (303d Fighter), and Captain P. P. Volokhov (240th Fighter). These were remarkable people, well versed in their specialties and fabulous organizers. They were all distinguished by high efficiency, resourcefulness, and good working and associative memory, and they always readily helped each other out.

During the meeting we spelled out the distribution and purpose of different radio wavelengths for each branch of aviation, the code names of the VPU and the guidance radio station, the tactics to be followed by aviation, and the order of retargeting. We also reached agreement on the sort of reports the lead groups were to transmit, the intelligence information they were to acquire and transmit, and on how to insure continuity of communications whenever the VPU had to relocate itself in the course of the offensive. Naturally the conversation also turned to maintaining radio discipline.

Collective discussion of the ways for fulfilling the forthcoming mission permitted us to organize aerial radio communication in such a way that the activities of the formations could be constantly monitored during combat from the VPU, and so that a minimum quantity of radio resources and maintenance personnel need be used in the radio network. In addition to radio networks intended for control of bombers, fighters, and attack aircraft, we organized yet another--for air reconnaissance. Two forward air controllers equipped with radio sets were assigned to each of the rifle corps. One of the controllers was to remain at the corps command post while the other was to move forward as need be, closer to the current targets. Wire communication was reinforced by radio printing-telegraphy within the network containing the VPU, the army staff, and the 211th Ground Attack and the 303d Fighter divisions.

Both General I. M. Belov and the formation communications chiefs were troubled by the possibility that signalmen and pilots might distort the names of German villages and (fol'varky). This issue especially troubled Major A. A. Gorchakov. The 523d Regiment of his division was basically involved in air reconnaissance. The fighters of this unit were converted into scouting aircraft owing to outstanding assimilation of radio communication. I had already mentioned the considerable meticulous work done in the army to upgrade the radio operating proficiency of the personnel in this army.

Among the fighter regiments, the 523d received the highest score for assimilation and use of radio communication in combat. The regiment commander, Lieutenant Colonel K. A. Pil'shchikov, was one of the first in the army to become a master of radio communication. The main credit for this belongs to Captain Ya. G. Sherstnev, the unit's communication chief. An exceptionally well trained specialist, and a persistent individual interested in his work, Yakov Grigor'yevich literally infected all of the personnel with his love for radio.

"I recently visited Sherstnev," Major Gorchakov related at the meeting. "He came up with the idea of organizing a get-together between the pilots and the radio station crew with whom they worked when transmitting intelligence."

"Well, what can we say, it's a sensible idea," supported Major N. N. Gyuppenen, the VPU's air intelligence liaison officer.

Right after the meeting Gyuppenen and I headed for that regiment, taking along radio operators Mariya Seliverstova and Aleksandra Leukhina with us. It was 2 years now they had been receiving messages from the scouting aircraft. Both had very precise hearing, truly a musician's ear, and clear diction, and they were able to write down the radio messages they received quickly and accurately.

The pilots met the young girls with a hearty frontline welcome. Using two low-powered radio sets, the radio operators and the airmen walked through the order of transmitting reconnaissance information. They came to an agreement in this case that pilots transmitting intelligence would repeat the names of population centers twice, slowly and clearly. In turn, the radio operators were obligated to memorize all the names of the enemy's principal strongpoints within the zone of operations of the scouting airplanes. Of course this did not preclude, at the times of transmission, the use of maps upon which the population centers were numbered.

The results of the meeting between the air scouts and the radio operators exceeded our expectations. During the offensive, which was not long in starting, and in general until the end of the war, all of the intelligence was received without significant ommissions and distortions.

General Ye. M. Nikolayenko visited the VPU on the eve of the offensive. He inspected all of the communication facilities together with me, at the observations post he talked by telephone with all of the air formation commanders, and he left satisfied. We had barely abandoned the observation post when the enemy began firing at our hill. We quickly took shelter in the first dug-out along the way. A few of the shells exploded in the communication trenches, and cableslaid within them were broken. Inasmuch as each cable was of a different color we were able to restore communications quickly. Nevertheless I also issued orders to lay a number of standby lines to the radio stations following other routes. After all, even a short interruption of remote control of radio stations could cost dearly in combat.

"That was a good decision," General Ye. M. Nikolayenko said on learning of my instructions. "God, they say, helps those who help themselves...."

I was also fortunate enough to work with Ye. M. Nikolayenko during the battle of Moscow. The general was always attentive to and demanding of communication, and with his help it was easy to settle not only general organizational but also particular purely technical problems.

"Your main job in this battle, Major," Nikolayenko continued, "is to keep the communication resources following immediately behind us as we move forward, so that I would not lose control of aviation or personal contact with the command of the army we're supporting for even a minute."

Of course I could not make such absolute guarantees, though it appears that everything was in readiness. But war is war, the enemy often makes it necessary to adjust our plans, and even subordinates might make certain mistakes.

MIL
(FOUO 33/79)

11 DECEMBER 1979 CALL SIGN 'RUBIN'--ORDER FOLLOWS 3 OF 3

An incident that occurred a few months previously in the 248th Fighter Regiment was still fresh in my memory. One of the squadrons was to provide cover to ground-attack airplanes during combat. At the appointed time, the IL's reached the area in which they were to meet the fighters, but they were unable to establish communication with them, and so they returned to their airfield. This all happened because Captain A. M. Lapta, the regiment's communications chief, forgot to tell his men to tune the radio sets aboard the airplanes to the wavelength of the ground-attack aircraft.

The radio operating data and call signs had to be changed frequently and the onboard and ground radio resources had to be retuned often to keep troop control covert. All of this was done according to a schedule, simultaneously in the entire air army. Late changes of wavelength and call signs in the ground radio network were easily correctable--it was sufficient to call the particular stations operating on the basis of the old data and to allude to the error by a special signal. But if aircraft radio resources are not retuned in time, there can be no remedy. Interacting crews of different regiments would be unable to establish communication with each other. As a result they would be unable to complete their combat mission.

A court martial hung over Captain Lapta's head. But the command considered his previous faultless record and his open confession of his terrible fault. As repentance the captain asked that he be assigned to ground-attack aviation as a common gunner. In 5 months as a gunner A. M. Lapta participated in 30 combat sorties participated in the most difficult combat assignments, and knocked down two German fighters in group combat. He was awarded an order and restored to his previous post.

Thus we see what can happen in war. This is why I insisted on perpetually rechecking the readiness of the communications center and the radio stations, why I talked with all formation communication chiefs, and why I visited the construction platoons.

The ground shuddered early in the morning. Artillery preparation began. On 4 October the 39th Army went over to the offensive. I glued my eyes to the stereoscopic telescope. The German forward edge was blanketed by explosions, fragments of shelter walls, chunks of earth, and uprooted trees flew into the air, and dust and smoke spread over the entire sky.

All telephones and radio station remote control lines were switched on for transmission. The radio stations began broadcasting to check communications. The correspondents answered immediately--that meant that the personnel of the duty shifts were in full readiness.

The attack airplanes were the first to reach the battlefield. The loudspeaker came to life: "This is 'Krapiva (Nettle) one-twenty.' I am going after target twenty-eight. Request permission to go for target twenty-eight. This is 'Krapiva one-twenty'." This was the pilots of the 1st Guards Ground-Attack Division. They are instantly recognized by their combat formation--in the outline of a kite, which was used for the first time by us. It permits each crew to defend airplanes in front from enemy fighters and to strike ground targets more successfully.

General Ye. M. Nikolayenko took the microphone:

" 'Krapiva one-twenty,' this is 'Krystall (Crystal).' Permission to go for Twenty-Eight granted. Anyone else near the target, please respond...."

An answer came back on the loudspeaker immediately: "Krystall,' this is 'Lebed (Swan) three-forty two.' I am going for target Forty-Five. Request permission to go for target Forty-Five."

This meant that the bomber group was also at the target approaches. Nikolayenko granted them permission to strike the designated target as well. Then he ordered attack aircraft following behind "Krapiva 1-20" to make three runs on the target, to remain over it longer.

Fascist antiaircraft guns came to life. But not for long. Covering fighters plastered the guns with onboard guns and machineguns. The attack aircraft formed into a circle and, diving one after the other, struck the enemy with rockets.

"The infantry's moving out," General Nikolayenko uttered.

This was an extremely critical moment of air control. From this time on the general was no longer the one to grant permission to approaching airplanes to strike targets; he transferred them to forward air controllers in the rifle corps, since they knew better what sort of air support the infantry needed.

All radio resources were operating at the observation post. Using them, Nikolayenko monitored the work of the air group and the controllers. Senior Lieutenant L.I. Beda (later a lieutenant of aviation,awarded the Hero of the Soviet Union title twice), the leader of the attack group with the call sign "3-62," came on the air. He reported to forward air controller "Verba (Pussy-Willow)-4" that he had completed his assignment, he requested permission to return to the airfield, and by a code signal he communicated that he had used up all of his ammunition. "Verba-4" told him not to leave the target, to make dummy passes--the developing infantry attack had to be supported.

Nikolayenko smiled with pleasure:

"The controller decided right. The unarmed attack aircraft can still make it hard for the Germans: As long as they hang over the heads of the fascists, they won't dare climb out of their burrows."

The VPU had not only radio but had also wire communication with forward air controllers in the rifle corps at the forming-up place. This permitted the operational group to obtain complete and timely information on the activities of friendly and hostile troops on the ground and in the air, and on the evolving situation within the entire zone of advance.

The air army commander came to the VPU. He immediately began telephoning the commanders of the operating air formations. While General T. T. Khryukin was talking with one commander another telephone line was getting through to another. Valya Rostovtseva, a very capable telephone operator, was on duty at this time. On her own initiative she connected the commander to three parties simultaneously, and the general was able to make conference calls to three division commanders.

"This is just like being at a dispatcher's convention," Khryukin said approvingly. "In the next operation, Koyander, set up the same sort of communication for me at my command post...."

The offensive developed more successfully than had been foreseen by the commander's concept. Troops of the 39th Army were advancing to the border of fascist Germany. Frontal signalmen began building a main communications artery in the very first day of the operation. We suspended our single telephone line from the poles being installed. In this case everything had to be done from scratch. Our gunners and airmen had almost done too well: There wasn't a single surviving pole anywhere in the German defense area!

Surmounting enemy resistance, troops of the 39th Army reached the territory of East Prussia in some sectors. During the time of these battles more than 500 two-way conversations were held between the air groups and the control and guidance radio stations, and attack aircraft were guided to targets and retargeted by radio 105 times. And there was never a case in which our airplanes fired at or bombed friendly troops, even though they had to strike targets that were only 400-500 meters away from the infantrymen.

During the operation the VPU was relocated 25 km forward. Communications remained as they had been at the forming-up place. The specialists managed to set up the lines right behind the advancing troops.

On 10 October the operational group returned to army headquarters. Preparations for a new thrust were already at full steam there.

Marshal of Signal Troops I. T. Peresypkin visited frontal headquarters. He acquainted the executives with the latest experience in organizing communications in major offensive operations of the Red Army, and he quickly resolved a number of problems the front was facing in relation to the supply of some especially scarce stores.

Of above average height, of good bearing, and well built, Ivan Terent'yevich rarely smiled, and outwardly he appeared to be a stern individual. He had no patience with wordiness and unchecked reports, and he was impatient with shortcomings. This is why some people were scared of him and tried not to go against the marshal in discussions with him. It is said that he immediately lost respect for such people.

At the same time we knew quite well that our supreme signalman knew how to evaluate subordinates, he supported their creative initiatives, and he was able to quickly analyze their merits and shortcomings. High efficiency in his work, boldness in making critical decisions, and firm leadership were all the foundation of Ivan Terent'yevich's high authority.

This visit by the marshal did not go unnoticed by the airmen either. The telephone and telegraph section of the front's communications directorate finally found it within its means to provide us with wire and equipment to organize telegraph communication with two divisions that were still without it.

The army was reinforced with new air formations. Their first echelons were accompanied only by advance parties of signalmen. Concurrently we began significantly regrouping our old divisions and units. They had to be afforded communication with the air army staff immediately. Soldiers of the 333d and 37th companies performed their missions excellently. In 3 to 4 days they suspended more than 250 km of permanent wire. Never had we attained such a construction rate before!

