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# CUBA 1962:
# Khrushchev's Miscalculated Risk

CIA/ORR
DD/I Staff Study

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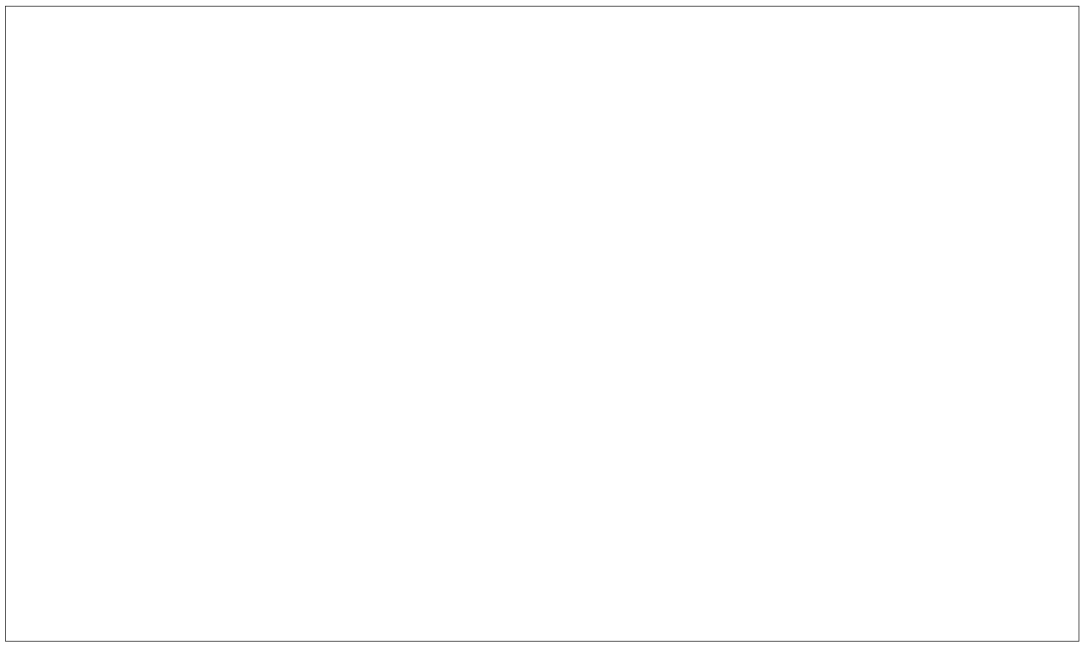

## FOREWORD

This staff study of the Office of the Deputy Director (Intelligence) (DD/I) was prepared by the Office of Research and Reports. Its purpose is to review the evidence concerning the nature, scope, and timing of the Soviet military buildup in Cuba in 1962 and to discuss the implications of that evidence.

The study is divided into two parts. Part One contains a comprehensive review of the evidence, which is presented in considerable detail in order to provide as complete and factual a reconstruction of the buildup as possible. However, if the reader does not choose to read the detailed assessment of the evidence and is willing to accept the facts and judgments derived therefrom, he may proceed to Part Two, in which the Soviet program as a whole is examined and in which conclusions are drawn from the entire body of evidence as to the Soviet concept of the buildup, the timing of the decision to embark on the venture, and the probable Soviet policy considerations and objectives that shaped the decision.

The conclusions drawn in the study regarding the implications of the manner in which the Cuban missile base venture was carried out cannot be proved absolutely. It was judged, however, that the major features of the Cuban venture were the result of deliberate, rational Soviet decisions that took into account the detailed knowledge of US reconnaissance capabilities acquired by the USSR in May 1960. It is believed, therefore, that the conclusions represent the most likely interpretation in view of the totality and interrelationship of the evidence available more than a year after the crisis.

Because the quality of the evidence ranges from conclusive to ambiguous, an effort has been made throughout the study to indicate clearly the degree of certainty surrounding the information and the judgments based on it. The time period covered begins in early 1960 and ends in November 1962 with the withdrawal of Soviet offensive weapons from Cuba. The review of evidence in Part One discusses Soviet military and economic relations with Castro's Cuba before 1962, recounts general evidence of the activity related to the buildup as a whole, sets forth on a

mission basis the details of the deployment of Soviet military forces in Cuba, and concludes with a summary of the withdrawal of offensive weapons.

Valuable assistance was provided in the preparation of the study by the Office of Scientific Intelligence, the Office of Current Intelligence, and the National Photographic Interpretation Center. The reader is directed to a complementary paper prepared by the DD/I Research Staff entitled The Soviet Missile Base Venture in Cuba. Although that study also discusses Soviet objectives, the timing of the decision, the Soviet estimate of risk, the course of the buildup, and the reasons for retreat, it is focused differently. Whereas this study collates and studies the hard facts of the buildup, drawing its principal conclusions therefrom, the Research Staff study examines the buildup within the broader context of a survey of Soviet foreign policy, placing primary emphasis on political factors, and considers the probable reasons why the USSR estimated that the Cuban venture would involve only a low degree of risk. In those areas where the studies overlap, they reach similar conclusions. Where the studies do not overlap, one study provides additional background for the reader of the other.

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## Summary and Conclusions

During the period from the end of July through October 1962 the USSR delivered to Cuba and deployed large quantities of weapons, equipment, and personnel representing a broad spectrum of Soviet military strength. These forces, which comprised a complete air defense system, naval and ground defense units, and two strategic missile systems, were equipped with some of the most advanced weapons available to the USSR. Although some of these forces were combat-ready during the critical week in October before Khrushchev announced the Soviet decision to draw back from direct military confrontation with the US, the original Soviet timetable apparently did not call for the completion of many of the major elements of the military establishment in Cuba, including the air defense system and medium-range ballistic missile (MRBM) units, until some time during the first half of November. The concept and execution of the venture clearly indicate that the Soviet authorities made no appreciable effort to prevent or delay US detection by aerial reconnaissance of the offensive weapons during the deployment phase. It is believed that the most likely explanation is that they judged the risk of a US military reaction to be very slight.

The chain of events that culminated in the Cuban crisis of October 1962 can be traced back to the visit of Soviet First Deputy Premier Mikoyan to Cuba in February 1960. This visit constituted the first public endorsement of the Cuban revolution, after a year of Soviet reserve following Castro's seizure of power and Soviet diplomatic recognition of the regime. It was followed by a series of economic assistance agreements and, in the third quarter of 1960, the first Soviet deliveries of land armaments. Soviet military aid to Cuba thereafter proceeded cautiously and deliberately, particularly when compared with assistance to other countries, as though the Soviet leaders were carefully testing both US reactions and their relations with the Castro regime. Deliveries of fighter aircraft to Cuba,

probably planned before the Bay of Pigs invasion, were not made until about June 1961. Following the Bay of Pigs episode, there was a period of assimilation and assessment, after which arms shipments, including the first naval vessels, were resumed. By late 1961 or early 1962 the decision may have been made to provide obsolescent Il-28 (Beagle) jet light bombers, but the Soviet authorities continued through mid-1962 to withhold from Cuba more advanced weapons that were already being supplied to other countries and limited their deliveries to weapons intended for defensive purposes, including the maintenance of internal order.

Although there is now available some evidence of a limited influx of Soviet personnel and increased activity in Cuba in the first half of 1962, probably foreshadowing subsequent manifestations of the drastic change in Soviet policy toward Cuba, the actual deployment of Soviet military forces to the Caribbean did not begin until the end of July. As it was unfolded over the next 3 months, the Soviet program for the establishment of a military base in Cuba was characterized by a high degree of concurrency in deploying and bringing to operational status both the major offensive and the major defensive systems. The Soviet concept of the venture obviously did not envision the initial establishment of an island defense in order to test US reaction and screen the subsequent introduction of strategic missile forces.

Although increasingly advanced Soviet radars were added to those existing in Cuba before the buildup, although more than 60 early model MIG fighters and adequate communications facilities were already available, and although SA-2 surface-to-air missile (SAM) units were emplaced in western Cuba during August and in eastern Cuba during September, an integrated, centrally directed air defense system was not brought into operation in Cuba until 27 October, the day before the Soviet decision to withdraw offensive missiles was announced. Moreover, the fact that this system expanded steadily for some time thereafter indicates that its activation at that time probably was earlier than planned. Command and control communications links between the USSR and Cuba had been activated only a few days earlier, also prematurely and in apparent response to US actions following detection of the strategic missile sites. Meanwhile, however, construction and preparation of the MRBM and intermediate-range ballistic missile (IRBM) sites had been underway since early September, and the missiles and unique system equipment were delivered to MRBM sites

from about mid-September through mid-October. Thus the SAM units and other air defense elements were not planned to become operational as a system for at least a month and a half after the presence of MRBM's in Cuba rendered Soviet intentions subject to detection. In addition, the geographical pattern of SAM deployment indicates that maximum protection of the strategic missile sites was not the governing consideration. The SAM deployment pattern was planned to provide an islandwide area defense, affording no greater protection to the strategic missile sites and other military installations than to all other locations on the island.

The precise degree of combat readiness of the 24 MRBM launch positions in Cuba at the time of the crisis cannot be determined from available evidence, even in retrospect. The principal uncertainty concerns the presence or absence of nuclear warheads; the evidence on this aspect of the buildup is so ambiguous and inconclusive that it is not possible to reach a judgment based on factual information. It is clear, however, that the Soviet program for the MRBM units was not complete by the time of the crisis. These units were originally deployed in a field mode, following which work was begun on the preparation of more permanent facilities. This work was not completed at any of the sites by the time dismantling began but probably would have been completed by about mid-November. Similarly, some of the sites may not have been fully equipped when the crisis occurred. If nuclear warheads were available, these shortcomings probably would not have prevented the launching of some missiles from all six sites during the critical week in October but might have affected significantly the time required to launch a salvo, as well as its effectiveness. On balance it remains uncertain whether the Soviet leaders could have considered the Cuban MRBM units sufficiently combat-ready to participate in a coordinated nuclear attack on the US at any time during the crisis.

With respect to the IRBM sites, which required far more extensive preparation, there is conclusive evidence that construction had not been completed by the end of October, nor had the missiles and most system equipment arrived at the sites. The missiles were almost certainly en route to Cuba when the US quarantine was imposed. Although proceeding at a rapid pace, construction of all three IRBM sites that were underway in October would not have been completed until about mid-December; if a fourth IRBM site was planned, as seems possible, it could not have been operational before some time in January 1963.

The 42 Il-28 jet light bombers and trainers delivered to Cuba beginning in late September were almost certainly not considered by the Soviet planners as an integral part of their offensive capability in Cuba but apparently were intended for the Cuban forces from the outset.

Moreover, at the rate at which they were being assembled after their delivery, they would not have been fully operational until at least March 1963, thus being distinctly out of phase with the timing of the offensive missile systems.

Although the Soviet authorities were fully aware of US photoreconnaissance capabilities by May 1960 and may have been aware of US overflights of Cuba by mid-1962, they made no effort in planning and executing the Cuban venture to reduce the risks of detection by US reconnaissance. This is evidenced not only by their concurrent deployment of offensive and defensive systems but also by their failure to camouflage or conceal unique MRBM system equipment, particularly the missiles themselves, before the crisis. The measures taken after the crisis began probably were a reaction to the initiation of low-altitude reconnaissance. Furthermore, there was no apparent effort to minimize the length of time during which some MRBM units were detectable before all of the MRBM units were emplaced, equipped, and combat-ready. Hence there would have been a period of about 2 months between the arrival in about mid-September of the first MRBM's and the estimated completion in mid-November of the full MRBM deployment program.

The conclusion seems inescapable that the Soviet leaders in their planning did not regard the possibility of US detection as critical to the success or failure of the Cuban venture. Unless the Soviet authorities were convinced that no measures could be taken to delay or prevent US detection, as seems unlikely, they must have chosen to disregard US reconnaissance capabilities. Thus they probably judged with considerable assurance that the US would acquiesce in the deployment of strategic missiles in Cuba or at least would not attempt to force their removal by reacting militarily. In any event, at some point in the process the Soviet leaders reached the conclusion that the advantages to be gained from the installation of Soviet nuclear striking power within 100 miles of US soil outweighed whatever risks they estimated were

involved. Moreover, in spite of some signs of Soviet concern, the deployment of strategic missiles proceeded unscreened by an activated SAM system even after President Kennedy's statements of 4 and 13 September implied that the US possessed photographic evidence of the buildup to that time and explicitly warned the USSR of the grave consequences if the US detected offensive weapons in Cuba.

Although it is not possible to trace the evolution of the Cuban plan or the specific decisions involved, the venture may have been conceived late in 1961 or at the beginning of 1962, when Khrushchev apparently was seeking some military means of rapidly and significantly improving the USSR's bargaining position in the German negotiations. There is some evidence that planning and initial preparations occurred in the USSR and Cuba during the first quarter of 1962. It is unlikely, however, that the final commitment was made until April or May, probably after Moscow had assessed and acquiesced in Castro's assertion of authority over the Cuban Communist movement in late March and early April.

One element in the Soviet miscalculation of the risks may have been the Soviet view of the role and significance of foreign military bases. Having lived restively under the shadow of US strategic bases for more than a decade, the Soviet leaders probably have come to regard them, particularly in the age of the ICBM, as a disquieting but not major phenomenon of great power relations. Castro's Cuba presented Khrushchev with his first opportunity to establish an overseas military base. He may have felt confident that the US would understand the rules as he did -- that military bases on the opponent's periphery are facts of great power life which fall far short of a provocation to war. Although such a view may have been a factor in the miscalculation of the Soviet leaders, their over-all judgment of the risks in Cuba must have been based on a much broader assessment of Soviet-US relations.

Khrushchev probably had a greater objective in sight than simply the establishment of a military base in the Western Hemisphere. In deciding to deploy offensive missiles in Cuba, the Soviet leaders probably were seeking primarily to reduce the strategic imbalance against the USSR, calculating that the success of the venture would improve sharply the Soviet bargaining position in world affairs and also be advantageous in a host of other ways. While the Cuban missile bases

would have increased Soviet missile strike capabilities against the US by more than 50 percent at the end of 1962, the Soviet leaders must have realized that their relative power gain would have been highly transitory in view of US ICBM and Polaris programs. It is possible, therefore, that had the Cuban venture been successful, it would have been followed shortly by some further Soviet initiative to achieve a dramatic victory elsewhere for a long-standing policy objective, such as Berlin, which also could alter the long-term "world relation of forces."

As it turned out, Khrushchev was faced with a direct military confrontation at a point where the US was able to concentrate overwhelming conventional military force, backed up by a clear strategic nuclear superiority. This unexpected and probably shocking turn of events left him with only one feasible course of action: to insure that the Cuban crisis did not escalate; to test the US resolve; and, if it were found firm, to remove the strategic missiles as hastily as possible while attempting to salvage as much of the remainder of the venture as possible. This appears to be precisely what occurred in the several weeks leading up to Khrushchev's announcement on 20 November of his decision to remove the Il-28's, which enabled both parties to allow the Cuban crisis to recede slowly and uneasily into history.

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## PART ONE: THE EVIDENCE

The evidence presented in this study was developed by examining information compiled on an all-source basis that related to the deployment of Soviet forces in Cuba. The major part of the evidence consists of aerial photography of Cuba obtained by overhead and peripheral reconnaissance and by surface photography of Soviet shipping en route to Cuba. Within the limits of coverage and the art of photographic interpretation, such evidence is regarded as conclusive. It was particularly valuable in establishing the validity of information from other sources.

Although information obtained from agents, refugees, and diplomats appeared initially to constitute a major source of evidence,* it was frequently proved to be unreliable. As a result, in almost all cases it could not be evaluated with confidence unless information was available from other types of sources against which it could be checked. For example, more than 200 reports contain references to the presence in Cuba of missiles before January 1962. Numerous reports also contain references to construction activity and equipment observed during the spring of 1962 in areas where SAM sites were located later. However, photography of these areas obtained during or after the reported period of observation failed to reveal any such activity or equipment. Reports originating from diplomatic sources in Cuba were relatively sparse before the crisis; thus they did not contribute significantly to the body of evidence used in this study, the time span of which ends with the withdrawal of offensive weapons. Nevertheless, in spite of these limitations, the vast body of collateral reporting provided some unique and valuable information that could not otherwise have been obtained.

* Referred to in this study as collateral information.

## I. Soviet Military and Economic Relations with Castro's Cuba Before Mid-1962

Before the creation of their military establishment in Cuba in the latter half of 1962, the Soviet leaders extended military aid to Castro cautiously and gradually, remaining well within the limits set by the precedent of their aid to other countries in the Near East, Asia, and Africa. The USSR did not give Castro some of the more modern weapons, such as the SA-2 system, which it contracted to supply to Indonesia, Iraq, and Egypt during this period, nor was there anything exceptional about the quantity of material or the terms under which it was supplied. Although the Bloc had come to account for about 80 percent of Cuban foreign trade by mid-1962 and although there was a steady rise in the amount of credit available to Cuba for economic development, there was no comparable pattern of growth in military shipments. Even in retrospect the military assistance provided by the USSR and other members of the Bloc from mid-1960 to early 1962 does not contain indications of any objective beyond improving the ability of the Castro regime to defend itself from an invasion or internal uprising.

Soviet military assistance to Castro, when compared with that provided to other revolutionary governments (for example, the regime of Qasim in Iraq), indicates that the Soviet leaders initially were somewhat reluctant to extend similar aid to Cuba. The first Soviet-Cuban military assistance agreement was reached some time between Mikoyan's visit to Cuba in February 1960 and Raul Castro's return visit to the USSR in the summer of 1960, or some 12 to 18 months after Castro had seized power. By contrast the Soviet agreement on aid to Iraq was concluded 4 months after the revolution that put Qasim in power. Whereas MIG aircraft and frequently naval vessels had been among the first items delivered to other recipients, Castro did not receive aircraft until the second quarter of 1961, and the first naval vessels did not arrive until January 1962. As far as can be determined, the equipment delivered before mid-1962 was limited to items useful primarily for defensive purposes. Furthermore, the equipment was composed of the more obsolescent items in the Bloc inventory. The total value of the arms supplied to Cuba before mid-1962 is estimated at roughly $100 million, which probably ranked Cuba below only Indonesia, Iraq, and Egypt as a major recipient of Soviet military aid.

A. Military Aid

As Cuba's efforts to purchase military goods in the West became increasingly difficult in 1959 and early 1960, the Cubans began to make military contacts with Bloc countries, mainly Czechoslovakia. Mikoyan's visit to Cuba in February 1960, when the USSR finally abandoned its reserved attitude toward the Cuban revolution and publicly endorsed the Castro regime, appears to have been an important milestone in the developing relationship. Mikoyan was followed in June 1960 by General M. A. Sergeychik, Deputy Chief of the Engineering Directorate of the State Committee for Foreign Economic Relations, which has been associated with other typical Soviet arms agreements with underdeveloped countries. When Raul Castro visited the USSR in the summer of 1960, the first shipments of Soviet arms probably were being readied. There is no information available, however, on the details of the arms agreement or even the approximate date on which it was signed.

Although photography of Cuban militia carrying Czechoslovak rifles suggests that a shipment of small arms may have arrived in July or August 1960, the first major shipment of Bloc arms to Cuba arrived on 8 September 1960 aboard the Soviet freighter Ilya Mechnikov. The cargo reportedly included T-34 tanks, antiaircraft artillery, machineguns, ammunition, electronic equipment, and other military materiel. Some Mi-1 (Hare) and/or Mi-4 (Hound) helicopters were delivered later in September 1960, and collateral sources reported the delivery of more than 8,000 metric tons of equipment by three Soviet ships in October 1960.

By mid-April 1961, at least 14 Soviet ships had delivered to Cuba equipment and supplies, almost exclusively land armaments, estimated at 40,000 metric tons.

What effect, if any, the Bay of Pigs invasion in April 1961 had on Soviet arms shipments is conjectural. The first of a total of more than 60 MIG-15 (Fagot), MIG-17 (Fresco), and MIG-19 (Farmer) aircraft apparently arrived at the end of May, and all the aircraft were delivered by mid-June. Although it is possible that delivery of these aircraft was expedited in response to urgent Cuban appeals engendered by the invasion, they probably had already been scheduled for delivery in 1961, inasmuch as Cuban pilots apparently were training in Czechoslovakia in the third quarter of 1960. No corresponding increase in shipments of other kinds of equipment was observed; in fact, no additional shipments

of military equipment were detected until December 1961. Bloc military assistance to Cuba in the second half of 1961 seems to have been focused on assimilation of new equipment, intensive training, and completion of reorganization of Cuba's military establishment along Soviet lines.

Arms shipments were resumed at the very end of 1961, and the first naval vessels appeared early in 1962. Two shiploads arrived at the end of 1961, and an average of two shiploads per month was noted from January through June 1962. However, collateral reports indicate that these shipments were confined to tanks, artillery, trucks, and other land armaments, with the exception of 12 torpedo boats and 6 Kronshtadt-class subchasers that were delivered between January and April 1962.

Throughout the period of arms delivery, Cuban personnel were being trained in the Bloc and by a military training mission (principally Soviet and Czechoslovak) sent to Cuba. Collateral sources reported that Cubans were sent for military training in the Bloc as early as the summer of 1960, According to collateral information, more than 500 Cubans were sent to the USSR for naval training in 1961,

Collateral sources indicate that a hundred or more Bloc military technicians probably arrived in Cuba during the second half of 1960 as the first arms shipments were being received, and there are continuing reports of Bloc military personnel and technicians arriving during 1961. By the time the Soviet authorities began to create their military establishment in Cuba in mid-1962, it is estimated that at least 350 Bloc military aid personnel were engaged in training Castro's forces on the island.

By mid-1962, Soviet Bloc military aid had turned the Cuban military establishment into one of the strongest in Latin America. The ground forces had acquired armored, artillery, antiaircraft, and antitank capabilities on a scale unprecedented in the Caribbean area. The Cuban air force was still a very limited organization, but even its small number of older Soviet jet fighters represented a vast improvement over previous capabilities. But the Soviet authorities had not provided, or apparently even offered, some of the more modern weapons being supplied to other underdeveloped countries, and the aid was limited

to improving the Castro regime's ability to maintain internal order and defend itself against an invasion.

B. Economic Aid and Terms of Trade

Before mid-1962, lines of credit totaling at least $357 million, with $100 million in addition likely, were opened by the Bloc for Cuban basic economic development, although Cuba had actually used by that time only about 10 percent of these credits. As in the case of Bloc aid to other countries, the bulk of the credits were intended for basic industrial facilities and overhead investments, such as transportation. The terms given Cuba were identical or very similar to those for other recipient nations: low interest rates, medium-term and long-term credits, and provision to repay the debt with indigenous commodities.

By the time the Soviet military buildup began in mid-1962, the Bloc had come to account for about 80 percent of Cuban foreign trade. Some trade concessions advantageous to Cuba were made. Bloc countries generally paid a premium price for Cuban sugar, and Cuba was permitted to run substantial trade deficits. The terms of trade as reflected by the balance between known prices set on Cuban exports to the Bloc versus prices set on Cuban imports of fuel, food, and raw and semifinished materials (which comprised more than 60 percent of imports from the Bloc) indicate a slight advantage for Cuba compared with world market prices for comparable items.

Information on the terms under which the military aid was supplied is sketchy. The Chinese Communists provided an unknown number of machineguns, including 12.7-mm antiaircraft machineguns, as a gift. Soviet-supplied equipment probably did not involve payment in hard currencies. Based on known Soviet practice and some collateral information, it is surmised that the initial agreements may have allowed a substantial discount on the equipment with a repayment time of 10 years or more. The arms agreement, or agreements, with Czechoslovakia required payment partially in pounds sterling, and at least $30 million (in sterling) has been paid by Cuba to the Czechoslovak State Bank. However, most if not all of Cuba's outstanding obligations for Bloc military aid may have been canceled subsequently, inasmuch as Castro stated publicly early in November 1962 that the USSR had canceled all of Cuba's military debts.

## II. General Activity Relating to the Military Buildup

During the period from the end of July through October 1962, the Soviet authorities deployed a number of weapons systems and associated personnel to Cuba that constituted a small but complete Soviet military establishment with all the necessary organizational superstructure. This section examines the evidence on general activities not related to specific weapons systems and provides a framework for the subsequent assessment of the detailed information on the deployment of specific weapons systems. It covers evidence of preparatory activities before the weapons and Soviet troops arrived in Cuba; the establishment of the command, control, and communications structure; and the flow of Soviet shipping to Cuba.

### A. Early Activity

Collateral reporting contains many references to the sighting, during the first half of 1962, of construction equipment, assorted vehicles, and Soviet personnel in the general locations where various Soviet military units were later identified. In several cases the reported locations corresponded closely to the actual locations. Nevertheless, later photography fails to contain evidence of visible activity in the areas mentioned until at least August and invalidates these reports as a basis for assuming that Soviet forces were present in significant quantities before the end of July.

There is a strong possibility, however, that this reporting reflected an influx into Cuba, beginning in early 1962, of Soviet personnel who were somehow associated with the military buildup that began physically in late July.

Soviet personnel first began to appear in unusual numbers during February-March 1962 and that by March-April 1962 groups of Soviet personnel were present all over the island.

that a plant manufactured prefabricated concrete beams and columns (specifications approved by the Soviet authorities) that were delivered to the Torrens reformatory, believed to be the Soviet military headquarters in Cuba, in late February or early March.

Other reporting generally supports this The Torrens area may have become a sensitive zone in June, and numerous reports, which substantiate one another, reflect a visit by Raul Castro to the reformatory and the evacuation of its inmates about the middle of July, followed by an influx of Soviet personnel in late July. A similar progression of events is suggested also by reports concerning the port of Banes. Twenty or 30 families allegedly were evacuated from the immediate port area in January 1962. Other reports indicate that the entire port area was evacuated sometime during the period between March and early July 1962, that a small number of Soviet personnel arrived almost immediately thereafter, and that large numbers of Soviet personnel moved in during the last week in August.

The shadow of coming events also may have been cast by Cuban officials in June, when a number of Cuban naval officers were (later) reported to have made statements to the effect that in September Americans would respect the Cuban flag and that by September Cuba would be the "buckle" in the belt of NATO bases surrounding the USSR. Also in June a briefing reportedly took place at which officials in the city of Matanzas were advised that in the event of an attack by the US the USSR would come to the assistance of Cuba within a 7-day period.

Based on the foregoing, it appears that the number of Soviet personnel in Cuba probably did begin to increase early in 1962 and that their very presence in any location could have generated the reports of activity observed during the January-July period. The influx of Soviet personnel at this time probably had some bearing on the later military buildup and may well have involved activity related to the planning and preparation required before the actual deployment of Soviet forces on the island.

There is evidence regarding Soviet surveying activities in Cuba, but it does not provide any indication of activity that can be directly associated with the selection and preparation of the offensive missile sites. It seems clear, however, that the Soviet problem of locating the sites geodetically was simplified considerably by the availability of earlier geophysical materials on Cuba. As in the case of Soviet economic aid programs to other underdeveloped countries, the Soviet aid program in Cuba included an intensive resource exploration survey. Such geological and geophysical survey activities necessarily include the utilization of large-scale topographic maps and associated triangulation control

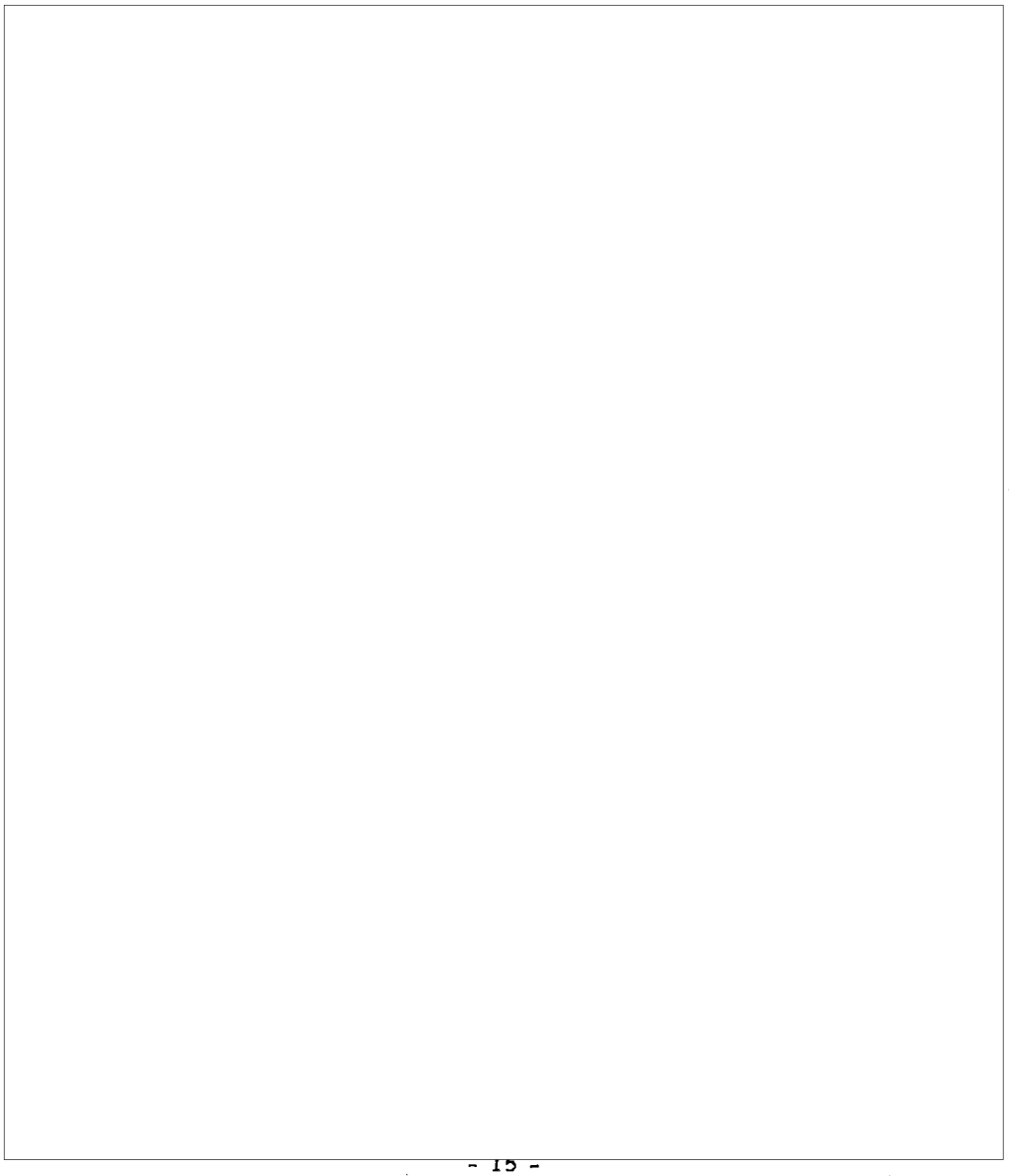
points, where available, or the undertaking of operations to establish such control points when they are lacking. These basic materials would have been directly applicable to the geodetic positioning of the Cuban missile sites. Moreover, the island of Cuba previously had been geodetically tied to the US mainland by the Inter-American Geodetic Survey, which is operated under the auspices of the US Army Corps of Engineers. In addition, during 1956-57 a system of horizontal and vertical control points for topographical mapping purposes had been established and a complete aerial photographic study of the island accomplished by a highly competent, private US contractor.

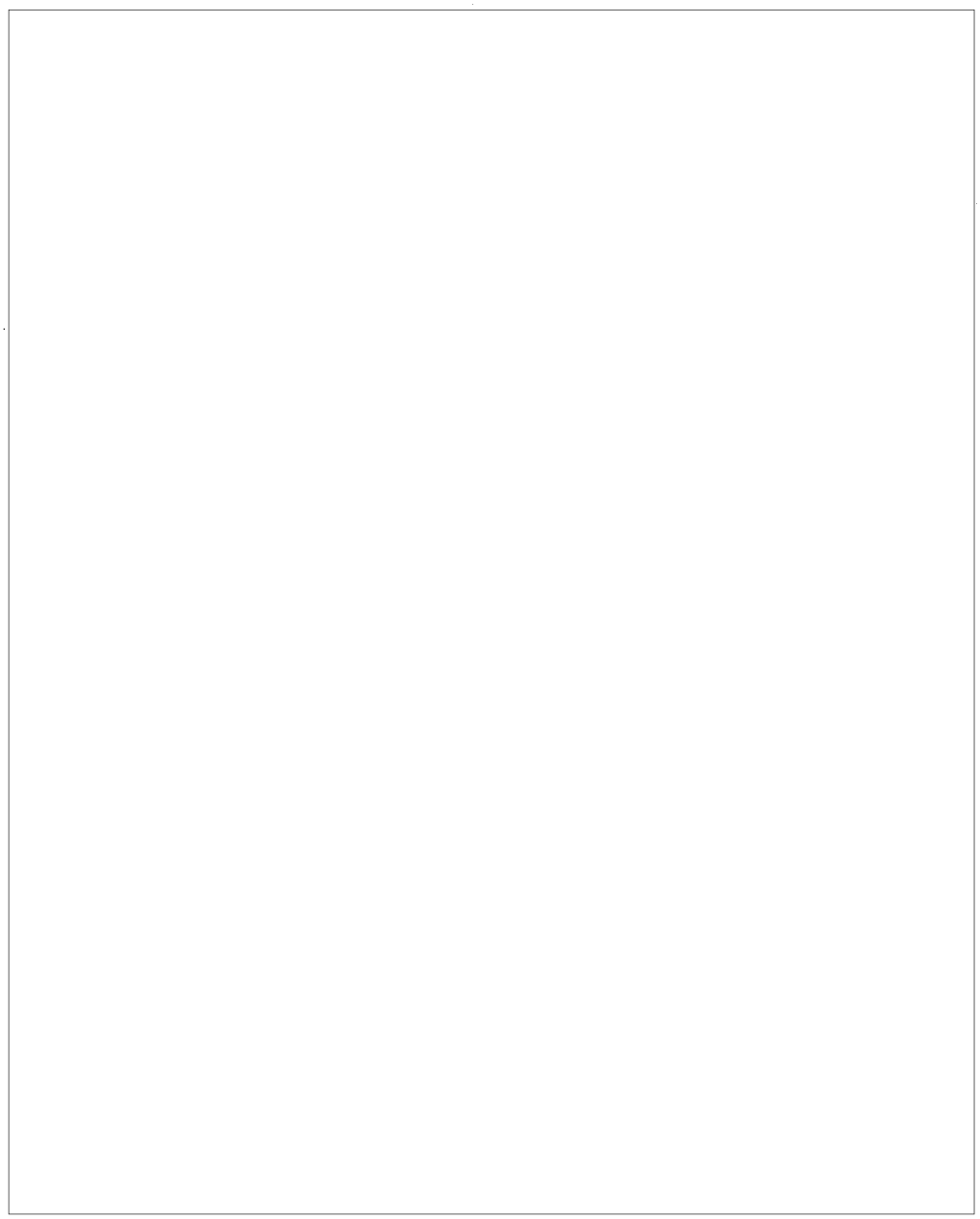
collateral sources have identified a Soviet geophysical team in Cuba under the direction of one Bogatyryev. This group, composed of about 150 people, was in Cuba at least as early as October 1961 and was engaged overtly at a great many locations in activities connected with exploration for oil, mineral, and peat reserves. In addition, some members of this team appear to have been geodesists whose function probably was to extend triangulation control points as required for their intensified survey program. That the Soviet personnel were doing their work well was attested to by a described a geological map then recently finished by the Soviet personnel as "magnificent and worth getting." He further advised that "the Soviet geologists have taken all of the information which all companies both mining and oil had in their files and put it all together."