The officers of our section also worked hard. They were working out the details of the plan for organizing communications to support aviation control in the East Prussian operation, preparations for which were underway. According to the concept, control was to be centralized at the commander's command post, with some of the control functions being delegated to auxiliary points created by the combined-arms armies in the sector of the main thrust.

It was in accordance with this concept that the plan was written. Two high-power STsR-399 radio sets, three or four guidance radio sets installed in "jeeps," two receivers, at an outfit of line and telephone equipment intended for internal communications and remote control of radio were allocated to the VPU's of the 11th Guards and 5th armies. A radio set with a printing apparatus (RST-1) was placed at the disposal of the air liaison officer. One more air control point was set up at the command post of the II Guards Tank Corps. It was provided with RAF and STsR-284 radio sets installed in an armored transporter.

An army fighter control point was organized in the main sector. It was placed in charge of General G. N. Zakharov, commander of the 333d Fighter Division. The point was supplied with two RUS-2 radar sets, and STsR-399 radio sets, two control and reporting sets, and receivers intended for interception of enemy radio transmissions. Moreover three control and reporting radio stations of the army VNOS company, deployed within the zone of advance of the 11th Guards and 5th armies, were subordinated to General Zakharov.

From his command post, the air army commander could control aviation with the help of a high-power radio set hooked into the radio network of both of the VPU's and the vectoring posts of the rifle and tank corps. Another

such set was intended for radio-telephone communication with the staffs of the air armies and all formations. Communication with fighters and with the command post of the 303d Division was maintained with medium-power radio sets. Different receivers could be used to obtain information from air reconnaissance aircraft and to monitor activity in other radio networks.

The reason for some difficulties in providing support to control was that our army did not have a corps level of control. After all, it did contain 13 divisions, six of which had just recently been placed within the composition of the army and had not completed relocating their signal units by the beginning of the operation. This is why we had to seek out the possibilities for temporarily attaching army subunits and detachments to them.

All officers of the section had clearly defined responsibilities in the period of preparations for the offensive. The efforts of all were directed at writing up the communications organization plan. This was very meticulous and laborious work. The radio frequencies and call signs had to be distributed among the main, reserve, and backup radio networks and communication routes at all control levels of the air army, the order of operating these networks and maneuvering radio communications in the course of the offensive had to be established, the passwords and authentication signals had to be determined, and many other details of the radio service had to be considered.

All of this work is done today with computers following a prescribed program, but in those days this was all done for us by Senior Lieutenant L. V. Ustinov--a former engineer of the Peoples Commissariat of Communications--"weaving spells" with a slide rule in hand. He could sit for hours over the radio operating data, selecting the optimum variants of frequency repetition and arranging them depending on the range to correspondents at the forming-up place and in the course of the offensive. He was assisted by Lieutenant S. F. Bavarov, a person of different interests who preferred the active side of operations. As with Major Ye. K. Chuvashin, Sergey Fedorovich spent the greater part of his time in the troops, especially with newly arriving units, he provided assistance to the communications chiefs, and he carried instructions from the communications section to the immediate executors.

There was also much to do for Captain A. V. Shuneyko, who was responsible for supplying the communications units and subunits, creating stockpiles of equipment and expendables, and distributing them among the formations. Major A. S. Zvyagintsev had his own concerns. He organized restoration of inoperable radio sets, and he was responsible for organizing the testing of radio resources allocated to support the operation. Engineer-Major A. A. Rechenskiy carried responsibility for the reliability of wire communications, for sensible erection of more communication lines, and for concentration of men and equipment in those sectors within which the frontal troops were to penetrate into East Prussia. Officers I. G. Orekhov and M. N. Baygushev planned the activities of the field postal services in the forthcoming offensive.

General I. I. Ptitsyn compared the section's work on the eve of the operation with a well tuned orchestra. He himself was the director, having unified a good and workable collective welded together by faithfulness to military duty and iron discipline.

In early evening on 14 October General Ptitsyn and I visited the communications regiment. Il'ya Ivanovich decided to send the soldiers off on their assignments himself.

The communications regiment had established the tradition of sending off the combat crews to the control posts ceremoniously, with all of the personnel formed up and with the banner unfurled. I attended this ritual several times, and I always experienced great spiritual agitation and pride for our signalmen, these modest and selfless laborers of the war.

The unit's personnel were already formed up by the time we arrived.

"Regiment, attention! Dress on the banner!" commanded Colonel V. F. Raznatovskiy, the unit commander.

General I. I. Ptitsyn gave a short, heartfelt speech. He said that East Prussia is the ancient breeding-ground of Prussian militarism, the main springboard of German aggression against our motherland. Since the olden days, the German generals have referred to it at times as "an iron glove stretching to Russia's throat," and at other times as "a pistol pressed against the Russian temple." The Nazis prepared it for war for many long years. There, every hill was transformed into a fortress, and every building was made a fire position. But there are no fortresses which Soviet soldiers could not take.

"Let us apply all of our strength, comrades, to beat the fascist animal into his own lair faster!" the general appealed to the soldiers.

"To your vehicles!" was commanded. The column of motor vehicles began flowing out of the forest onto the road leading to the front.

"Well, go with God, as they say. Anyway.... Keep your nose clean," Il'ya Ivanovich told me in parting.

During the night we made our way to the air army's forward command post without incident, we meticulously camouflaged the radio station, and we settled down to work. Remote controls of the radio sets were placed in the observation posts and in the commander's shelter, and reserve connecting lines were laid from each station, detouring around the main lines and coursing along trenches. Cables of different colors were used. We also set up internal and external command post communications.

The East Prussian operation began on the morning of 16 October 1944 with powerful 2-hour artillery preparation. Following this, a group of "flying tanks" lunged at the enemy. From the command post, we did not find in difficult to determine the attack divisions to which the airplanes flying over our heads belonged. Aircraft of the 1st Guards Division had a white stripe on the wings, those of the 277th also had a white stripe, but it was along the fuselage, and airplanes of the 311th had their wingtips painted white. General T. T. Khryukin introduced these identification markings in response to a proposal made by some division commanders and signalmen. Identifying the formations to which the craft belonged by their markings and knowing their call signs, the forward air controllers could guide the attack aircraft and retarget them faster, and correctly evaluate the combat results of pilots in each division.

Wave after wave of airplanes approached the forward edge. The airwaves went into a frenzy of activity: The conversations literally climbed up on one another's back, the attack aircraft found it hard enough just to maintain communications within their own groups, and the calls for fighter cover were unceasing. The pilots of subsequent divisions overloaded the radio network to the breaking point. To make sure that they received target instructions correctly, the transmissions had to be repeated two or three times, reception had to be confirmed, and all of this overloaded the airwaves even more.

It was here as well that something which we had not witnessed for a long time in the 1st Air Army occurred. Due to excessive traffic in the airwaves the lead group of ground-attack aircraft of the 182d Division was unable to reach the guidance radio station, and some of the crews dropped their bombs over an area occupied by our troops.

"Koyander, clear this mess up right away!" the commander literally exploded from indignation. "Do you hear me, immediately!"

Instructions transmitted to the groups by the commander's radio set did not produce any results. Then I suggested making the radio network smaller and decentralizing air control. The communications plan foresaw this variant. General T. T. Khryukin would not give his consent this, and he ordered me to seek other ways to clear up the radio traffic. I quickly composed a coded message: 'Attack aircraft and bombers are not to use their radios when approaching a target and when over a target in formation. Turn all attention to guidance radio stations and to my radio station, code name 'Rubin'. Aircraft in formation may operate their radios only in exceptional cases. When 20-25 km from the front line, lead groups are to call the guidance radio station within the sector into which the group is heading, and the number of airplanes in the group and the target number are to be reported.... In the event that communication with guidance radio stations or with my station is absent, you are not to strike designated targets."

The message, which was signed by Khryukin on the spot, was transmitted to the divisions and regiments. Deputy Commander General I. G. Litvinenko and

General I. I. Ptitsyn sent officers to the units to monitor fulfillment of the order. More airplanes began to be placed in the air groups, which made it possible to reduce the number of lead aircraft and decrease the number of exchanges with air controllers. From this day forward the army began a fierce struggle against every unnecessary word transmitted into the airwaves.

The results of aviation's combat activities became known at the command post at the end of the day. Just pilots of the French Normandy-Neman Regiment alone knocked down 20 enemy airplanes during this day, having lost not a single one of their own.

Hot battles flared up in East Prussia. Our troops stubbornly hacked away at the strongly fortified enemy defenses. As our ground troops moved forward we began relocating the rifle corps command posts and the forward air controllers. We tried to make these moves during lulls in air activity or at night.

Of course, not everything went smoothly. On the third day of the offensive we lost radio communication with the forward air controller in the XXXVI Rifle Corps. Thus the attack aircraft had to be controlled from a VPU quite far away from the target. This alarmed the commander, and he asked what might have happened. I told him that the corps had two radio stations and two controllers; something completely unforeseen had probably occurred there.

"Take a vehicle with a reserve radio set and head for the corps quickly," T. T. Khryukin instructed. "The Germans are making ready for a counterattack there. I'm giving your 30 minutes."

On learning the location of the corps I sped off on my way. Anyone who has traveled the roads of the forward edge knows how difficult it is to find one's way without a guide. We made it to the corps' location only owing to luck: We met both of the forward air controllers. They were marching on foot. There was no time to find out what happened. A battle was raging in front. The enemy was already counterattacking. We rushed at full speed to the corps command post. The radio set was immediately connected to the attack aviation control network. Listening in, Khryukin heard it begin operating. He transmitted:

"This is 'Rubin'. You're doing fine. I'm sending another group of airplanes into your area. Let's see some bolder control."

Powerful support by attack aircraft helped the infantrymen to fight off the enemy counterattack. The commander ordered me to return. As I was departing the forward air controller explained to me that when the corps command post made its move to a new place, their radio stations ended up within the German disposition. It was only owing to the resourcefulness and courage of driver G. T. Valivach that both vehicles were quickly led out into our territory. But then they met enemy artillery fire. The vehicles were destroyed, and Valivach was seriously wounded.

On returning to the command post I reported mission accomplished to the commander. At this moment he was in the company of Lieutenant Colonel N. V. Zhuk, chief of the personnel section, and I was able to witness their conversation on decorating those who had distinguished themselves in the battle.

Zhuk went on with his list, calling out the names of pilots and navigators one after the other. The commander signed the awards lists without any sort of remarks. He had a good memory, and he never forgot the names of outstanding airmen. When the lieutenant colonel named gunner-radio operator R. S. Khabarov, the general asked me:

"Is that the same Khabarov who transmitted intelligence on reporting mission accomplished after hitting a second target?"

"Yes, Comrade Commander."

Khryukin elaborately wrote out the following on the awards list: "Valorous Service Medal," and above that he wrote: Order of Glory, 3d Degree." Then N. V. Zhuk laid another document on his desk:

"Radio Station Chief Warrant Officer Kozlov, Ivan Fedorovich, is to be awarded the Order of the Red Star."

"What did he do?"

"He assisted Major Kapustin, one of the forward air controllers."

"Decorate him by all means." T. T. Khryukin signed the sheet and ordered the lieutenant colonel: "Check the formations to see that all radio station crews and controllers have been decorated. And don't forget Valivach." Then he turned to me: "You get in on this too; see to it yourself that we do not forget to decorate signalmen at the forward edge. It seems sometimes that decorations are awarded more to those who are constantly in public view."

Soon many chiefs of air control radio stations and communications regiments officers were given government awards.

With the active support of aviation, troops of the 3d Belorussian Front invaded East Prussia to a depth of 30 km on a front 140 km wide.

Wire communication operated very stably at the forming-up place. As the air liaison officers moved forward, the bulk of the command information load was assumed by radio printing-telegraphy with the assistance of RST-1 sets and the command radio-telephone network. It would be sufficient to point out that the communication load handled by RST-1 sets between 16 October and 1 November was 1,000 radio messages containing 73,500 words, and 12 hours' worth of direct conversation. During this time we had many occasions to reflect gratefully on the RST-1's developer, Engineer-Major I. M. Malev. Radio printing-telegraphy successfully replaced wire telegraph communication.

The air army headquarters moved to Sternishki settlement, 8 km east of Vil'kavishkis. It was here, on the border of East Prussia, that an army communications center was set up on Soviet territory for the last time.

The 333d and 37th companies tackled the job of lengthening the wire lines leading west. The enemy had destroyed the lines as he retreated. Moreover even our own troops, aviation in particular, did not spare them in attacks on enemy defenses. Thus construction had to be started from scratch everywhere.

Laying permanent lines over the territory of East Prussia, we still did not know if the Germans already had underground multiple cables traveling in the directions we needed. Frontal signalmen did think of this, and they began explorations which in short time bore their fruit. Sensible use of enemy underground communication trunklines made it possible to organize communications somewhat more quickly.

Inspired by the successes of our front, and by invasion of fascist Germany by victorious Soviet troops, the signalmen worked with special enthusiasm. Telegraph and radio operators labored with the motto "A quickly and correctly transmitted telegram or radio message is our blow at the enemy!" The construction subunits accumulated stockpiles of wire and fittings, and they prepared efficiently to lay wires of victory all of the subsequent way into the den of the hated enemy.

CHAPTER THIRTEEN

IN THE CITADEL OF PRUSSIAN MILITARISM

The chart I drew up for deployment of air communications in the second phase of the East Prussian operation was not much to look at. What sort of draftsman am I? And there was no one I could order to make the charts better, more handsomely. This was prohibited. Before the previous offensive Il'ya Ivanovich received a stiff scolding from the commander for violating this prohibition. Only the section chief was entitled to draw up the documents for deployment of communications in an operation undergoing planning: Everything had to be prepared in the deepest secrecy.

Before last night I was also aware only of the planned redeployment areas of the air formations. General Ptitsyn worked on the plan alone. But he had barely managed to outline the organization of communications at the forming-up place when he suddenly fell seriously ill and was sent to the hospital. The army commander ordered me to assume the responsibilities of communications chief.

"But don't forget that you will be with me at the command post," said General Khryukin. "The responsibility of communications there is on your head."

It took almost the entire day to finish the charts. I was of course worried about my accuracy. The manpower and equipment had to be accounted for and the possibilities afforded by wire and radio resources had to be determined accurately and realistically. Defining the mission, General T. T. Khryukin pointed out that at the forming-up place, he would be controlling aviation from his own command post, and as the offensive proceeded he would exercise control through the VPU's of the ground armies. As a departure from previous operations, this time we were to deploy eight such points, five of them in the course of the offensive. We also had to provide dependable communication between the command post and the three air divisions supporting the tank corps. Three radio printing-telegraphy sets, 25 high- and medium-power radio sets, and three radar sets were allocated to the ground troops. More than 250 persons were needed to service

communications in support of interaction. We had never brought in such a large quantity of men and equipment for work at the forward edge before.

But there were other difficulties as well. As before, we still did not have a corps level of control. All divisions and separate regiments were answerable directly to army headquarters. And this meant 1,350 warplanes! Moreover we had to set up communications with six aviation base areas, which contained 41 air base maintenance battalions. We also needed to insure constant communications with the 3d Air Army, the formations of which were supporting our front's offensive. We established Baudot telegraph communication with its staff.

I prepared a detailed account of the men and equipment together with Major M. V. Ubortsev, the acting communications regiment commander. How much this list had grown!

By the beginning of 1945 we possessed excellently trained personnel. Eighty-seven percent of the army telegraph operators were rated specialists, and half of them had 1st and 2d class ratings. Class ratings had been awarded to 81 percent of the radio operators, 45 percent of whom were certified at the the highest ranks. The skill level of personnel in the communications regiment was even higher. Here, 95 percent of the telegraph operators and 50 percent of the radio operators had 1st and 2d class ratings.

All airplanes now carried radio sets, except for light night bombers. We even had more communications stores than foreseen by the equipment tables. Our equipment availability had recently grown considerably due to both centralized supply sources and captured equipment. Nevertheless we had to take risks in drawing up the estimates, leaving ourselves with almost no equipment reserve.

"You weren't tight with the equipment," T. T. Khryukin declared on reviewing the communications plan. "That's good. The frontal commander feels that our aviation will have an extremely important role in this offensive because the defenses are highly fortified and the enemy has a lot of tanks. I trust that the signalmen won't let us down."

On giving his approval to the plan he asked:

"How about our dummy sites?"

"They're working," I reported. "They're working, as if they are real."

Beginning on 1 January we made it look as if we were providing cover to troops supposedly concentrating on the left wing of the front. A network of dummy airfields was created there, and supplied with 100 dummy ground-attack airplanes and 60 dummy fighters. We maintained the usual radio traffic at these airfields. Major V. M. Aleksandrov directed the radio effort at deceiving the enemy, having accumulated experience in this work. All of

the other army radio networks remained silent. The radio stations of all staffs were sealed by the cryptographic sections. The communications chiefs found themselves in a difficult position. New radio operating data were introduced for the operation: Wavelengths, call signs, and authentication signals were changed. The radio sets had to be retuned, the communication lines had to be checked, and the directional antennas of the radio printing-telegraphy stations had to be adjusted. And so I asked the commander to give us 2 hours in which to do all of this.

"Not a single minute!" General Khryukin sternly replied. "We will begin radio communication only when artillery preparation begins. It will go on for over an hour. If you think out everything well, that will be enough time for you."

"If he says that's the way it is, then that's the way it is," General I. M. Belov uttered as we left the commander. "Set up full control locally and check the reliability of staff communications with the troops once again."

I was quite certain of its reliability. The air army headquarters was located at the center of the combat formations. There was direct telegraph and telephone communication with all divisions, separate regiments, and aviation base areas. Correspondents could be switched from the radio networks to the radio communication routes as well.

A couple of days before the offensive we held a meeting with the communications chiefs of the formations and separate units, during which we thoroughly discussed the plan of the forthcoming actions. Concurrently the army commander convened the air liaison officers and forward air controllers. The officers studied the situation on the ground within their sectors of the front, the coded target maps, the organization of communications on the battlefield, the radio operating data, and other problems. Major I. D. Kapustin gave a demonstration of his own experience. A group of attack aircraft was raised aloft specifically for this purpose.

General T. T. Khryukin felt that one of the reliable means for insuring clear coordination of aviation with ground troops was to see that the airmen had a good knowledge of the enemy's forward edge. He sent all of the group leaders, forward air controllers, and ground-attack squadron and regiment commanders to the forward positions within the main sector. Signalmen visited these positions with them as well.

Walking the trenches and inspecting the German forward edge of defense from dug-outs, we clearly felt like fish out of water. Mortar shells rustled disgustingly over our heads, passing shells wore our souls ragged, and bullets rushed by with a terrifying whistling. Here and there explosions churned up the ground. And we unwittingly dropped at the sound of every bullet, gunshell, and mortar shell. But the infantrymen paid no attention at all to this, calmly going about their business. Force of habit.... And yet our group of airmen contained famous aces who had looked into the face of death in savage aerial combat dozens of times.

Each of us had a particular task during our visit to the forward edge. Using optical instruments, the pilots and controllers studied the near targets, the configuration of friendly and enemy trenches, and the profile of the terrain. The signalmen were interested more in the equipment the infantrymen possessed at their command and observation posts, and in the communication resources, since it might become necessary to have the forward air controllers utilize them.

One telephone operator at a rifle division's command post was servicing several telephone sets at the same time. "How does she do it?" I thought, and immediately heard my answer in her angry voice:

"I told you, use short rings, then I will know that it's you, and I'll use your set."

So this was the secret of this young "human switchboard"! She prescribed different ring patterns to each of her parties: One was to use fast short rings, another was to ring long, and a third was to alternate long and short rings. This permitted her to answer the right telephone every time.

We acquainted ourselves with yet another innovation at a rifle regiment command post. The telephones stood in a pedestal, and the receivers were secured to holders fastened above each instrument. There were sockets on the holders for neon lamps, which turned on whenever the bell rang. The telephone operator could immediately determine which of his correspondents was calling.

We found this to our liking, and we did not delay in making use of the improvements arrived at by infantry signalmen. We set up one of the telephone pedestals at the commander's command post and another in the headquarters operational section. Each usually had five or six instruments.

A pleasant surprise awaited me at the command post of the 5th Army, to which the airmen returned in the evening. A small crowd of soldiers was gathered together beside a good-sized covered trench. A broad-shouldered officer in a poncho thrown over a coat was telling them something, vigorously gesticulating. His gestures seemed very familiar to me. When the speaker turned in my direction I shouted with joy:

"Sasha, is that you?"

Yes, it was he, Aleksandr Makiyevskiy, who served as a first-termer in the same regiment with me in the 81st Rifle Division.

"Zhen'ka?! What are you doing here?" he literally showered me with questions. "Why haven't I seen you in our army before? I'm the chief of staff of the signal regiment. Where are you, and what are you? Would you like me to get you into our regiment? But why are you a private? What sort of trouble did you get into? Did you have to, eh...?"

I had to explain that I had not gotten into trouble, that I was serving in the 1st Air Army as deputy chief of communications, and the soldier's shoulderboards and everything I was wearing were simply camouflage: All airmen change into infantry uniforms and wear enlisted or sergeant shoulderboards when visiting the forward edge.

This evening was joyous and agitating to both me and Makiyevskiy. After all, we had not seen each other for 10 years! And how many events occurred in the lives of each of us during that time!

The operational group reached the control post in the evening or 12 January. The army command post was deployed by the city of Shtaluppenin, a kilometer and a half from the forward edge. I immediately began organizing and checking our wire communications. Everything was working normally. General T. T. Khryukin arrived at the command post at two in the morning. Either by accident, or due to failure of the arriving team to strictly observe blackout rules, two German airplanes bombed our position precisely at this very moment. Some of the wires were knocked out. They had to be spliced by touch: Use of flashlights was prohibited. Even the hint of a flame immediately produced a threatening command: "Put out that light or I'll shoot!"

It was coming close to the time for artillery preparation. The commander had to make an urgent call to the army chief of staff and the formation commanders. But the telephones were dead. I hurried my people on, and I raced along the lines together with the linemen. Finally we managed to repair one of them connecting us to army headquarters. Khryukin placed a call to General Belov. The commander was worried: A thick mist had crawled in from the Baltic, and the beginning of artillery preparation had to be postponed.

"The weathermen said that they did not expect the weather to improve until midday," Belov reported.

"We will have to act in small groups," the commander uttered, deep in thought.

The variant had been foreseen, and the operators began making the appropriate corrections in the plan for use of aviation.

Finally the "god of war" spoke in eloquent thunder--powerful artillery preparation began. Thousands of radio stations began broadcasting to its accompaniment, checking their readiness to support troop command and control. Lieutenant K. Ye. Yermolin made successive radio contact with our VPU, the command post of the 303d Fighter Division, and the army and air formation staffs. Observing the work of the officer, the commander said to me:

"And you feared that there would not be enough time to check things out. What is it with you signalmen, always wanting something to cry about...."

Before he could finish his thought several unknown stations broke into the wavelength reserved for control of ground-attack aircraft. A female voice

was pattering: "'Baklany' (Cormorants), this is 'Chayka (Seagull) Central', take this radio message...." This was followed by words interspersed with numbers. "Baklany" confirmed reception.

General Khryukin literally drilled through me with his angry look:

"Stop this nonsense! Who told them they could use the aircraft wavelength?"

I grabbed the microphone, made a simultaneous call to "Baklany" and "Chayka Central", and demanded:

"This is "Rubin", get off my wavelength immediately, don't interfere with my work!"

"We won't bother you, my sweet little Ruby," "Chayka" instantly replied with a flirtatious tone. "As soon as your's arrive, we'll get off the line right away. We can't use ours right now, it's been cut off. Don't worry, we'll go away."

"Chayka" kept her promise: As soon as the attack aircraft began transmitting she left the wavelength. But whenever there were pauses in our work she immediately began contacting her "Baklany".

"Find out," Khryukin ordered,"who this bird might be...."

"Chayka Central" turned out to be the code name of the artillery reserve of the Supreme High Command. Sergeant Aleksandra Chaykovskaya was working the radio set. General Khryukin soon met her in the artillery division commander's shelter, which was located 300 meters from us, and praised the young girl for her resourcefulness.

The ground-attack formations made their first strikes against previously designated, planned targets, operating in response to instructions from air liaison officers. The lead groups made contact with the VPU within the sector in which they were operating. Communication with the aircraft was managed by Major Zvyagintsev and captains Shvartsman, Yevstigneyev, and Levitin. The aircraft were guided to their targets by Lieutenant Colonel Zadorozhnyy, majors Kapustin, Kusin, and Demin and captains Shugay, Bogun, Rogozin, and Rutkovskiy.