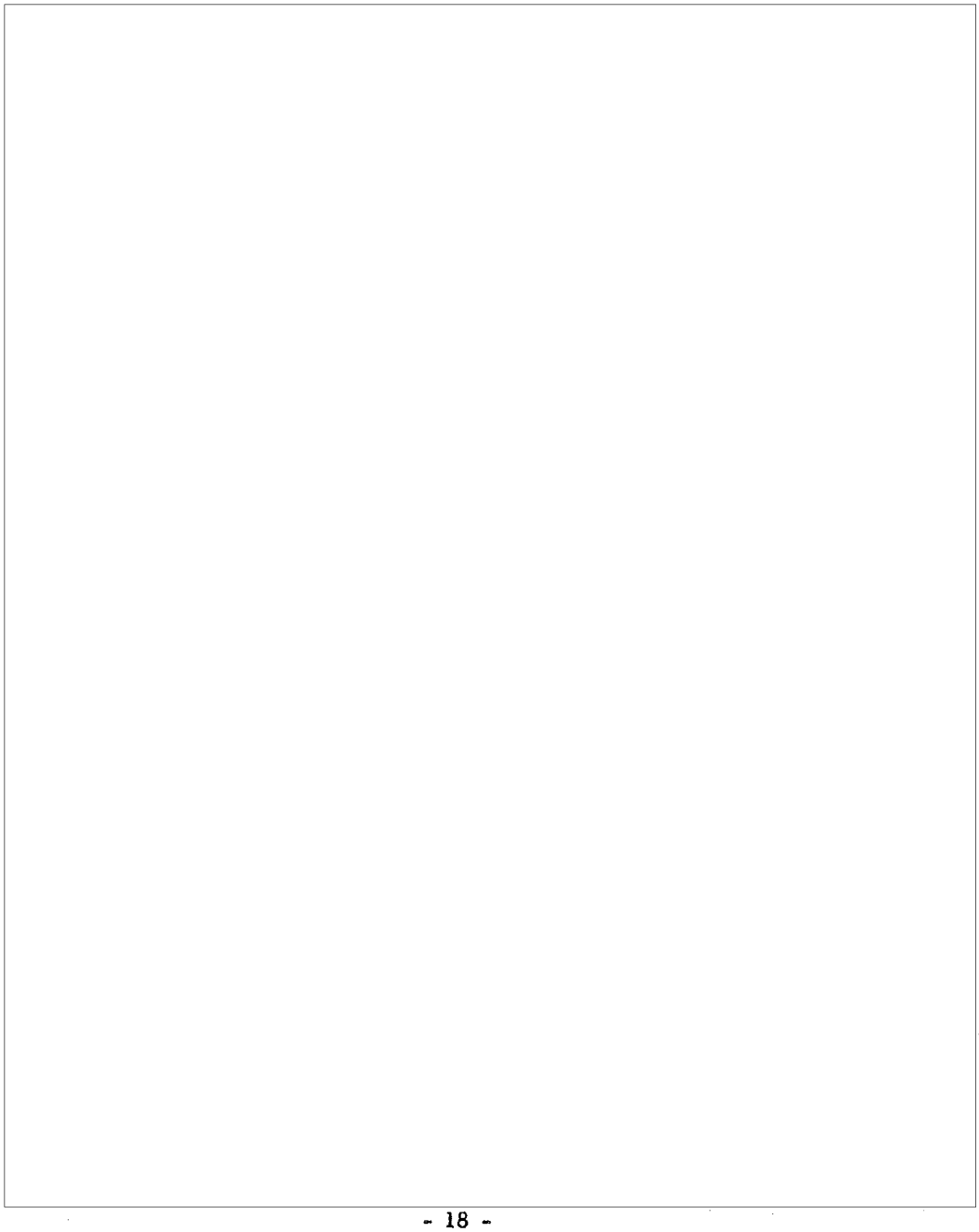
Although no reports are available of surveying in specific areas that later became missile sites, members of this Soviet group may well have been active in such areas. It would not be possible from the fragmentary type of evidence available, however, to distinguish between activity related specifically to the establishment of the sites and activity associated with the more general survey. In general, the appearance of Soviet surveying groups at any given point or time in Cuba cannot be considered evidence of a Soviet intention subsequently to deploy missiles.

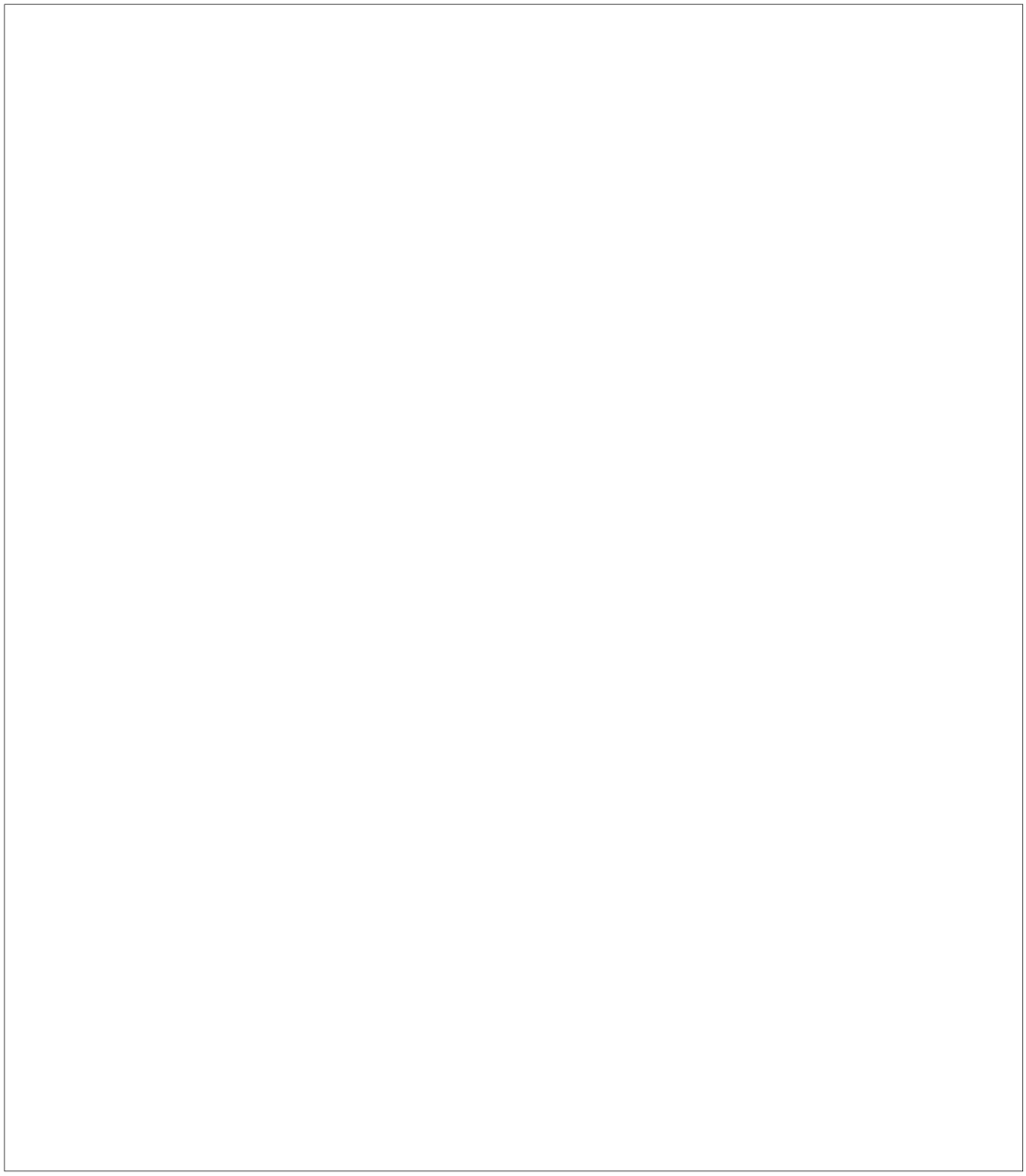
Because the Soviet geophysical team had been in Cuba at least 9 months before missile deployment and a wealth of data had been immediately available to them, it must be assumed that virtually all of the basic data required to locate the missile sites geodetically had been acquired before the missiles were deployed. Therefore, the time necessary to tie in an individual site to established geographic control points

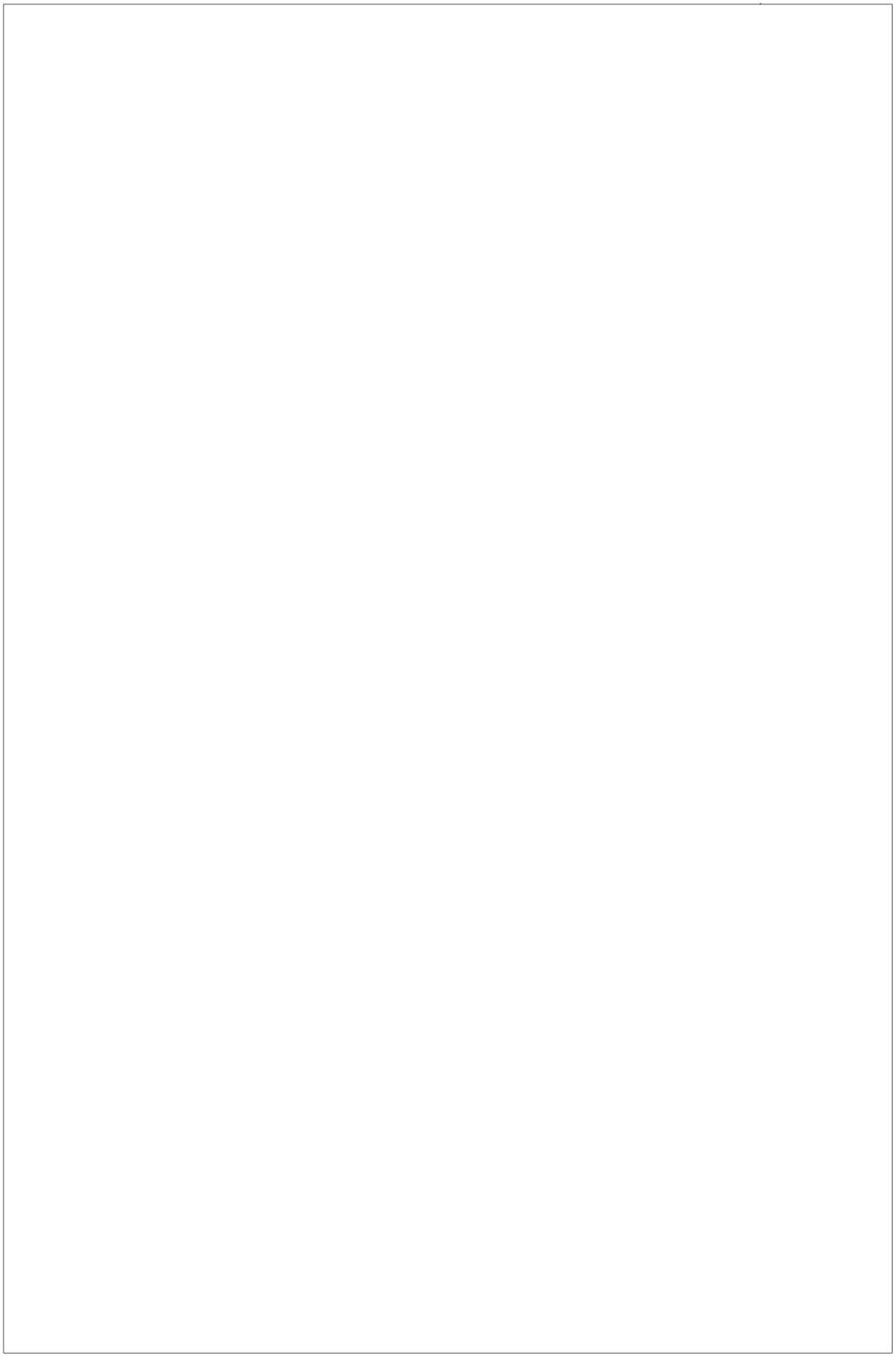
would have varied from only a few hours to a maximum of 1 week, and this final preparation could have occurred after the site area was initially occupied.











C. Soviet Merchant Shipping

The pattern of Soviet merchant shipping to Cuba provides a measure of the magnitude and intensity of the Soviet military buildup and shows the abruptness with which it began. Whereas arms shipments to Cuba had averaged about two shiploads a month during the first half of 1962, about 125 voyages involving military cargoes were completed in the 3 months between the last days of July and the establishment of the US quarantine. The first ships carrying Soviet forces and their equipment probably left the USSR during the first or second week of July while Raul Castro was in the USSR. A key role in the subsequent flow of Soviet arms to Cuba was played by a group of large-hatch ships, which were the only Soviet-flag vessels capable of loading assembled strategic missiles below decks.

Knowledge of both the volume and the nature of Soviet shipments to Cuba is based on a variety of sources: photography of deck cargoes obtained while Soviet ships were exiting the Black and Mediterranean Seas, approaching Cuba, and being offloaded. From late July 1962 to the time when the US established its quarantine on 24 October, Soviet dry cargo ships completed about 150 voyages to Cuba (including 17 voyages by passenger ships). Sixteen other Soviet dry cargo ships turned back to the USSR after the quarantine was announced. All but about 25 of the 150 voyages are believed to have involved military cargoes.

An examination of the pattern of Soviet shipping to Cuba from January through July 1962 indicates that dry cargo ship arrivals averaged 15 per month. However, the number of Soviet dry cargo and passenger ships arriving monthly approximately tripled from July (15 arrivals) to August (43 arrivals) and increased still further in September (50 arrivals). The September level would have been maintained in October had the additional 16 ships en route to Cuba completed their voyages (see the chart, Figure 52*). In comparison, there was no significant variation in the pattern of petroleum, oil, and lubricant shipments. Although the Cuban buildup required a large relative increase in Soviet shipping allocated to the Cuban trade, the diversion of this shipping probably was not a serious problem in view of the size of the Soviet merchant fleet and the availability of shipping in the world charter market.

* Following p. 82, below.

By the time of the US quarantine the USSR had employed in the Cuban trade all seven of its vessels that were capable of transporting MRBM's as hold cargo. Two of these vessels had made voyages to Cuba before the military buildup began in July; the other five all made their maiden voyages during the period of the buildup. *

With one exception, all of these large-hatch ships were built outside the USSR, in Japan or Finland. As far as can be determined, the contracts for these ships were awarded in a normal fashion, and there was no evident haste in either the contractual negotiations or the conditions set for their delivery. The Japanese contract, for example, was negotiated from September to December 1960, and the lead-ship was completed in December 1961. In addition to the three ships already built, the Soviet authorities have placed orders with Japanese builders for five additional ships of the same general type as the initial three. The Finnish contract is part of a 5-year trade agreement with specific deliveries negotiated annually. There is no information which indicates that any of these large-hatch ships underwent extraordinary modification of original designs while being built, and there was no sense of urgency noted in the later stages of their construction.

The timing of the contracts and the fact that large hatches are fairly common design features of large and modern ships currently being built in shipyards throughout the world, as well as the absence of any special circumstances involved in the construction of these ships for the USSR, clearly indicate that they were not built for the purpose of covertly carrying missiles to Cuba. However, the task of clandestinely introducing those weapons onto the island probably could not have been carried out before these vessels became available.

## III. Air Defense Systems

One of the most striking features of the Soviet military buildup in Cuba was the concurrency in bringing both defensive and offensive systems to an operational status, indicating a Soviet lack of concern for acquiring the capability to protect the offensive weapons systems against aerial detection or attack during their deployment phase. This section reviews the evidence relating to the individual elements of the integrated

* For a detailed examination of the activities of these vessels, see V, p. 50, below.

Soviet air defense system that eventually emerged in Cuba. These elements are the early warning and target acquisition radar systems and their supporting communications network, the SAM system, and the force of fighter aircraft. Although all of these elements were present in quantity in Cuba by the end of September, they were not integrated into an operating air defense system until 27 October, the day before the Soviet authorities announced their decision to withdraw the offensive missiles from Cuba. The steady expansion of the air defense system for some time thereafter indicates that its activation at that time probably was earlier than the Soviet authorities had planned.*

A. Early Warning and Target Acquisition Radar Capability

1. Before the Beginning of the Buildup

For more than a year preceding the crisis, the USSR had been assisting Cuba in building an air defense capability, including the provision of a variety of early warning and target acquisition radars. Although some may have been delivered as early as September 1960, when Soviet military shipments to Cuba began, the first firm evidence of Soviet radars in operation in Cuba was acquired in June and July 1961, It is probable that early warning radars were included, along with the first jet fighters, in shipments of military supplies which reached Cuba in late May and early June 1961.

It is estimated that by late July 1962, before the arrival of additional equipment during the buildup period, there were between 20 and 30 early warning radars and about 20 antiaircraft artillery fire control radars deployed in Cuba. a majority of the early warning equipment was located in the western and central portions of the island. The fire control radars generally were sited with antiaircraft artillery units along the northern coast of Cuba between Mariel and Caibarien, with the heaviest concentration around Havana.

* For a photograph of a SAM site in Cuba with missiles in place on all launchers, see Figure 2.

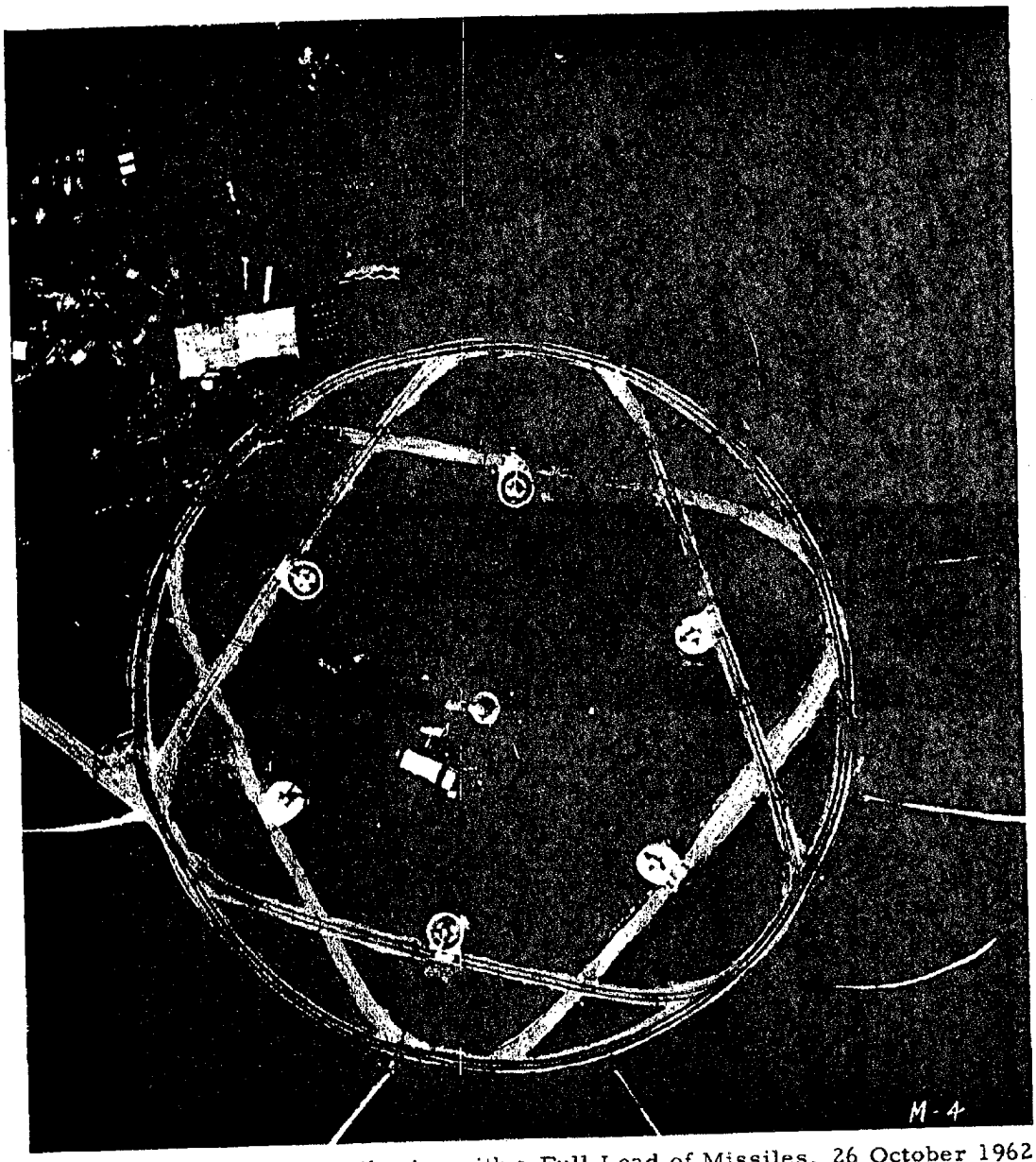



Figure 2. SAM Site at Caibarien with a Full Load of Missiles, 26 October 1962

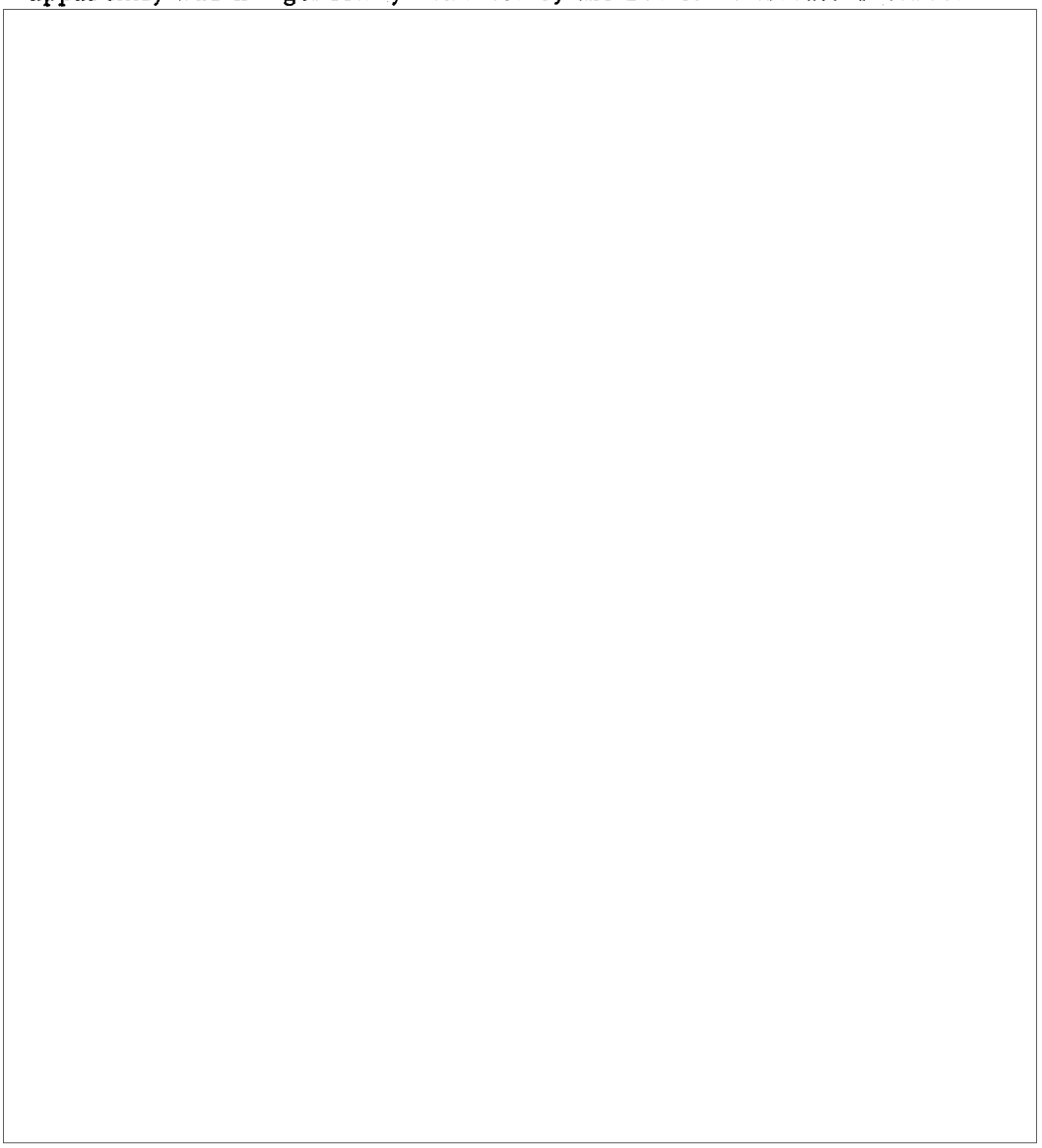
In spite of this increase in radar capability, there was no indication that a fully developed and integrated air defense system was present in Cuba that could have assembled, collated, and transmitted to appropriate control points the data necessary for passing surveillance of an intruding aircraft from one responsible group to another. However, there were isolated instances that suggested progress toward such a system. In addition, ground-controlled intercept (GCI) exercises were occurring routinely by July 1962, and on two occasions MIG fighters intercepted unidentified foreign aircraft.

2. During and After the Buildup

As part of the Soviet military buildup beginning in late July 1962, more modern and advanced radar equipment of greater range and effectiveness was deployed in Cuba in sizable quantities. Much of this equipment was associated with the SA-2 missile system. Photography of late August and early September revealed the presence of SAM system target tracking and control radars (FAN SONG) at the SA-2 sites emplaced in the western half of Cuba and the presence of possible target acquisition radars (SPOONREST) at two of the sites. In mid-September the presence of SPOONREST radars in Cuba was confirmed Starting in late October, photography and permitted the identification of other modern Soviet radars, including a long-range warning radar and a height-finding radar that, in combination, represent one of the most advanced Soviet radar capabilities against aerodynamic vehicles.

It is estimated that by the time of the crisis period some 200 Soviet radars of all types were in Cuba. Much of this equipment, particularly that associated with the SAM system, is known to have been available to Soviet personnel when the US resumed reconnaissance overflights of Cuba on 14 October 1962. The remainder probably also was available at that time or immediately thereafter, for little additional equipment is believed to have arrived in Cuba at any time since the announcement of the US quarantine on 22 October.

Although SAM sites and associated radars were deployed in increasing numbers beginning in late August, this radar equipment apparently was not generally activated by the Soviets until late October.



3. Evidence on the Detection and Tracking of US Reconnaissance Overflights During 1962

It cannot be determined when the Cuban government first became aware of these missions and their purpose. However, there were numerous opportunities for identification of these flights before mid-1962, and the Cubans may well have been aware that their territory was being overflown by July 1962, if not considerably earlier.

B. Surface-to-Air Missile System

The geographical placement of SA-2 sites and support facilities in Cuba through the time when the strategic missiles were withdrawn strongly suggests that the intention of Soviet planners was to establish an area defense for the island as a whole and that maximum protection of key military targets was not the governing objective. The Soviet authorities evidently had no intention of employing the SAM system to prevent detection of strategic missile sites under construction and had not planned to activate this system until some time in November. There was, nevertheless, no apparent reason why SAM sites could not have been individually activated or the group on the western half of the island activated by mid-September to screen the developing MRBM/IRBM sites from aerial reconnaissance. Almost all the SA-2 sites were emplaced and equipped and could have been integrated into a partial or fully developed SAM defense system by 14 October, when the first reconnaissance aircraft photographed an MRBM site under development.

The SAM complex defending Cuba consisted of 24 SA-2 sites that at the time of the crisis provided coverage of virtually the entire island. Interspersed among the sites were seven support facilities that provided the logistic support for the whole complex of sites. The individual SA-2 sites were integrated into an island-wide SAM defense system by a network of communication facilities linking the sites, the early warning radar network, and the command and control centers. This integration

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*Types and Duration of Radar Illuminations Recorded During the Reconnaissance Mission of 2 May 1962*

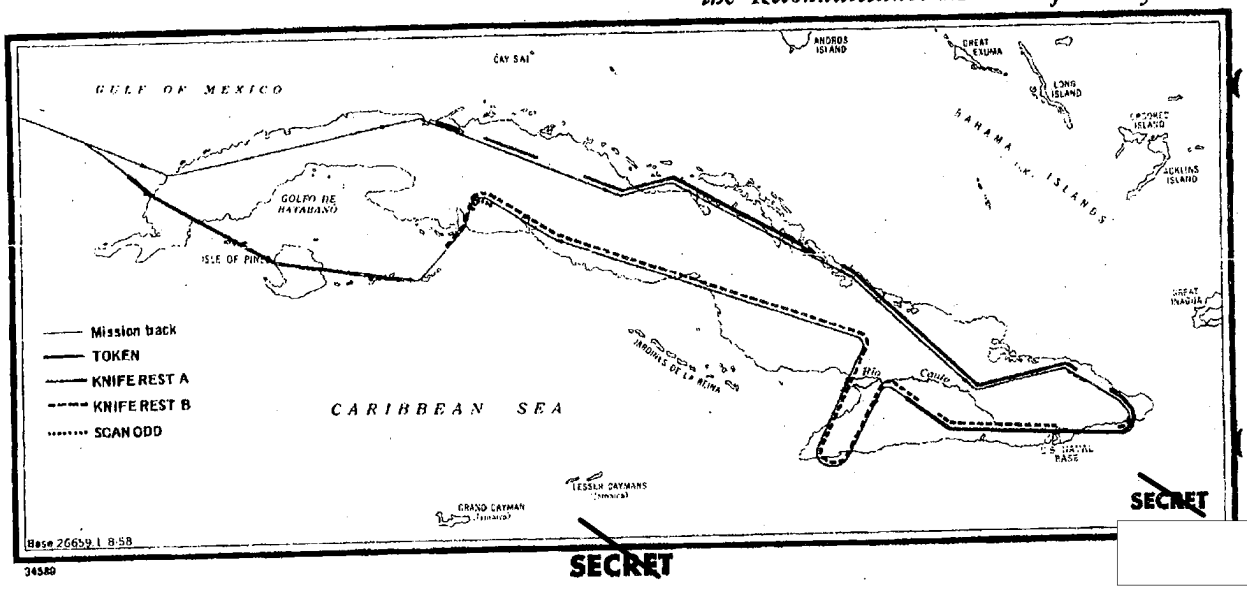


Figure 3

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*Types and Duration of Radar Illuminations Recorded During the Reconnaissance Mission of 5 September 1962*

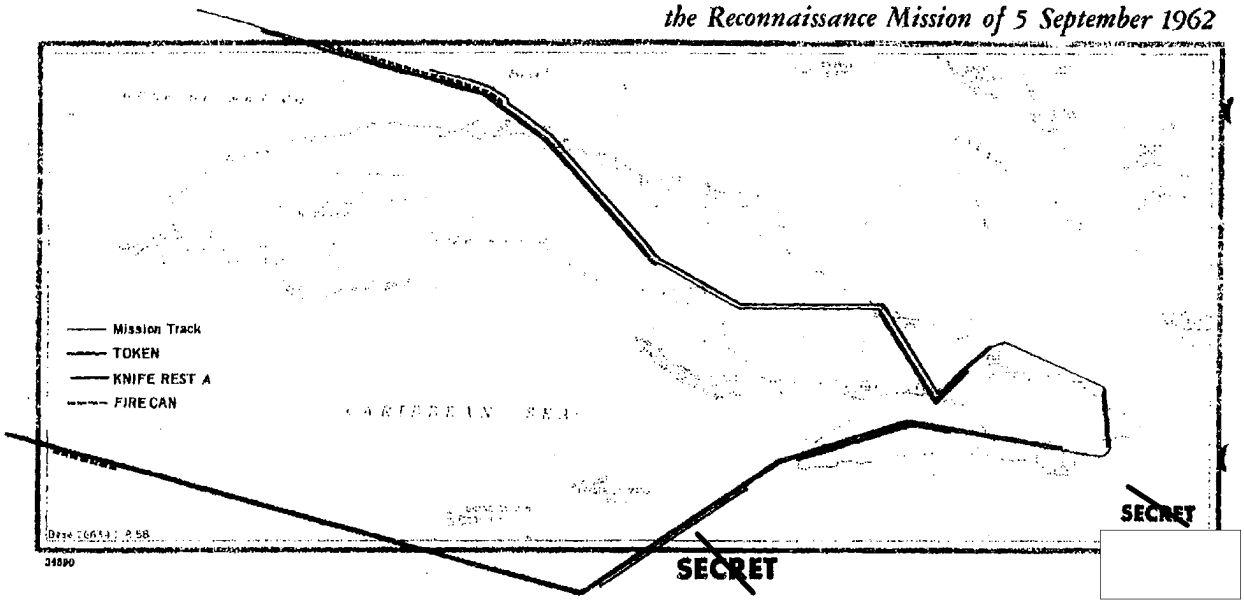



Figure 4

greatly increased the effectiveness of the system by providing additional warning time, greater target tracking capability, and centralized control of the entire system.

Although a few of the Cuban sites were deployed in a slightly modified configuration, the accompanying sketch and photograph portray the typical, fully developed SA-2 site constructed in Cuba. The site contains six revetted launch positions deployed in a star-shaped configuration around a revetted, centrally located guidance area. In addition, there are three revetted hold positions equally spaced about the periphery of the circle formed by arcs connecting the launch positions (see Figure 5*).

Because the SA-2 system is entirely road-transportable and SA-2 sites do not require extensive preparation, units can be deployed and reach operational status relatively rapidly (see Figure 6). In Cuba,

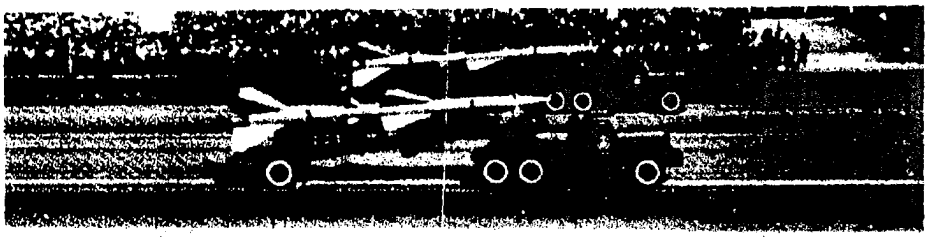


Figure 6. SA-2 Surface-to-Air Missiles on Display in the Havana Parade of 2 January 1963

equipment apparently was simply brought into the site area and placed in the same respective and predetermined positions that it would occupy at a fully developed site (see Figure 7*). The cables connecting the necessary equipment were laid on top of the ground, and the site thereafter became operational as soon as missiles were present, the essential electronics checks and radar calibrations had been made, and the equipment had been activated. Observations made in East Germany indicate that an SA-2 unit can be moved out of a fully developed (revetted) site location, transported a distance of 25 miles, and set up again in an

* Following p. 30, below.

open field in a single day, presumably in an operational condition. Soviet documents also attest to this capability.

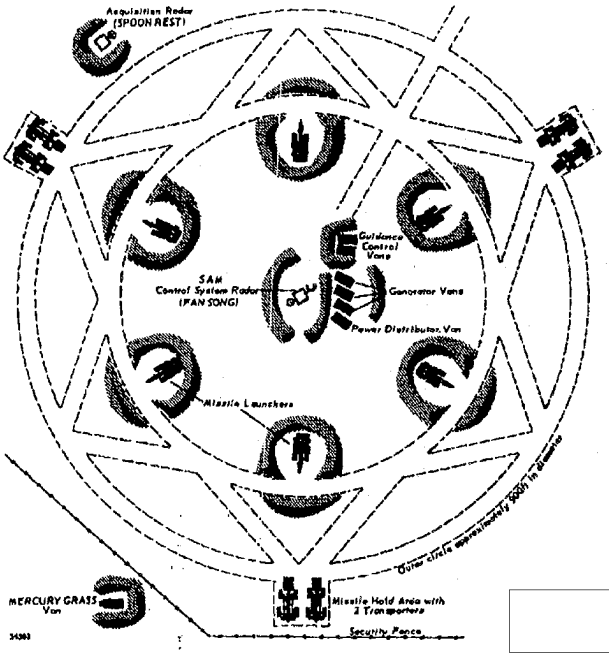
As demonstrated in Cuba, the revetting of operational sites is not an essential element of SA-2 deployment; as of 27 October 1962, when an air defense system capability was first demonstrated, only eight, or one-third, of the SA-2 sites had been revetted or were being revetted. At all those sites, revetting was accomplished after the unit apparently had been operationally deployed, but no pattern of revetting among sites can be determined from the photographic coverage (see Figure 8). More than half of the original SA-2 sites were never revetted.