All of these people knew their jobs extremely well, such that communications and control of the aircraft over the battlefield were in trustworthy, firm hands. Thus when "Baykal-101" unexpectedly called "Rubin" the commander had reason to be curious.

"Who is that?" he asked.

"The commander of the 311th Ground-Attack," I replied.

Hugging the ground almost level with our command post, a pair of IL's flew by several dozen meters away. Khryukin literally tore the microphone from the radio operator's hands and ordered:

"'Baykal-one-o-one', this is 'Rubin'. Return to your base immediately!"

The division commander got it good for this self-initiated flight. Just the day before the commander had strictly prohibited the formation commanders from flying combat sorties in the first day of the operation.

General Khryukin was intolerant of even the slightest deviations from his instructions. Moreover he was also nervous that day: The weather prevented massed use of aviation, and the ground troops were able to push forward only a kilometer and a half or two. The weather could be forecast only from the coast. It was precisely from that direction that it approached us. Special airplanes were launched to scout the weather on enemy territory, but quite naturally they could not gather all of the data required for a forecast of any greater length of time. A radio platoon having the mission of intercepting enemy weather data provided tangible assistance under these conditions. In 3 days it intercepted 60 German messages on the actual weather conditions in areas of East Prussia of interest to us.

Personnel of the army meteorological service had recently become so used to acquiring weather information from the radio interceptors that they sometimes went as far as blaming the Germans for the inaccuracy of our own forecasts. Such was the case this time. Summoned by the commander, meteorological service officer Captain F. I. Bogomolov reported that the radio operators were ignorant of the weather over enemy territory, and that without their data there was no way of finding out when it would improve.

"Why no weather summaries?" Khryukin asked me with irritation.

"The Germans are keeping quiet, Comrade Commander. Our operators are standing by all the time. Perhaps the Kraut radio station has been destroyed."

"Find out what's going on and straighten things out right away...."

Now that was an interesting little job he gave me. So he wanted me to find out what's going on and straighten things our for the Germans, is that it? I went to the man in charge of radio interception of German weather summaries, Sergeant Semen Tsirin.

"So what's going on, are they still quiet?" I asked.

"They're still quiet."

"We need their summaries pretty badly."

"I can't just go and ask for them,now can I?" the sergeant smiled. "Maybe if we could transfer their communications chief under your command, things would be different."

"Lay off the jokes, Senya," I interrupted the sergeant. "This is not the time."

The Germans continued to remain silent. Fog kept rolling in from the sea....

On the third day of the operation the infantry finally did manage to gnaw its way through the enemy defenses. Frontal commander Army General I. D. Chernyakhovskiy committed his breakthrough exploitation echelon to action. In the evening of 16 January he visited our command post together with Lieutenant General V. Ye. Makarov, the front's Military Council member. While Chernyakhovskiy and Makarov were examining the aerial situation map General Khryukin composed the following message in a bold hand on a sheet torn from his notebook:

"To all pilots, technicians, and chiefs of the RAB and the BAO, and to all rear services personnel. Congratulations, comrades in arms, on penetrating all of the tactical defenses and invading the vitally important areas of East Prussia. Troops of the front are heroically attacking important centers of the German lair, and they are mercilessly pounding the enemy. By your heroic combat, you, our glorious hawks, are performing a great deed to the glory of our motherland. Hit the retreating enemy, his tanks, motor vehicles, and artillery hard. Forward, to the final defeat of the enemy! Chernyakhovskiy, Makarov, Khryukin."

Reading the message written by the army commander, General Makarov said:

"Good."

"But isn't it a little too early to congratulate them on penetrating all of the tactical defenses?" I. D. Chernyakhovskiy expressed his doubt. "There's no limit to their depth here. We will have to fight them all the way to Konigsberg."

"There can't be a better time, Comrade Commander," Khryukin answered assertively. "A word of congratulations will raise the morale of the airmen."

The frontal commander once again ran his eyes over the text, inserting the following after the word "artillery": "...do not let him dig in on lines further back,"* and then he signed the document.

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* TsAMO, f. 290, op. 201843, d. 18, l. 60-61.

"Transmit it by telegraph," Khryukin ordered me.

While at Shtalluppenin we experienced an extraordinary occurrence. Our observation post was located in the attic in the city's sole four-story building, which for practical purposes was nothing more than a brick box. There was a small bomb shelter in the basement. The attic communicated with it by a small staircase and, of all things, a smooth wooden pole. I became curious about it back on my first day at the observation point, while I was checking the readiness of communications.

"What's the pole for?" I asked the combat engineer who had put it up.

"If the Germans start pounding this place with guns or mortars, Comrade Major, it would be very easy to slip down the pole into the shelter. You'd be there in a flash!"

Now that was a resourceful soldier. Except that it was not due to a German raid that the pole came in handy. Bombers of the 3d Air Army were participating in the operation. Generals I. D. Chernyakhovskiy and T. T. Khryukin were already at the observation point at the time of their approach to the forward edge. I was standing on the staircase leading to the attic. The loudspeaker came alive: " 'Rubin', this is 'Tabun-One-Twenty-Seven', we're heading for target One Eighty-Five. Permission to strike target One Eighty-Five."

Khrukin took the microphone from me and transmitted:

" 'Tabun-One-Twenty-Seven', this is 'Rubin', I can see you. Permission to strike target One Eighty-Five granted." Then he turned to Chernyakhovskiy: "Look, Comrade Commander, the bombers are now assuming their combat course, and we'll soon see them at work."

But what was this? The third group of nine was already dropping its bombs. Judging by their trajectory, the bombswould land right next to our observation point, and they may even make a direct hit! At that moment our half-destroyed building shuddered from the nearby bursts. Khryukin threw the microphone to me.

"Order them to stop the bombing immediately!" he shouted while leading Chernyakhovskiy to the "fire pole." They dropped down to the shelter. The soldier's smart idea did come in handy!

I was bleeding from the ears, and I could no longer hear. Captain S. G. Karaush, battalion commander of the communications regiment, plugged my ears with cotton and bound my head tightly with a bandage. I understood from the radio operator's gestures that the cables leading to the radio sets were damaged, and that communication was cut off.

Karaush ran over to the radio sets to find out whether or not they survived, and to get repairs going on the damaged lines immediately. Fortunately the radio sets had not suffered--they were in well-built shelters. Linemen Talakhadze and Lyubimov repaired the cables in a few minutes. By the time generals Chernyakhovskiy and Khryukin ascended back to the observation point the radio sets were ready to go on.

The memory of being bombed by our colleagues from the 3d Air Army remained with me for my entire life. My hearing never did return to normal.

An investigation of this extraordinary occurrence revealed that the munitions specialists servicing the lead airplane of the third group of nine were at fault. When the navigator opened the bombbay doors as the aircraft approached the target, one of the bombs worked itself loose from its catch. Seeing the bomb dropping from the lead aircraft, the followers also began bombing as required. Immediately realizing what was happening, the navigator of the group of nine ordered the followers to halt their premature bomb drop.

After mobile formations were committed to the breakthrough, control of the attack aircraft was transferred to air force liaison officers traveling with the tank brigades.

Ptitsyn was still in the hospital. How we missed his knowledge, experience, and, above all, his authority! Signalmen, the officers especially, had to carry a double load in these days. They had to provide extremely reliable support to control of aviation, the combat activities of which had become more aggressive, and to hastily prepare for further augmentation of the wire transmission lines and for deployment of communications centers on conquered territory.

Coordination of aviation with the advancing rifle and tank formations required us to constantly update the targets in the region of combat. The commander even issued an order requiring that air groups which could not make contact with their forward air controllers for some reason were to strike alternate targets 15-20 km into the enemy defenses.

And we must give due credit to the guidance officers and the signalmen servicing their radio sets--in the exceptionally complex conditions, when the command posts of the ground armies did not know exactly where our forces were and where the enemy troops were, they invariably helped the pilots to make precise strikes on the enemy.

I would say that aircraft retargeting attained its apogee in East Prussia. Moreover interaction among forward air controllers became more widespread, and the practice of transferring groups of aircraft from one controller to another depending on the particular way the battle was proceeding became more common. I could cite many examples of this. But I will dwell only on one, the most typical.

Three groups of attack aircraft commanded by Kolomoyets, Putilin, and Kastrin were flying toward targets in the vicinity of the population center of Aymenishken. The groups were being controlled by an air force liaison officer with the code name "Altay-1." But suddenly targets of greater importance that had to be annihilated on priority appeared. "Altay-1" immediately transferred control of all three air groups to air controller "Altay-2". Following the latter's instructions, the airmen annihilated six of the enemy's artillery batteries and three antiaircraft batteries, blew up a munitions dump, and killed more than 200 fascists.

On the way back Captain Kolomoyets spotted about 10 German tanks moving toward the front. Receiving his message, "Altay-1" directed a group of Il-2's approaching the forward edge toward the tanks. The German tank reinforcements failed to reach the battlefield. All that remained of them were heaps of twisted metal. Incidentally, owing to incidental reconnaissance obtained by Captain Kolomoyets on another day, forward air controller "Zakat-2" was able to direct an attack aircraft group toward an enemy tank column consisting of 40 vehicles. Our pilots trampled it soundly, concurrently knocking out 2 German antiaircraft batteries. As in all previous battles, Major I. D. Kapustin, the main guidance officer of the 1st Air Army, worked especially proficiently in East Prussia. It later became known that German fighters conducted a special effort against his radio station.

The commander himself often had to intervene in the work of the air liaison officers and the air controllers, providing operational assistance to them. Once the air liaison officer stationed with the 28th Army asked his neighbor, the air liaison officer of the 5th Army, to quickly retarget 2 or 3 groups of attack aircraft into his sector--the enemy was undertaking a strong counterattack. His neighbor replied: "The attack aircraft are flying planned targets. They cannot be retargeted to you."

General T. T. Khryukin heard the entire conversation. He sent a message to the 28th Army:

"I am sending you 2 groups. Guide them in."

In about 15 minutes Il's from the commander's reserve shot over our observation point. Gaining contact with the group leaders, the forward air controller transmitted the location of the moving target to them and spelled out the tactics of the concentrated attack.

"The pilots worked things out between themselves quickly," the army commander stated with satisfaction. "Pass on my gratefulness to them and the radio operators, Major."

Soon General T. T. Khryukin was once again offered an opportunity for extending his personal gratefulness to the signalmen. This time Major A. S. Zvyagintsev and his subordinates managed to guide attack aircraft to their targets with the help of, of all things, fighters. This happened during the battle for the city of Tsinten. Mobile units had wedged themselves deeply into the German defenses there. The guidance radio station fell back

from the tanks. It could not advance on its own--the Germans were patrolling the breakthrough corridor. General Ye. M. Nikolayenko decided to use airplanes of the 240th Fighter Division as forward air controllers. Zvyagintsev was given the job of organizing three-way communication between the VPU, the fighters, and the attack aircraft. Aleksandr Sergeyevich successfully completed this unique mission. Maintaining a standing patrol over the city, the fighters indicated the targets to the approaching groups of Il-2's by radio and by diving at the targets. Being at a higher altitude than the ground-attack aircraft, they could maintain stable communication with the VPU and served in a sense as relay stations, transmitting General Nikolayenko's instructions to the ground-attack aircraft.

The enemy tried many times to disorient the Soviet airmen by radio in East Prussia. He constantly monitored our radio air control networks, and he transmitted misleading commands. When, for example, a group of fighters of the 909th Fighter Regiment under the command of Senior Lieutenant Shevchenko arrived in its designated area, "Granit" (Granite) (the code name of one of our guidance radio stations) called the lead aircraft and transmitted: "You are not on time, go back, do not interfere with the work of the others." The senior lieutenant doubted the authenticity of these orders, and asked "Granit" to state the password. A few seconds went by, but there was no answer. The Germans had been unable to deceive our pilot, and this is why they remained silent. Meanwhile the real "Granit" came on the air. The radio operator heard the German transmission and the forward air controller issued instructions to Shevchenko: "This is 'Granit'. You are ordered to complete your mission. Over."

A couple of days later Major Parshin's air group from the 943d Ground-Attack Air Regiment was approaching the front line. He received confirmation of the designated target from the VPU. Parshin quickly made the final adjustments on his course and guided the airplanes to a place called Brankunen. Immediately a female voice hastily transmitted: "This is 'Altay-Thirty-two'. Brankunen has been captured by our troops. Do not attack Brankunen. Go for target Forty-Eight." The female voice made Parshin suspicious. We did not have female operators at the attack aircraft guidance stations, and all of the pilots knew this. Therefore the lead group immediately asked for the password, and of course it did not receive an answer. It went on with its mission and made a raid on Brankunen. Target No 48, meanwhile, to which the Germans wanted to guide the aircraft, was already occupied by our infantry.

Our army flew more than 20,000 sorties during the East Prussian operation. In some hours there were up to 300 aircraft over the battlefield simultaneously. There were about 34 radio stations at the army command post, at the VPU, and with the forward air controllers within the zone of advance. Moreover another 50 radio sets of varying power were operating at the airfields. Such a tremendous quantity of radio equipment operating practically continuously at the same frequencies necessitated faultless proficiency and the strictest compliance with radio discipline and the rules of radio communication from the flying personnel and the crews of the ground radio stations. It was only owing to this that the Germans were never able to disorient the airmen in their combat activities.

The crews of our radio stations and the forward air controllers always displayed irreproachable combat skills, alertness, and courage. They were constantly within the combat formations of the advancing troops, they often found themselves under enemy fire, but they maintained communication with the airplanes stably and continuously. We suffered few losses in personnel, but by the end of the operation we did not have a single radio set without dents made by bullets or shell fragments.

The situation became especially critical at the command post of Guards Colonel G. A. Chuchev's 6th Guards Bomber Division. During an enemy bombing raid two radio operators were killed immediately and the radio station driver was wounded. The signal officer, Guards Captain I. P. Yevstigneyev, was wounded as well. However, he would not abandon his combat post, he continued to maintain communication with the airplanes, and he additionaly took over the work of the driver, who was sent to the hospital. During a subsequent relocation of the radio station, it found itself right in the path of counterattacking enemy tanks. Chuchev was with Yevstigneyev. While moving, they managed to gain contact with ground-attack aircraft arriving in the area of combat, and they guided them to the tanks. Yevstigneyev's last radio operator died during this time. We immediately sent him a new crew out of our reserve. This crew was also killed in the vicinity of Preysish-Eylau. The radio station was knocked out of action completely.

A third crew with a new radio set was sent from the communications regiment to replace the fallen comrades. The division command post never lost control over the airplanes: Despite a wound, Yevstigneyev managed the communications competently and courageously. Incidentally, Guards Captain Yevstigneyev was wounded three times during the war, which was a rare phenomenon among signal officers. He was a totally fearless individual. He always went wherever the battle was the hottest, disdainful of the danger. He was subsequently fated to survive the same mortar fire that mortally wounded the frontal commander, General I. D. Chernyakhovskiy. Following the war, Ivan Petrovich Yevstigneyev continued to serve in the air force, becoming a major general of aviation.

Control of aviation in the link between the forward air controller and the air group leader was always the touchstone upon which the effectiveness, coordination, and stability of the entire system of combat direction of air army forces were tested in battle. This system was not only hierarchical, but it was also extremely branched. All forms and types of communication equipment played important roles in keeping the system working faultlessly. I had already mentioned that constant attention was devoted in the 1st Air Army to the development and improvement of printing radio-telegraphy. During the East Prussian operation we had a possibilty to extensively maneuver radio sets possessing RST-1 attachments. They were first used at the VPU's of the three ground breakthrough and breakthrough exploitation armies. As the breach was enlarged they were transferred to the radio networks.

After the VPU's no longer needed radio sets with RST-1 attachments, the stations were transferred to those air formations which were having difficulties with wire communication. In February we managed to achieve radio-telegraph communication with the 3d Air Army. In all during the operation,

12,118 radio messages were sent with the RST-1. This included 544,164 groups and 57 hours of direct exchanges.

Army rear organs perfected their independent communications during combat in East Prussia. The army rear had wire transmission lines leading directly to the RAB staffs. These lines and the rear communications center were serviced by a company from the reserve battalion of the Red Army Air Force.

The technical and orginizational talent of Major V. M. Aleksandrov, the deputy chief of communications for the rear, clearly revealed itself in the creation of rear communications. Establishing that frontal specialists were rarely using the surviving transmission lines following the railroads, the major immediately added them to his system. He made skillful use of the high-voltage electric power transmission lines, patching their damaged sections with field cable.

Vasiliy Mikhaylovich competently managed the RAB communications chiefs. The state of communications at airfields and their prompt organization depended in many ways on their activities. I should state that officers were never excited about becoming communications chiefs of aviation base areas, feeling that this would put them apart from real combat; this is why we had to "volunteer" personnel for these posts.

Captains M. A. Borovitskiy, A. I. Antonov, N. K. Korneyev, and A. A. Gorchakov and majors V. I. Taratuta, V. I. Mal'tsev, V. M. Yefremov, A. V. Kostikov, and V. M. Gorodetskiy served at different times as RAB communications chiefs.

All of these officers did a lot of work to see that communications would insure the uninterrupted work of the rear services of the air army, the role of which was growing constantly.

The East Prussian operation was concluded on 1 February. By its design, it should have ended with the annihilation of the enemy's Tilsit-Insterburg *grouping, and attainment* of the Dayma River by our troops. In fact, however, we attained the defensive ring about Konigsberg. In the course of 17 days, Soviet troops marched in battle from Pil'kallen to the Baltic coast in the hard winter conditions.

As in all previous offensive battles, the air force signalmen moved forward as the breakthroughs by rifle and mobile formations were exploited. Construction subunits always augmented the communications to new places of deployment of command posts and staffs in time. Our specialists had acquired good experience in this work. Practice had long persuaded us that it was best to restore permanent lines only when the degree of their damage did not exceed 45-50 percent. Otherwise the labor and time would not justify themselves. It was easier to build new lines, scavenging materials from the damaged ones. We set up our first communications center on German territory in the village of Narpgallen, 3 km northeast of Gumbinnen. We worked here for only 5 days. On the night of 30 January, communications with all 12 air formations and the staffs of the front and Red Army Air Force were transferred to a new center--the town of Vil'kendorf, east of Toppiau.

We encountered completley unforeseen difficulties while building the wire transmission lines. The Germans suspended the wires of local lines from crossarms with insulators spaced 10-15 cm apart. The spacing of our lines, meanwhile, was 20-30 cm. The lines occupied from five to eight crossarms, and they consisted of a large number of wires. Our builders tried to restore only the upper wires. But if this was impossible they used those suspended below, making temporary bridges. This disturbed the uniformity of wire suspension and made operational maintenance of the lines much more complicated. Moreover wires suspended from the German crossarms tended to swing in the wind, causing short circuits here and there.

General Burov published an order requiring us to remove extra wires from the lines, and from now on to use only four insulators on the German eight-point crossarms. This made it possible to increase the distance between wires to 20-30 cm. Interruptions in their work dropped dramatically.

The demarkation lines between the 3d Belorussian and 1st Baltic fronts were changed in the first half of February. Our staff was relocated to Gross-Kelen, and the formations remained at their former places. As a consequence the wire networks consisted of a trunk reaching to Gerdauen, from where its branches fanned out to the divisions. Try as we could, we were not able to hook up more than 40 percent of the correspondents with the main communications center. Captain V. E. Zholi and Lieutenant L. M. Beylin suggested temporarily creating an intermediate communications center in Gerdauen. General I. I. Ptitsyn, who had already returned from the hospital by this time, approved the officers' idea. Thus the air army headquarters now could maintain telegraph communication with all subordinated staffs through an intermediate communications center, and with some of them directly.

The 333d and 37th companies accelerated their work of suspending telephone lines from the staff's new place of deployment to the areas to which the air formations were subsequently to be relocated. Whenever they could, they used wire made from nonferrous metal. This guaranteed high quality and maximum range of operation of telephone communication. The nonferrous metal lines were multiplexed with captured TFB transmitters, making it possible to conduct two or three conversations simultaneously with a single pair of wires. The midpoints of these telephone circuits were used for telegraph communication. The TFB apparatus was a gift to us from Warrant Officer P. P. Zotov, chief of the telegraph station of the 80th Communications Company, II Fighter Corps. He discovered it in a truck abandoned by the Germans in the forest during their retreat from the city.

During the operation, the forces of the 333d and 37th companies restored and suspended 900 km of wire and erected more than 400 km of cable and pole lines. In addition the frontal communications chief furnished us with 700 km of working transmission lines, to include underground cables. I hardly need to comment on these impressive figures. They eloquently attest to the proficiency of the Air Force signalmen and their combat enthusiasm, directed at attaining a total victory over the enemy.

Troops of the 3d Belorussian front, to include the signalmen, were given an honorable mention 10 times in orders of the Supreme High Commander for the successful offensive in East Prussia. The air force's 1st Communications Regiment and the 203d Air Communications Squadron were named Tilsit units after that city.

CHAPTER FOURTEEN

THERE CAN BE NO VICTORY WITHOUT COMMUNICATIONS

Mounting a short stepladder, a Red Army soldier chiseled savagely with a sapper's shovel at the corner of a masonry building that had just been selected to house the headquarters. Several people were crowding about him. "What could they possibly be doing now?" I thought in curiosity, coming closer and listening to their conversation.

"The Krauts sure put this one on tight."

"Yep, I think they intended to have it stay up for at least a century."

"Well we shortened their century for them. The end has come to their 'Thousand-Year Reich'," said the soldier on the ladder as he tossed an enameled board down to the ground. It read: "Herman Goring-Strasse."

So that's what was going on! Our headquarters was on a street named after the "Number-Two Nazi." A coincidence, of course, but a noteworthy coincidence--the headquarters of the Soviet Air Army was deploying on the street named in honor of the leader of the Fascist aerial outlaws, the chief of the Luftwaffe.

This was in the rather ordinary town of Bartenstein. The staff of the 1st Air Army redeployed there on the recommendation of Chief Marshal of Aviation A. A. Novikov. Soviet troops were preparing for the last blows against the enemy's East Prussian grouping. It would have been hard to wish for a better place from which to control aviation than Bartenstein. It was in the center of East Prussia. All buildings, with the exception of the rail station, had survived here, and the wire communication network had not suffered either. We, the signalmen, were also pleased with the new place because the army headquarters and the principal services located themselves in a single large house. Frankly speaking, the command did take a certain risk by making such a decision. But it firmly believed that not a single enemy airplane would be able to surmount the front's air defenses and break through to Bartenstein.

It took about 5 days to organize communications in Bartenstein, the last pla e at which the headquarters of the 1st Air Army based itself during the war. Everything was done thoroughly, without haste. The frontal subunits restored several intercity underground cables, and we were furnished with a large quantity of manpower. The 303d and 37th companies erected aerial transmission lines, suspending about 400 km of wire.

On 13 March the new communications center took over all of the wire and radio communications--with 12 air formations, 4 separate regiments, and 7 RAB's. In addition it cooperated with the 3d Air Army and some formations of the 4th Air Army, which were operating in behalf of the 3d Belorussian Front. Our men and equipment provided full communication to the VPU's of the ground armies.

The organization of air force radio communication did not experience significant changes in Bartenstein. But its capacity was significantly higher. This time, formations of the 1st and 3d air armies were to support the advance of not only the 3d Belorussian but also the 1st Baltic fronts. Therefore we set up common radio operating data for the aerial networks and agreed that whenever airplanes of our army were operating within the zone of the 1st Baltic Front, they would use their radios tuned to the wavelengths of the 3d Air Army. When within the zone of the 3d Belorussian Front, the aircraft of the latter would maintain communications at our frequencies.

On acquainting himself with the plan for organizing communications and on evaluating their possibilities, General T. T. Khryukin decided to control the formations right out of the air army headquarters.

"But we will constantly keep the operational group ready," he declared. "The need for creating forward command posts may also arise."

The commander decided to base two regiments at the same airfield--a ground-attack and a fighter regiment or a fighter and a bomber regiment, and to locate the staffs of their divisions also in the same points. This significantly facilitated organization of coordination between the different branches of aviation. The staffs of these formations and units were serviced by common communications centers. Thus we decreased the number of communication routes and economized on men and equipment. Owing to this, for example, three pairs of RST-1's could support control of six formations.