1. Capability of an Individual Site to Take Action

An individual site, whether minimally or fully deployed, that is not tied into an over-all command and control system has a limited capability for independent action. Although its radars can acquire and track the target independently, and identify it as friend or foe, the probability of a successful target intercept would depend heavily on the skill and training of the troop unit, for the SA-2 system appears to be designed to operate within the context of a fully developed air defense system. Independent acquisition of the target would be difficult without additional azimuth and elevation data provided from both early warning radar and from other SA-2 sites. In addition, the reaction time of an individual site probably is too slow to enable it to launch its missiles effectively against high-speed targets initially acquired by its own radar. * As target speed decreases below 600 knots, however,

* An individual site, assuming acquisition of a target with a speed of 600 knots at a range of 100 nautical miles (nm) and an altitude of 10 nm, would have approximately 10 minutes from the time of target acquisition until the target was directly over the site itself. Thereafter, less than 2-1/2 minutes would elapse before the target was out of missile range. The criticality of the time factor in this case is pointed up by the fact that, according to Soviet documents, an SA-2 site requires from 8 to 13 minutes (depending on whether the power generators are on or off) to move from a standby condition (Readiness No. 2) to a launching or firing condition (Readiness No. 1). Because an individual site is normally in an alert status no greater than Readiness No. 2 and cannot be held in a firing condition, according to Soviet writings, for longer [footnote continued on p. 31]

Figure 5
*Sketch of an SA-2 Surface-to-Air Missile Site*




* An individual SAM unit is estimated to be capable of engaging aircraft and cruise-type missiles out to distances of about 25 nm, most effectively between the altitudes of 3,000 and 80,000 feet. The SAM control system radar (designated FAN SONG) performs both a tracking and a missile guidance function against a single target. An acquisition radar (designated SPOON-REST) is usually co-located. The FAN SONG is believed to be capable of tracking a target at ranges up to 64 nm, the SPOONREST at ranges up to 145 nm.

Each launch position contains a single launcher and missile, and each hold position contains two missile transporters, each carrying a single missile. In all, there are 12 missiles at each site, 6 on launcher and 6 in reserve. The central guidance area contains the following equipment that is interconnected by cabling and also is connected by cabling to the launchers: one SAM control system radar van, five electronics vans, and one or two generator vans.

Typically the van-mounted target acquisition radar, with associated IFF (SCOREBOARD) equipment, is located outside the circle of launch positions but within the site area, which is surrounded by a security fence. It also is connected by cabling with the necessary power and electronics equipment in the central guidance area. A communications van (MERCURY GRASS) is located outside the security fence and provides the necessary command link between the site and control elements at higher echelons. A number of general-purpose vehicles and other auxiliary equipment also are required to support a site.

Figure 7. SAM Site at Los Angeles, Oriente Province, 26 September 1962. An example of the ease with which a SAM unit may be deployed: all elements of the system are present.


Figure 8. SAM Site at Mariel, 23 October 1962. Revetting in progress at an operational SAM site during the crisis period.

reaction time becomes increasingly less critical and probably is not a controlling factor in successful target intercept. Because the U-2 is not a high-speed aircraft, the ability of an individual SA-2 site to launch missiles successfully against it is therefore dependent primarily on the ability of the radar components to provide accurate position data.

2. Location and Timing of Offloading of SAM Units and Associated Equipment

It is not possible from photography or other evidence to determine the precise times and ports at which SA-2 missiles, associated equipment, and unit personnel arrived in Cuba. However, the first vessels carrying military shipments for the buildup began docking in Cuba during the last week in July, and the first firm evidence of SAM deployment was obtained from aerial photography of 5 August of vehicles at locations in western Cuba later identified as the Santa Lucia and Matanzas SAM sites and the Pinar del Rio SAM support facility. SAM equipment, therefore, must have begun flowing into Cuba from the very beginning of the Soviet buildup.

Collateral reporting indicates that parts of a number of ports in western Cuba, including Matanzas, La Isabella, Punta Gerardo, Casilda, and Mariel, were restricted at various times during the month of August while Soviet ships were offloading. Presumably SAM equipment moved through some of these ports during August. According to these reports, some offloadings occurred at night, and all offloading of equipment was accomplished by Soviet personnel.

Although the dates and ports of arrival of SA-2 missiles and related equipment cannot be specified, it appears that unit equipment other than the missiles probably moved directly from the ports to the site areas. For example, a number of informants have reported the offloading and movement of equipment from Matanzas to the immediate area of the Matanzas SA-2 site a day or two before 5 August, when vehicles first appeared at the site on aerial photography. Moreover, 10 other SAM sites on the western half of the island that were observed in photography of 29 August or 5 September all had launchers, missile transporters, and electronic and other equipment present, indicating relatively rapid

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than 20 to 25 minutes, an independently acquired target traveling at this speed might well be out of range before a missile could be launched against it.

movement of these units from the ports of debarkation to the site areas. With respect to the SA-2 missiles, however, the identification of large numbers of shipping containers of two different sizes at the SAM support facilities in Cuba (see Figure 9) clearly indicates that the missiles were shipped from the USSR disassembled, the boosters and sustainers being subsequently mated and checked out at the support facilities before being delivered to the operational sites. This procedure is consistent with known Soviet practice in the USSR and East Germany.

3. Problem of Operational Status

The most conclusive photographic indication that an SA-2 site has reached operational status -- that is, is capable of launching a missile -- is the positive identification of one or more missiles on launcher, assuming that all other necessary equipment is present and properly emplaced. If judged by this criterion, none of the SA-2 sites in Cuba can be demonstrated to be operational before mid-October 1962, when the first such identifications were made. In most cases, however, this timing reflects the lack of effective photographic coverage rather than the actual status of the sites. It is virtually certain, given the start of SAM deployment activity at the beginning of August and the level of activity evident in photography thereafter, that a number of SA-2 sites had the capability of launching missiles well before mid-October. Accordingly a more realistic means for defining an individual site as operational has been sought than that based on missiles on launcher.

Most of the sites, when first observed in photography, had major items of equipment present, including guidance and other electronic equipment and varying numbers of identifiable launchers and missile transporters. Missiles could not be specifically identified, however, either on the launchers or on the transporters, both of which were canvas-covered. Although SA-2 missiles arriving in Cuba had to be processed through support facilities before delivery to sites, the evidence clearly indicates that support facilities were being established in Cuba and receiving missiles concurrently with the deployment of SA-2 units. The rate at which operational units received their missiles was therefore governed by the length of time required to process them at the support facilities. Although there is no direct information available on the

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Figure 9. SAM Containers and Ground-Support Equipment at the Santiago de las Vegas Assembly Area, 7 November 1962

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processing time that was actually required in Cuba, Soviet documents indicate that under favorable field conditions a support facility can prepare and check out 10 missiles and their airborne equipment in a 24-hour period. It is likely, therefore, that the SA-2 units in Cuba were receiving missiles within a relatively short time after they arrived on site with the rest of their unit equipment.

Because it is not possible to determine the precise timing of missile deliveries to the individual SA-2 sites and hence their initial operational dates, for the purposes of this study a "unit emplacement date" has been established. This represents the date on which photographic coverage indicates the presence and proper emplacement of all major items of equipment, with the possible exception, as indicated, of missiles. The actual operational date, if later than the "unit emplacement date," probably was reached within a week or two thereafter in most cases.

4. Timing of Establishment of Individual Sites and Support Facilities

Virtually all of the evidence concerning the timing of SA-2 site and support facility development in Cuba is based on photography. Because of gaps in photographic coverage, it is not possible to derive a precise, time-phased, sequential deployment pattern for a typical site. Instead, judgments with respect to timing must be based on the apparent status of sites observed sporadically and, in most cases, in an apparently completed status at the time of first observation.

The chart, Figure 10,* presents the evidence available from photography on the timing of each of the 24 SAM sites in Cuba from 5 August, when SAM deployment activity was first observable, to 27 October, when the capability of the SAM system as a whole was first demonstrated. Four distinct time frames have been indicated, when possible, for each site as determined by (a) the latest date on which photography indicates that no activity was present at the location later occupied by a site ("negation date"), (b) the earliest date on which activity was first observed but major equipment was not yet in place ("earliest activity date"), (c) the earliest date on which all major equipment (with the possible exception of missiles) is known to have been present and properly

* Following p. 34, below.

emplaced ("unit emplacement date"), and (d) the actual operation of the integrated network as a system. The time relationships between these dates provide critical insights into the Soviet planning and programing of the entire Cuban buildup.

The following general conclusions may be drawn from this evidence:

a. There was no visible activity at any of the sites before 5 August. Although activity at two site areas apparently was just beginning on 5 August, there was no visible activity at any of the other sites by that time.

b. In all but four cases the SA-2 units were emplaced on site when first observed. Unit emplacement, therefore, could have occurred at any time between the negation date and the time the sites were first observed and cannot be fixed more precisely. Of the 20 such cases, only 3 had gaps in coverage of 10 or fewer days; the remaining 17 had gaps of 23 to 61 days.

c. Eleven, and possibly 12, units were emplaced on the western half of Cuba between 5 August and 5 September.* One additional unit on the western half of the island was not emplaced until mid-October. Two units (at Sagua la Grande and Sancti Spiritus) are known to have been emplaced within a 6-day period.

d. SAM units generally were emplaced on the western half of the island before they were emplaced on the eastern half. On 29 August, for example, when at least 8 units were emplaced in the west, at least 6 units, or about 50 percent, were not present in the east; by 5 September, when at least 11 units were emplaced in the west, at least 4 units were not on site in the east.

e. All units were emplaced and are known to have had missiles on launcher by 23 October at the latest. Most of them probably had missiles on launchers long before this time, but they cannot be identified in available photography.

With respect to SAM support facilities, the evidence on time-phasing is even less complete than it is on the sites. The chart,

* The twelfth, Siguanea, is a special case; it is located on the Isle of Pines and was not covered by photography from 5 August until 29 September.

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Figure 10

# TIME PHASING OF SAM UNIT EMPLACEMENT

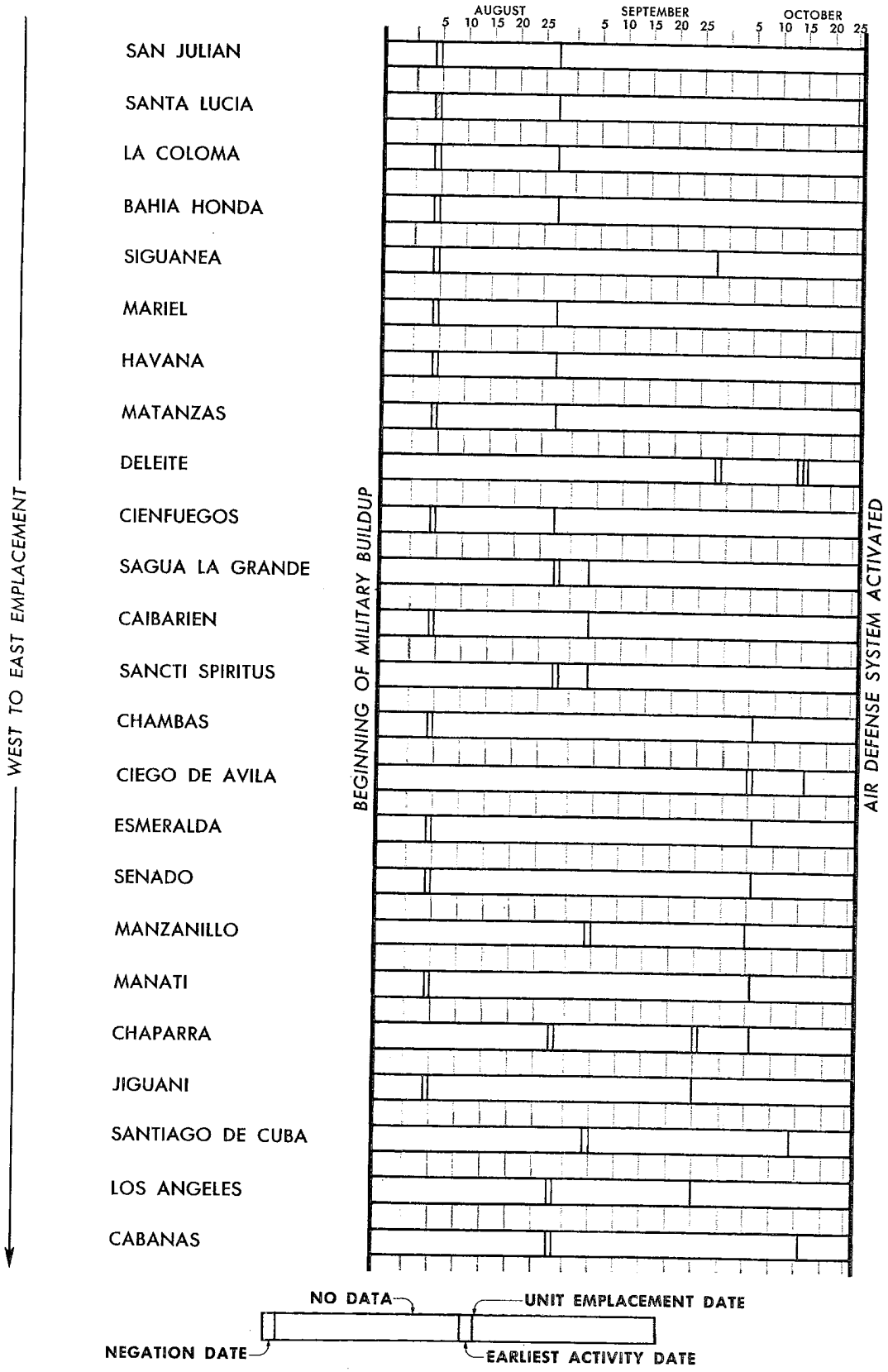


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Figure 11,* presents the negation date, the earliest known activity date, and the first demonstrable operational date for each facility. The criterion for the operational dates was the presence of missile transporters and missile containers, indicating that the facility was already functioning. The long time intervals between most of the dates reflect the lack of photographic coverage of these facilities.

There is good evidence that two and probably three SAM support facilities were established and functioning at the same time that SA-2 units were being emplaced on the western half of the island. The support facility at Santiago de las Vegas, which was not present in photography of 5 August, was operational by 29 August, when photography revealed the presence of missile transporters, missile containers, and other support equipment. Collateral sources reported that about the end of July or early August the civilian population in the area of the Pinar del Rio support facility was evacuated and that Soviet personnel, vehicles, and construction equipment were observed moving in. On 5 August, oblique, partly cloud-covered photography of the area revealed the presence of a few unidentified vehicles. It seems likely, therefore, that the Pinar del Rio support facility was actually established slightly earlier than the one at Santiago de las Vegas, although both were definitely operational on 29 August. In addition, a third support facility, at Cifuentes, was observed to be operational on 29 August.

On the eastern half of the island, two support facilities, at Santiago de Cuba and Victoria de las Tunas, also could have been functioning during the period after 5 September when SA-2 units were being emplaced in that area. Photography of 5 September revealed four SAM support vehicles at the Santiago de Cuba facility. When covered again on 26 September, this facility was clearly operational. There is no photographic coverage of the Victoria de las Tunas facility during this period, however, and its presence cannot be determined from other evidence. The remaining two support facilities were established during the first half of October; one of them, at Manzanillo, was set up in less than 10 days.

5. Geographical Pattern of Deployment

As can be seen on the map, Figure 12,* which indicates the location and effective coverage of the Cuban SA-2 sites at the time of the

* Following p. 36, below.

crisis, there was a continuous string of sites along the northern coast providing island-wide coverage from the western end of Cuba as far as the port of Banes in the east. Although the coverage along the southern coast was much less complete, the major gaps occurred in areas that are sparsely populated and contained few targets of strategic interest to either the Soviet authorities or the Cubans. Curiously, Havana, the capital city and presumably one of the areas of greatest defense interest to the Cubans, was defended by only one SAM site, even though capital cities throughout the Bloc are ringed by as many as six individual sites. Even more revealing, however, was the pattern of deployment as related to the Soviet military presence on the island.

On the western half of the island, two and perhaps three of the San Cristobal MRBM sites were covered by only a single SAM site, at Bahia Honda, and probably only one of the San Cristobal sites had as much as double overlapping SAM coverage. All four of these MRBM sites appear to have been extremely vulnerable to approaches from off the southern coast. The same is true for the two Guanajay IRBM sites, only one of which appears to have had double overlapping coverage; both sites appear to have been extremely vulnerable to approaches from the south. Farther east the area of the two MRBM sites at Sagua la Grande and the area of the IRBM site at Remedios were each covered by only a single SAM site.

The four Soviet armored groups, at Artemisa, Santiago de las Vegas, Remedios, and Holguin, also were poorly defended, in each case by only one SAM site. In the Santa Clara area, where initially all the MIG-21's were deployed, no specific missile defense was provided. The same is true for the important transport junction and the Eastern Military Headquarters site at Camaguey.

For comparative purposes, the map, Figure 13, illustrates how the same number of SAM sites might have been deployed had maximum defense of the principal Soviet military installations been the major objective of SA-2 deployment. Although this type of point defense leaves open several areas, at least overlapping coverage would have been provided for all important Soviet military installations, including triple overlaps of some, in addition to a limited interdefense of the individual SAM sites themselves. Had the Soviet authorities originally intended to provide

Figure 11

# *TIME PHASING OF SAM SUPPORT FACILITIES*

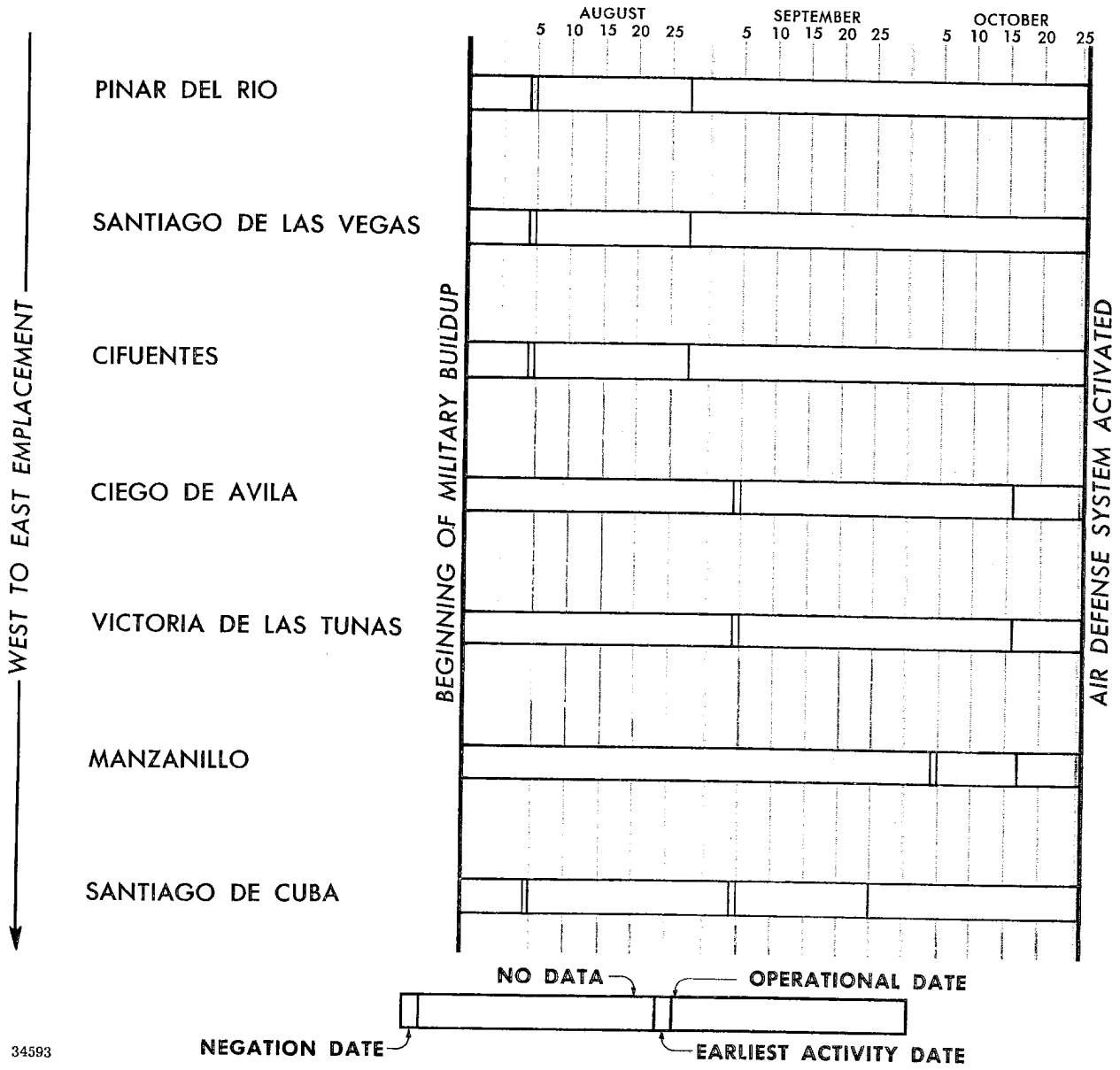

Figure 12

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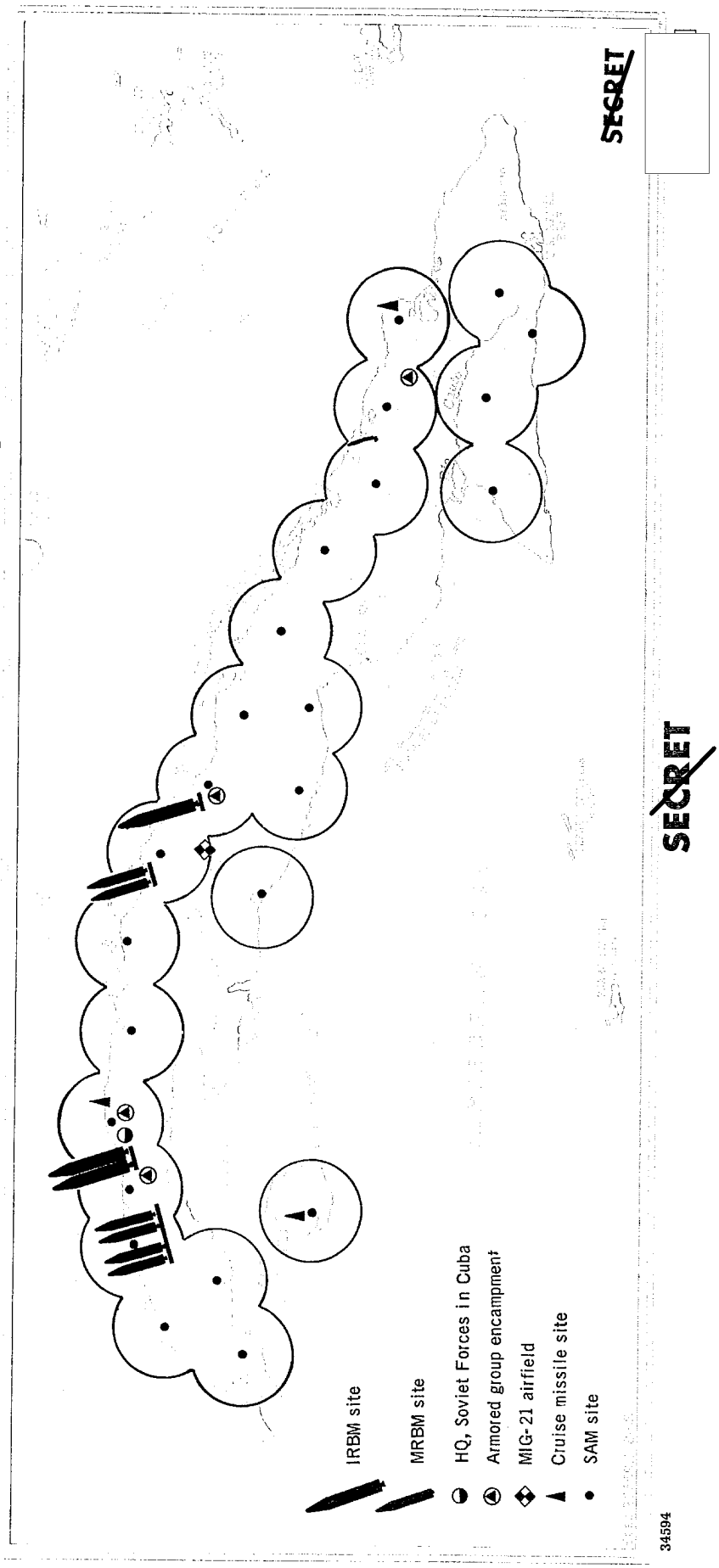
*SAM Units Deployed in a Peripheral Defense Pattern During the Crisis Period*

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*SAM Deployment Pattern That Would Have Provided Maximum Defense of Principal Soviet Military Installations During the Crisis Period*

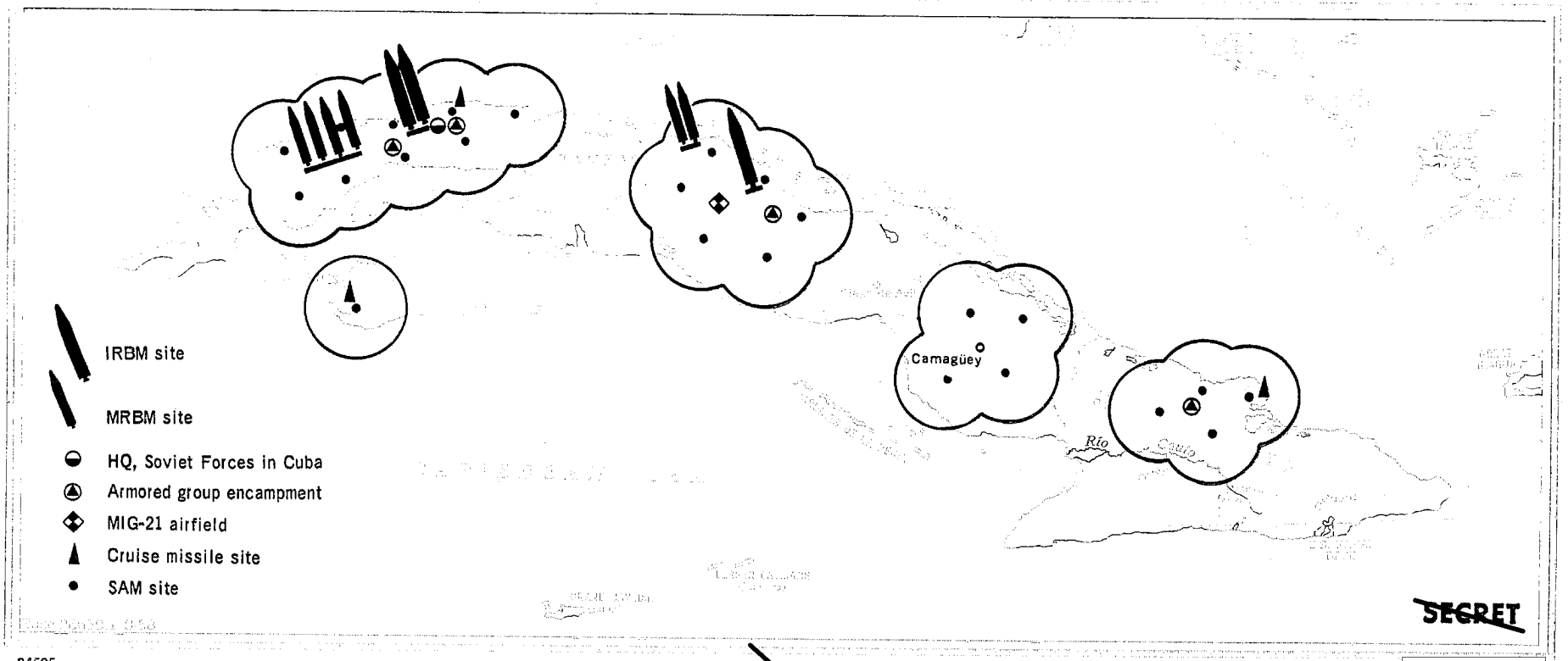




Figure 13



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maximum protection for their installations, the deployment pattern of the SA-2 system probably would have resembled more closely the pattern of defense shown on the map, Figure 13, than the actual manner in which the sites were deployed.

By early 1963 the Soviet authorities had made five principal redeployments of SAM sites.* Four of these represented adjustments of the original concept in order to provide better point defense for Soviet military installations and personnel. From west to east the changes were as follows (see the map, Figure 14**): (a) the Bahia Honda SAM site was moved about 25 nm southeast to Majana, providing better coverage of the armored encampment at Artemisa; (b) the Havana site was relocated to Managua, southeast of Havana, which is closer to the armored encampment at Santiago de las Vegas; (c) the Senado site was moved about 18 nm inland to Camaguey, thereby providing direct SAM coverage for that city, its transport junctions, and military installations; and (d) the Chaparra site was shifted about 10 nm southeast to the vicinity of the Holguin armored encampment and airfield. The significance of the fifth relocation, the movement of the Cabanas site about 10 miles inland to the northwest to Maldonado, is not entirely clear. This shift may have been occasioned by the earlier proximity of the site to Guantanamo or may have been intended to provide better coverage of the eastern approach to Cuba.

### 6. Development of an SA-2 System Capability

The foregoing evidence on the timing of SAM site and support facility emplacement indicates that most of the SA-2 units in western Cuba were emplaced by the first week of September 1962 and that if they were not already in operational status, they could have been made so shortly thereafter. The SAM units and support facilities in the east probably were emplaced during September or the beginning of October and reached operational status before mid-October. Nevertheless, there is no evidence that these sites were activated individually or integrated into a partial or fully developed air defense system until a day or two before the Soviet decision to remove the strategic missiles from Cuba was made public.

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* Later redeployments definitely established a point defense of critical military and civilian targets.

** Following p. 38, below.

There is no apparent reason why the SAM defense system could not have been brought into operation at a much earlier date had the Soviet authorities so chosen. As previously indicated, it is estimated that some 20 to 30 early warning radars were deployed in Cuba before the Soviet military buildup began in late July 1962 and that approximately 150 additional and more sophisticated pieces of radar equipment, much of it associated with the SAM system, were introduced onto the island during the buildup. Moreover, each of the SAM sites has its own communications equipment, and a variety of Cuban communications facilities, particularly the ROCMI network, presumably would have been available to the Soviet authorities at any time before their own communications facilities became operational or as an alternative to establishing their own facilities. Nevertheless, despite the initiation of extensive US reconnaissance overflight activity following 14 October, the first general SAM-associated radar activity did not occur until 26 October, and an integrated air defense command communications system did not appear until 27 October.

In the absence of any evidence suggesting unexpected delays or difficulties in establishing the SAM system, it is concluded that the Soviet authorities did not intend to activate SAM sites as quickly as possible either on an individual basis or in any grouping as they apparently could have done in western Cuba by early September. The SAM deployment program was evidently planned and programed to activate all sites more or less simultaneously, along with the other elements of a complete air defense system that would encompass the entire island, at some time in November. It appears, therefore, that the Soviet leaders had no intention of employing the SAM system in Cuba against US reconnaissance aircraft to prevent detection of the MRBM/IRBM sites under construction and had not even provided for such an eventuality. Thus the general west-to-east phasing of SAM site emplacement probably was not directly related to MRBM/IRBM site construction in western Cuba. Moreover, the fact that the air defense system was not activated by the time the MRBM sites had achieved some degree of combat readiness provides a further indication that defense of these sites was not the primary purpose of SAM deployment in Cuba.

C. Fighter Aircraft

Although early-generation MIG fighter aircraft were first delivered to Cuba in mid-1961 as equipment for the Cuban Air Force,

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*Initial Redeployment of SAM Units in Early 1963 — Emergence of a Point Defense*

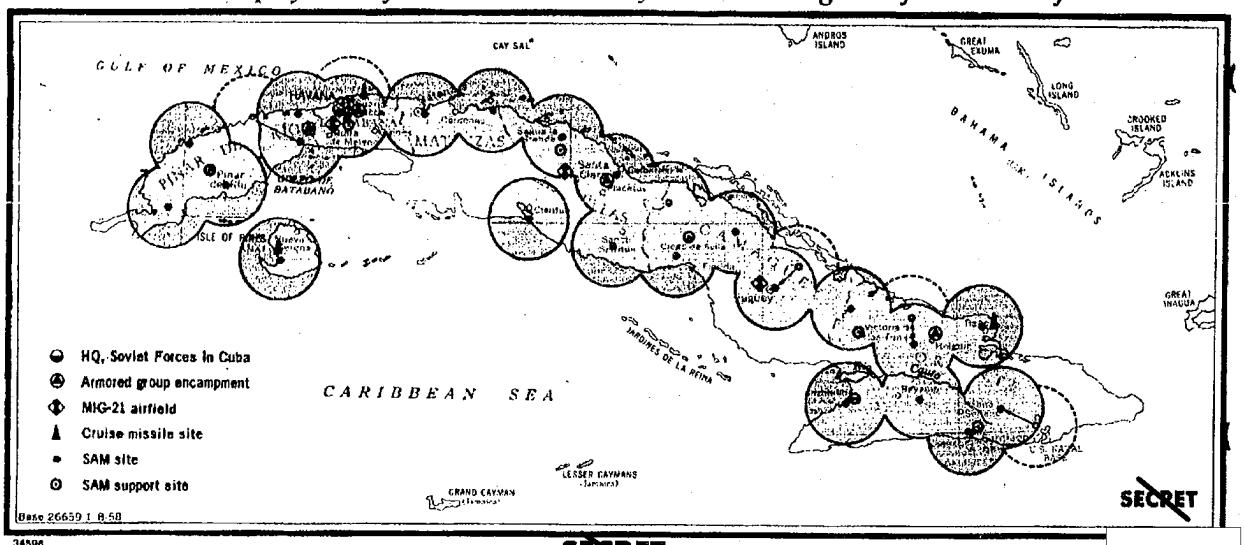


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Figure 14

MIG-21 aircraft (see Figure 15) were introduced concurrently with the other advanced weapons intended to form a complete Soviet military establishment in Cuba. The MIG-21's were the only supersonic (Mach 2)

Figure 15. MIG-21 Aircraft of the Type Deployed in Cuba

fighters in Cuba during the buildup period and apparently were the only ones equipped with missiles. These aircraft were all based at a single airfield throughout the buildup and crisis. In early November, at about the time that the Soviet authorities originally planned to activate a fully operational air defense system, some of the MIG-21's were deployed to two additional airfields.

Photography comprises almost the entire body of evidence pertaining to the introduction and deployment of Soviet fighter aircraft in Cuba. Such evidence indicates that early-generation MIG fighters were first introduced into Cuba in mid-1961, and by August 1962 aerial photography had confirmed the presence of 32 to 36 MIG-15/17 aircraft and 9 MIG-19 aircraft at Cuban airfields.

The deck cargo of two Soviet ships approaching Cuba on 29 August and 4 September included at least 22 MIG-21 aircraft crates. Offloading of MIG-21 crates was observed to be taking place at the port of La Isabella on 5 September, and at that time a third Soviet ship carrying MIG-21 crates was known to be nearing Cuba. The first assembled

MIG-21 was photographed on 5 September at Santa Clara Airfield, and on 17 October a total of 39 MIG-21 fighters was found to be located there.*

Photography also indicates that all the MIG-21's were offloaded at the port of La Isabella and shipped directly to the Santa Clara Airfield, where they were assembled and where all, or virtually all, of them remained through the end of October. Deployment of these aircraft was initially observed when photography of 4 and 5 November disclosed that about half of them had been dispersed to Camaguey and San Antonio de los Banos Airfields, thus supplementing the earlier generation MIG aircraft deployed at those airfields and better balancing the distribution of fighter strength on the island.

The first indication that MIG-21 aircraft were operating was obtained on 9 October 1962, when a nonmilitary radio station in the vicinity of Santa Clara made an announcement (the first of its kind) that supersonic aircraft flying in the area that day had been breaking the sound barrier over Santa Clara Province. Confirmation of MIG-21 flights was obtained on 18 October, when a MIG-21 aircraft was photographed taking off from Santa Clara Airfield.

Photography of 10 and 12 November disclosed that at least 11 MIG-21's were armed with infrared, air-to-air missiles (designated AA-2 by Western intelligence) (see Figure 16),

Because air-to-air missiles are believed to be part of the standard equipment for these aircraft, all 42 MIG-21's in Cuba probably are so equipped, but there is no direct evidence to indicate the number of such weapons actually introduced into Cuba. It is known, however, that the Soviet authorities contracted to provide 10 AA-2 missiles for each MIG-21 aircraft sold to the Iraqi government, and had the same ratio held true in Cuba, more than 400 AA-2 missiles would have been delivered.

* Based on the totality of photographic evidence available to the present date and the near certainty that no additional aircraft have been shipped to Cuba since the imposition of the US quarantine, 110 MIG aircraft are considered to have been in Cuba at the time of the Soviet decision to withdraw their missiles on 28 October, as follows: MIG-15/17, 56; MIG-19, 12; and MIG-21, 42.

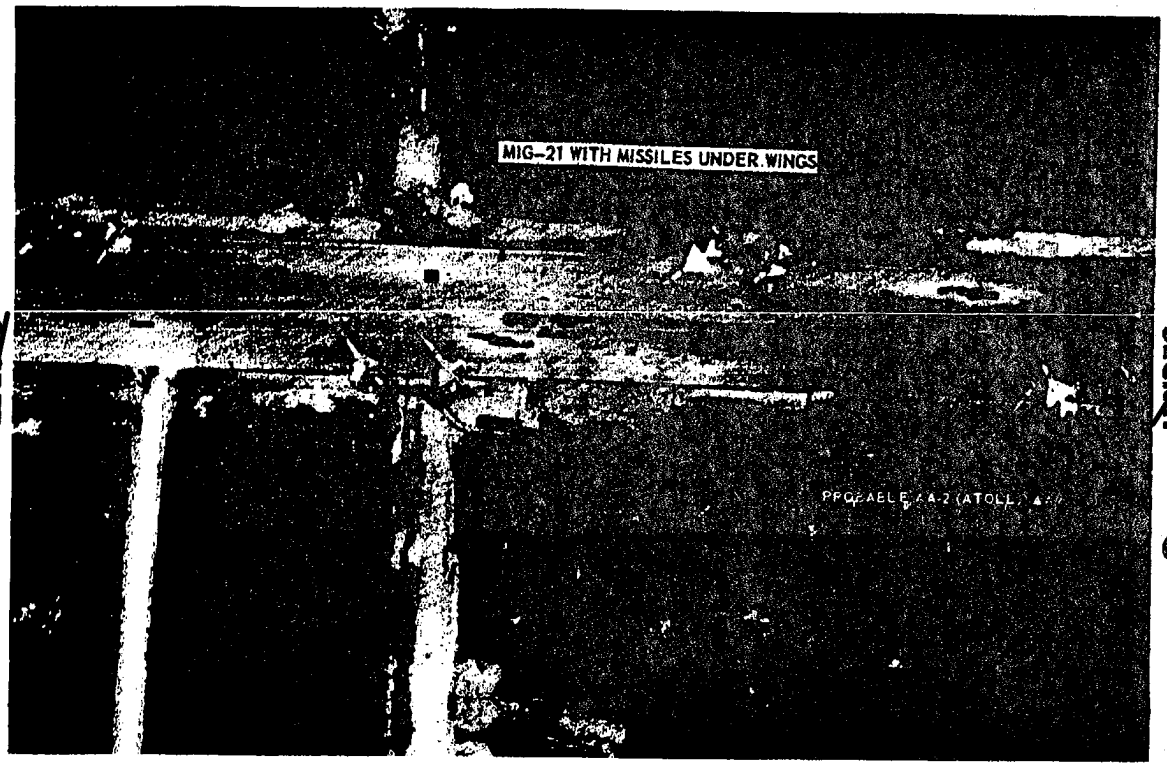


Figure 16. MIG-21 Aircraft at Santa Clara Airfield Armed with AA-2 Missiles, 10 November 1962

## IV. Naval and Ground Systems

### A. Coastal Defense Missile Systems

Four Soviet cruise missile units were debarked in Cuba as part of the first wave of the Soviet military buildup. Three were immediately deployed to coastal areas, where two probably were operational by mid-August and the third by early September. The fourth unit was temporarily deployed during the crisis. The early deployment of the three permanently sited units and the temporary deployment of the fourth provided coverage of the seaward approaches to many of the Cuban beaches most suitable for large amphibious landings.

A photograph of the cruise missile site at Siguanea (see Figure 17*) shows the typical layout of all the Cuban sites. The configuration of the site remains unchanged regardless of the degree of site refinement.

This system employs the aerodynamic missile designated KENNEL, AS-1, the identification having been positively made from photography of the cruise missiles displayed in the parade of 2 January 1963 in Havana (see Figure 18*). Based on an assessment of the radar capability of the system, a probable range of 30 to 35 nm has been estimated. However, because the range to which a given site can fire using its organic radar is a function of the altitude of the site and the height of the surface target, the range to which the sites in Cuba can fire effectively is estimated to be from 23 to 32 nm.

#### 1. Offloading of Coastal Defense Units and Equipment

There is no direct evidence concerning the arrival of the first cruise missile units in Cuba. Photography of 5 August 1962, however, disclosed the presence of unidentified equipment at the Santa Cruz del Norte site and of unidentifiable objects in the area of the Banes site. Photography of 29 August, which revealed the presence of operational cruise missile sites at both locations, leads to the conclusion that the equipment and objects noted earlier were associated with cruise missiles. Because these sites were not yet operational on 5 August, it is concluded that the units and their associated equipment had arrived only recently, probably on or about 1 August 1962.

* Following p. 42, below.

Missiles and associated equipment were noted in the Campo Florido area in photography of 29 August, and the presence of an operational cruise missile site at Siguanea on the Isle of Pines was disclosed by photography of 29 September. Equipment for both these facilities probably arrived in Cuba some time during the month of August.

Although the ports at which cruise missiles and equipment were offloaded cannot be identified, it is assumed, because of the proximity of both the Santa Cruz del Norte site and the Campo Florido unit to the port of Havana, that the equipment and missiles for these locations were offloaded there. Equipment for the Banes site probably was offloaded at the port of Banes. It is believed, because of the shallowness of the coastline around the Isle of Pines, that the missiles and equipment for the Siguanea cruise missile site (as well as the SAM site) probably also were unloaded in the Havana area, shipped across Cuba, and transported by ferry to the Isle of Pines. Supporting this contention, an informant reported that from 27 August to 5 September, the date on which his observation ended, a ferry boat made "continuous runs" to the Isle of Pines carrying Soviet troops and military equipment, including radar equipment.

2. Timing of Deployment of Individual Sites

During the buildup and crisis period, there were only three permanently located operational cruise missile sites in Cuba -- at Banes, at Santa Cruz del Norte, and at Siguanea on the Isle of Pines. The fourth cruise missile unit, initially located at Campo Florido, probably was deployed temporarily during the crisis at La Sierra and then returned to Campo Florido. *

Although the equipment emplaced at Campo Florido was deployed in an operational mode and apparently interconnected by cabling, the inland location of this unit and the trees surrounding the area make it most unlikely that the unit was in a position to fire. In addition, the lack of equipment revetments, on-site troop housing facilities, the proximity of the site to the Santa Cruz del Norte site, and a subsequent analysis which determined that the launchers were oriented toward Havana indicated that another function, possibly training, was assigned to this site. In this regard it was noted that an adjacent "institutional"

* The unit at Campo Florido was absent during the time that a unit was deployed at La Sierra.

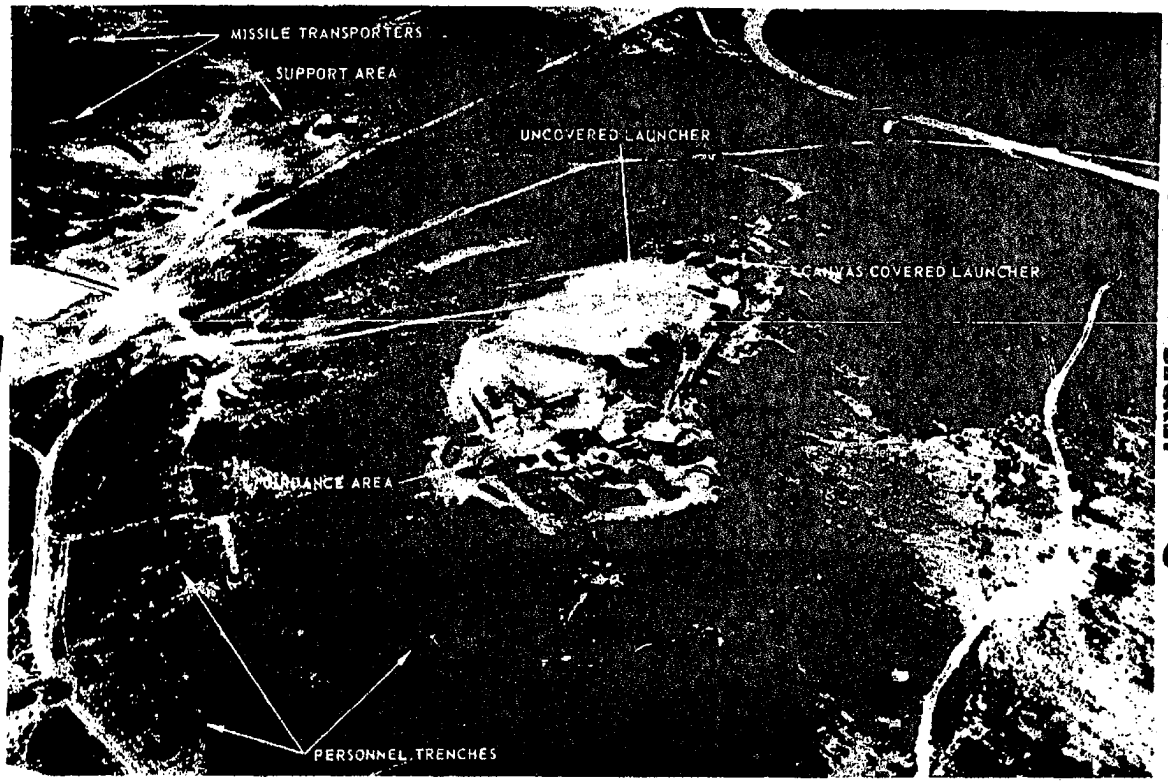


Figure 17. Cruise Missile Site at Siguanea -- a Typical Unit Emplacement Pattern, 9 November 1962

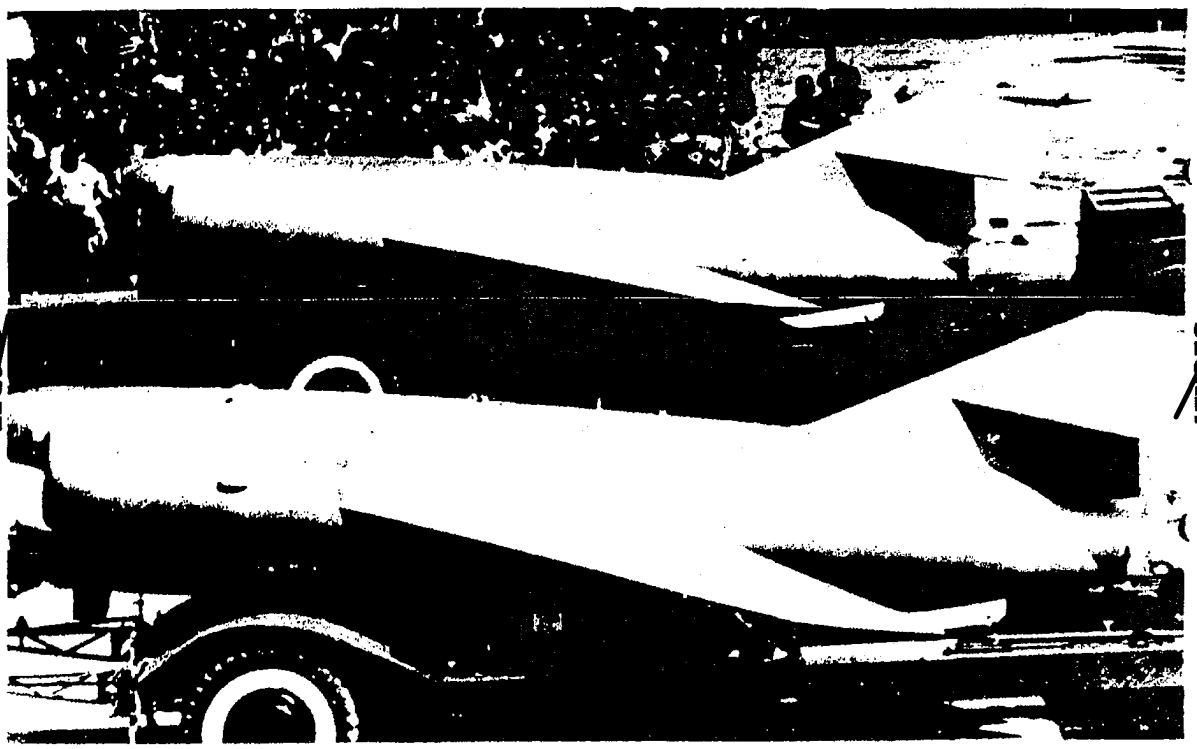


Figure 18. Cruise Missiles on Display in the Havana Parade of 2 January 1963

facility composed of 15 main buildings appeared adequate to serve the several purposes of troop housing, administration, and training.

Because of the dissimilarities noted between the unit situated at Campo Florido and the sites at other locations, the following discussion of the time required to deploy an individual unit and develop a site is limited to photographic evidence concerning the three permanently located operational sites and the operational site that was temporarily located at La Sierra.

As previously mentioned, equipment was first observed in the area of the Santa Cruz del Norte and Banes sites on 5 August. Both sites were next observed and apparently were operational on 29 August, with all equipment present and properly emplaced. Further development and refinement of these sites, consisting primarily of completely revetting the major pieces of equipment, continued for some time thereafter. The Siguanea site on the Isle of Pines was operational when first observed on 29 September. Refinement of this site continued slowly through 9 November, when all major elements of the system had been revetted and extensively camouflaged with netting and canvas.

The La Sierra site was operational when first observed on 4 November. At that time this site had its equipment in place and its cabling connected, but site refinements were limited to revetments for electronic equipment. The revetting of other positions at the site was later observed to be underway, but by 28 November all the equipment, with the exception of one possible missile transporter/loader and three arch-roofed vehicles, had been moved from the site. If, as seems most probable, the unit deployed at La Sierra came from Campo Florido, then it is a fact that this unit was packed up, moved 240 kilometers (150 statute miles), and deployed in an operational condition during a time span of 9 to 10 days. Therefore, the Banes and Santa Cruz del Norte sites probably were operational by mid-August, and the Siguanea site probably was operational by late August or early September.

The evidence clearly indicates that this weapons system is transportable and capable of relatively rapid deployment. In addition, it seems evident that the Soviet authorities, in fact, did place their three permanently situated sites in an operational condition quickly, although subsequent site refinements (particularly revetting) proceeded at a much slower pace. It should be noted, however, that once a site has been

placed in an operational condition, subsequent refinements do not improve the operational capability and so may be effected at any pace desired.

3. Evidence of Intent to Deploy Additional Units

Approximately 100 cruise missile crates were identified in photography of October-November 1962 and early 1963 of probable storage areas at Mayari Arriba, Guerra, and Santiago de Cuba (see Figure 19). The bulk of these crates probably were delivered by four ships that were observed between 26 September and 10 October carrying a total of 62 cruise missile crates to Cuba. By that time the deployed units already had missile crates on hand, and there is no evidence that they have received additional crated missiles subsequently.

Because missile transporters also were observed at Mayari Arriba and Guerra and because later photography disclosed the presence of two launchers at Mayari Arriba, it is probable that at least part of the cruise missiles at these locations were intended to equip additional units. Even in retrospect, however, it is impossible to determine whether Soviet or Cuban personnel were intended originally to receive this equipment.

There have been some indications since the crisis that control of the coastal defense missile system will eventually be turned over to the Cubans and this transfer may have been the Soviet intention from the outset, with Soviet units being deployed initially to provide an interim capability against amphibious operations while Cuban units were being trained. An informant has reported that in December 1962 he was offered a naval post as commander of Cuban coastal defense forces, including the cruise missiles. In addition, during the Havana parade of 2 January 1963 the Cuban television announcer indicated that the cruise missiles passing by were associated with Cuban military units, demonstrating Soviet willingness at the time to have the weapons publicly associated with Cuban forces.

B. Komar-Class Patrol Boat Missile System

Komar-class (missile) patrol boats were first observed while being offloaded in Cuba during the second week of August 1962, about 2 weeks after SAM and cruise missile equipment began arriving in Cuba.

These vessels are similar to motor torpedo boats, but each carries two short-range cruise missiles (of about 10 to 15 nm). Analysis of photography of deck cargo on Soviet ships indicates that 12 Komar-class boats were delivered to Cuba aboard the following four ships, as follows:

| Delivering Freighter | Number of Komar-Class Boats | Date of Delivery 1962 |
|---|---|---|
| Dvinoles | 2 | 12 August |
| Severoles | 2 | 17 August |
| Sovetskaya Gavan | 4 | 20 August |
| Fizil Lebedyev | 4 | 16 September |

All of the boats were based initially at the port of Mariel. However, four were transferred to Banes between 16 and 18 October, where they remained throughout the crisis period (see Figure 20*). The first sighting of a Komar-class boat at sea was reported by the Navy in the vicinity of Mariel on 29 August. Subsequently they were seldom observed out of their port areas, and none was observed with uncovered missile launchers.

Support facilities for these boats have not been identified in photography. It is believed, however, that the Soviet authorities made use of existing support facilities for the Soviet-built motor torpedo boats that have been operating in Cuban waters since early 1962, inasmuch as the Komar-class boats are essentially a modified version of that type of boat.

There is no direct evidence as to the number of P-15 missiles delivered to Cuba for the Komar-class boats. However, an agreement between Indonesia and the USSR calls for 96 such missiles and 12 Komar-class boats. Since the same number of Komar-class boats are in Cuba, 96 P-15 missiles also may have been delivered. Such an arrangement would provide for eight missiles per boat, two on launchers aboard each vessel; the remaining six would be held in reserve at the port facility because the Komar-class boats are not equipped to stow additional missiles.

* Following p. 46, below.

C. Submarines

The establishment of Soviet submarine bases in Cuba was the subject of many clandestine reports received before the October crisis. Banes and Mariel were among the more frequently mentioned locations. However, there is no evidence that substantiates these reports in any way. It is possible that the installation of the cruise-missile facilities in the vicinity of Banes and on the Isle of Pines and the basing of the Komar-class boats at Banes and Mariel may have given rise to some of these reports. In addition, the public announcement on 25 September 1962 of a Soviet-Cuban agreement to construct a joint trawler base resulted in several subsequent reports to the effect that the base would provide submarine support facilities.

On the other hand, it is estimated that four F-class long-range torpedo-attack submarines (see the photograph, Figure 21) were deployed about the beginning of October from northern fleet waters to the Western Atlantic This date of deployment correlates with the general Soviet military buildup in Cuba and indicates that it was not specifically related to the US quarantine imposed on 24 October. This deployment assumed additional significance because, in the past, the USSR had seldom deployed even single submarines in the western Atlantic. Logistical support for the submarines appears to have been provided during the period 11 October - 21 November by the Soviet naval auxiliary Terek, which was sighted in the North Atlantic and whose track ran to within 700 miles east of Bermuda. There is no known instance of any of these submarines entering Cuban ports.

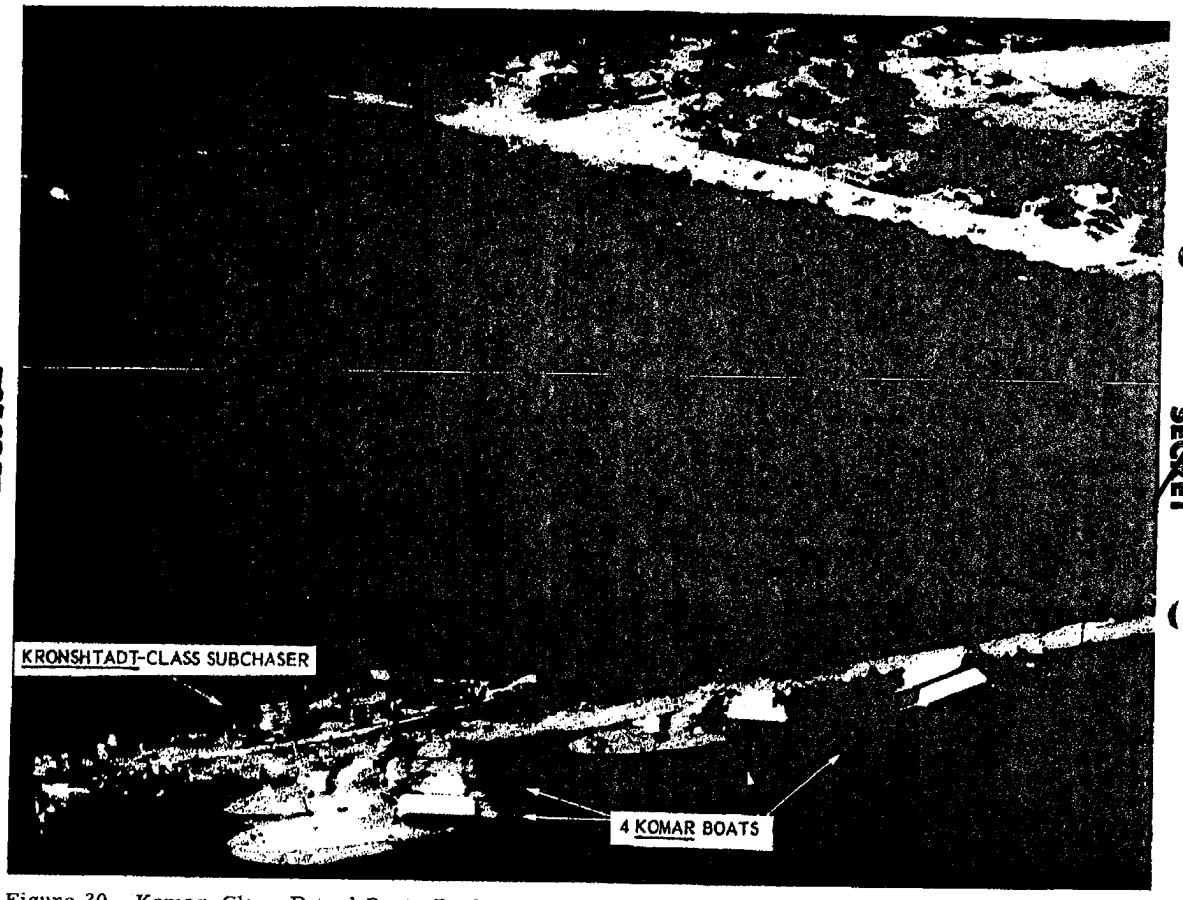


Figure 20. Komar-Class Patrol Boats Deployed to Banes During the Crisis Period, 3 November 1962

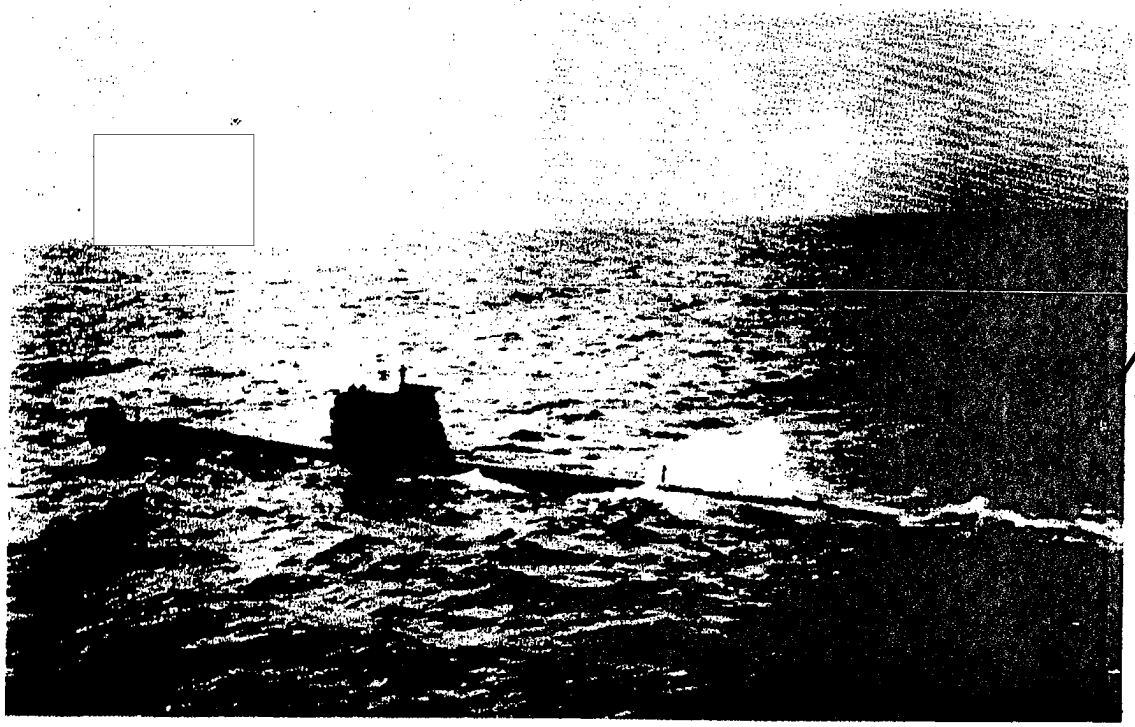


Figure 21. Soviet F-Class Submarine Under Surveillance by US Destroyers in the Vicinity of the Cuban Quarantine Zone, 11 November 1962

Based on this evidence, it seems probable that the Soviet authorities were using facilities in Cuba in limited support of submarine operations in the Western Atlantic. However, there is no conclusive evidence that the Soviet authorities intended to use Cuban ports as bases for either submarines or tenders.

D. Soviet Ground Units

Four highly mobile, Soviet armored combat groups were deployed in Cuba during the buildup period. These forces were located initially and with one exception remained during the crisis period at the following locations: Artemisa, Holguin, Remedios, and Santiago de las Vegas (see the photograph, Figure 23*). ** The numbers and types of equipment deployed at each of these encampments were basically similar and among the most modern of Soviet ground combat weapons. Each group was composed, with minor variations, of a combination of the following units: a medium tank battalion, an armored reconnaissance company, an infantry unit possibly of battalion strength, a multiple rocket launcher battery, a free-rocket-over-ground (FROG) artillery battalion with two launchers, *** and an antitank missile (SNAPPER) company with about nine triple launchers (see the photograph, Figure 24,* and for an example of FROG missiles, see the photographs, Figure 25*). At least one of the armored groups (located at Holguin) also included a 120-mm mortar company with 10 mortars, a 57-mm antitank gun battery, an antiaircraft unit with self-propelled twin 30-mm or twin 57-mm guns, and an engineer unit with self-propelled hydraulic bridging equipment. Some of this equipment also was known to be deployed with the other three armored groups, but because of canvas coverings, dispersal of equipment, and foliage cover in the area, the exact quantities could not be ascertained from photography.

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* Following p. 48, below.

** The armored group located at Remedios evidently was deployed outside the encampment area during a period from approximately 26 October to 3 November.

*** This weapon is mounted on an amphibious tracked chassis and is estimated to have a range of 11 to 26 nm and to be capable of employment with either a conventional or a nuclear warhead. Such weapons were not identified at Holguin.

Collateral sources reported the offloading of Soviet personnel and ground equipment at the ports of Mariel and Bahia Honda as early as the last week in July. During the first week of August, other collateral reports indicated the movement of small Soviet convoys in the area of Santiago de las Vegas and a number of other points on the island. However, owing to the imprecision of reporting and the wide variety of Soviet activity throughout Cuba, it is not possible to determine whether the observed convoys included units later deployed with the armored groups.

Subsequent collateral reporting may have reflected the movement of Soviet troop units in the other three areas to which armored groups were deployed. On 25 August an informant reported seeing a convoy of armored equipment driven by Soviet personnel moving toward the city of Caibarien (located near the Remedios armored group area). A similar report indicated that Soviet trucks, tanks, and artillery pieces continued to move into this same general area until at least 26 September. In the Holguin area a convoy was observed on 19 September that reportedly contained jeeps, trucks (of a type unknown) with "mounted rocket launchers," trucks pulling howitzers, heavy Soviet tractor trucks with flatbed trailers carrying what resembled T-54 Soviet medium tanks, and other heavy trucks carrying crates and boxes of assorted sizes. This convoy was heading east on the Central Highway in the direction of Holguin and may have been part of the armored group. The sighting of a convoy including large and medium-size tanks and trucks of various descriptions was reported in the Artemisa area on 27 September. As described, however, it is impossible to determine whether the tanks were part of an armored group or were simply accompanying the other vehicles in the convoy, which were carrying construction materials possibly destined for some other Soviet activity.

During August and September, sightings of armored equipment and Soviet troop movements also were noted in other locations throughout Cuba. In the Guasimal area, which is near the Sancti Spiritus SAM site but more than 50 miles from the nearest armored group at Remedios, a convoy consisting of "antiaircraft guns, self-propelled guns of various lengths, canvas-covered trucks, and motorcycles" was seen moving down the highway away from Remedios. Soviet equipment and personnel also were observed in the Guantanamo district and near the Matahambre mines in Pinar del Rio Province.

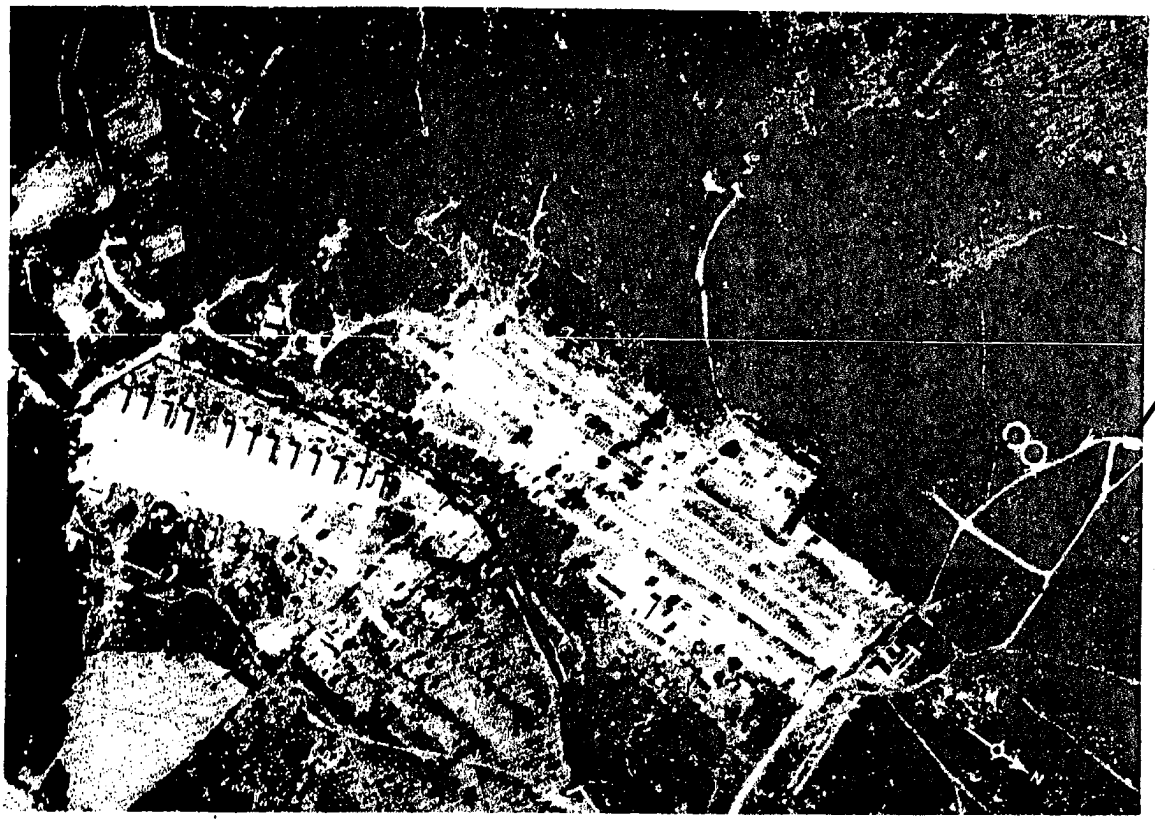

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Figure 23. Soviet Armored Combat Group Encampment at Remedios, 1 February 1963

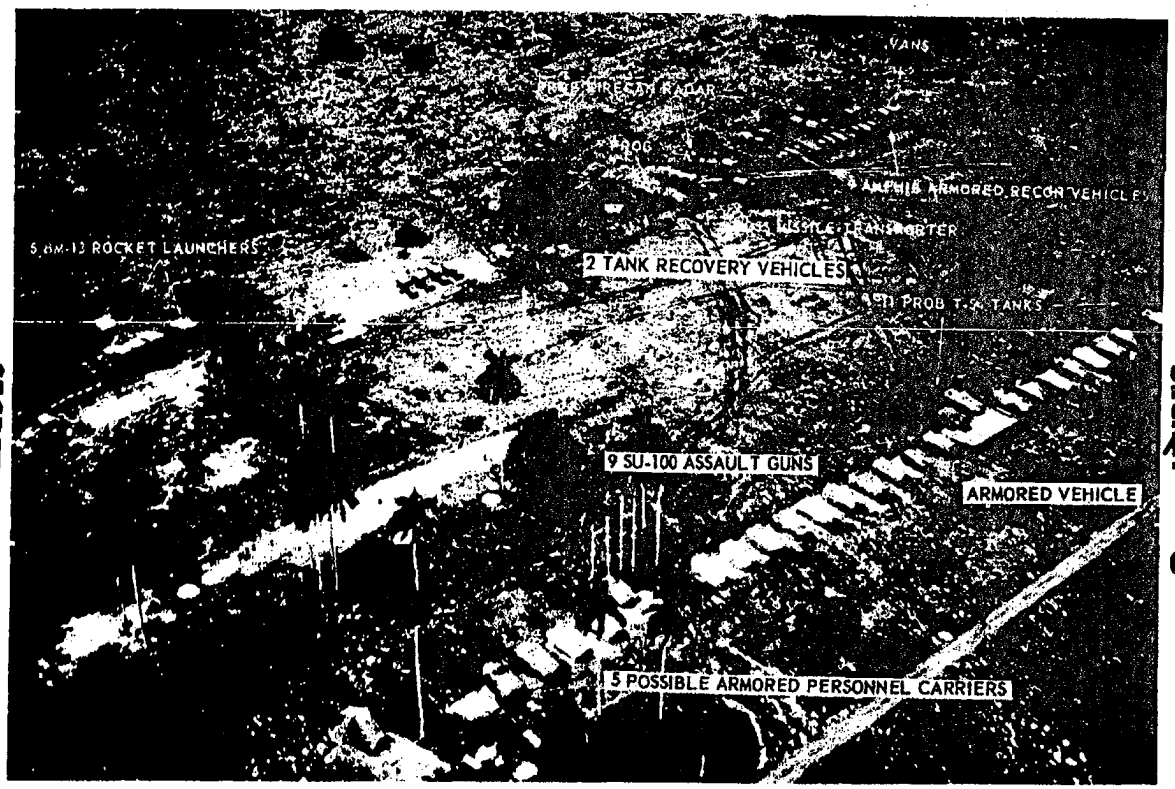
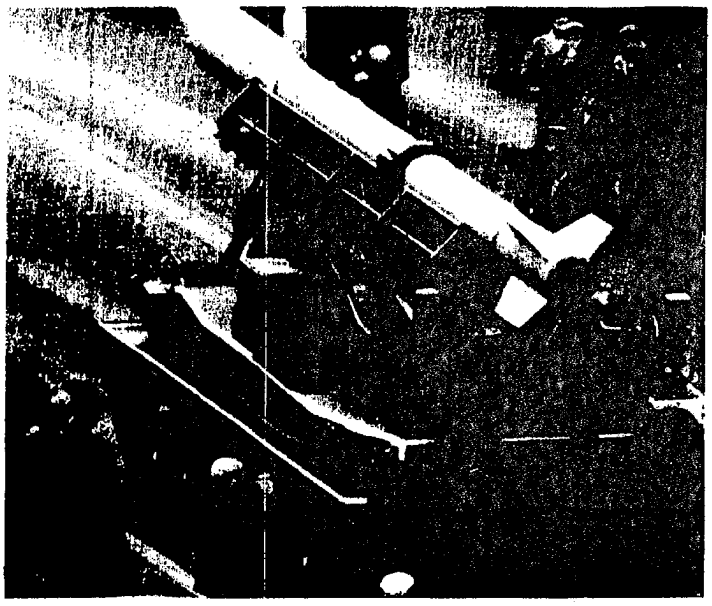



Figure 24. Part of the Armored Equipment Located at the Remedios Encampment During the Crisis Period, 25 October 1962



FROG-3

FROG-4

Figure 25. FROG Missiles on Display in Moscow

In sum, because collateral sources continually reported observations of Soviet equipment and personnel moving throughout Cuba after the end of July, it is not possible to determine the point in time or the ports at which personnel and equipment associated with the four armored groups arrived in Cuba. For the same reason, it is impossible to determine from collateral reporting even the approximate dates on which they were deployed at their encampments. Photography does make it possible, however, to determine dates prior to which the encampments did not exist. When those dates are combined with dates of first observation in photography, a time span is established during which the armored groups must have been deployed. These dates are presented in the following tabulation:

| Armored Group | Negation Date 1962 | Date of First Observation 1962 |
|---|---|---|
| Artemisa | 29 August | 17 October |
| Santiago de las Vegas | 29 August | 25 October |
| Remedios | 5 September | 17 October |
| Holguin | 29 August | 17 October |

The four groups were situated in areas that contained military installations of varying interest to the Soviet authorities (see the map, Figure 12*). Three were deployed from 12 to 36 miles from the sites of long-range missile bases. One of these groups also was located 9 miles from the Soviet military headquarters at Torrens. The fourth was approximately 6 miles from the airfield at Holguin, where nine Il-28's were to have been deployed. This deployment, therefore, would not have been inconsistent with a Soviet desire to defend certain of their installations against US attack and also may have been intended to provide some measure of security against "counterrevolutionary" activity. However, the relatively small size of each encampment, the distance from the missile sites, and the absence of major military installations near the Holguin encampment suggest that these groups may have been located for the more general purpose of supporting the entire Soviet military presence on the island. In this regard the deployment of a group at Holguin is particularly interesting because its location there would afford control over the network of major roads in the eastern end of the island.