Our airmen had no luck with the weather in East Prussia. On 13 March the ground armies initiated an offensive southwest of Konigsberg. Moreover the forward airfields thawed out, the sky was shut off by a low cloud ceiling, and fog flowed in from the sea. Only individual "hunter" aircraft took to the air.

But the offensive went on. Our construction subunits began augmenting the wire transmission lines. The Red Army soldiers worked quickly and confidently. We trained our own men to clear mines from the routes. There was a great deal of them, but our "home-grown" combat engineers removed them skillfully.

Company commanders captains A. A. Vorob'yev and M. I. Fen' no longer followed their previous practice of hovering over the work areas, and the platoon commanders no longer climbed the poles. Sergeants became the direct supervisors of all jobs done in both companies. Each warrior knew what he was supposed to do, and most of them were proficient in two or three associated specialties. Naturally I could not get to know all of the signalmen. But I met many of them, and I delighted in observing their work. I recall the following as always being named among the cream of the crop--Matvey Zharov, Mikhail Blinov, Vasiliy Solov'yev, Ivan Skirukha, and Sergey Murashov. Master Sergeant Vasiliy Korytchin and A. I. Gorbunov, a platoon commander in the 37th Company, organized the work efficiently and competently.

I recall bitterly that in those days, in the concluding stage of the war, we lost two valorous and competent soldiers: Junior Lieutenant Lysenko was blown up by a mine, and Private Petr Zaykov died while hanging wires to the command post.

Sometimes we had to resort to line erection methods not foreseen by any of the regulations. Once at the very beginning of the March offensive General T. T. Khryukin ordered us to set up a direct telephone link with the 3d Air Army on priority. The route crossed the Pregel River, which was at its high-water mark at this time. Captain Vorob'yev dropped into thought: How was he going to surmount such a broad expanse? Platoon commander Senior Lieutenant P. I. Solntsev was sent to the place designated for joining the wire transmission lines of the neighboring fronts. He reported:

"Open water is about a hundred meters wide. Ice is moving down the river. The closest crossing is about 10 km away. There are no boats. If we could only get an aircraft out here...."

An aircraft? A brilliant idea! I immediately flew to Solntsev's position aboard a Po-2.

The soldiers and I unwound about 500 meters of field cable. We secured one end firmly to the bank, and to the other end we tied a heavy rock, which we placed in the airplane's rear cockpit. Pilot Fedya Morozov scratched his head thoughtfully, tugged the cable here and there, and said, not very resolutely:

"Well, we can at least try."

I dropped the rock as we flew over the opposite bank. But I had apparently miscalculated: For some reason it dropped not to the ground but onto floating ice. Thus we had to start all over again. The second attempt was successful. Using this cable, we stretched the permanent wires across the river and suspended them from high poles set up on both banks. The telephone line to the 3d Air Army created by our winged linemen went into operation. The commander expressed his gratefulness to Senior Lieutenant P. I. Solntsev for his resourcefulness.

"Solntsev should have been decorated with an order," I noted as I reported our aircraft cable-laying operation to General I. I. Ptitsyn.

"You've got your own problems," Il'ya Ivanovich smiled. You deal with them. General Uspenskiy needs help. Call him up...."

I telephoned. General V. L. Uspenskiy, the army rear services chief, literally attacked me with his first words:

"Tie me in with the forward dump. It's at the railroad station. I need it now, understand?"

"But you've already got radio communication."

"I need a telephone."

"Comrade General, the dump is a little too far away. We would need copper wire to make telephones work over such a distance."

"Copper wire, you say? Our troops captured about a hundred tons of wire at one of the airfields today. You know, it looks sort of yellow?"

"But how am I going to transport it? Our fuel situation is pretty bad."

"I'll give you the fuel as well. I'll give you everything. I'll even carry it myself."

Ptitsyn listened to the conversation, and he shook his head:

"Give the rear services an inch and they'll take a mile. We've established good communications within the rear area, and now he additionally wants operational communication with the dumps and the supply stations. Anyway, fly over and see what sort of wire he's found."

Coils of bimetallic wire with a cross section of 3.5 milimeters lay on a railroad flatcar. Just a quick look told me that this was not less than 100 tons . This meant about 1,800 wire-kilometers. This sort of wire, which is characterized by good conductivity, was used for long-distance lines multiplexed with high-frequency apparatus. Outwardly it resembled copper or bronze wire. In a word, it was exactly what we needed.

General Uspenskiy had the valuable trophy moved to Bartenstein. Two line platoons quickly suspended the wires between the rear headquarters and the forward dump. Engrossed in all of these concerns, I completely forgot that I was a member of the operational group. But Ptitsyn telephoned and reminded me:

"Go to the commander immediately. He's calling for you.... "

"And where have you been all this time?!" Khryukin asked with irritation when I appeared at headquarters. "You're holding things up...."

"Some good trophies have turned up, Comrade Commander. They will be very useful after the war...."

"After the war.... The war is still going on. Go with the operational group to the 28th Army. And make sure that I have communication with it by morning."

In the morning the commander went to his command post in the 28th Army. The communications center that had been created here by this time was already working with all of its planned correspondents. As the weathermen predicted, flying weather set in on 18 March. Our army's aviation and part of the forces of the 3d Air Army concentrated their efforts on a narrow sector of the front. The offensive began to develop more successfully. Corps of the 28th Army reached the shore of the Bay of Frishes-Khaff.

On 25 March General T. T. Khryukin transferred his command post to the sector of the 5th Army, which had broken up enemy defenses on Cape Kol'khgol'ts. A large quantity of guidance radio stations servicing ground-attack aircraft accumulated here. In order that they would not hinder one another's operation, the commander ordered the forward air controllers to transmit only when called by the group leaders; during this time all other controllers that had not been called were to stand by in reception mode. This necessitated not only meticulous planning of the combat sorties but also prompt notification of the forward air controllers by wire communications on the approach of the air groups.

Our commander was not generous with his praise. But during these days, rubbing his hands with satisfaction, he said many times to officers of the operational group:

"Smart lads, our hawks, they're doing good work."

The commander hardly ever parted with the remote control panel of his radio set, personally monitoring the attack aircraft radio control network. He always knew everything that was going on in the air and on the ground, and he maneuvered his forces confidently. Guiding their aircraft from their positions within the infantry combat formations, the forward air controllers transformed the commander's operational directives into concrete strikes by the ground-attack aircraft. And they did this skillfully.

Once Senior Lieutenant Lavrent'yev and Lieutenant Somov, Il-2 group leaders, called the guidance radio station with the code name "Altay-22". The air controller replied immediately and guided them accurately to their targets. Following the commands from the ground, the pilots attacked the enemy 18 times in succession. They used up all of their ammunition, but "Altay-22" would not let them leave the battlefield, ordering them to make a few passes over some structures in which the Germans had dug in with the goal of lowering the enemy's morale. This permitted the tank crews to break into the population center on the move and sieze it without losses. The ground command radioed its thanks to the pilots and the forward air controller, and it reported that during the sortie the attack aircraft had annihilated about 40 moter vehicles and 34 gun positions and suppressed the fire of 25 enemy antitank guns.

"Clouds are completely covering the target and it's raining hard," reported Captain Vasil'yev, the leader of a group of nine Il-2's from the 182d Ground-Attack Division. "Request permission to strike the target. We can hit it by surprise."

General Khryukin took the microphone:

"Permission granted."

The airmen made a massed strike against a highway crowded with the enemy's manpower and equipment. The commander immediately declared his gratefulness to Vasil'yev and his subordinates.

Some "Rayaks" came on the air. This was Major Del'fino and his fighters, providing escort to a group of bombers. They were already approaching their designated target. At that moment the command post of the 303d Fighter Division reported that its radar had detected a large group of German airplanes taking off from the airfield at Pillau. On Del'fino's command some of his "Yaks" turned to meet the enemy and contained them in combat. Meanwhile, the rest regrouped and continued on their escort mission. The bombers completed their mission without interference.

"Smart man, that Del'fino, he did the right thing," the commander said. "The radar operators were also sharp. Thank them for me."

The practice of retargeting fighters, of assigning additional missions to them while in the air on the basis of radar reconnaissance data, became customary. General T. T. Khryukin also decided to use the RUS-2 radar in East Prussia as a means for guiding bombers to ground targets, of all things.

A certain fortress protected by very strong fortifications was a considerable hindrance to the infantry's advance. The low cloud ceiling made a massed bomb strike against it impossible, and strikes by individual airplanes did not produce the desired impact.

"What sort of accuracy can we achieve with radar?" Khryukin asked me.

"If we use radar to guide the airplanes in, we'd get within 3-4 kilometers of the target. With radar, it would be desirable for the group leader to turn his IFF transponder on. This would make the signal coming from the bombers clearer."

We began installing these instruments aboard lead aircraft in late 1944. When operated together with the RUS-2 they emitted high-power coded signals. Using them, radar operators could determine that the airplane they were observing was friendly, and not enemy.

"All right, I'll issue the orders. Let's send a squadron from the 6th Bomber to the fortress," General Khryukin decided. Thinking for a moment, he said to Lieutenant Colonel A. F. Alyunin, an officer of the operational section: "If the pilots fail to see the targets, send them to Konigsberg, and let them dump their load there."

The commander personally explained the mission to the pilots. Alyunin and I drove to the command post of the 303d Fighter Division, where an RUS-2 was located, we briefed its crew, and we tuned the radio set to the wavelength of the bombers. Soon Guards Major G. Zabiyvorota, the commander of the bomber squadron, came on the air:

" 'Rubin', this is 'Dragun (Dragoon) Six-Fifteen', I'm going for target number Forty-Eight-bis. Give me the course."

Observing the display, Alyunin replied:

"This is 'Rubin', I have visual contact. Turn on IFF. You course is Two-Hundred Seventy-Four."

After the transponder was turned on the return from the squadron could be seen well on display. The route led precisely to the target.

" 'Dragun-Six-Fifteen', 10 kilometers to the target. Maintain course," A. F. Alyunin commanded.

The pilots dropped their bombs as they dived over the fortress. R. S. Khabarov, the gunner-radio operator of the lead craft, reported:

" 'Rubin', this is 'Dragun-Six-Fifteen'. Target has been covered. Direct hit. No losses."

A little while later a message arrived at the command post for General T. T. Khryukin that the infantry quickly captured the fortress following the bombing run.

On the following day Lieutenant Colonel A. F. Alyunin and I met the crew of the group leader in order to extract everything we could from our first experience of guiding bombers with an RUS-2 while it was still fresh in our memories. Guards Captain M. A. Lashin, the squadron navigator, declared that although he did receive a message that he was in the vicinity of the target, he was not confident of this, because the ground was not visible. Luckily a small hole opened up in the clouds, and on clearly seeing the fortress, the officer dropped his bombs on it.

"The bombs landed precisely. I could see that well," said Guards Senior Sergeant R. S. Khabarov.

A veteren soldier, he had flown 129 sorties, personally knocked down one enemy airplane, and helped to knock down two in group combat. He received many honorable mentions in the regiment for being one of the best gunner-radio operators. R. S. Khabarov was awarded the Order of the Red Star, Order of the Patriotic War, 2d Degree, the Order of the Red Star, the Order of Glory, 3d Degree, and several medals.

Being at the regiment on that day, I was able to witness a celebration in honor of gunner-operator Guards Master Sergeant K. N. Belyakov, who had just completed his 100th combat sortie. Prior to service he worked as a radio operator aboard the Volga steamships, and after being called up into the army he graduated from the Lebedyan Aerial Gunner-Radio Operator School. Belyakov had been at the front since the first day of the war. He began flying aboard medium bombers, he was knocked down with the crew several times, and once he suffered burns on his arms and legs and spent time in the hospital. On returning to his regiment following recovery from one of the succession of his wounds, Konstantin Nikolayevich learned the ropes aboard the Pe-2, and he was assigned to the regimental commander's airplane. Belyakov fought in the Southwestern and Stalingrad fronts, he participated in the liberation of the Donets Basin, the Crimea, Belorussia, and Lithuania, and he was now participating in the final defeat of fascists in East Prussia. The courageous airman had been awarded three combat orders and many medals.

I learned of all of this from a battle leaflet published in honor of the hero of the day. He himself was in the air at this time, on a combat assignment. The airmen convened at the airfield, awaiting the return of the celebrant.

" 'Rapira (Foil) Twelve', this is 'Dragun-One-Twenty-Five', request permission to land," Guards Master Sergeant Belyakov's voice came through the loudspeaker.