* Following p. 36, above.

V. Offensive Systems

At the time of President Kennedy's speech on 22 October, there were six Soviet MRBM sites established in Cuba, four near San Cristobal and two near Sagua la Grande (see the map, Figure 12*), containing a total of 24 launch positions. The missiles and other unit equipment then at the sites had been delivered to Cuba aboard five or six large-hatch ships that arrived between approximately mid-September and mid-October. (For a photograph of a Soviet MRBM, see Figure 26.)

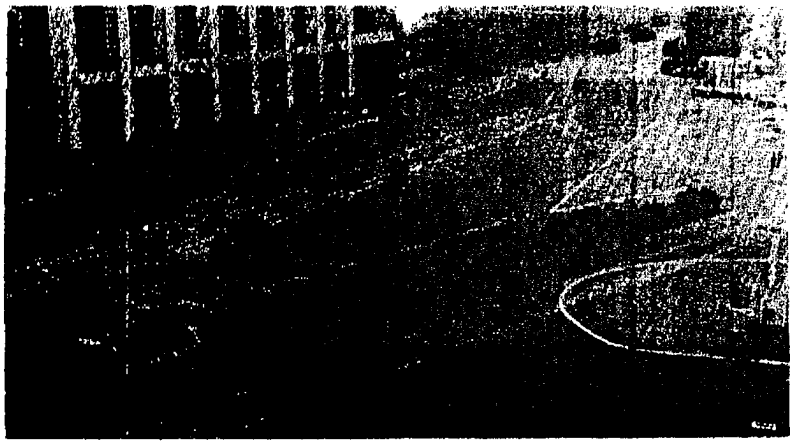


Figure 26. Soviet MRBM on Display in the Moscow Parade of 7 November 1960

Although work was still in progress at the sites, and the Soviet timetable apparently did not call for their completion until some time during the first half of November, some if not all of them probably were capable of launching their full initial round of four missiles. The principal uncertainty regarding their operational status concerns nuclear warheads for the missiles, and the evidence remains inclusive as to whether MRBM warheads had arrived in Cuba prior to the US quarantine.

On the other hand, the three IRBM sites, two near Guanajay and one near Remedios, were in the mid-to-late stages of construction, and none was operational. No missiles were present on the sites, nor were most major items of system equipment. The first shipment of missiles and equipment almost certainly was en route to Cuba when the US quarantine was imposed.

* Following p. 36, above.

The third offensive weapon system being deployed in Cuba in October, the Il-28 light bombers, evidently was not regarded by the Soviet authorities as an integral part of their military buildup in Cuba. These aircraft almost certainly were intended for the Cuban Air Force and, at the rate at which they were being assembled, would not all have been operational until about March 1963.

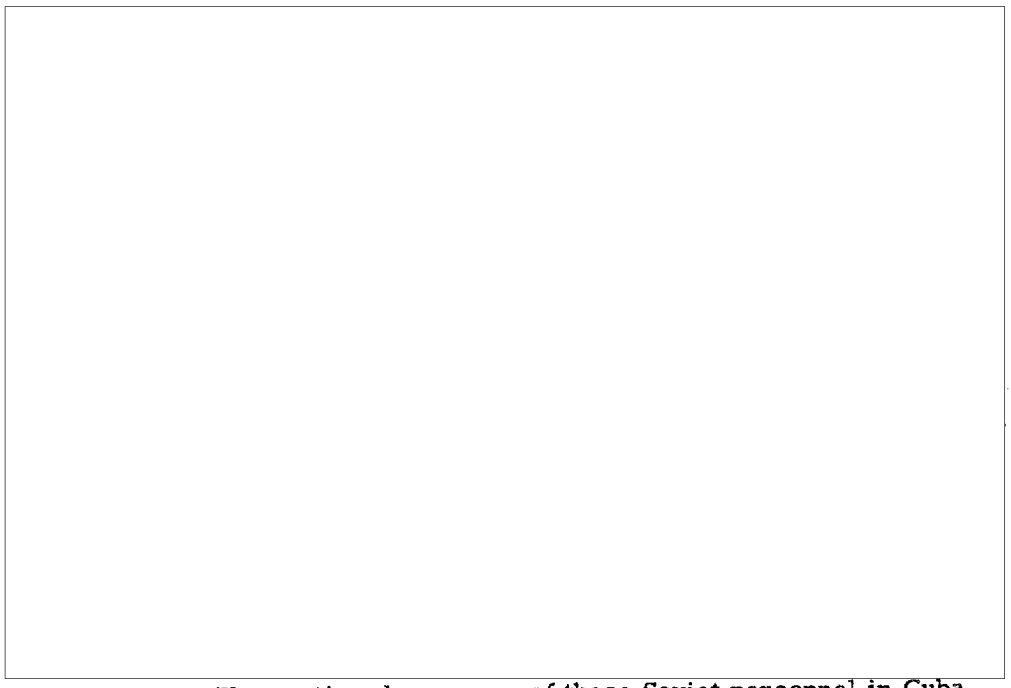
A. MRBM System

1. Origin of the MRBM Units

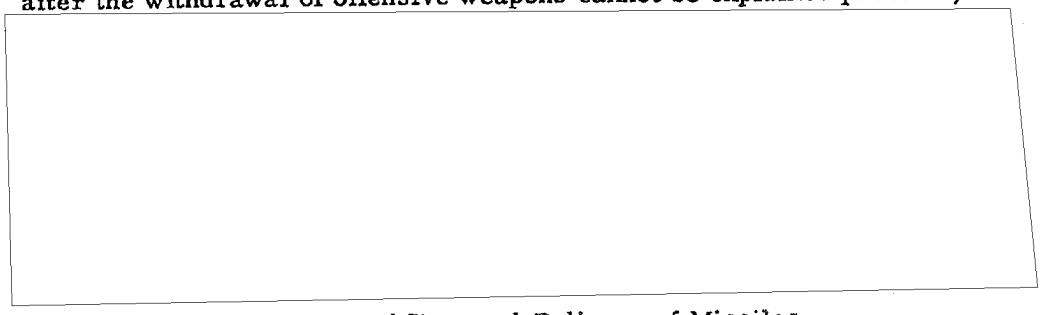
The movement of Soviet military forces from one continent and closed society to another produced virtually no evidence concerning the specific points in the USSR from which various units departed. The few pieces of indirect evidence regarding this problem are derived from the movement of large-hatch ships.

The movement of Soviet large-hatch ships from the USSR to Cuba indicates that MRBM units came from an area fairly near the Black Sea. An examination of these ship arrivals in Cuba reveals that all but one of those which docked in Cuba during the time period when MRBM's probably were delivered (mid-September to mid-October 1962) began their journey from a Black Sea port.

* See p. 16, above.

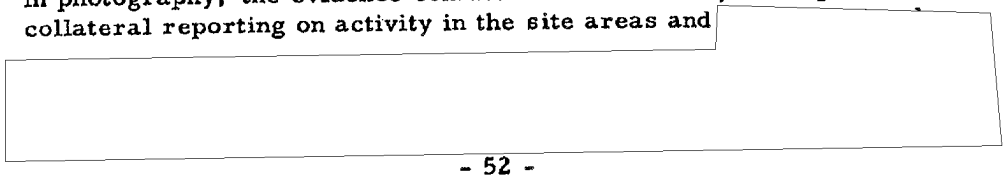


The continued presence of these Soviet personnel in Cuba after the withdrawal of offensive weapons cannot be explained precisely.



2. Preparation of Sites and Delivery of Missiles

Before mid-October, when the sites were first identified in photography, the evidence consists almost entirely of fragmentary collateral reporting on activity in the site areas and



photographic information on shipping activity; after mid-October, virtually continuous photographic coverage is available. Although it is not possible to determine from this information the precise time phasing of the MRBM sites, the evidence is sufficient to identify the approximate dates of significant stages of MRBM deployment.

The firmest information bearing on the beginning of activity at the MRBM sites is provided by photography of 29 August covering the area of all four sites near San Cristobal and of 5 September covering the two Sagua la Grande site areas. This coverage established that no activity had occurred in any of the site areas by those dates which is identifiable, even in retrospect, as being associated with preparation of the MRBM sites. It thus established the "negation dates" for all six sites. The photography indicates conclusively, for example, that improvements on the access roads to the Sagua la Grande sites, which are clearly visible in photography of mid-October, had not been started by 5 September. In addition, photography of 29 August and 25 September negates, respectively, two key MRBM support facilities that are discussed in succeeding sections of this study: the Punta Gerardo missile oxidizer transshipment facility and the Mariel Naval Air Station nosecone and/or warhead receiving facility.

On the other hand, a variety of collateral reports and other evidence indicates that the site areas either had already come under Soviet control, or were about to, by these dates and that the reconnaissance missions probably preceded by only a few days the actual beginning of site preparation activities. During the last half of August, farmers reportedly were being evicted from the area where San Cristobal Site 3 was later located. Evictions also were reported to have occurred in the vicinity of San Cristobal Sites 1 and 2 during the first week in September. No reports were received concerning evictions in the area of the Sagua la Grande sites, but collateral information indicates that some construction, or preparation for construction, was being carried out by Soviet personnel in the area no later than the second week in September.

The most plausible information available converning the first delivery of MRBM's or system indicates that at least eight missiles arrived in the San Cristobal area about 18 September and that they probably were delivered directly from Mariel, the port of entry.* It is known

* A single informant reported the movement on 12 September of 20 missiles 70 to 75 feet long from a Havana [footnote continued on p. 54]

the Poltava, a large-hatch ship of the type used to transport the MRBM's on their transporters as hold cargo, was docked in Mariel on approximately 16 September. Collateral sources reported that probable MRBM's were unloaded at the port some time preceding the night of 17 September. Other collateral reports describe the night journey of a convoy carrying at least eight MRBM's through various towns along the main route from Mariel to the vicinity of San Cristobal Sites 1 and 2 during the night of 17-18 September. The only other case in which a ship arrival can be associated directly with the delivery of missiles to a site concerns the arrival of the Omsk, another large-hatch ship, in Mariel about 16 October and the identification of seven missiles in photography of 19 October of San Cristobal Site 4, where no missiles were visible the previous day. These two shipments, which account for more than half of the MRBM's later withdrawn from the San Cristobal area, indicate that the MRBM's were unloaded promptly and delivered from port to site within 3 or 4 days. These shipments also may represent, respectively, the first and last completed MRBM deliveries to Cuba. Tending to confirm this timing of missile deliveries was the construction of the secure missile oxidizer transshipment point at Punta Gerardo between the photographic coverage of 29 August and that of 25 September.

Although it is not possible to trace the shipment from ports to sites of the additional 27 missiles withdrawn from Cuba in early November, it is possible to establish with a fair degree of assurance the ships on which they must have arrived. The only Soviet vessels capable of carrying MRBM's below deck, where they could be protected from exposure and damage, were three classes of large-hatch ships (see the photographs, Figures 27 and 28). The arrivals of all such ships in Cuba from the beginning of the buildup to the crisis period are listed in Table 1.* As the table indicates, the six large-hatch ships that arrived**

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dock to a Cuban military air base in the western part of the city. Although the missiles described could reasonably have been MRBM's, several facts cast doubt on the credibility of this report. Missiles being delivered to the San Cristobal site area could have been offloaded at a closer port (Mariel), and the possibility of subsequent observation could have been materially reduced. The number of missiles reported was too large for a single ship to have delivered, and the only large-hatch ship near Cuba at that time probably was not in Havana harbor.

* P. 55, below.
** Text continued on p. 57.

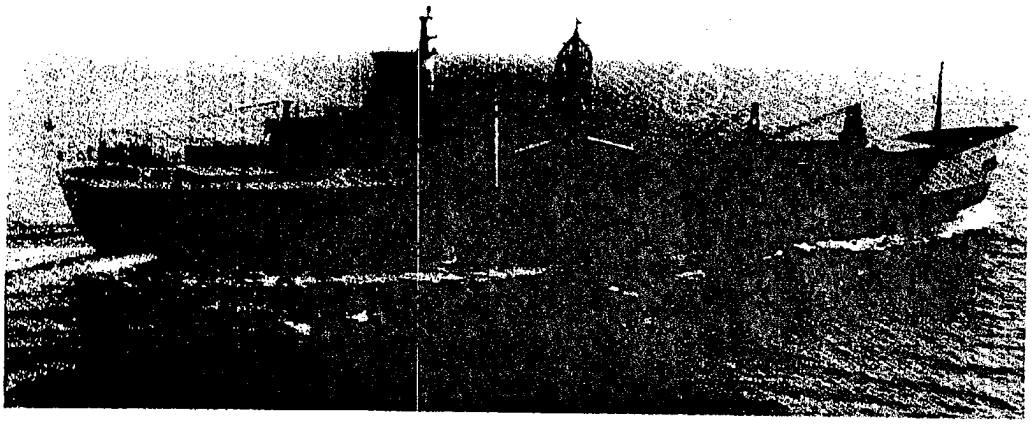

Figure 27. Soviet Large-Hatch Ship Kimovsk Approaching Cuba on 21 September 1962*

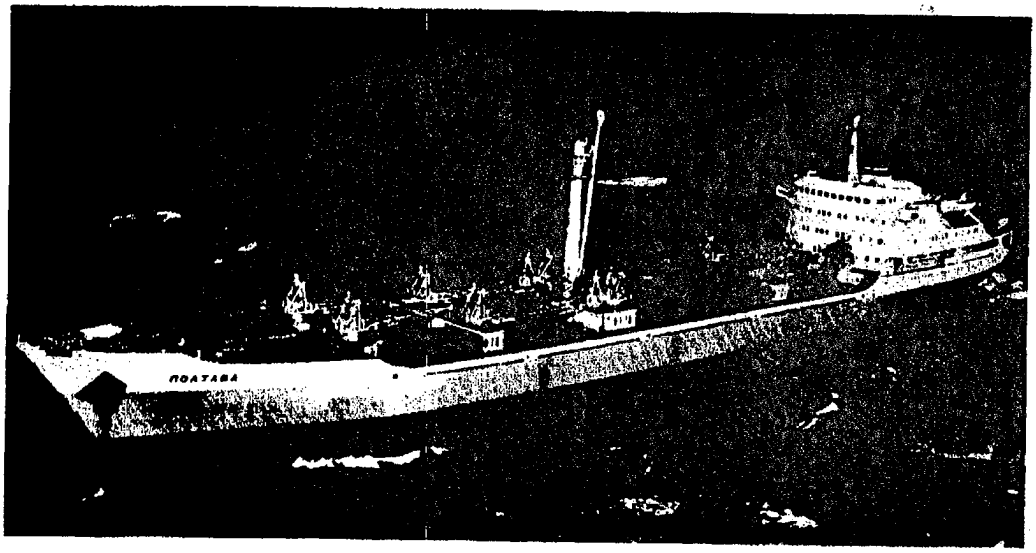


Figure 28. Soviet Large-Hatch Ship Poltava Returning to the USSR on 31 October 1962 After Imposition of the US Quarantine*

* Light loading (indicating military cargo) is suggested by the distance of waterlines above the water.

Table 1

Arrivals of Soviet Ships in Cuba
with Holds Capable of Carrying
Medium-Range Ballistic Missiles
July-October 1962

| Date | Ship | Port | Known or Suspected Cargo | Comment |
|---|---|---|---|---|
| 28 July | Omsk | Mariel area | Military equipment (on deck) | Probably not a missile carrier a/* |
| 2 August | Poltava | Unknown | Military equipment b/ | Probably not a missile carrier a/ |
| 10 August | Kimovsk | Unknown | Military equipment b/ | Probably not a missile carrier a/ |
| 21 August | Krasnograd | Mariel | Construction equipment | Probably not a missile carrier a/ |
| 29 August | Orenburg | Casilda | Land armaments | Probably not a missile carrier. a/ Photography of 29 August disclosed that 23 tanks/self-propelled guns and 36 other vehicles were being unloaded from the deck and hold No. 1. The large-hatch hold had not been unloaded. |
| 2-10 September | Omsk | Unknown | Military equipment, possibly including missiles b/ | Possibly a missile carrier by virtue of its time of arrival. Although information concerning the movement of this ship is conflicting, it apparently docked at a central Cuban port, probably either La Isabella on the north coast or Casilda on the south coast. |
| 16 September | Poltava | Mariel | Military equipment, probably including 8 MRBM's c/ | Collateral reporting indicates that eight MRBM's were transported from Mariel through Artemisa, Candelaria, and San Cristobal to the vicinity of San Cristobal MRBM Sites 1 and 2 during the night of 17 September and the early morning of 18 September. |
| 20 September | Okhotsk | Havana | Agricultural equipment | Observed transiting the Panama Canal |

* Footnotes follow on p. 56.

Table 1

Arrivals of Soviet Ships in Cuba
with Holds Capable of Carrying
Medium-Range Ballistic Missiles
July-October 1962
(Continued)

| Date | Ship | Port | Known or Suspected Cargo | Comment |
|---|---|---|---|---|
| 22 September | Kimovsk | Casilda | Military equipment, probably including MRBM's | See a/ |
| 30 September | Kasimov | Mariel Havana area | 10 Il-28 fuselage crates on deck and probably associated equipment in the hold. | Photographed in Cuban waters on the way to port |
| 2-3 October | Krasnograd | Probably Mariel | Military equipment, probably including MRBM's | See a/ |
| 6-8 October | Orenburg | Mariel | Military equipment, probably including MRBM's | See a/ |
| 16 October | Omsk | Mariel | Military equipment, probably including seven MRBM's c/ | Seven MRBM's and four erectors arrived at San Cristobal MRBM Site 4 between the photographic coverages of 18 and 19 October. The on-site arrival followed the ship arrival by the same amount of time as was the case with the Poltava arrival 1 month earlier. |

a. MRBM's were transported to the San Cristobal missile sites within 2 to 4 days after the Poltava and the Omsk docked at Mariel. Because the San Cristobal site area was unoccupied on 29 August and the Sagua la Grande site area was unoccupied on 5 September, ships arriving more than 5 days before these dates probably did not carry missiles. Given the number of missiles observed departing Cuba, the number of large-hatch ships that docked at Cuban ports during September and October, and probable missile loading arrangements, all such ships which arrived after mid-September carrying unknown cargoes probably were carrying missiles.
b. Unless information indicates otherwise, it is presumed that all these ships carried military equipment to Cuba during the buildup period.
c. The Krasnograd, Kasimov, Kimovsk, and Poltava could have loaded six missiles on trailers on the decks of their large holds, and four more could have been double-loaded. The Omsk and the Orenburg could have carried seven MRBM's on trailers on the decks of their large holds and four more by double loading. As noted above, the Poltava probably carried eight MRBM's and the Omsk seven.

in Cuba with unknown cargoes after the dates on which the sites were found unoccupied (29 August and 5 September) were so few that most of them must have carried missiles. The scheduling of these ships, therefore, spread the delivery of MRBM's to Cuba over approximately the 4-week period spanning the time between mid-September and mid-October.

The Soviet MRBM units in Cuba were initially deployed in a field mode, and very little advance preparation was required.* The irregular placement of the four launch positions at each of the sites and the varying arrangements and type of support facilities probably reflect variations in local conditions and do not appear to be significant. Development of the sites, which consisted of some building construction, the laying of aggregate floors under missile-ready tents, the construction of hardstands on which to place missile erectors, and the placing of fill or crushed rock on roadways continued throughout the time the missiles remained in Cuba. Nevertheless, after reaching the presurveyed and minimally prepared site areas, the units could have achieved an operational

* The preliminary work necessary included surveying to determine the precise geodetic positioning of the sites, relatively minor road improvements, and whatever clearing and grading was made necessary at launch positions and their approaches by terrain conditions at the individual sites. Probably because of soil and weather conditions in Cuba, the usual but not universal procedure was to construct a hardstand for the missile erector and to lay small, rectangular concrete pads for the rear wheels of the missile transporter, thus providing a relatively close and stable alignment of erector, launch stand, and transporter to facilitate raising the missile onto the stand. In most cases, however, these measures were taken after the units and equipment were already on site. Similarly, missile-ready tents, in which the MRBM's were checked out and stored, were erected soon after the arrival of the unit on site, and at a later date aggregate floors were laid under some of the tents.

Aside from microwave towers, one of which was constructed for each pair of sites, the only permanent structures observed that were related functionally to the weapons system were the arch-roofed buildings probably intended for the checkout, storage, and maintenance of nuclear warheads. Assuming that the necessary checkout and maintenance equipment was present, however, these buildings probably were not indispensable for operational purposes. Barrack-type structures also were being built at some sites, almost certainly for personnel housing.

capability as soon as the system equipment* was emplaced and checked out and the units were familiarized with operating in their new environment.

Because site preparation activities probably had been underway at most of the sites by about mid-September and because the uncompleted condition of roadways and hardstands in some cases may have affected adversely unit reaction time, it is difficult to explain why such facilities were not complete by the time of the crisis. The most likely explanation is that the pace at which such facilities, as well as the nuclear storage bunkers, were being developed reflected a program to bring the MRBM system to a fully operational status more or less simultaneously along with a complete air defense system at some time during the first half of November.

The following series of photographs (Figures 29 through 38) illustrates a number of the observations made concerning the deployment of MRBM units in Cuba: simplicity of emplacement, variations in placement of launch positions and support facilities, and continuation of site development throughout the crisis period.

3. Delivery of Oxidizer and Fuel to Sites

There is conclusive evidence that supplies of the oxidizer used in the MRBM system -- red fuming nitric acid (RFNA) -- were present in Cuba at the time of the crisis, but apparently not all MRBM units had been fully supplied with the oxidizer by 27 October. Photography of a secure port facility at Punta Gerardo on 17 October first confirmed the presence of about 24 cylindrical storage tanks connected to the quay by pipeline, several buildings under construction, and varying numbers of the same type of oxidizer trailer observed at the MRBM sites, some of which were in the process of being loaded. Various features of the facility indicated that it was a storage and transshipment point for a toxic, corrosive liquid, such as RFNA, the only such facility identified in Cuba.

* System equipment includes missiles, missile transporters, fuel and oxidizer vehicles, launchers, warheads, and necessary checkout and control equipment.

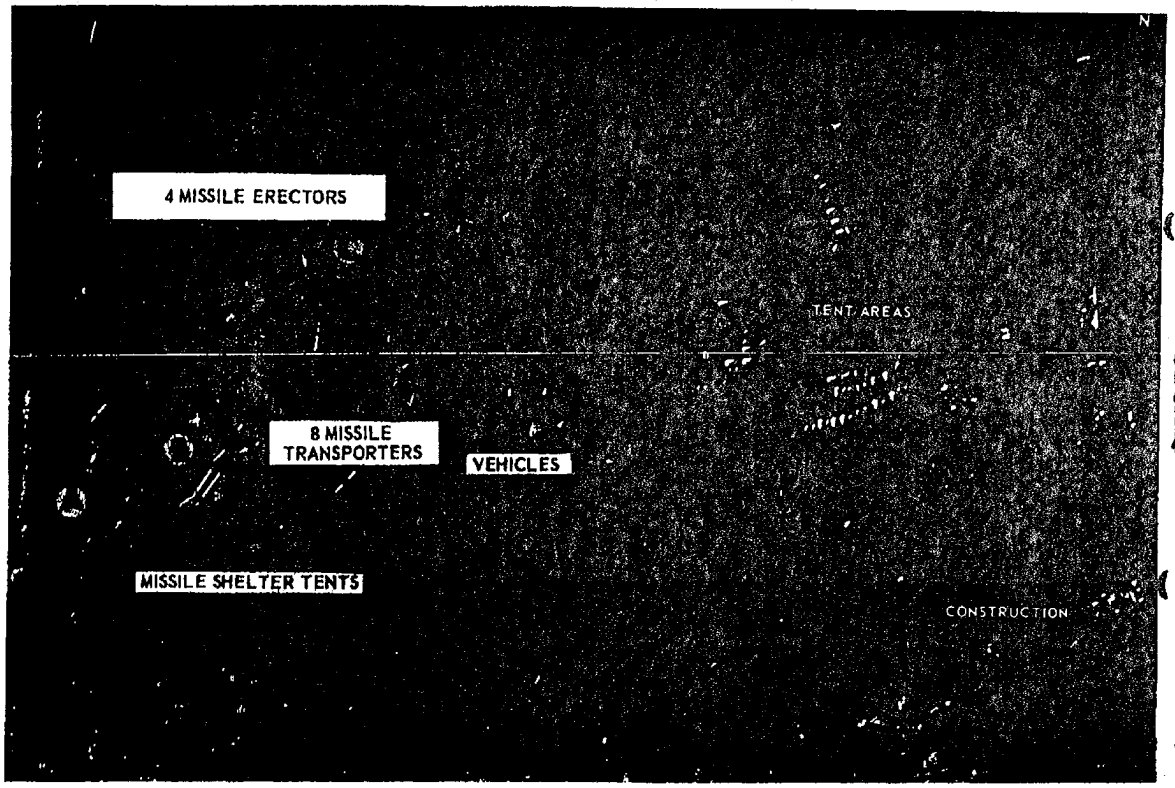


Figure 29. MRBM Launch Site I at San Cristobal, 15 October 1962. Deployment in unprepared positions in open fields illustrates the ease of emplacement. Note that a missile transporter is aligned with the erector at launch position D.

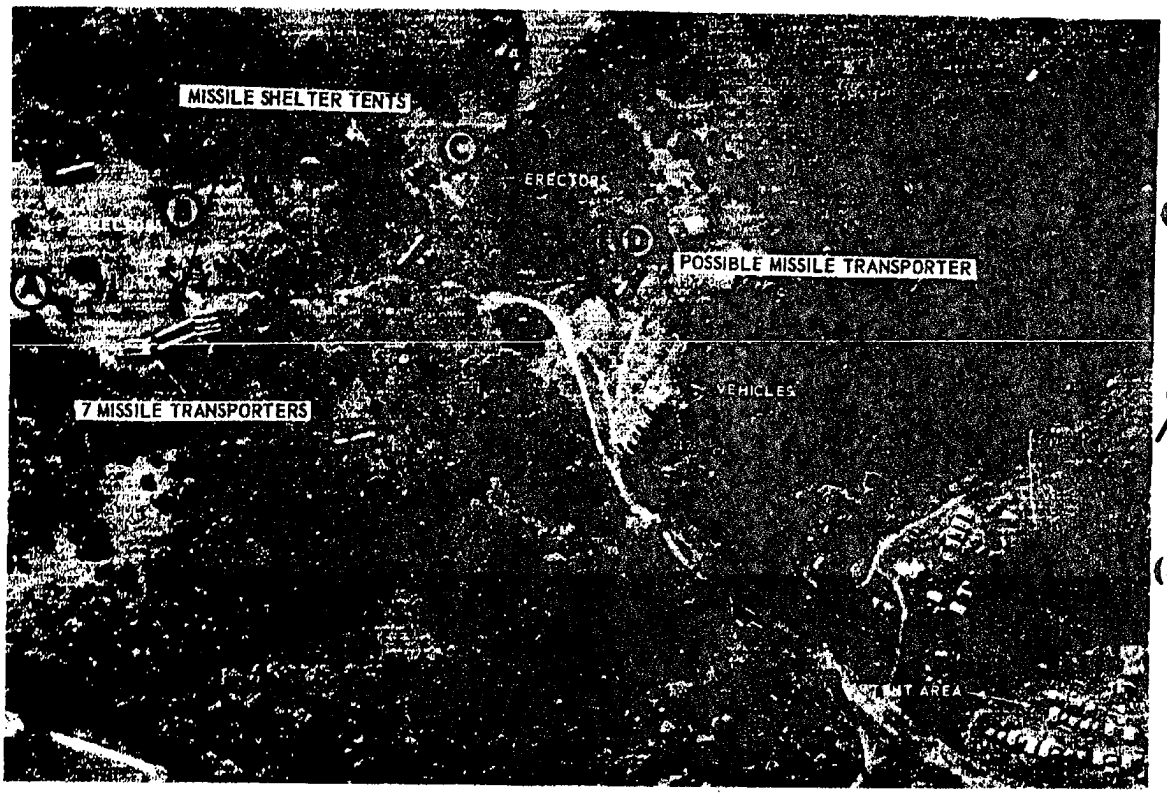


Figure 30. MRBM Launch Site 1 at San Cristobal, 17 October 1962. Launch positions A and B are being improved by the addition of crushed rock or steel matting in front of the erectors.

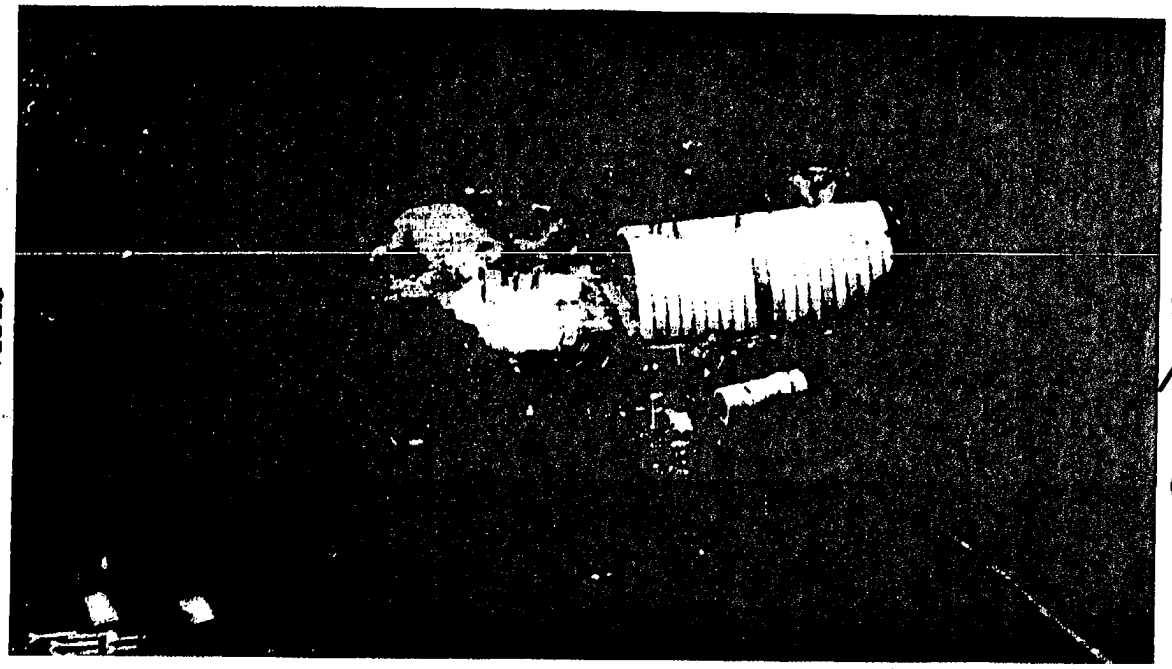



Figure 32. Construction of the Nuclear Weapons Facility in Progress at MRBM Launch Site 1 at San Cristobal, 23 October 1962

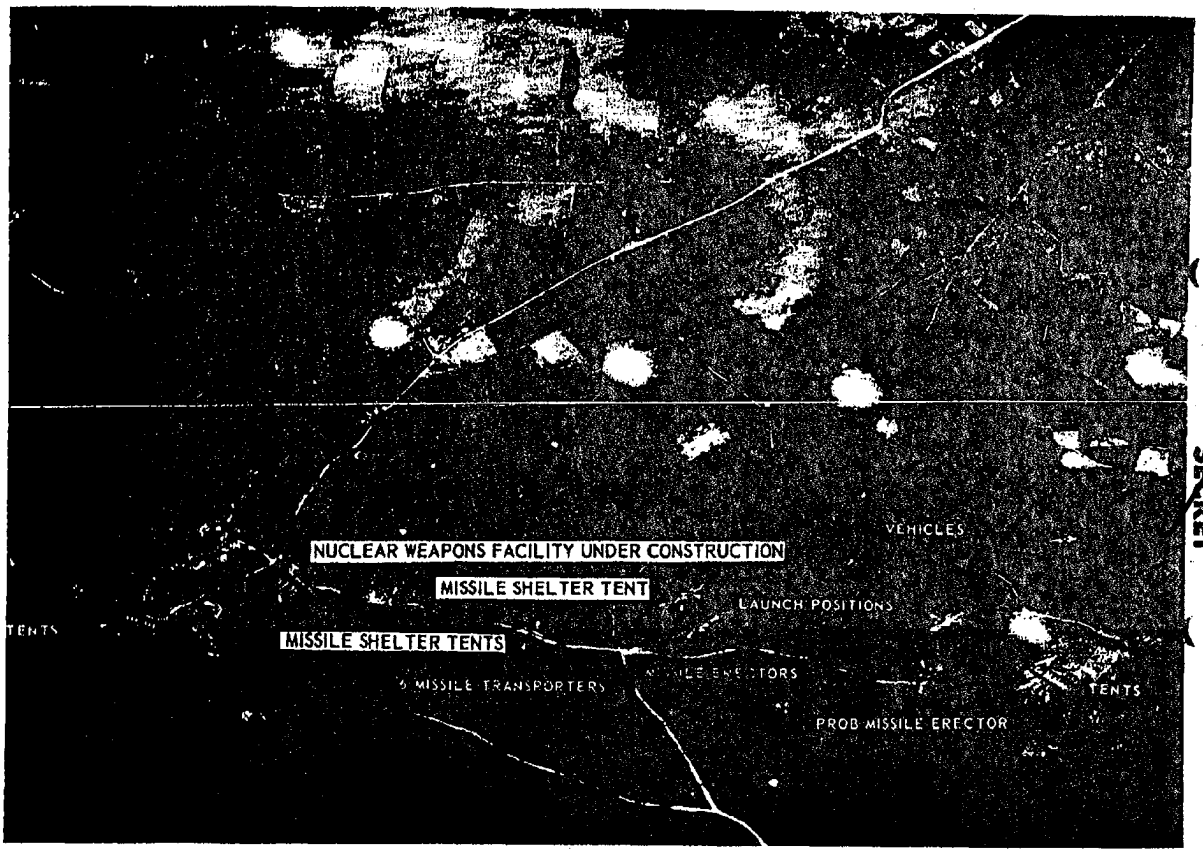


Figure 33. MRBM Launch Site 1 at Sagua la Grande, 17 October 1962. Unlike Launch Site 1 at San Cristobal, this unit is deployed in rough terrain, and missile shelter tents are located considerably farther away from launch positions.

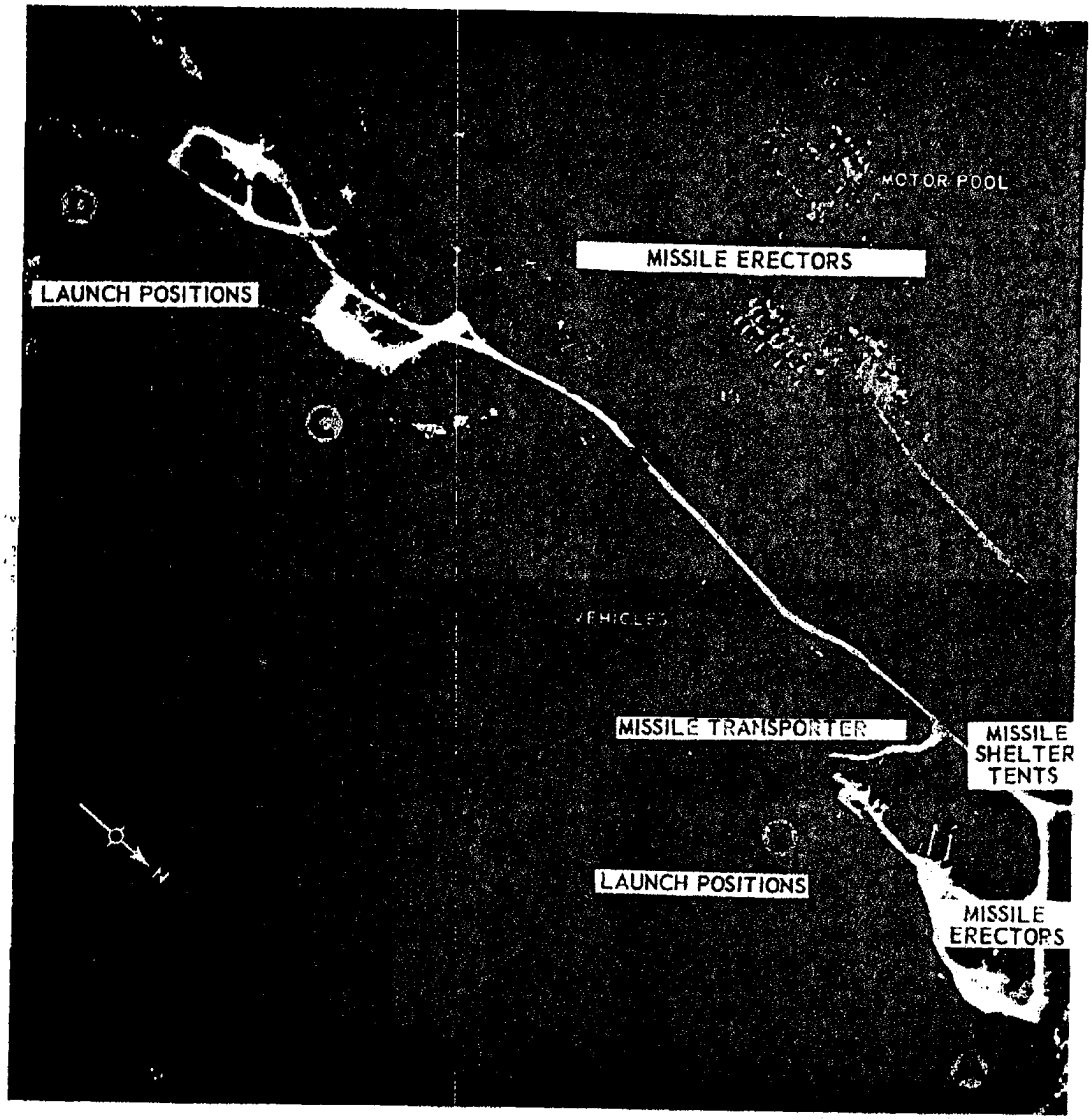


Figure 34. MRBM Launch Site 2 at Sagua la Grande, 17 October 1962. Erectors are not in place at launch positions C and D.

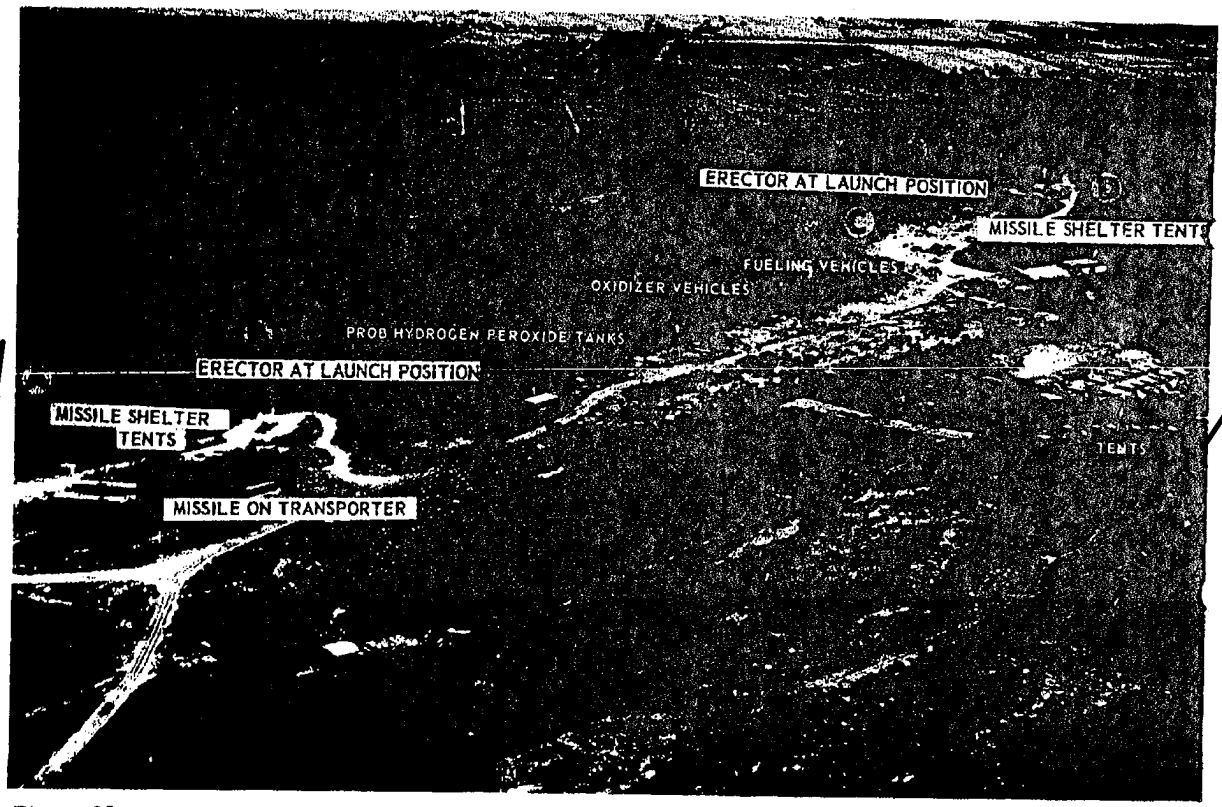


Figure 35. MRBM Launch Site 2 at Sagua la Grande, 23 October 1962. The erector is now in place at position C, and two missile shelter tents have been erected nearby.

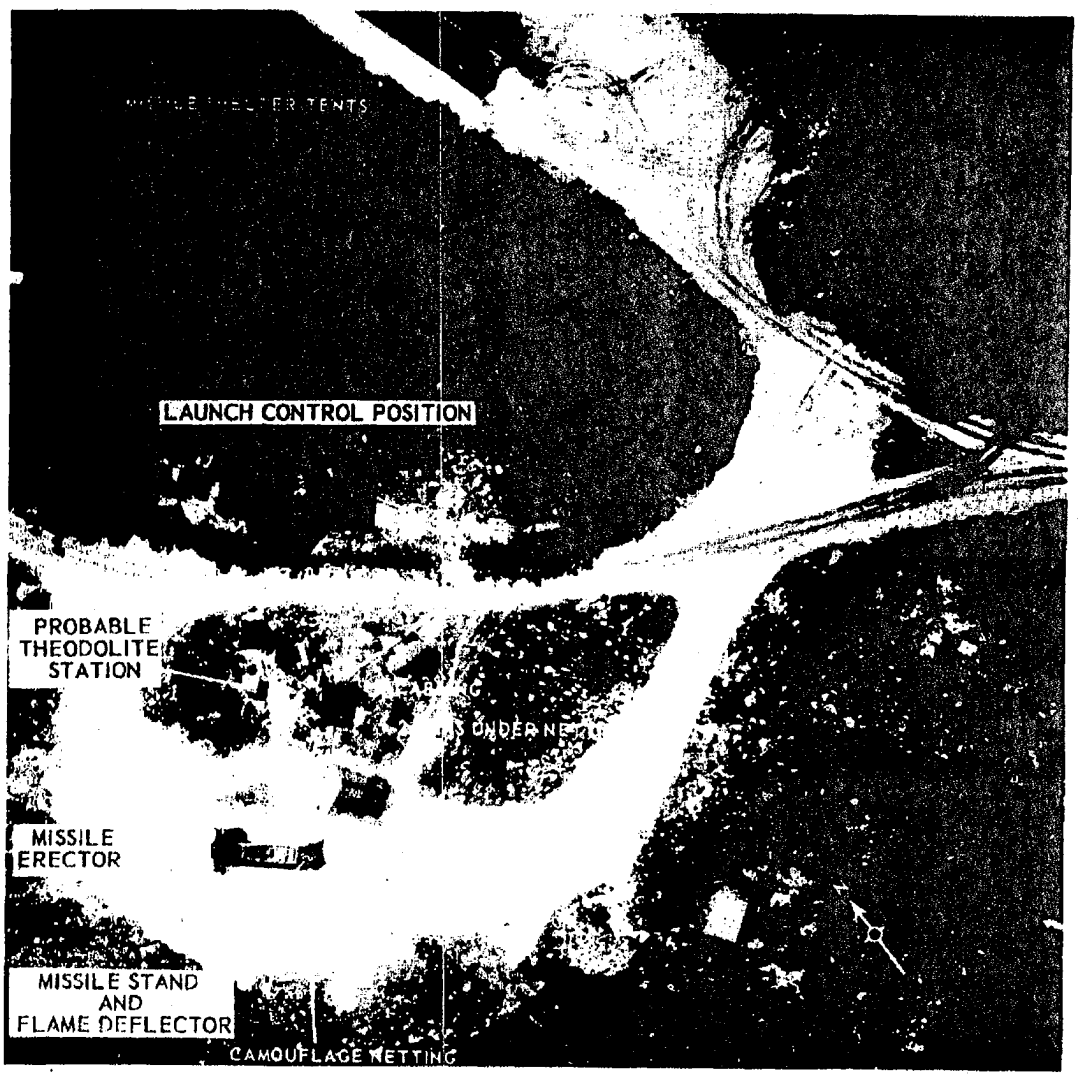


Figure 36. MRBM Launch Site 2 at Sagua la Grande, 23 October 1962. The use of camouflage netting is ineffective, and the unique appearance of the launch position is unobscured.

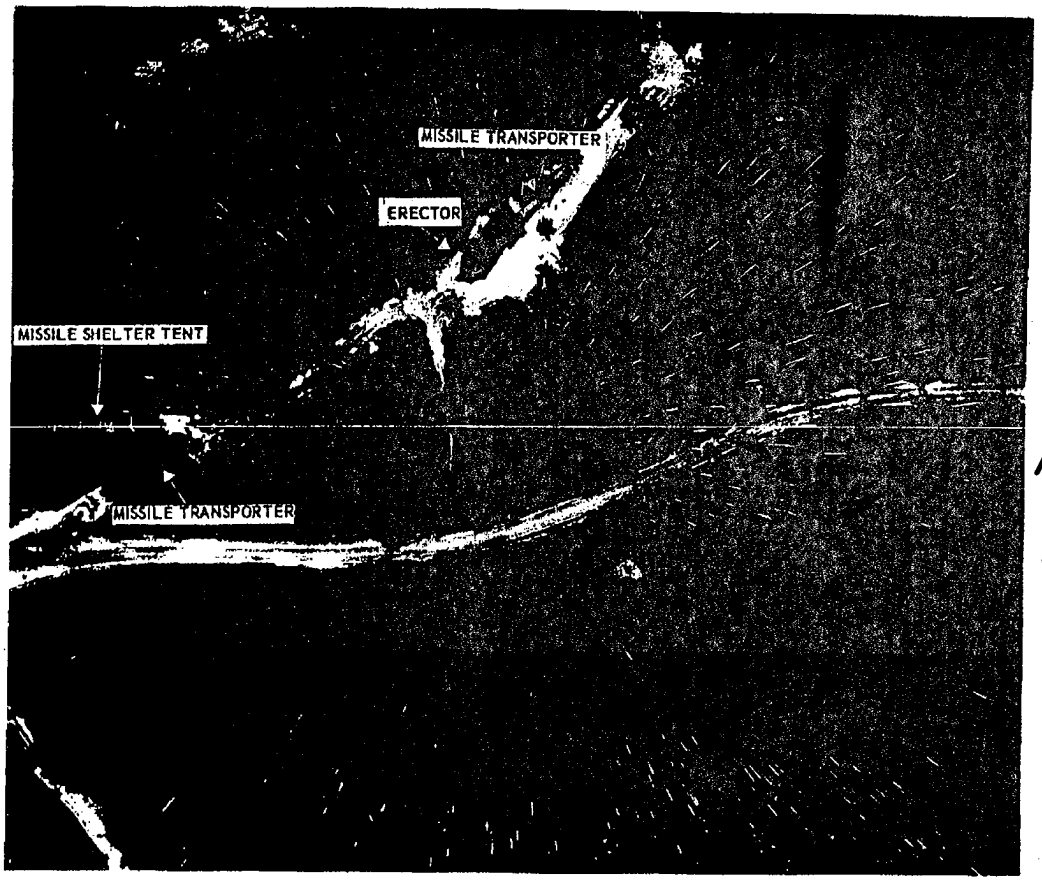


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Figure 37. MRBM Launch Site 1 at Sagua la Grande, 26 October 1962. One missile transporter is aligned with the erector.




Figure 38. MRBM Launch Site 3 at San Cristobal, 27 October 1962. Construction of permanent support facilities continues.

Photography of 29 August shows no indication that this facility, then being used for the storage of sugar products, was to be converted into a secure RFNA transshipment point. In fact, the area subsequently occupied by the RFNA storage tanks was still planted in sugar cane. A collateral report indicated that the RFNA tanks had been installed and that the double security fences were being erected sometime during September. US naval photography on 25 September disclosed a freighter unloading at the double-fenced transshipment facility that by that time existed substantially as it appeared in more detailed photography of 17 October 1962.

Although the SA-2 system also used RFNA as an oxidizer, no SAM oxidizer trailers, which are readily distinguishable from the MRBM vehicles, were observed at Punta Gerardo. It appears likely, therefore, that this installation was converted into a RFNA handling facility for the purpose of supporting the MRBM forces in Cuba at roughly the same time the first missiles were being delivered to Cuba.

Because RFNA is storable over relatively long periods of time without significant losses, supplies of this oxidizer do not require frequent replenishment as in the case of cryogenic liquids, such as liquid oxygen. Consequently, the MRBM oxidizer vehicles photographed at Punta Gerardo during October probably were being loaded for the first time since their arrival in Cuba. The presence of 10 of these vehicles at Punta Gerardo on 27 October (see the photograph, Figure 39*) thus indicates that the Cuban MRBM sites had not been fully supplied with oxidizer by that time. If these vehicles were from a single MRBM site, they represented more than 60 percent of the RFNA storage capacity of that unit, based on the observed complement of 16 such vehicles per site, and the unit might not have had sufficient oxidizer on site for its initial round of four missiles. It cannot be determined whether the RFNA being loaded on 27 October was intended for one or several sites, but it is possible that it was part of the initial supply for San Cristobal Site 4. That site apparently did not receive missiles until 18 October, and only a few oxidizer trailers were discernible at the site until 29 October, when two groups of canvas-covered vehicles, presumably oxidizer and fuel trailers, were observed.

If, as is considered most probable, kerosine is the fuel used in the MRBM, the Soviet authorities would not have needed special

* Following p. 60, below.

facilities for its shipment to site areas. Fuel trailers of the type observed at sites could have been filled from any convenient storage point, and such a storage point would not have contained any unusual features.

4. Problem of Combat Readiness

Assuming the presence of nuclear warheads at the MRBM sites in Cuba, which cannot be confirmed, it is virtually certain that some missiles could have been launched at the US from one or more sites by the time the sites were first identified in photography of 14 October and that some missiles could have been launched from all six sites by 28 October, when the Soviet authorities announced their decision to withdraw the missiles. On the other hand, the sites were not so complete as the Soviet authorities evidently planned them to be eventually. It is doubtful, therefore, that at any time during this period all six MRBM units had achieved the degree of combat readiness considered normal for units deployed in the USSR. Although there was a steady improvement in the readiness of the units throughout the period of observation, there is no evidence that an effort was made to alert or "peak" any part of the MRBM force in Cuba during the crisis.

Soviet documents have provided relatively detailed information on the operational deployment, capabilities, and reaction times of MRBM units in the USSR. Although this information is not directly applicable to the circumstances of MRBM deployment in Cuba, it is extremely useful in evaluating and interpreting the Cuban evidence. The documents indicate, for example, that MRBM units can move into permanent sites while they are under construction, receive their system equipment from depots, and launch their missiles from these sites. Similarly the documents describe the fairly rapid movement of MRBM units to presurveyed but relatively unprepared "alternate sites" (generally resembling the Cuban MRBM sites) from which missiles are launched. In addition, four degrees of combat readiness are described.*

* From Readiness 4, which appears to be the normal readiness posture of Soviet missile units, missiles can be launched in 6 to 20 hours, depending on how much of the unit and its equipment are on the site at the time of the alert and the length of time required to prepare the missiles and nosecones. From Readiness 3, which is achieved when all personnel are in position, the missiles and nosecones have been mated and are in prelaunch storage in the launch area, and the propellant trucks are loaded, about 2-1/2 hours are required [footnote continued on p. 61]

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Figure 39. MRBM Oxidizer Trailers Apparently Being Loaded at the Punta Gerardo Storage Facility, 27 October 1962

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From these descriptions it appears that in the USSR an MRBM unit would be expected to be able to launch its initial round of missiles (four per site) from even a minimally prepared site in considerably less than a day after all personnel and equipment had arrived on site. The deployment of such units to Cuba, however, introduced a number of factors that may have affected significantly the length of time required to achieve a combat-ready status, even though the total effect cannot be judged with any precision. For example, the time required to check out and make operative the missiles, electronic equipment, and other essential components after a voyage from the USSR, which involved several transloadings, presumably was considerably greater than would be normal in the USSR. There is no way of determining, however, whether any major difficulties were encountered. Unit equipment and personnel apparently did not arrive on site en masse. In the case of San Cristobal Site 4, for example, this activity occurred over a period of at least 4 days, culminating in the arrival of the missiles, erectors, and other key system equipment on 18 or 19 October. At Sagua la Grande Site 1, approximately 35 miscellaneous vehicles did not arrive until 17 October, although missiles apparently were delivered to one or both of the Sagua la Grande sites at least 3 weeks earlier. Finally, the units presumably required additional time to exercise their equipment and to work out and become proficient in the procedures required for launch operations in unfamiliar surroundings and climatic conditions.

The problem of determining readiness status is further complicated by the inability at times to identify the presence or quantity of essential system components, owing to the limitations of photographic coverage and analysis, as well as Soviet camouflage, dispersal, and concealment after 22 October. The most striking example of this is the fact that only 33 MRBM's were identified in Cuba before the observation of 42 being withdrawn. At San Cristobal Site 3, only two missile transporters were ever observed, and only four were observed at Sagua la Grande Site 2, although observations during the withdrawal indicate that some additional trailers and missiles must have been present at both sites or en route to them. Only a few propellant trailers were positively identified at San Cristobal Sites 3 and 4. Finally, it is not possible to determine whether nosecones and missiles were ever mated at any of the Cuban MRBM

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for launch. From Readiness 2, with missiles on launcher and "aimed" but not fueled, about 1 hour is required; from Readiness 1, with missiles fueled and checked, about one-half hour.

sites, a prerequisite to bringing the missile units to Readiness 3. Mating would have occurred within the missile-ready tents where it could not be directly observed, although the presence of cabling into some tents indicated that some form of missile checkout had been or was being conducted. However, nosecone vans were not identified in the immediate vicinity of the missile-ready tents at any time, and repeated observations and measurements of the canvas-covered loads on missile transporters did not disclose the additional 13 feet in length required if a nosecone had been attached to a main missile body.

Notwithstanding these difficulties, there is evidence available from the photography that assists in making a general evaluation of the readiness status of the MRBM sites. By 23 October, for example, sufficient quantities of essential MRBM system equipment to effect the launching of at least four missiles per site were present and positively identifiable (again excluding warheads) at four of the six MRBM sites; at San Cristobal Sites 1 and 2 and at Sagua la Grande Sites 1 and 2. Because missiles probably were delivered to the area of these two San Cristobal sites from the Poltava about 18 September and to Sagua la Grande from the Kimovsk about 25 September, it appears that one and possibly both sites in each area had started receiving system equipment 4 to 5 weeks before the beginning of the crisis. This time would certainly have been sufficient for these units to reach a reasonably high degree of combat readiness, provided equipment deliveries were planned so as to bring the MRBM units to such a condition on an individual basis relatively rapidly.

Although it is not known whether there were simulated launch exercises involving erection of missiles on launcher, which could have occurred before first coverage of the sites or at night, there is evidence of practice in the movement of some equipment to the launch areas at San Cristobal Site 1 and probably at both Sagua la Grande sites. At San Cristobal Site 1 on 15 October a missile transporter with prime mover was aligned with the erector at one launch area.* On 19 October, one erector was uncovered, and propellant vehicles were in the area; on the following day the erector was again covered, and the propellant vehicles were removed, suggesting that an exercise of some kind was in progress the day before.

On 26 October propellant vehicles were discernible at camouflaged positions near all four launch areas at Sagua la Grande Site 1;

* See Figure 29, following p. 58, above.

four missile transporters also were present near the launch areas, although only two were aligned with erectors.* This may have been an exercise simulating the transition from Readiness 3 to 2, in which the propellants would be moved to the launch area and the missiles erected on launcher. In this case, however, it was clearly an exercise and not an actual alert condition, for the transporters, as determined by the length of their loads, were carrying missiles without nosecones. Photography of Sagua la Grande Site 2 on the same day revealed heavy motor vehicle trackage in the propellant vehicle storage areas and on the approaches to the launch areas, as well as the absence of some propellant vehicles from the storage area, suggesting that a similar exercise might have been conducted recently at that site, possibly at night.

There are additional uncertainties with regard to the readiness status of San Cristobal Sites 3 and 4. At Site 3, as previously indicated, it was not possible to make positive identification of sufficient missile transporters and propellant vehicles to support operations from all four launch positions. However, this equipment may well have been obscured in photography by the relatively heavy tree cover in the area, as suggested by the withdrawal of five more missiles from the San Cristobal area than had been identified at the sites. Moreover, the general appearance of this site, which had the largest number of permanent buildings of any of the MRBM sites, suggested that it had been well prepared. At San Cristobal Site 4, missiles and other items of system equipment were not received until about 18 October. Nevertheless, by 26 October at the latest, erectors were in position at the launch areas, suggesting relatively rapid progress toward combat readiness.

Although the Soviet MRBM sites did not have a full refire capability, which would have required 48 missiles (2 per launcher) instead of the 42 present in Cuba, there seems little reason to doubt that some missiles probably could have been launched from all of these sites during the critical week of 22-28 October, and possibly from some of them well before that time. There is no firm basis in the evidence, however, for judging the reaction time that would have been required following a decision to launch or the total number of missiles that could have been salvoed from the 24 launch positions. Reaction time, for example, might have been affected appreciably by the absence of completed hardstands and graveled roadways at some sites (see the photograph, Figure 40**). Both

* See Figure 37, following p. 58, above, which shows a missile transporter aligned with the erector at one of the launch positions.
** Following p. 64, below.

reaction time and salvo capability also would have depended on the readiness of missile and other system equipment that, of course, cannot be determined. On balance, it does not seem probable that the USSR could have considered the MRBM forces in Cuba sufficiently combat-ready, even by 28 October, to participate with full effectiveness in a coordinated strike against the US.

5. Target Coverage

The estimated maximum range of the Soviet MRBM system is about 1,020 nm (nonrotating earth). From the Cuban sites this range would have provided coverage of the southeastern and south central parts of the US (see the map, Figure 41). Potential targets within this zone include about 20 bases of the Strategic Air Command, as well as Washington, D. C., and several other major US cities.

Statements are made in Soviet documents that a theodolite is one of the basic instruments used in "aiming," or aligning, the all-inertial guidance system of the Soviet MRBM. Attempts were made, therefore, to identify the target system against which the missiles were programed by determining the probable direction of flight from the relationship between the theodolite and the launch position. This method, however, has not yet yielded consistently meaningful results.

B. IRBM System

It is evident from photography of the uncompleted IRBM sites under construction in Cuba that these sites were to be far more elaborate than the MRBM sites and that they required a number of substantial permanent installations. As a result, although construction of the first IRBM site may have started somewhat earlier than the MRBM sites, the first IRBM site would not have been ready for launch operations until about mid-November. Construction of the other two IRBM sites was about a month behind the first. Thus the timing of the IRBM sites was not in phase with deployment of the MRBM's, although the IRBM's by virtue of their greater range would have increased significantly the threat to the US from Cuba (see the map, Figure 41).

Because the Soviet authorities presumably would have deployed the IRBM units in a field mode had this choice been open to them, thereby

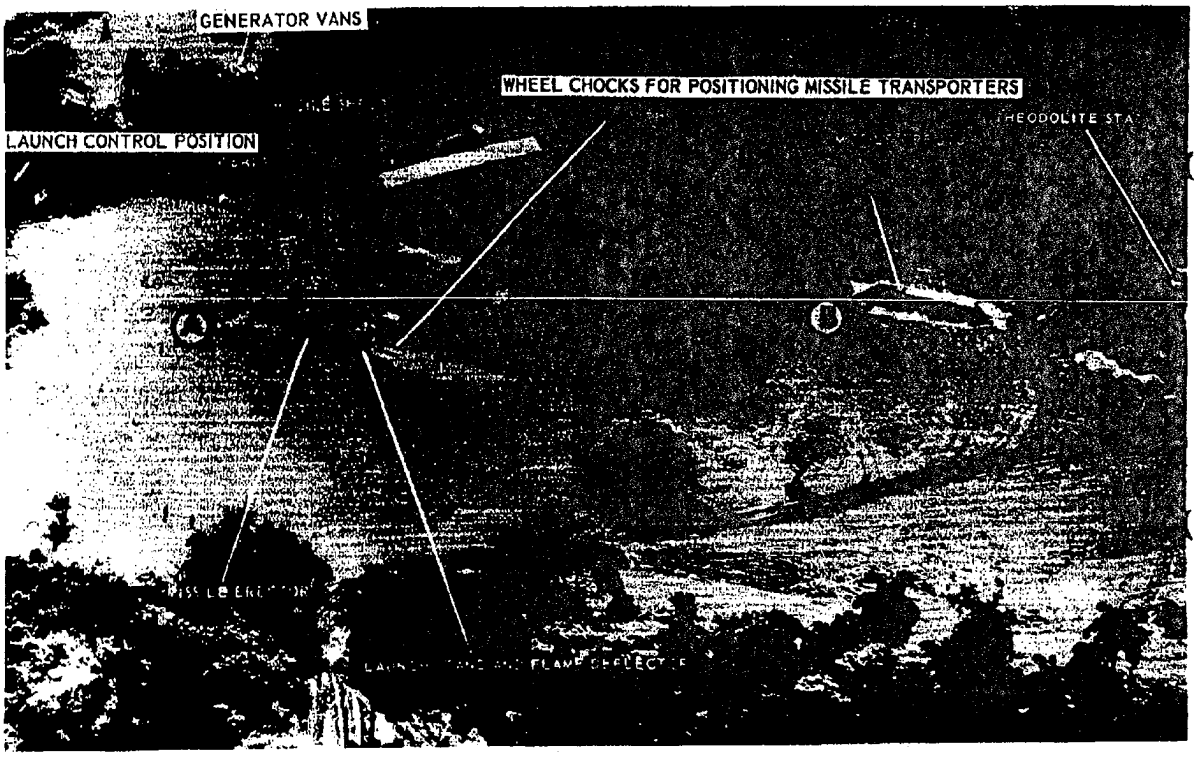


Figure 40. MRBM Launch Site 1 at San Cristobal, 23 October 1962. Continuing refinement of launch position B interferes with combat readiness.

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Figure 41

*Target Coverage of the US That Would Have Been Provided by MRBM's and IRBM's Deployed in Cuba*


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avoiding the long and relatively extensive construction effort involved in the Cuban sites, it is virtually certain that the IRBM system is designed solely for deployment at fixed facilities and that IRBM units are incapable of movement to alternate field positions. Photography of Guanajay Site 1, which was in a relatively advanced stage of construction at the time of the crisis, provides a clear indication of the general character and layout of a completed IRBM site. The other two sites under construction were far enough advanced to indicate that they would have generally resembled Guanajay Site 1. As indicated in the photographs, Figures 42 and 43,* Guanajay Site 1 consisted of three principal types of functional facilities: the launch facilities, support facilities, and nuclear weapons facility. The launch facilities were comprised of four launch positions and included a control building for each pair of launch pads.**

1. Timing of Construction Activity at Individual Sites

Evidence concerning the timing of activity at the three IRBM sites comes only from photography. As in the case of the MRBM sites, there is no effective coverage available for more than a month before the photography of mid-October on which the sites were first identified, following which there is virtually continuous photographic coverage until the sites were dismantled.

The earliest firm indication of activity in the IRBM site areas is contained in photography of 29 August, which discloses the

* Following p. 66, below.

** The concrete launch pads contained an imbedded steel ring on which a launch stand probably was to be mounted, an elongated concrete apron surrounding the pad, a concrete duct running through and under the pad to a blast shield, and two buried storage tanks at one end of the apron. The control buildings were connected to their respective pads by cables running through the blast shields. The support facilities included a large concrete block building, presumably for missile checkout and maintenance, and four missile-ready buildings located behind their respective launch positions. The arch-roofed (probably nuclear) weapons facility at Guanajay Site 1 was the only one of its kind in Cuba constructed as a drive-through building. Because it was about twice as long as the corresponding building at Remedios and because there was no evidence of a similar building at Guanajay Site 2, it is likely that the large structure at Guanajay Site 1 was intended to serve both Guanajay sites.

presence of vehicles and construction materials at a location later identified as the construction support area for Guanajay Sites 1 and 2. In fact, this equipment and material must have been intended for Guanajay Site 1, for later photography indicates that Site 1 was in a considerably more advanced stage of development than Site 2. However, there is no evidence in the photography that site construction had begun by 29 August. Photography of the Remedios site area on 5 September provides no indication of either equipment or activity associated with the subsequent construction of the IRBM site.

When first identified in photography of mid-October, Guanajay Site 1 was approaching completion, while Guanajay Site 2 and Remedios were in essentially the midstage of their development. Based on the progress noted at Guanajay Site 1 between the end of August and mid-October, on the rate of construction at all three sites while under continuous photographic observation until 29 October, and on known Soviet and US construction practices, a complete construction schedule was established for Guanajay Site 1. This schedule was then applied to Guanajay Site 2 and Remedios. The estimated completion dates for all three sites, together with the approximate time phasing of construction, are presented in Table 2.*

As can be seen in Table 2, construction of Guanajay Site 1 probably preceded the other two sites by about 4 weeks. By 29 October, Guanajay Site 1 was essentially complete except for the missile-ready buildings, but it is estimated that 3 to 4 weeks more would have been required to "cure" the concrete in the launch areas. The marked consistency observed in the sequence of construction operations and the time required to accomplish them at Guanajay Site 2 and Remedios indicate that construction of these sites was methodical and probably conformed to a schedule.

2. Intention to Construct Additional Sites

It is possible that a second IRBM site was intended in the Remedios area, but there is no evidence that construction had begun by the time the existing sites were dismantled. This intention was suggested by the pairing of all other strategic missile sites in Cuba, which also is

* P. 67, below.

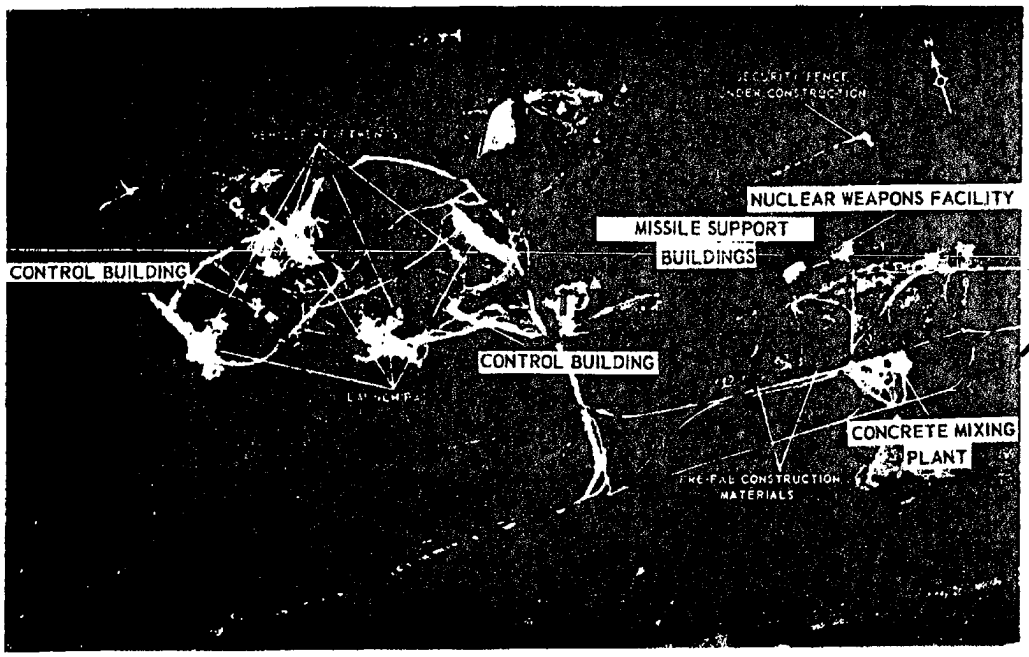





Figure 42. IRBM Launch Site 1 at Guanajay, 17 October 1962. Principal features are clearly discernible in this early photograph.

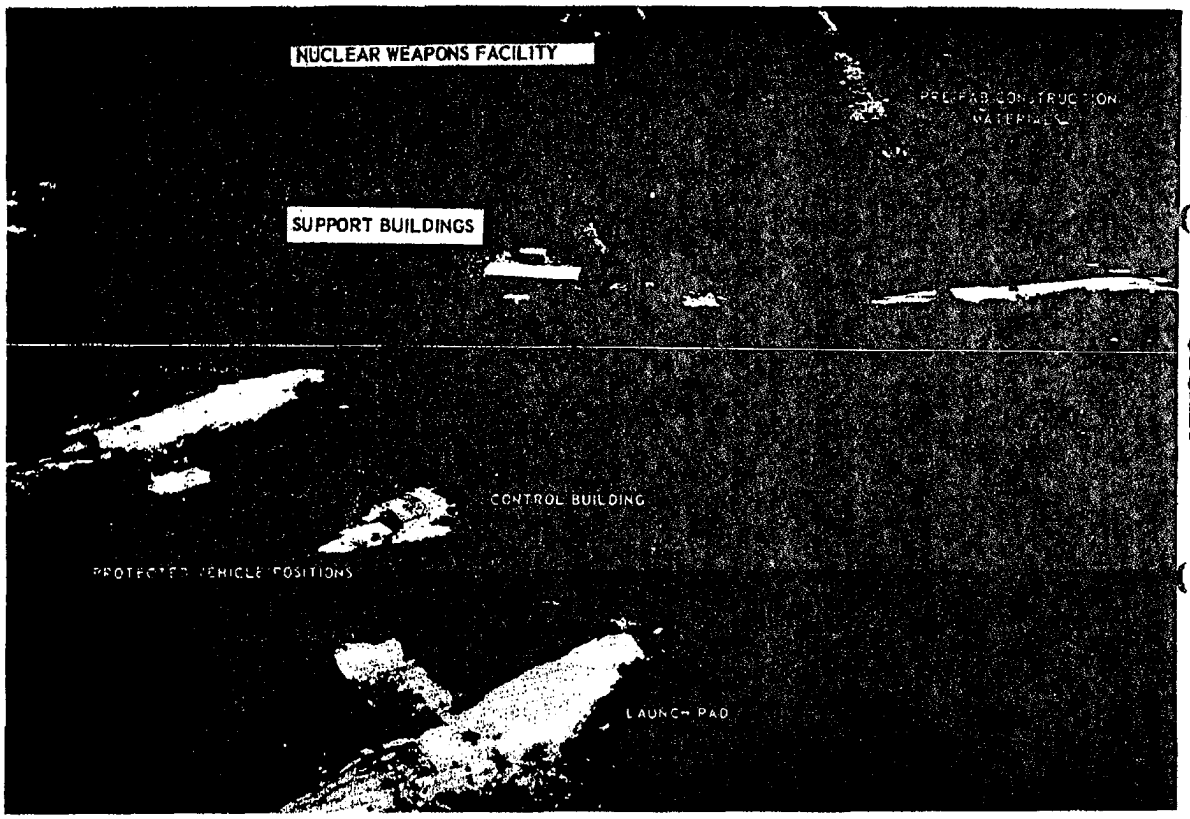



Figure 43. IRBM Launch Site 1 at Guanajay, 23 October 1962. Low-level photography shows details of paired launch pads and the control building.