A Pe-2 appeared on the horizon. Circling, it began to approach the landing strip. The aircraft flown by Guards Lieutenant Colonel Paliy, the commander of the regiment, landed last. Belyakov was immediately surrounded by his friends, and before he was even able to remove his parachute they raised him up on their shoulders and began tossing him about recklessly.

The hero's celebration moved to the mess hall, where Belyakov was brought a double vodka and a cake with "100 Sorties" written on it.

Konstantin Nikolayevich Belyakov flew another 29 combat sorties before the war ended. He was mentioned twice in the army newspaper STALINSKIY PILOT, and his picture was published.

When Alyunin and I returned to the command post the commander interrogated us *ad nauseum* about the way the bombers were guided to their targets by radar.

"That was valuable experience," he summarized our story.

But we were unable to develop this experience further at that time--the war was coming to an end. On 29 March our troops finished off the Germans in the northern part of Cape Kol'khgol'ts. Preparations for the capture of Konigsberg were started.

Konigsberg is the ancient outpost of German aggressive aspirations in the east. It was from here that fuedal knights began their predatory campaigns on Russian soil. The city, which was founded in the early Middle Ages, developed throughout its entire history for one purpose only--as a strong military fortress.

We knew from our reconnaissance data that Konigsberg was ringed by three strong defensive zones. The first was 7-8 km from the city, and it contained 15 forts connected together by several trenches. Before them were a deep and wide antitank ditch, reinforced concrete dragons' teeth, minefields, and wire entanglements. The second zone consisted of the outskirts, and the third was the city center. The Germans felt their defenses to be completely impregnable. They called their forts "fortresses within a fortress." And in fact they were highly fortified defensive structures. The thick ancient walls were reinforced by earth fill several meters thick.

The main guns were located in rotating steel and nonmoving reinforced concrete pillboxes. Ammunition was stored in subterranean magazines. Each fort was defended by 400-500 enlisted men and officers.

"Mm, yes, this royal mound is a tough nut to crack," General I. M. Belov uttered thoughtfully as he acquainted the staff officers with the reconnaissance materials.

He told them that the city would be assaulted simultaneously from the northwest and the southeast--from the flanks and the rear. Our commander's command post was to be deployed in Kormitten, a small settlement 14 km from Konigsberg. All engineering preparations had already been made there by the front's manpower. We had to provide communications to three VPU's of the combined-arms armies, in addition to the command post.

Organizing communications with the new command post, we used bronze wire, multiplexing the telephone circuit with TFB apparatus. The line had to be laid around Konigsberg, parallel to the forward edge. As insurance we set up a second circuit following a separate route. A radio set with an RST-1 attachment was deployed at the command post. It operated over the heads of the enemy.

Our army's formations participated in the operation together with the 3d and 18th air armies and the Baltic Fleet's aviation--more than 2,500 airplanes in all. We created a special radio network to maintain coordination among the formations. All forward air controllers possessed radio sets installed in motor vehicles. Foreseeing the probability of street battles, the commander issued orders furnishing them with portable V-100 and STsR-824 radio sets as well.

The raid on Konigsberg began at 1200 hours on 6 April. Prior to this, aviation and artillery had consistently pounded enemy fortifications for 4 days. Assisted by radar and radio guidance stations, the 303d Fighter Division dependably covered the attack aircraft and bombers and supported airplanes of the 18th Army (formerly long-range aviation) during daytime.

Artillery preparation for the assault lasted about 4 hours. As soon as the powerful artillery strike ended, waves of aircraft screamed over our heads. So many airplanes had never operated simultaneously in the 3d Belorussian Front before. Hundreds of radio stations took to the airwaves. Some were calling for others, and others were transmitting instructions. There was no method to the madness at first. But this did not last more than a few minutes. The air force liaison officers turned on their powerful radio sets, and they efficiently and competently distributed the groups of airplanes approaching the battlefield among the different forward air controllers.

The ground-attack aircraft and fighters quickly suppressed the enemy's antiaircraft gunners and struck his airfields. Bombers of the 18th Air Army appeared over the city 20 minutes later. Group after group, just like at the practice range, 515 heavy bombers dropped their deadly loads onto the enemy's fortifications. This went on for 55 minutes, without losses.

In 4 days the pilots flew 14,090 sorties against Konigsberg, dropping 4,410 tons of bombs on the city. Five hundred sixty groups of attack aircraft totaling 4,104 airplanes were guided to their targets by radio. In this case each group made from three to five passes.

The commander maintained contact with the staff, issuing instructions to the formations and air liaison officers mainly by telephone. Use of intermediate and terminal amplifiers insured good audibility. The deputy commanders at the VPU's of the ground armies, meanwhile, had telephone contact only with the headquarters of the 1st Air Army and the closest divisions. This caused trouble. In the morning I was called to the telephone by General T. T. Khryukin:

"I'm at Nikolayenko's location. I can't reach either Chuchev or Khatminskiy* by phone. What happened to your promise that I would have telephone contact with everyone?"

"Comrade Vorob'yev,** the plan did not foresee such communication from Nikolayenko's."

"Hear me right," the general interrupted impatiently, "I must have telephone communication with the bombers."

"We won't be able to do it in less than 4 hours," I reported, "and only on the condition that you remain with Nikolayenko. We can set up a long-distance telephone only at your workplace at the command post."

"I'll agree to that. Go ahead."

*Formation commanders.
**General T. T. Khryukin's pseudonym.

Inapplicable in relation to such a remarkable military leader and fabulous person though such a term might be, we the signalmen did "spoil" our commander. It was now about 3 months that he had not used the telegraph, controlling his formations only by telephone from wherever he happened to be located at the particular time.

I went to Senior Sergeant Sergey Shchebnev, an expert in long-distance communication, and told him about the instructions I received.

"We'll have to move a terminal amplifier to the VPU, and switch the intermediate amplifier from our communication route to the temporary post," the senior sergeant suggested.

"Good," I agreed. "Unhook the commander's amplifier quickly and fly it and yourself to General Nikolayenko, and I'll switch the intermediate amplifier."

In 3 hours the commander was already talking to both air division commanders by telephone. He returned to the command post together with Shchebnev the following day.

"I arrived at the VPU in no time at all," the senior sergeant told me. "The commander was holding a meeting, and the adjutant would not let me into his office. I went ahead and opened the door anyway, and reported my arrival. The general interrupted his meeting and gave me his permission to install the apparatus. General Nikolayenko himself helped me to cut the insulation off the ends of the cable and hook up the power. The link began working right away. The commander talked with the staff of the bomber formation, and then he handed the receiver to some rear admiral. The latter requested a strike against enemy ships and gave instructions on how to approach the targets. I wanted to leave, but the commander ordered me to remain and call his parties up for him."

Our troops maintained their assault on Konigsberg for several days. In the night of 10 April the fascist garrison surrendered.

Three days after Konigsberg was captured the 3d Belorussian Front began mopping up the Zemland grouping of fascist German troops. Preparations for this operation did not elicit special difficulties for the signalmen. The pattern of control and communication remained unchanged. As before, the commander's command post was deployed in Karmitten. The air liaison officers and their operational groups moved to prepared VPU's belonging to the three ground armies.

Owing to efficiently organized radio communication, escort of infantry by ground-attack aircraft attained true perfection--the airmen operated successfully even against point targets. Thus on 13 April a group of airplanes led by Lieutenant Somov annihilated an enemy armored train. On that same day a group of six Il-2's commanded by Guards Captain Polagushin destroyed a German gun position hidden in a small grove. On 18 April fighter pilot

Lieutenant Makogonenko spotted eight enemy warships at the port of Pilau, retarding the advance of infantry units by their fire. On receiving the lieutenant's report by radio, General Khryukin sent several groups of attack aircraft and bombers to the port. The airmen cleared a path for the infantrymen.

Between 13 and 25 April the command post of the 1st Air Army and the VPU's of the ground armies maintained radio communication for 1,451 groups of attack and bomber aircraft. Fighters knocked down 34 German airplanes with the assistance of radar sets and radio guidance stations.

Senior Sergeant I. I. Lunichkin, the chief of the Normandy-Neman regiment's radio station, displayed high proficiency and great endurance during the battle of Zemland Peninsula. The French fighters flew from an airfield located 8 kilometers from the forward edge.

One time a large group of airplanes took off for a mission. Soon the enemy began to shell the airfield with long-range guns. The landing strip was blanketed by craters. Several fighters were annihilated and knocked out of action. One shell exploded beside the regiment's radio station, damaging the antenna.

There was very little time left before the return of the Rayaks. Ivan Lunichkin and electrician V. Fedorov repaired the antenna under enemy fire. Almost immediately after they finshed their work the group leader requested permission to land. The Germans ceased fire. Lunichkin thought: "I'll bet the Krauts noticed the returning airplanes,and that they'll hit the airfield once again as soon as they land." There was not a minute to lose. The airplanes were already beginning to circle. Lunichkin kept cool, and he transmitted:

"Permission to land denied. Go to landing strip in quadrangle Four Hundred Fifty-Eight 'Zh'."

The French responded to the command and landed at a neighboring airfield. Our counterintelligence agents discovered a German gunlayer a couple of kilometers from the Normandy-Neman regiment's airfield, correcting the artillery fire by radio.

The commander of the Normandy-Neman regiment issued an order making special mention of the service rendered by Senior Sergeant I. I. Lunichkin. Here is an excerpt from this document:

"The French Republic, the French Air Force in the USSR, Normandy-Neman Fighter Regiment.

"...Sergeant Lunichkin is a superior radio operator.... During the victorious offensives in which the regiment took part, while serving as chief of the regiments's radio station he competently provided the pilots with dependable communication from the ground.

"This order entitles this individual to wear the Military Battle Cross. USSR, April 1945, Major Del'fino, Commander, Fighter Regiment."

On 25 April the 3d Belorussian Front captured the enemy's last strongpoint on the Zemland Peninsula--the fortress-city and the huge naval base of Pilau.

The sandy Frishes-Nerung Spit extended beyond Pilau. It stretched dozens of kilometers--all the way to Gdansk. The spit was separated from the continent by Frishes-Khaff Bay. The width of the spit reached 10 kilometers. It was to this spit that the survivors of the enemy's defeated troops retreated. The Germans offered stubborn resistance, hoping that they would all be carried away to neutral ports.

We deployed the aviation control post in the vicinity of the village of Fraunberg. Army Chief of Staff General I. M. Belov was placed in charge. Marshal of the Soviet Union A. M. Vasilevskiy, the front commander, would not permit General T. T. Khryukin to go to the VPU. Incidentally Timofey Timofeyevich had just been awarded a second Hero of the Soviet Union title.

The observation post was moved to the outskirts of the settlement, in a park, from which there was a good view of the bay and the spit. The observation post had the same communication resources possessed by the VPU, as well as remote transceiving apparatus connected to radio stations intended to control aviation above the battlefield.

It was fabulous spring weather. There was not a cloud in the sky. Graceful birches were beginning to put out leaves. They reminded me of May 'Forty-One. We were just a step from war at that time, and now we were at the last step to victory. My heart pounded with joy. The years flashed by as if in a kaleidescope--all of the failures and joys, and the adversities and victories.

My recollections were interrupted by the quickly approaching roar of aircraft engines. Airplanes with red stars rushed towards the enemy fortifications.

The bombers and attack aircraft hit their targets throughout all of the light part of the day, almost unceasingly. Aviation was operating over Frishes-Nerung Spit at maximum intensity.

Because the zone of advance was so narrow the fighters were guided to their targets by just one radio station in the center of the infantry battle formations. A radio guidance station was also possessed by the layer of the artillery group, though it was located not far from the VPU, on the continent, and it entered into communication with the airplanes only as needed. This significantly facilitated communication and control of the air groups.

On 2 May we got the news that Soviet troops had taken the fascist den--Berlin. People hugged each other, kissed each other, and cried from joy.

"There's a time for triumph and a time for war," General I. M. Belov interrupted the revelry of the officers.

The Germans were still resisting savagely within our sector. In the evening we heard the radio set run by forward air controller Captain Gromov go out. This was a bad time for it to do so, because aviation was to intensify its activities within this sector on the following day.

I never left the radio station for even a minute. We finally managed to hear Captain Gromov's code name very weakly over the crackle of the interference. The chief of his radio set, Master Sergeant Lev Kornilov, reported:

"I'm working with a borrowed low-power set. My dynamo broke down. There's no fuel. I'm in quadrangle Six Hundred Seventy-Five 'A'. Request instructions...."