Table 2

Estimated Time Phasing of Construction at IRBM Sites
August-December 1962

| Site | Area First Occupied | Support Buildings Completed | Nuclear Weapons Facility Completed | Date of Emergency Operational Capability of Launch Position | Date of Full Operational Capability of Launch Position |
|---|---|---|---|---|---|
| Guanajay 1 | 24 Aug - 1 Sep | 10 Oct | 22 Oct (to serve Site 2 as well) | 12 Nov | 22 Nov |
| Guanajay 2 | 20 Sep - 27 Sep | 30 Oct (virtually complete on 29 Oct) | 22 Oct | 9 Dec | 19 Dec |
| Remedios | 17 Sep - 24 Sep | 30 Oct (virtually complete on 29 Oct) | 28-29 Oct | 6 Dec | 16 Dec |

the general practice for MRBM/IRBM sites in the USSR.* Moreover, it is known that Soviet MRBM units, at least, are organized on the basis of two sites per regiment. Finally, a senior Soviet official stated that 24 "sites" (that is, launch positions) had been completed in Cuba and that 16 were under construction. Because all 24 MRBM launch positions were completed but only 12 IRBM launch positions were identified as under construction, this statement implies that an additional IRBM site was planned.

If the construction time relationship between the two known sites at Guanajay is applied to the known and a postulated IRBM site at Remedios, activity at the postulated site would not have been far enough along to be identifiable in photography until just about the time of the President's speech on 22 October. It is possible, therefore, that a second Remedios site was planned by the Soviet authorities and that it was not identified because the initial preparations were halted by the onset of the crisis. Had construction of the site been carried out at about the same pace as the other sites, it would have been operational by about the third week in January. If the construction crews from Guanajay as well as those at Remedios were to have been used, a second Remedios site might have been completed somewhat earlier, possibly about the end of 1962.

C. Search for Nuclear Warheads

It cannot be demonstrated from available evidence that the USSR had delivered nuclear warheads to Cuba by the time of the US quarantine. If they had not been delivered, then the USSR probably had no capability whatever during the crisis to attack the US by missiles fired from Cuba, for it is highly unlikely that the USSR would have provided conventional, high-explosive warheads for the MRBM's. On the other hand, the evidence indicates that much of the equipment believed to be necessary for the handling and on-site transportation of MRBM warheads and nosecones was present and that permanent facilities almost certainly intended for the storage of nuclear warheads were being constructed at both the MRBM

* By contrast, the fact that the nuclear weapons facility at the Guanajay Site 1 was intended to serve both Guanajay sites, while that at Remedios would have served only the single site under construction, suggests either that another site was not to be built or that the pattern of deployment observed at Guanajay was to be altered at Remedios.

and the IRBM sites. Although a thorough effort failed to uncover direct evidence concerning the presence of warheads, there is no assurance that they could have been detected by photography or other means; hence there is also no basis in evidence for concluding that the USSR did not have a nuclear capability in Cuba.

1. Equipment and Facilities

There are three bodies of evidence, all ambiguous and inconclusive, that may relate to the presence of nuclear warheads. The first of these concerns the equipment and facilities required for their handling and storage. At five of the six MRBM sites, as well as at the Mariel Naval Air Station, special-purpose units were observed in the photography which, because of their unique equipment and physical positioning, have been identified as probable nosecone handling units.* These units also may perform some function with respect to warhead handling or processing.

At the missile sites these units generally were located in an area by themselves, just as the propellant vehicles were in separate areas, indicating a special function. In some cases they were positioned in close proximity to the arch-roofed, probable nuclear weapons facilities. Moreover, most of the equipment at the missile sites has been identified as to function, and no other equipment was observed that appears suitable for nosecone handling.

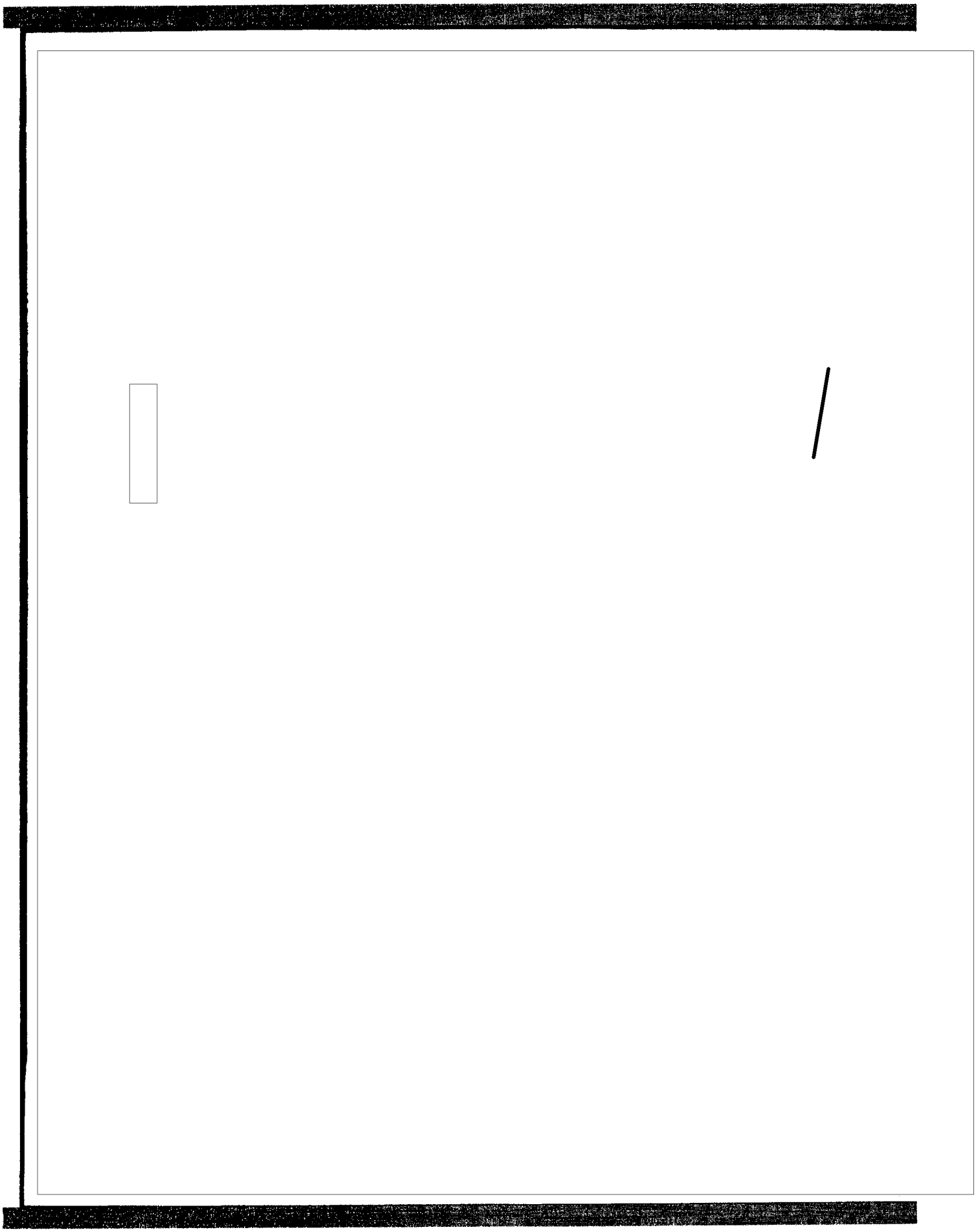
It is known from Soviet documents that nosecones and warheads normally are stored separately from the missiles for which they are intended. When an increased state of readiness is ordered, the nosecones with warheads are transported to the missile-ready facility for mating to the missile. In Cuba the MRBM nosecones probably were stored in the vans of the nosecone handling unit and would have been transported to the missile-ready tents in these vans. The presence of

* In general, the equipment included: eight large vans that seemed appropriate for nosecone handling because of their lack of windows, their wide opening rear doors, and a possible air-conditioning or ventilating unit; a truck-mounted crane; an undetermined number of dollies that appeared suitable for nosecone handling and generally corresponded to descriptions of such equipment found in Soviet documents and to analogous US equipment; some ordinary cargo trucks; and two or three tents probably containing other associated equipment.

the vans, however, provides no assurance of the presence of warheads. No vans were observed in the immediate vicinity of missile-ready tents at any of the Cuban MRBM sites, and, for that matter, none of the missiles observed on their transporters was of sufficient length to have had nosecones (with or without warheads) attached. The only activity of the nosecone handling units at the MRBM sites that may have been indicative of some nosecone/warhead checkout consisted of a single instance of photography of a van at one of the San Cristobal sites being loaded or unloaded, but the cargo cannot be identified. Otherwise little or no activity was observed.

It is likely that nuclear warheads would have been delivered to Cuba in special hermetically sealed containers in order to maintain proper temperature and humidity control, regardless of whether they were shipped installed in the nosecones or separately from them. About two dozen such containers were observed in photography of a special unit located at the Mariel Naval Air Station throughout the period 15 October - 10 November (see the photograph, Figure 44). These containers, which appeared to be large enough to accommodate an MRBM nosecone but too large to contain only a warhead, were located in a separately secured area at the end of the runway, together with a number of nosecone dollies and 12 or more probable nosecone vans. The unit at Mariel was not present in photography of the Naval Air Station taken on 25 September. However, it appears to have been active before and during the week of crisis in October, as evidenced by the movement of vehicles and the apparent shifting of some containers from one group to another, suggesting that some sort of checkout or processing was underway in the nearby tents. As in the case of the Punta Gerardo oxidizer facility, the continued activity of the unit at Mariel during the crisis indicates that the deployed MRBM units may not have been fully equipped at that time.

Although the unit at the Mariel Naval Air Station appears to have performed some unique function, there is no way of determining from the available evidence whether its activity concerned MRBM nosecones alone or both nosecones and warheads. If warheads were in Cuba, this unit may have served as a receiving and initial checkout point through which they were transshipped to the sites. It must be noted, however, that the facilities at Mariel were of a field type and rudimentary. Although they might have sufficed for a temporary receiving facility, their appearance seems somewhat out of keeping with the stringent procedures and precautions that normally surround Soviet handling of nuclear weapons,



especially in view of the general availability of more appropriate facilities in Cuba.

In addition to the nosecone handling units and their special equipment, each MRBM site was evidently to have its own arch-roofed nuclear warhead bunker. The size of these bunkers suggests that they were intended for more than just storage of the warheads; probably warhead checkout and maintenance also would have been performed in these facilities. By 28 October, although three of the bunkers at the MRBM sites might have been sufficiently complete to be used for shelter, none had been earth-covered. It is unlikely that any of the bunkers had equipment installed or was actually in use. If warheads were present and operational at the MRBM sites, therefore, they must have been maintained and stored elsewhere, presumably in vans.

Bunkers also were present near the IRBM sites at Guanajay and Remedios. Because of its size, however, the single bunker at Guanajay probably was intended to serve both Guanajay missile sites (see the photographs, Figure 45*). It is curious that both of the IRBM warhead bunkers were virtually completed by 28 October, in contrast to those at the MRBM sites, even though missiles and most other IRBM system equipment had not yet arrived, whereas MRBM's and equipment had been arriving on site for well over a month. Because warheads for both systems are controlled by the same Soviet authority, it is possible that both the MRBM and the IRBM warheads were to be delivered to Cuba in a single shipment after completion of all of the storage and checkout facilities, which was not planned to occur until some time in November.

2. Shipment to Cuba

A second body of evidence that may be pertinent to the presence of nuclear warheads in Cuba concerns the voyage of the Soviet freighter Aleksandrovsk. Although any shipment of military cargo to Cuba during the buildup period could have included nuclear warheads, the Aleksandrovsk is suspected of having had some special cargo aboard, possibly nuclear warheads, because it was the only ship that departed from and returned to a Soviet Arctic naval port during the entire Cuban buildup. Again, however, the evidence is inconclusive.

* Following p. 72, below.

The Aleksandrovsk was engaged in transporting cargo to Cuba exclusively from Baltic ports during 1961 and most of 1962.

On 3 October the Aleksandrovsk was photographed at the Arctic port of Guba Okol'naya, a part of the naval complex in the Severomorsk area that serves submarines and surface craft of the Northern Fleet. The Aleksandrovsk is the first merchant vessel known to have called at this port.

it was not observed or photographed at sea, nor was it covered at La Isabella by overhead photography. The Aleksandrovsk probably remained at La Isabella for about a week after the quarantine was imposed, following which the vessel sailed to Mariel some time between 29 October, when it was not present in photography of Mariel, and 3 November, when it was identified at La Boca Pier in Mariel. The Aleksandrovsk was one of the first Soviet ships to depart Cuba, leaving Mariel with a deck cargo of nosecone vans on 5 November and arriving at Guba Okol'naya in late November.

The reason for this unique voyage from a Soviet Arctic port is not readily apparent. It can be hypothesized that the use of Guba Okol'naya enabled the vessel to reach Cuba and return with an unusually sensitive cargo, such as nuclear warheads, without risking surveillance or an incident of any kind in narrow waters under Western control, such as the passages from the Baltic or Black Seas. If the cargo consisted of MRBM or IRBM warheads, Guba Okol'naya probably served only as a transshipment point.

If this is the correct explanation for the voyage of the Aleksandrovsk, it must have been the first delivery of warheads to Cuba, for all other known voyages transited the Baltic or Black Sea passages or, in a few cases, the Panama Canal. In that case, none of the Cuban MRBM sites had a nuclear capacity at the time of the President's speech on 22 October. Moreover, they could have achieved such a capability during the critical week thereafter only if the cargo of the Aleksandrovsk had been unloaded at La Isabella and delivered to the sites, which seems unlikely in view of the general Soviet reaction to the crisis.

On the other hand, the movements of the Aleksandrovsk following the Soviet decision to withdraw the offensive missiles seem

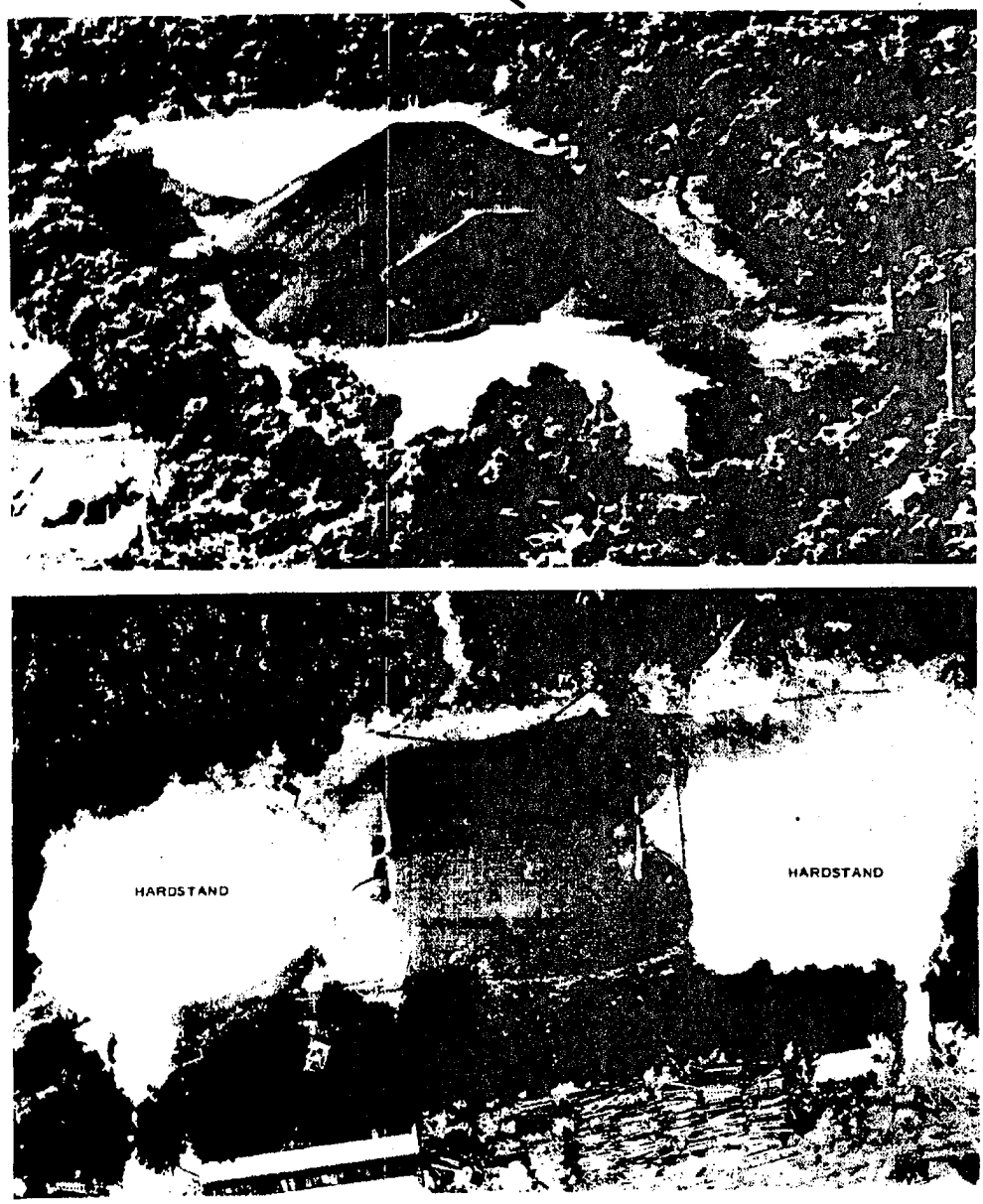



Figure 45. Completed Drive-Through Nuclear Weapons Facility at IRBM Launch Site 1 at Guanajay, 1 November 1962

inconsistent with a conclusion that it was making the first delivery of warheads to Cuba. Because of the cargo's sensitivity, the Soviet authorities presumably would have ordered the vessel to return directly to the USSR as soon as they considered it safe to do so. It is difficult to account for the ship's movement along the Cuban coast to Mariel about the first of November, therefore, unless the ship was to load a cargo of at least equal sensitivity -- that is, additional warheads that had previously been delivered to Cuba from some port other than Guba Okol'naya.

The only remaining hypothesis involving nuclear warheads that seems to fit all the circumstances of the mysterious voyage of the Aleksandrovsk is that it was carrying IRBM warheads which for some reason the USSR chose to transship through Guba Okol'naya, whereas MRBM warheads were shipped earlier, probably from a Black Sea port. In order to get the warheads out of Cuba in a single voyage, however, they were all removed on the Aleksandrovsk and returned by the safest route to the Soviet Arctic. This hypothesis is supported to some extent by the fact that many of the vessels believed to be carrying IRBM equipment to Cuba at the time of the quarantine had departed Baltic Sea ports, suggesting that Guba Okol'naya may have been the nearest or most convenient secure port for IRBM warheads, whereas the MRBM shipments apparently were loaded in the Black Sea. Alternatively, of course, Guba Okol'naya and the Aleksandrovsk may have had no nuclear significance whatever.

3. Soviet Statements

The only other evidence bearing on nuclear warheads consists of the statements of Soviet officials on the subject. On 8 November, for example, Deputy Foreign Minister Kuznetsov stated to Ambassador Stevenson that nuclear warheads had been taken out of Cuba "immediately" after the decision was made to remove the missiles, presumably on one of the first Soviet ships that left Cuba on 5 November. Two days earlier, however, Kuznetsov had indicated that the warheads would be removed "if warheads are indeed in Cuba." On 12 November, Khrushchev twice stated to British Ambassador Roberts that nuclear warheads had been removed from Cuba. Aside from an interview between Khrushchev and [redacted] at the height of the crisis, these have been the only explicit Soviet references on the subject; however, there also

have been Soviet statements that missiles were operational in Cuba in October 1962, implying that warheads were present.

Although the November assertions regarding nuclear warheads may well have been true, they cannot be taken at face value, in the absence of confirming evidence. The Soviet authorities probably judged that they would not be compelled to demonstrate the removal of nuclear warheads as they would be compelled to demonstrate the removal of the missiles. Hence statements that warheads were not present in Cuba, even if true, probably would not have served the Soviet purpose at the time, which was to reassure the US that the offensive weapons were being withdrawn. Once the crisis was past, the Soviet authorities could hardly be expected to admit that warheads had not reached Cuba, had that been the case.

D. Il-28 Light Bombers

Il-28 light bombers began arriving in Cuban ports during the last half of September 1962, at about the same time that MRBM's were being delivered. Nevertheless, viewed in the context of the over-all Soviet military buildup in Cuba, the evidence strongly indicates that the Il/UIl-28's* delivered to Cuba were not a part of the establishment of a Soviet offensive base on the island but were intended from the outset to be turned over to Cuban forces as the early generation MIG fighters had been.

Although there had been occasional reports of a Soviet intention to introduce Il-28's into Cuba since early 1962, the earliest indication of their delivery to Cuba came from an informant who reported seeing four crates that he believed contained Il-28's arriving at the Port of Mariel on 19 September 1962. Another informant reported the arrival of an unspecified number of possible Il-28 crates in the Port of Havana on 20 September 1962 and identified photographs of Il-28 fuselage crates in the Port of Havana on 20 September 1962 and identified photographs of Il-28 fuselage crates as resembling those he had observed.

* The Il-28 (Beagle) is a jet light bomber with a maximum combat radius of 740 nm, a cruise speed of 385 knots, and a bomb load capacity of 6,600 pounds. The UIl-28 (Mascot) is a training version of the Il-28 and is different only in a few exterior characteristics. For example, it has a slightly different cockpit. This bomber is now obsolescent and is being phased slowly out of the Soviet Air Order of Battle.

Photography of Soviet ships carrying Il-28 crates on deck and bound for Cuba was first taken in September. Ten Il-28 fuselage crates were observed on the deck of the Kasimov, which arrived in Cuba about the end of September. Subsequent photography disclosed seven Il-28 fuselage crates on the deck of the Bratsk, which arrived about 20 October. The Leninskiy Komsomol, which was photographed in Danish waters on 9 October with 13 Il-28 fuselage crates on deck, also arrived in Cuba about 20 October. San Julian Airfield was photographed on 15 October, at which time 2 fuselages and 20 fuselage crates were present. By 7 November a total of 42 Il/UIl-28 aircraft had been identified in aerial photography.*

Between 15 October, when fuselages were first observed out of their crates, and 27 October, one day before the Soviet decision to withdraw the missiles, only one aircraft had been completely assembled (see the photograph, Figure 46**). However, from 27 October to 15 November, the date on which assembly apparently stopped, six additional aircraft were completed, an assembly rate of slightly more than 3 days per plane. At this rate, assembly of the 42 Il/UIl-28's would not have been completed until March 1963. By way of comparison this rate is much slower than the assembly rate of the MIG-21's in Cuba, which was about 1 day per plane.

San Julian Airfield has long been able to handle aircraft of the Il-28 type. Therefore, little modification of its facilities was required. It was not, however, being used regularly by the Cubans before the arrival of the jet bombers, and some repair may have been necessary to make it operational. Holguin Airfield, on the other hand, before the completion of a new runway in June 1962, could not accommodate either Il-28's or MIG-21's, and construction of that runway, as well as of revetments and taxiways, was observed to have been well underway by December 1961. Although the runway itself was completed by June 1962, work on aircraft revetments and new taxiways continued after the arrival of the Il-28 fuselage crates. Special facilities for their assembly probably were not required at either airfield, for the aircraft at San Julian were observed being assembled in the open, with no specialized equipment in evidence.

* Nine fuselage crates were noted in photography of 4 November at Holguin Airfield. Nine aircraft and 24 crates were present at San Julian Airfield on 7 November.

** Following p. 76, below.

the early collateral reports that the Cuban Air Force would receive Il-28's and the high proportion of UIl-28 trainers among the aircraft uncrated (4 of the 13), indicates that it was the Soviet intention to place these aircraft under Cuban control. Moreover, at the slow rate at which the Il/UIl-28's were being assembled, all would not have been operational until 2 to 3 months after the estimated date on which the last IRBM sites under construction would have become operational. Finally, whereas the quality of most of the other Soviet-controlled weapons in Cuba was high, the Il-28, in contrast, is an obsolescent and relatively ineffective aircraft, currently used primarily in a coastal defense role in the USSR.

E. Soviet Withdrawal of Offensive Systems

At the time of the President's speech on 22 October, approximately 22,000 Soviet military personnel (combat troops and technicians) were in Cuba.** All of the air defense, naval, ground, and offensive weapons systems that had been delivered to Cuba since late July, with the exception of the Il-28 bombers, were then totally manned and controlled by the Soviet authorities. This is evidenced by a substantial body of information indicating that Cubans were excluded from the areas where Soviet troops and weapons were located; training programs that would have enabled the Cubans to operate these complex weapons had not been accomplished; and an exclusively Soviet command and communications structure was established to control their use. Although the Soviet authorities may have planned before the crisis to turn some of these systems over to the Cubans eventually, this transfer could not have been accomplished quickly and would have required training programs such as that carried out with the Il-28's. The Soviet authorities clearly intended to maintain their complete military establishment in Cuba for an extended period of time.

** The number 22,000 is used as the most common estimate available. At best, direct evidence on which to base a definitive estimate is not available. Much has already been written about this subject, and a re-examination will not be attempted in this study.

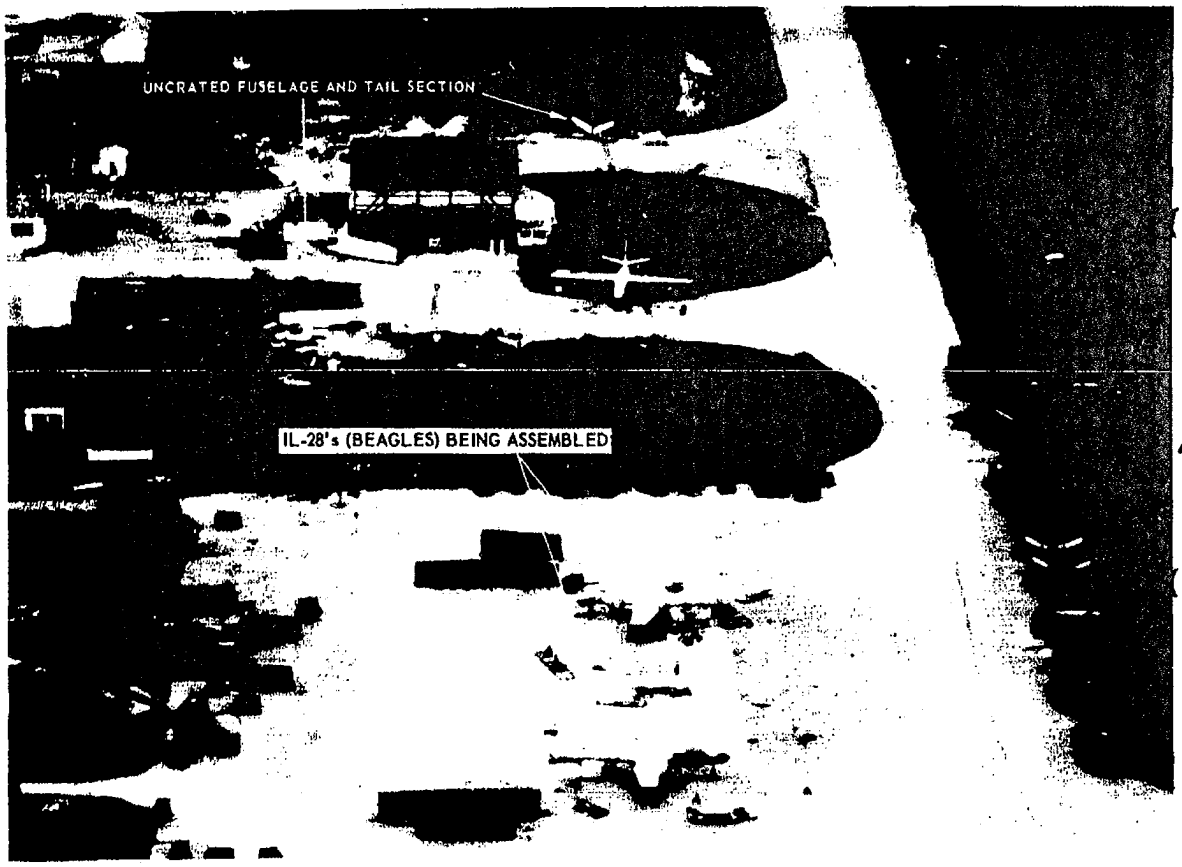





Figure 46. Il-28 Bombers Being Assembled at San Julian Airfield, 27 October 1962

1. Week of Crisis, 22-28 October

During the critical week between the President's speech and the Soviet withdrawal announcement, the Soviet reaction to the crisis, as reflected by the activities of Soviet forces in Cuba, did not follow a consistent pattern, suggesting that there may have been some indecision and confusion. Although some actions were taken to improve the combat readiness of elements of the Soviet forces, most of these did not occur until several days after the President's speech and appeared to have been taken earlier than intended; other elements of the Soviet forces showed little or no change in status throughout the height of the crisis.

The small but complete air defense system did not become operational until 27 October, and it expanded steadily thereafter, suggesting premature activation. At the MRBM sites, construction of buildings and hardstands continued, and some training activity may have occurred. Moreover, vehicles and equipment were dispersed and camouflaged (see the photograph, Figure 47*), and antiaircraft artillery positions and personnel trenches were prepared. These defensive measures may have been occasioned as much by the commencement on 23 October of low-altitude reconnaissance missions as by reaction to the President's speech, for the low-level missions must have vividly impressed the Soviet personnel at the sites with the danger of attack by US forces. The concealment of equipment also may have been intended to prevent close observation of deployed units. In addition to these measures, one cruise missile unit was moved from an inland location about 25 or 26 October and deployed operationally on the coast, and one armored group was moved out of its encampment at about the same time. Finally, the only aggressive act ever committed by the Soviet Forces in Cuba occurred on 27 October, when a U-2 aircraft was shot down near the Port of Banes, probably by the surface-to-air missile unit located north of the port. Even in retrospect the causes underlying this unusual action cannot be determined, although collateral reporting strongly supports a contention that a surface-to-air missile was the weapon used to down the aircraft.

* Following p. 78, below.

On the other hand, all or virtually all of the Soviet-manned MIG-21 aircraft continued to be based at the same airfield where they had been assembled, but apparently they did not maintain an unusually high level of activity during the crisis and were not dispersed to other airfields until the first week in November. There was no discernible activity during the crisis at three of the four ground force encampments where the armored groups remained in place and highly vulnerable to attack. So far as is known, the Komar-class boats also remained generally inactive at this time.

2. Pattern of Withdrawal

By 1 November (see the photograph, Figure 48) the Soviet authorities, evidently having had enough of high-risk, low-profit confrontation, had begun dismantling the long-range missile sites and withdrawing the MRBM's and key items of associated equipment. The missile withdrawal operation was notable for its rapidity and overtness.

Because none of the large-hatch ships in which the missiles had been brought to Cuba as hold cargo was near Cuban waters on the first of November, the Soviet authorities chose to use the shipping immediately available in Cuba to return the missiles as deck cargo. On 2 November, missiles and equipment began appearing at the port of Mariel (see the photograph, Figure 49). On 5 November, missile equipment was noted moving into the port area of La Isabella on the north coast, and missile transporters and equipment were observed near Casilda on the south coast. By 10 November, all 42 missiles and some associated equipment had been loaded and were at sea en route to the USSR. Following the departure of the missiles, the removal of other MRBM equipment proceeded at a more leisurely pace through December.

In all, 28 MRBM's, presumably from the San Cristobal sites, were removed through Mariel and 14, apparently from Sagua la Grande, through Casilda. At the time of withdrawal, the two ships observed in photography of 3 November at La Isabella, the closest port to the Sagua la Grande sites, probably were unsuitable for transporting the missiles because of the arrangement of their deck superstructure. Casilda, therefore, may have been the closest port to Sagua la Grande at which both suitable port facilities and shipping were immediately

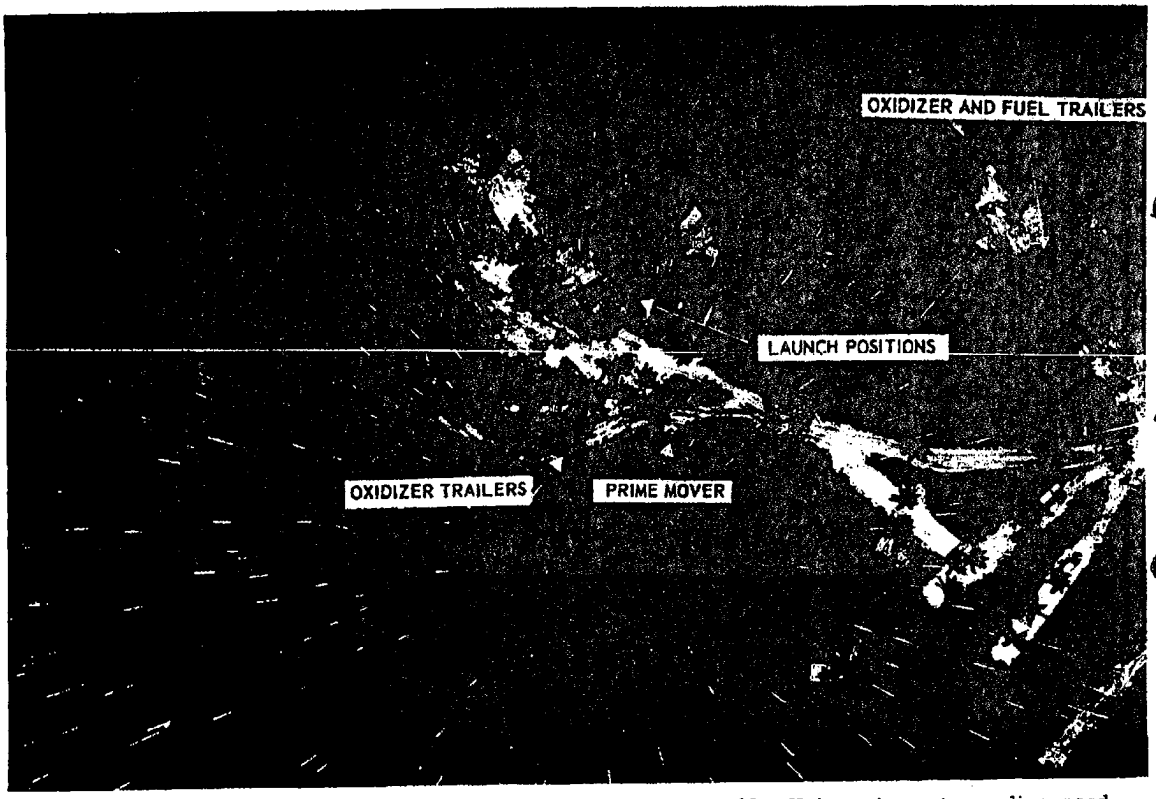





Figure 47. MRBM Launch Site 1 at Sagua la Grande, 26 October 1962. Unit equipment was dispersed and camouflaged after low-level flights began.

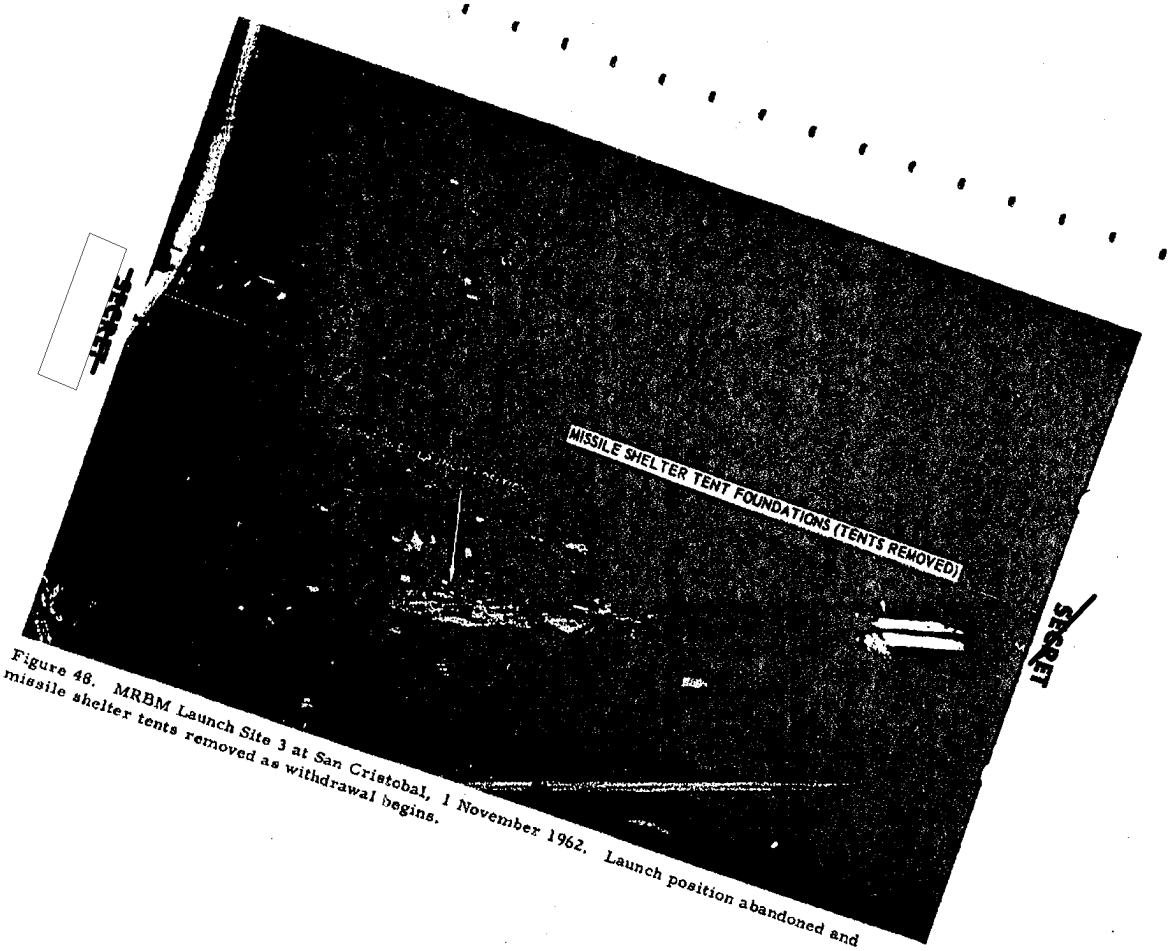



Figure 48. MRBM Launch Site 3 at San Cristobal, 1 November 1962. Launch position abandoned and missile shelter tents removed as withdrawal begins.




Figure 49. Missile Equipment at the Port of Mariel, 2 November 1962. MRBM unit equipment and metal rings from IRBM launch positions are visible.

available. The vessels involved in the initial phases of the withdrawal; their types of cargo, dates, and ports of departure; and their probable destinations are listed in Table 3.

Table 3

Soviet Withdrawal of MRBM's from Cuba
November 1962

| Port | Ship | Cargo (Number of Missiles) | Date of Departure | Destination |
|---|---|---|---|---|
| Mariel | Dvinogorsk | 4 | 5 Nov | Odessa |
| Mariel | Metallurg Anosov | 8 | 7 Nov | Odessa |
| Mariel | Bratsk | 2 | 7 Nov | Kaliningrad |
| Mariel | Volgoles | 7 | 8 Nov | Kaliningrad |
| Mariel (then Havana) | Ivan Polzunov | 5 | 9 Nov | Kaliningrad |
| Mariel (then Havana) | Labinsk | 2 | 9 Nov (Havana) | Nikolayev |
| Casilda | Fizik Kurchatov | 6 | 7 Nov | Nikolayev (probably) |
| Casilda | Leninskiy Komsomol | 8 | 9 Nov | Odessa |

Although the use of immediately available shipping required deckloading of the missiles and thus contributed to the overtness of the withdrawal, there are some indications of a deliberate effort by the Soviet authorities to demonstrate as plainly as possible, short of on-site inspection, that the offending offensive missiles and bases were gone. For one thing, they made no attempt to shelter the missiles and equipment while in port awaiting shipment, although warehouses were available (see the photograph, Figure 50*). Moreover, at Guanajay Site 1, the only IRBM site at which concrete had been poured for the launch pad and apron, the metal launch rings were removed, and the launch areas left visibly demolished; the other IRBM sites were simply bulldozed over.

* Following p. 80, below.

Finally, the Soviet authorities generally cooperated in drawing back the tarpaulins from the missiles when challenged at sea by US inspection parties. Although the nuclear storage facilities at the MRBM and IRBM sites have still not been dismantled, there is no evidence from repeated photographic coverage that additional construction work has been performed or that they are being used for storage of any element of an offensive weapon system.

In contrast to the expeditious withdrawal of the MRBM's, the 42 Il-28's in Cuba at the time of the quarantine were not removed until early December and then only after Mikoyan had apparently spent some uncomfortable days and nights in Havana exercising his powers of persuasion. In fact, assembly of the Il-28's went on slowly but steadily after 28 October until about mid-November, following which no change was observed in the status of the aircraft. At that time, 7 aircraft had been completed and an eighth lacked only an engine cowling; most of the remainder were still in crates. After Khrushchev's announcement on 20 November that the Il-28's would be withdrawn, all of the aircraft were moved from San Julian and Holguin Airfields to the ports of Nuevitas and Mariel, where they were loaded on the decks of three vessels that departed by 7 December (see the photograph, Figure 51). It is certain, in view of the limited shipping space required and the return of several of the aircraft to the USSR uncrated as deck cargo, that the Il-28's could have been withdrawn at any time after 28 October. The fact that they were not, together with the apparent disarray between Moscow and Havana on the subject, provides further evidence that these aircraft, as previously indicated, were intended from the outset to be turned over to Castro's forces.




Figure 50. Missiles and Missile Equipment Awaiting Shipment at the Port of Mariel, 9 November 1962

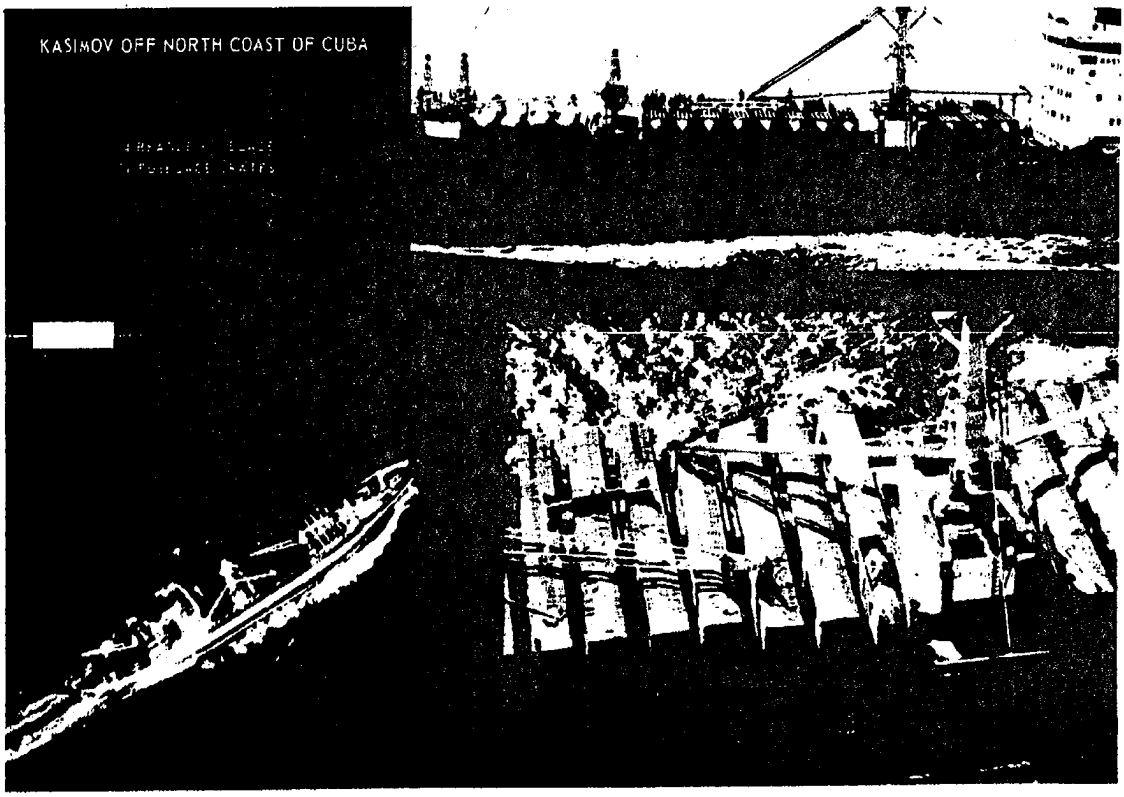



Figure 51. The Soviet Freighter Kasimov Returning Il-28's to the USSR, 5 December 1962

## PART TWO: IMPLICATIONS OF THE EVIDENCE

### I. Concept and Timing of the Soviet Venture in Cuba

During a 3-month period beginning at the end of July 1962 the USSR delivered to Cuba and deployed Soviet forces and weapons systems representing all major elements of a complete military establishment. The principal milestones that are identifiable from evidence of the deployment of each weapons system are recapitulated in the chart, Figure 52.*

#### A. Defensive Systems

Among the defensive systems the first SAM equipment probably arrived in early August, and deliveries continued throughout August, September, and possibly the first part of October. Although about one-half of the SAM units had been emplaced before the end of the first week in September, no general activation of the SAM units appears to have occurred until 26-27 October. Although deliveries of MIG-21 aircraft began about the end of August and the first aircraft was assembled by the first week in September, the first known flight of one of these aircraft did not occur until the second week in October, nor were they all assembled until about mid-October. It was not until early November that they were operationally deployed to three separate airfields.

* Following p. 82, below.

It appears, therefore, that even though the Cubans and the Soviet authorities probably were aware of US reconnaissance overflights of Cuba at least by July 1962 and must have had increasingly complete knowledge of these activities during the buildup period, the Soviet authorities did not rush to completion either the parts of their air defense capability or the entire system. The Soviet program apparently called for the full flowering of the system at some given point in time, probably in the first half of November. Thus the air defense system in Cuba was not intended to be employed to screen the buildup. It was not until the Cuban crisis was almost over and the Soviet authorities had virtually capitulated that the air defense system was brought into operation, and even then it probably was earlier than they had planned.

The Soviet naval defense forces, consisting of 12 Komar-class patrol boats and 4 identifiable coastal defense cruise missile units, were introduced into Cuba in the very early stages of the buildup and rapidly became operational. These weapons are readily deployable, however, and it is difficult to impute any particular significance to their early operational status, for their maximum usefulness appears to reside in countering landing attempts by fairly large groups of vessels. They could not conceivably have been deployed to screen the emplacement of other weapons.

It has not been possible to establish with any degree of precision when the four Soviet armored groups were moved into their encampment areas, but this must have occurred between the first week of September and the middle of October. Although these units may have been the last of the defensive forces to arrive in Cuba, they would have been ready for combat operations as soon as the personnel and equipment were assembled. The Soviet authorities probably considered these units to be an important element of their military presence in Cuba. They probably calculated that establishment of the armored groups would serve a variety of purposes, ranging from deterrence of external attack, particularly by small forces, to protection of Soviet forces and equipment from any internal threat. It is not possible to determine, however, whether these units were in place during the period beginning about mid-September when the first offensive weapons were being introduced into Cuba.

TOP SECRET

## *IDENTIFIABLE MILESTONES OF THE SOVIET MILITARY BUILDUP IN CUBA*

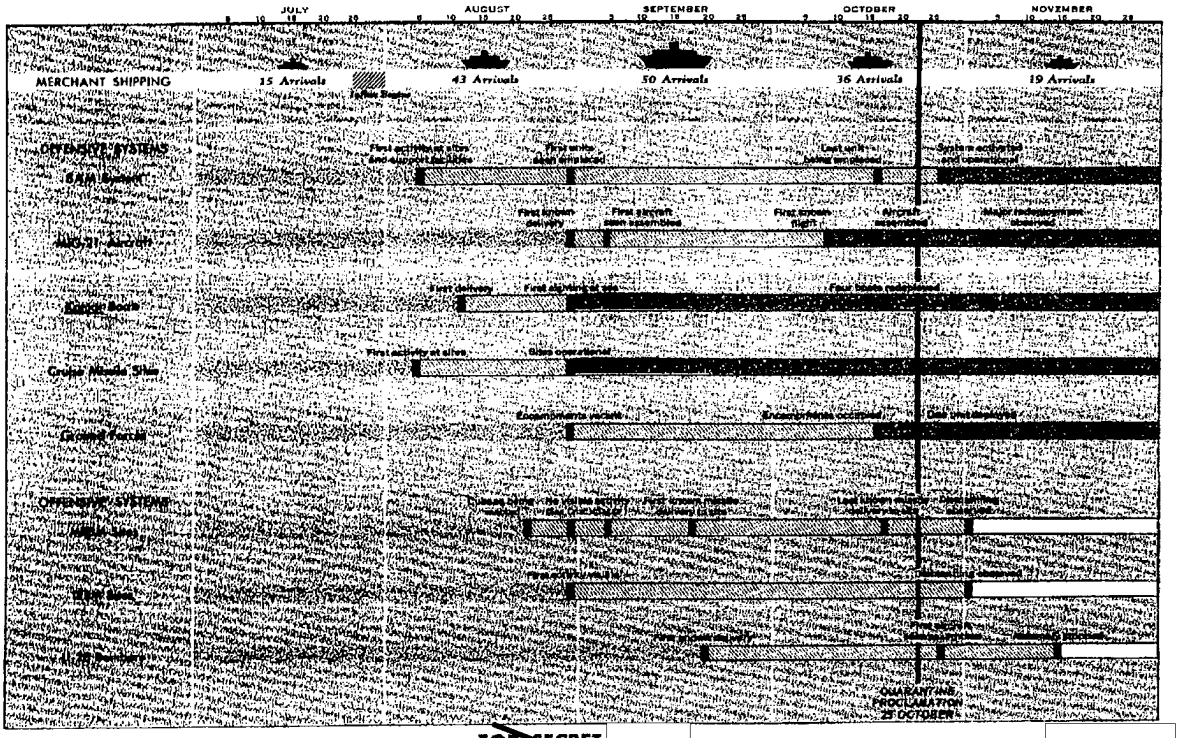



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Figure 52

B. Offensive Systems

Significant differences are apparent in the time-phasing of the various offensive weapons systems. By the end of August, Cubans were being evicted from the vicinity of some of the MRBM sites, and the first evidence of activity was discernible in the area of the Guanajay IRBM sites. By mid-September, MRBM's and related system equipment were being delivered to sites. Although Il-28 bombers probably arrived in mid or late September, at the rate they were being assembled they would not have been completely operational until well into 1963, thus being quite out of phase with the deployment of other systems. In view of other evidence suggesting that these aircraft were intended for delivery to Cuban forces, it appears unlikely that the Il-28's were regarded by the Soviet authorities as an integral or significant element of the deployment of offensive weapons to Cuba.

Whereas the MRBM units were combat-ready to some degree during the crisis (assuming the presence of warheads) and probably would have been entirely combat-ready, with a full refire capability, by mid-November, none of the IRBM sites was completed by the end of October and virtually no system equipment had arrived in Cuba. Although construction of the most advanced IRBM site probably was begun at about the same time or shortly before the MRBM sites, it would not have been completed until about mid-November, owing to the vastly greater complexity of the construction and facilities required. The other two sites would have been completed by about the middle of December while construction of a fourth site, if it was planned, would have extended into early 1963. The observed rate of construction at the IRBM sites was relatively rapid, indicating a Soviet intention to bring them to operational status as soon after the MRBM sites as possible. It is clear, however, that the Soviet authorities did not plan the deployment of their offensive missile systems in Cuba so as to achieve a full operational capability with both systems more or less concurrently, as appeared to be the case with the major defensive weapon systems.

C.

D. Implications of the Timing of the Program

The most striking aspect of the Soviet plan as it was unfolded in Cuba was the high degree of concurrency in the phasing of the development of offensive and defensive capabilities. The evidence which has been presented makes it clear that the Soviet authorities did not conceive of the Cuban military buildup as a sequential program in which weapons intended for the defense of the island would be established first and brought into operation early enough to screen the subsequent deployment of offensive weapons. This probably could have been done, for example, by delaying the beginning of IRBM site construction and of MRBM deployment by only a matter of weeks to insure that the air defense system was operational before the strategic missile sites were detectable by US reconnaissance. As the program was carried out, however, the first MRBM unit and its readily identifiable equipment were on site about 1-1/2 months before the air defense system was activated, on 27 October. Also, the first IRBM site, although not equipped, was nearly completed by that time. The schedule of deployment of the MRBM units, moreover, could have been planned to minimize the length of time during which some of the MRBM sites were detectable before all of the MRBM sites were emplaced, equipped, and combat-ready. Because the first delivery of unique equipment, including missiles, probably was made to a site area in mid-September, approximately 8 weeks would have elapsed before the estimated date on which refinements at all the sites would have been finally accomplished. During most of that time the MRBM sites would have been subject to observation and would have been readily identifiable by the presence of such obvious items of equipment as missiles and fuel and oxidizer trailers openly situated in the site areas.

The actual program, as has been indicated, with the sole exception of the IRBM force, would have resulted in all of the major elements of the Soviet military establishment in Cuba (that is, the SAM system, MIG-21 fighter aircraft, armored groups, and MRBM units) becoming fully combat-ready more or less simultaneously at some time between the end of October and mid-November. Yet the 12 to 16 planned IRBM launchers would have been of major importance in strengthening the image of a Soviet strategic threat to the US from Cuba. These time relationships and the view that they yield of the Soviet concept of the program are critical to the following reconstruction of what was in the Soviet mind at the time the Cuban venture was undertaken.

## II. Soviet Policy Considerations and Objectives

There is no apparent significant event or action in Soviet external or internal affairs that indicates the particular point in time when the Soviet leaders made the momentous decision to project their armed might into the Caribbean Sea, historically a US mare nostrum. It is likely that the decision was not suddenly reached but stemmed from a continuing assessment by the Soviet leaders of the balance of world power and of opportunities for advancement of the Communist cause. It is beyond the scope of this study to examine the full range of political, military, and economic considerations that might have impelled Soviet policymakers to embark on the Cuban venture, but the nature and timing of the military buildup itself shed considerable light on some of the motivating factors.

### A. Soviet View of the Risks

In a sense the Cuban crisis had its origin in February 1960 when First Deputy Premier Mikoyan was sent to Cuba to conduct economic negotiations with the Castro government. Following his visit, which signaled public Soviet endorsement of the Cuban revolution, economic aid agreements were consummated, and the first major Soviet arms shipment arrived in September 1960, more than a year after Castro seized power. However, the pattern of military aid thereafter continued to reflect Soviet caution. Deliveries of military equipment were limited to items that could be used only for the maintenance of internal order and for defensive purposes. The first MIG fighters were not supplied until June 1961, whereas such aircraft have been among the first items delivered to other countries receiving Soviet military aid. Sometime in late 1961

or early 1962, Cuban pilots evidently began training in Il-28 bombers, but there are no indications of a Soviet intention to deliver more advanced offensive or defensive weapons. Once the process of supplying military aid to Cuba began, it was characterized by a gradual escalation in the type of arms made available, giving the impression that US forbearance was being carefully tested and that the Soviet authorities may have had continuing reservations about the Castro regime. At some point in the process, however, the Soviet leaders reached the conclusion that the advantages to be gained from the installation of Soviet nuclear striking power within 100 miles of US soil outweighed whatever risks they estimated were involved.

The best measure of their miscalculation, apart from its consequences, is the clear indication contained in the concept and execution of the Cuban venture itself that the Soviet authorities believed the risks were relatively low. Although not conclusive, the evidence strongly suggests that the Soviet authorities were aware, both before and during the buildup, of US reconnaissance activity over Cuba. In any event, they had acquired relatively full knowledge of US photoreconnaissance capabilities in May 1960 and could hardly have failed to consider them in planning the Cuban venture.* Nevertheless, they made no apparent effort to minimize the chances of detection by establishing an operational air defense system before the introduction of offensive weapons, by camouflaging or concealing the deployment of MRBM units, or by

* The possibility has been considered that the Soviet military leaders responsible for planning the Cuban venture were unaware of or grossly underestimated US photoreconnaissance capabilities. This possibility seems unlikely, however, in view of the following considerations: (1) acquisition of film and equipment from the U-2 downed near Sverdlovsk in May 1960 and Soviet appreciation of the quality and intelligence utility of the photography as evidenced in the expert testimony given at the Powers trial as well as in comments made by Khrushchev and others; (2) the widespread publicity given the U-2 story throughout the USSR from Khrushchev's revelations before the Supreme Soviet on 5 May through the conclusion of the Powers trial in August 1960; and (3) the fact that Marshal Biryuzov, who had been Chief of Air Defense (PVO) forces during the entire period of the U-2 overflights of the USSR, became Chief of the Strategic Rocket Forces in April 1962 and therefore must have had a key role in the final planning and execution of the missile base venture in Cuba.

minimizing the length of time in which some of the MRBM sites were identifiable before all these sites would have been finally complete and combat-ready. The conclusion seems inescapable that the Soviet authorities chose to ignore the distinct possibility of US overflights in planning the Cuban operation. This choice seems inexplicable unless the Soviet leaders judged with considerable assurance that the US would acquiesce in the deployment of strategic missiles in Cuba -- or at least that the US would not attempt to force their removal by reacting militarily -- and hence that the possibility of US detection was not critical to the success or failure of the venture.

This view of the Soviet estimate is supported by the fact that the USSR proceeded in the manner in which it did despite the firm and explicit warnings of President Kennedy. On 4 September the President, after indicating that the US had recently obtained information which "establishes without doubt" the presence of surface-to-air missiles and missile-armed patrol boats in Cuba, declared that "the gravest issues" would arise if the US acquired evidence of "offensive ground-to-ground missiles, or of other significant offensive capability either in Cuban hands or under Soviet direction and guidance." This injunction was hardened by the President during his press conference of 13 September, when he stated: "I have indicated that if Cuba should possess a capacity to carry out offensive actions against the United States, the United States would act." Given their knowledge of US photoreconnaissance capabilities and of US overflights of Cuba, as reflected in the evidence of radar-tracking up to that time, the Soviet authorities could easily have judged that at least some of the US information came from photography. Thus they probably calculated that the nature and general scope of the buildup visible by the end of August were known to the US and that the subsequent deployment of offensive missiles also could be detected.

On the other hand, the Soviet leaders had no reason to interpret the President's statements as indicating that the US already knew of the Soviet intention to introduce offensive weapons and had chosen to look the other way, thus enabling them to proceed with impunity. At the time of the first statement, on 4 September, no activity had occurred at the MRBM or IRBM sites that could be identified from photography, and the first missiles almost certainly had not reached Cuba, although they were on the high seas. By 13 September, activity at the sites would still not have been identifiable, and what was probably the first shipment of MRBM's was only then approaching Cuban waters -- with the missiles below deck.

Although the President's warnings did not cause the USSR to attempt thereafter to conceal the buildup from overhead reconnaissance, perhaps because the IRBM sites would have been difficult to camouflage, certain publicized statements indicated increasing Soviet concern over the developing US attitude toward the presence of Soviet forces in Cuba. For example, during the course of a long official statement on 11 September attacking US Cuban policy in general and the President's request to Congress for authority to call up reservists in particular, the Soviet government asserted that "the armaments and military equipment sent to Cuba are designed exclusively for defensive purposes." It added, however, that "The Soviet Government considers it its duty in this situation to display vigilance and to instruct the Minister of Defense of the Soviet Union, the command of the Soviet Army, to take all measures to raise our armed forces to peak military preparedness" but that these were "exclusively precautionary measures." Nevertheless, there is no persuasive set of indications from which one can conclude that the Soviet Armed Forces in general were brought to an alert status at any time before the President's speech of 22 October (nor that they were subsequently placed in a position which suggested that a state of hostilities was imminent).

In contrast to their attitude toward US reconnaissance, Soviet personnel took considerable pains to prevent ground observation of or access near their weapons and related equipment in Cuba. The security precautions accompanying the offloading, movement, and permanent deployment of these weapons, in general, were well planned and executed. In fact, Soviet personnel did succeed in concealing from the general population the true extent of the Soviet presence on the island, and even in retrospect it is impossible, without photography, to judge where, when, and what weapons arrived and were deployed. These measures probably were intended largely to protect the weapons from both close observation and possible sabotage. However, the Soviet authorities also may have wished to avoid widespread public knowledge, not only in Cuba but also in the US and other countries of the Free World, of the extent and nature of their activities in Cuba. This is suggested by the Cuban action on 25 September in declaring all of Cuba outside Havana offlimits to Western correspondents.

B. The Decision

In late 1961, probably during and after the Twenty-Second Party Congress in October, the Soviet leaders undoubtedly conducted a broad

reappraisal of Soviet military, economic, and foreign policies and objectives in the light of the Kennedy-Khrushchev meeting in June 1961, the crisis of the Berlin Wall in August, the revelation of the myth of Soviet ICBM superiority in October, mounting economic problems, and the continuing controversy with the Chinese Communists. The Soviet intention to establish a military base in Cuba probably had its origins in the policy deliberations of that time. The final commitment to set the plan in motion, however, probably did not occur until the spring of 1962, perhaps in April or May. Within this time span, there is no way of identifying a more precise period of decision. Some of the evidence suggests an early date; other information indicates a late decision. In fact, the plan probably evolved over a considerable period of time and may have resulted from a series of decisions.

Although inconclusive, there is some evidence of an influx of Soviet personnel and increased Soviet activity in Cuba beginning in about February or March 1962. In view of the magnitude and complexity of the buildup that was to follow, it is possible that an advance party was sent to Cuba at about this time for the purpose of planning, perhaps on a contingency basis, for the deployment of Soviet forces. This action would suggest that the venture was conceived at the end of 1961 or very early in 1962. An exceptionally well-placed informant reported in January 1962 that because of Khrushchev's inability to resolve the Berlin problem, the Soviet leader had decided to build up the strategic rocket forces and to complete production of the required number of missiles and nuclear warheads "this year" (that is, in 1962). Although this information appeared to apply to allocation of resources in the USSR and contained no hint of the establishment of overseas bases, the timing of the decision, the target date, and the motivation (if not the details) could have applied equally well to plans for the Cuban missile bases. Because the information of the informant, although secondhand, originated in high Soviet military circles, this report may have been a reflection of actual planning for the Cuban operation or of some other plan under consideration at the time that was later supplemented or supplanted by the Cuban venture. In any event, the report indicates that in late 1961 or at the beginning of 1962, Khrushchev was seeking some military means of rapidly and significantly improving the USSR's bargaining position in the German negotiations and suggests the climate in which the Cuban decision was made.

In the spring of 1962 the Soviet leaders set in motion in Indonesia another overseas military venture involving the possible commitment of Soviet forces against a NATO member. The Indonesian decision was almost certainly closely related in time to the Cuban decision and, like the latter, represented an unprecedented projection of Soviet military power into the non-Communist world, although on a much smaller scale. Sometime between February and April the Soviet authorities decided to encourage and support actively an Indonesian military buildup against the Dutch in West New Guinea by increased arms shipments and by the deployment to Indonesia of Soviet-manned submarines and jet medium bombers equipped with air-to-surface missiles. Subsequent events strongly suggested that these Soviet forces would have been committed in the Indonesian-Dutch hostilities which were narrowly averted.

Other evidence connected with the Indonesian buildup suggests that the planning of the Cuban operation was well along by mid-May.

The only direct evidence available as to the date of the Cuban decision is a remark attributed to a Soviet diplomat, that an important decision had been made with respect to Cuba and who later, during the crisis, indicated that the decision had been made in May. It cannot be judged whether this Soviet official did in fact possess prior information about Soviet plans in Cuba, but it seems improbable. However, because the first shipments of personnel and equipment for the buildup did not leave the USSR until about the beginning of July, the final decision to go ahead with the venture possibly could have been made as late as May, particularly if there had been a good deal of prior planning.

Regardless of the manner in which the Cuban plan evolved and the timing of specific decisions, it seems unlikely that the final commitment was made until after Moscow had assessed and acquiesced in Castro's assertion of authority over the Cuban Communist movement and the Moscow-backed "old Communists" in late March and early April 1962. These developments, although in a sense unfavorable to Moscow, at least

indicated that the buildup could be carried out in a relatively stable political climate in Cuba. Moreover, it should be noted that even if the Soviet authorities had desired to deploy strategic missiles to Cuba much earlier than they did, only two of the large-hatch ships required to transport MRBM's and IRBM's below decks were available before June 1962 and that four others made their maiden voyages to Cuba in August or later.

C. Probable Soviet Objectives

In deciding to deploy offensive missiles in Cuba, the Soviet leaders probably were seeking to reduce the strategic missile imbalance against the USSR drastically and rapidly. Completion of the MRBM and IRBM sites in Cuba (assuming that a fourth IRBM site was planned) would have provided the USSR with the equivalent of 40 ICBM launchers on Soviet soil, as these sites would have provided coverage of the entire US except for a part of the Pacific Northwest (see the map, Figure 41*). This would have represented an increase of more than 50 percent above currently estimated Soviet ICBM strike capabilities against the continental US at the end of 1962. Moreover, this additional capability would have been acquired more rapidly than if the same number of ICBM launchers had been constructed in the USSR.

The Soviet leaders must have calculated that successful establishment of the Cuban missile bases would have been advantageous in a host of ways. Foremost among these, they probably judged that the Soviet bargaining position in any international crisis affecting vital US interests would be sharply improved, perhaps as much by having discredited US resoluteness and will to resist as by the increase in both the substance and the image of Soviet military power. The Cuban bases also would have provided a deterrent to US military action against the Castro regime, which the Cuban if not the Soviet leaders may have believed to be imminent; demonstrated dramatically Soviet support for regimes in underdeveloped countries seeking to realize their "national aspirations"; and disarmed mounting Chinese criticism. Finally, if a line of retreat were required immediately or at some future date, the Cuban bases could provide leverage for the removal of US overseas bases.

Nevertheless, the Soviet leaders also must have realized that the added capability represented by the Cuban missile forces would have left the USSR far short of parity with the US in either over-all strategic capabilities or missile strike capabilities. Moreover, they would have

* Following p. 64, above.

known that even if they followed an initial success with the deployment of additional offensive missiles in Cuba, the gain in their relative power would be temporary in view of the high rate of ICBM and Polaris launcher activation programed by the US in 1963 and thereafter. It is possible, therefore, that the Cuban venture represented to Khrushchev a clear but transitory opportunity to open the way for a dramatic victory elsewhere, such as Berlin, which would alter the long-term "world relation of forces" in his favor. In this sense the Cuban venture was only a prelude.

D. The Withdrawal

As it happened, Khrushchev was faced with a direct military confrontation at a point where the US was able to concentrate an overwhelming conventional military force -- and the Soviet leaders were well aware of this situation. In effect, the Soviet authorities had only one possible response to make against the threat of US conventional forces striking Cuba, and that was a nuclear response. This recourse could hardly have been appealing, inasmuch as they were well aware that the US was massing conventional forces in the southeastern US and that the USSR also was faced with a fully alerted, nuclear strike capability of uncomfortable proportions. This realization was illustrated later in Premier Khrushchev's speech to the Supreme Soviet on 12 December 1962, when he delivered the following résumé of US actions following the President's speech of 22 October:

> Events developed at a quick pace. The US command brought into full military preparedness all their armed forces, including the troops present in Europe, as well as its Sixth Fleet in the Mediterranean and the Seventh Fleet based in the Taiwan area. Several paratroop, infantry, tank, and armoured divisions -- numbering about 100,000 servicemen -- were detailed for an attack on Cuba alone. Apart from this, 183 ships with 85,000 sailors aboard were moved toward the shores of Cuba. The landing in Cuba was to be covered by several thousand military aircraft. About 20 percent of all aircraft of the strategic air command were in the air round the clock carrying atomic weapons and hydrogen bombs aboard. Reservists were called up.

Given this knowledge, the Soviet leaders had no options respecting withdrawal. Their only possible course of action was to insure that the Cuban crisis did not escalate, to test US resolve, and if it were found firm, to attempt to salvage as much out of the venture as they possibly could. This, apparently, is precisely what occurred in the days between the President's speech of 22 October and Premier Khrushchev's announcement on 20 November of his agreement to withdraw the Il-28 bombers.

The US position, both as regards what constituted offensive weapons and what must be done about them before the quarantine would be lifted, was made unmistakably clear in the President's address of 22 October and his quarantine proclamation of 23 October. The stage within which the Soviet leaders were to reach their decisions had then been completely set. They were in no position to make an adequate response to the conventional forces opposing them and could hardly have felt themselves in a position to consider seriously a nuclear response. Their job, if the US held firm, had to be to extricate themselves from a very poor situation as reasonably as possible. Their subsequent statements, actions, and decisions appear to fit this scenario extremely well.

While carefully refraining from actions that might provoke the US nuclear strike capability, the Soviet personnel continued work on the missile bases, and the leaders undertook, in an official government statement of 23 October, to muddy the waters by reiterating that their assistance to Cuba was aimed solely at enhancing Cuba's defense potential and charging that the US "blockade" violated international law. They also raised characteristically the spectre of thermonuclear war. In addition, Premier Khrushchev's reply on 24 October to a telegram from Bertrand Russell attempted to drag the US into universal negotiations by suggesting a top-level meeting "in order to discuss all the problems which have arisen."

However, as the US stood firmly by its demands and the crisis deepened, the Soviet leaders were forced to abandon their attempts to divert the US. Under the resulting pressure, Premier Khrushchev, in a letter of 26 October, as interpreted in a note from the President to him the next day, proposed to remove those weapons systems considered offensive from Cuba under appropriate UN observation and supervision*

and to undertake, with suitable safeguards, to halt the further introduction of such weapons systems into Cuba. In turn, the US, on the establishment of adequate arrangements through the UN to insure the carrying out and continuation of these commitments, would (1) remove the quarantine measures and (2) give assurances against an invasion of Cuba. In spite of his letter on 26 October, and before receiving President Kennedy's response, Premier Khrushchev on 27 October forwarded another letter in which he proposed the mutual dismantling of bases in Cuba and Turkey. The US rejected this letter on the same day, stood firm in its original position, and held the Premier to the proposal implicit in his letter of 26 October. Following this exchange, Premier Khrushchev introduced his next maneuver, which was to order, on 28 October, the "dismantling of the weapons which you describe as offensive [and] their crating and return to the Soviet Union." His order, however, covered only the missiles and their bases. The jet bombers remained in Cuba.

Before this time it does not seem probable that the Soviet authorities consulted the Cubans. Indeed, Premier Khrushchev, at a Kremlin reception on 7 November, implied that Castro had not been consulted before his announcement of 28 October, indicating at the same time that Castro was extremely bitter at the Soviet leaders for agreeing to remove the missiles. Cuban bitterness over the Soviet missile withdrawal, confirmed by a number of sources, may have played, in fact, as much a part in Soviet reluctance to remove the Il-28's as their own desire to preserve as much of the Cuban investment as possible. At any rate, as the US firmness on bomber withdrawal became apparent, the Soviet-Cuban position shifted from one of claiming that the bombers were defensive weapons in Cuban hands to an admission by Fidel Castro, in a letter to UN Secretary General U Thant on 19 November, that they were the property of the USSR. The next day, in what appears to have been an action coordinated with the Cubans, Premier Khrushchev announced that the Il-28's were being withdrawn and was rewarded by the lifting of the US quarantine.

At that point, both parties allowed the "Cuban crisis" to recede slowly and uneasily into history without further concessions on either side, the final formality being observed with a joint letter to the UN Secretary General on 8 January 1963 removing the situation from further consideration by the UN Security Council.