Bending over the map, General Belov told us that Gromov was on the shore of the bay opposite us; it was 7-8 km to his position as the crow flies, and the trip via Konigsberg would be more than 150 km long; moreover the bay would have to be crossed as well.

"What is your opinion, Lieutenant Colonel?" the general asked me.

"We could ferry the dynamo and gasoline over aboard a U-2 or in a boat."

"I don't care what you use, but make sure you get it there."

Senior Lieutenant I. K. Bordashev, the commander of the communications company, doubted as to whether the U-2 would be able to land: There were forests, brush, and dunes all about.

"The chances would be better with a boat," he advised.

He decided to take the boat across the bay himself. Tanks of gasoline and a power block for the radio set were loaded in the boat. It was a windless day. The sea was calm. The officer pushed off together with two soldiers.

By my estimate they should have crossed to the opposite shore within 2 hours. But a fresh breeze came up unexpectedly, and the boat began to drift in the direction of the enemy. The Red Army soldiers put their full weight on the oars while the officer rowed on the left side to compensate for drifting, and from time to time he bailed water from the boat. But they were still pushed farther and farther off course toward the enemy position. General I. M. Belov, who had been observing the crossing silently with binoculars, hurled an angry accusation at me:

"You sent them to a sure death!"

There was nothing we could do to help them. With my heart sinking, I watched the boat with a stereoscopic telescope. Suddenly the water around them was churned by explosions. This meant that they had managed to reach their own lines; otherwise the Germans would not have started firing at the boat. But what if they're hit? After all, just one shell would be enough....

I lowered myself to the ground and lit up a smoke. After 10-15 agonizing minutes meteorologist F. I. Bogomolov, who was spelling me on the stereoscopic telescope, suddenly exclaimed:

"They're getting out of the boat!"

Everyone on shore sighed with relief. But we did not know yet whether or not everyone in the boat was alright. We kept our radio set in reception mode, and we periodically called Lev Kornilov. After 3 more hours he finally replied:

"'Rubin', this is 'Baykal'. The cargo has arrived."

General I. M. Belov immediately gave orders to present the "For Valor" Medal to Lieutenant N. K. Bordashev and his soldiers.

The forward air controller on Frishes-Nerung Spit had to work very intensively. General Belov issued orders to send Captain Gromov a reserve vehicle-mounted radio station. I reported these instructions to General I. I. Ptitsyn by telephone. He sent the radio station off with Master Sergeant I. F. Kozlov, who had worked prior to this time with the chief forward air controller of the 1st Air Army, Major I. K. Kapustin, and was now in the vicinity of Konigsberg.

On the way, Kozlov joined a long motor column, and together with it he fell under intense enemy bombing. Everyone lunged for the roadside ditches and hugged the ground. A bomb exploded a few meters from the vehicle. The shock wave overturned it, and the crew was showered with dirt. The driver, Private Pyzhenko, was the first to come to. He dug Kozlov out. With the help of the infantrymen the airmen righted the vehicle.

The radio station crew crossed to the spit aboard a barge, and by the evening of 7 May it reached Gromov's position. But the radio operator never went to work. Kozlov and Pyzhenko became witnesses of the final act of the events occurring on Frishes-Nerung Spit. They watched our truce envoys carrying an ultimatum and the surrender conditions to the Germans, and the Germans flocking out of their trenches and pillboxes, dropping their weapons in a pile.

Military actions on Frishes-Nerung Spit ended on 8 May 1945, and at dawn on 9 May hundreds of guns thundered a salute and thousands of machine guns, rifles, automatic rifles, and pistols chattered in response. The frontline heroes were saluting the historic victory of the Soviet people over Nazi Germany, and the victorious conclusion of the Great Patriotic War.

The officers of our command post also discharged their clips in the air. Then General I. M. Belov ordered us to pack up our last auxiliary control points. The target maps, the communications diagrams, and the code name and password tables were folded up carefully. I wrote on my working map: "The last combat radio exchange with airplanes occurred on 8 May 1945 at 1859 hours. The code name of the leader was 'Flamya (Flame) 102'. The end of the war. Hurray!"

We were ordered to remain at the VPU until special instructions were issued. Disarmament of the German troops and reception of the prisoners of war continued on the spit. The command did not exclude the possibility that certain groupings of fascists might resume their resistance. Moreover enemy warships that had not yet hoisted white flags were still out at sea.

Flights of attack aircraft and fighters remained on alert at the airfield, ready to take off and enter into combat at the first signal. The command post crew unpacked its maps, placed its tables and code names on the work bench, and performed its last combat watch for 2 days.

Nor were officers of the operational group able to attend the triumphant banquet organized on 10 May by the army command in honor of the victory. I learned from my comrades how the banquet went.

All formation and separate air unit commanders, their deputies for political affairs, officers of the army staff and rear, representatives from the command of the 3d Belorussian Front, and distinguished signalmen of the army regiment attended the banquet. Our young girls prettied themselves up with beautiful dresses and high-heeled shoes.

General T. T. Khryukin made the first toast in honor of the State Defense Committee headed by Marshal of the Soviet Union I. V. Stalin, to the glorious Leninist party, and to the great victorious Soviet people. Noting that during the war the motherland had saluted airmen of the 1st Air Army 19 times, the commander warmly congratulated the pilots, navigators, engineers, technicians, staff and rear officers, and signalmen on the victory.

"Our communications worked well, and no one let us down in all of the operations conducted by the army," Timofey Timofeyevich continued. "Honor and glory to the hard-working signalmen!"

Finishing his speech, he approached I. I. Ptitsyn, embraced him, and through him heartfully congratulated all of the army's signalmen for their combat work.

The triumphant evening culminated with a major amateur concert put on by the communications regiment, during which they played a song composed in the regiment, simple but dear to us:

The steel wire networks
Carry orders to the troops,
And the divisions go to battle.
There can be no victory without communications!

The war in Europe drew to a close. It was still blazing in the Far East and the Pacific. Japanese militarists were holding their largest force of assault troops--the Kwantung Army--at our borders. In this situation the Soviet Union could not assume its security to be guaranteed. Faithful to its duty to the Allies, following the defeat of Nazi Germany it began transferring combat formations from the west to the east. Many air formations, Captain Smetankin's high command reserve communications battalion, and Captain Fen"s 37th Line-Construction Company dropped out of the composition of the 1st Air Army. Many of our generals and officers were also transferred to the Far East.

"The time has come for us to part as well," General Il'ya Ivanovich Ptitsyn said once. "They are calling me back to Moscow...."

It was sad to part. I had served under Il'ya Ivanovich for so many years, I was with him in the war from its first day to the last, and together with him I experienced so many agonies and joys.... What we were losing was a wise chief and a close friend, a concerned teacher who had nurtured many air force communications executives--generals D. N. Morosov and N. D. Ignatov, colonels K. G. Denisenko, Ye. K. Chuvashin, L. M. Parnas, K. F. Prokof'yev, and V. Ye. Dudashvili, and many others. About twenty of his subordinates subsequently became chiefs of military districts, air force communications, and searchlight services.

I took Ilya Ivanovich's place in the 1st Air Army. He, meanwhile, was appointed air force communications chief for the main command of Soviet troops in the Far East.

The war documents of the Great Patriotic War are carefully preserved in Podol'sk, in the USSR Ministry of Defense Central Archives. I used them extensively while working on this book. These meticulously catalogued documents, carefully bound into thick files, already yellowed by time, did so much to refresh my memory. The accounts and summaries and the briefings and reports scrupulously documented the history of the development of communications in the air force during the successive stages of the war, all of the titanic work done by signalmen with blue patches in savage encounters with the enemy.

Let me sight just some of the data.

In the last year of the war the average daily volume of correspondence at the communications center of the 1st Air Army was: From 3,000 to 4,300 telegrams having a total volume of up to 150,000 word-groups, 8.3 hours of direct telephone conversations, and from 240 to 420 radio messages with a total volume of 15,000 groups; 1 hour 32 minutes of radio exchanges and 200 telegrams sent by printing radio-telegraphy; 1.5 hours of conversations

with the RST-1. Liaison aircraft clocked 60 hours of flying time in a day, delivering up to 2,000 pieces of mail. The long-distance telephone station made up to 1,000 connections of parties per day.

These figures show that wire communication carried the bulk of the information exchange. Radio contributed not more than 8-9 percent of the load. This, as the war experience persuades us, was quite natural. Radio communication was put to use in aviation mainly when wire transmission lines were put out of action on certain communication routes, or when they were absent altogether. During preparations for an operation, meanwhile, use of radio at the forming-up place was generally prohibited. And yet it was the uncontested sovereign in relation to controlling air groups over the battlefields, guiding aircraft to their targets, and retargeting them. In these cases all other resources were helpless.

During the war our soldiers set up 50 army wire communication centers and 50 radio centers, and they restored, built, and laid over 40,000 kilometers of permanent wire transmission lines and more than 10,000 kilometers of cable-and-pole lines.

Compare and see, they always say. Like all the rest, I cannot help but make comparisons either. They simply astound the imagination.

In July 1941 the Western Front's air force headquarters at Mogilev possessed a wire telegraph network with a total length of about 1,000 wire-kilometers (without counting the wire transmission lines leading to Red Army Air Force headquarters). We did not possess high-frequency telephones at that time. The rear did not have its own communications system, and it made use of the general staff system. The radio communications center operated with three radio-telegraph networks. They were serviced by two radio sets and four receivers. Bombers were the only aircraft possessing onboard radio sets. We had only one communications center--there were no standby or auxiliary centers....

In 1945 in Bartenshtayn, the total length of our wire communications system was 6,700 wire-kilometers, to include about 700 kilometers of underground cable. The commander, the staff, and the rear enjoyed around-the-clock telephone communication with all subordinated formations and units, and with the VPU's of the ground armies. The army headquarters and all air liaison officers employed government high-frequency telephone communication. The radio center serviced 24 networks, to include five aerial networks, printing radio-telegraphy was used on three radio communication routes, microphone-serviced command radio networks were used extensively, and 12 high and medium power transmitters and 29 receivers operated at the communications center. More than 150 radio sets were constantly operating in the army troops. Four RUS-2 stations maintained constant observation of the airspace. The staff possessed a main, a standby, and auxiliary communications centers. They were present at all VPU's of the major ground combined-arms formations. We had two communications squadrons containing 12-15 aircraft each, with which we interacted closely with field post offices. In the 2 last years of the war they delivered and received 90 tons of mail, thousands of valuable letters and money orders, and about 10,000 messages.

The swift growth in availability of equipment corresponded to growth of our strength. In 1945 army communications were serviced by a regiment, a high command reserve battalion, a rear communications company, a separate VNOS radio guidance company, a telegraph-construction and a line-construction company, army communications workshops, a field post office, and two communications squadrons. In July 1941 we had nothing of this sort....

Three decades have passed since the war. The fates of the signalmen of the 1st Air Army have varied. Most are now involved in peaceful labor. Many have retired. Some comrades are still serving in the armed forces. But friendships made at the front are still strong today. We constantly correspond with one another, and on occasion we meet. One such reunion was held in a unit created within our army during the war. More than 100 veterans convened for it. The young defenders of the fatherland received us triumphantly and joyfully. They told the frontliners about their service and training, they showed them their combat equipment, and they demonstrated how it worked.

"Air force communications have been transferred to dependable, competent hands," Lieutenant Colonel (Reserve) A. M. Yegorychev said with satisfaction as he observed the precise actions of the crew of a high-power radio station.

Frontliners related their recollections of the war, and they founded, within the unit's territory, Veteran's Park--a symbol of continuity in the combat traditions of air force signalmen. Major (Reserve) G. I. Gitel' brought three young firs from suburban Moscow and planted them at the entrance to the headquaters.

"They grew up on soil flooded with the blood of the capital's defenders," he told the officers that were helping him. "Care for them well. Let them forever remind you of the selflessness of our senior comrades in arms, the participants of the Great Patriotic War."

The years pass. The park is growing, and our fir trees are growing. And the friendship between the veterans and the young military signalmen is growing and strengthening. Faithful to their military duty, our successors are untiringly raising their combat proficiency, and they are ready to defend the sacred borders of the Soviet motherland instantly.

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END