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a ten-page typewritten paper entitled "Aeroflot, The Soviet Airline - A Condensed Historical Survey." This paper was prepared by Sergei Sikorsky, son of Igor Sikorsky, the helicopter designer, as a resume of a speech he made before a group of German aeronautical personnel believed in late 1962. It is UNCLASSIFIED.

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AEROFLOT, THE SOVIET AIRLINE

A Condensed Historical Survey

Following the Communist Revolution in 1917, the Soviets inherited a mixed bag of Imperial Air Force fighters, reconnaissance and bomber aircraft, estimated at approximately 350 - 400 aircraft, including Caudron, Nieuport, Ansaldo fighters, DH-4 bombers and some 35 - 50 Sikorsky four-motored heavy bombers. Most of the pilots, engineers and technicians were refugees, dead or dispersed, while the aircraft were scattered in small units from the Baltic to the Balcans.

Early 1918, a conversation was held between three men that was of inestimable significance to Soviet air power; Professor N. Zhukowsky and a young engineer by the name of A. N. Tupolev (Caudron representative before the Revolution) met with Lenin to sell him on the idea of salvaging and re-organizing the crippled Russian Air Force and industry. Tupolev recalled later that Lenin was cool at first, but warmed-up as soon as the two pointed out that a strong air fleet was possibly the only way of holding a vast Russian continent under Soviet control. Lenin agreed with this theory and immediately ordered that an effort be made to re-organize the Soviet Air Force and authorized the immediate creation of a central research and design establishment which became known as ZAGI. Its decisive role in the development of Soviet aviation is well-known. Professor Zhukowsky was named the first director of the research offices / university facilities and Tupolev became his assistant.

In 1922 German know-how gave a vital push to the Soviets. Barred by the Versailles Treaty from building aircraft in Germany, a number of leading German engineers were invited by the Soviets to establish a modern aircraft plant north of Moscow. A number of German technicians gave the writer some interesting background on those early days. The main technical know-how was provided by Professor Hugo Junkers and his staff who created the Zili plant mentioned above and spent nearly a decade teaching aircraft design and production methods at Zili, at ZAGI in Moscow and elsewhere. Tupolev is quite frank in admitting that a great deal of his success is due to the education gained as a result of his intimate association with Junkers. A study of Tupolev-designed aircraft will show traces of Junkers-inspired structures - even today.

By 1922, German - Soviet communications were so heavy that a joint airline was formed, flying between Berlin, Königsberg and Moscow using Junkers, de Havilland, Vickers and Fokker aircraft. Deruluft was 50% Soviet, 50% German financed, but crews and ground staff were mainly German.

In 1923 the first true Soviet airline was formed. Dobrolot flew between Moscow and Novgorod. This airline carried 230 passengers and two tons of mail on its opening year. Aeroflot today celebrates its anniversaries on the basis of Dobrolot's founding in 1923 and ignores the fact that Deruluft was already operating with Soviet blessing one year earlier. A number of other Soviet shuttle airlines were born, grew and died during this period but very little precise data is available on these sporadic attempts.

In 1932 all local airlines were merged by a decree of the Soviet Council of Ministries into one organization, controlled by GUGVF (a central committee for the control of all civil aviation activities), and the airline that emerged from the re-organization was almost immediately known as Aeroflot. A period of consolidation followed but by 1934 Aeroflot was carrying annually just under 97.000 passengers and 3.585 tons of mail.

By 1935 the number of passengers carried jumped to 127,500, almost 7,000 tons of mail and 12,000 tons of freight. That same year, the Supreme Soviet Council published the revised air code of the USSR assigning overall control to Aeroflot of all aircraft transport design, manufacture and operation. Further, all development and operation of airports, airport facilities, navigation aids, and radio installations were to become Aeroflot's operational responsibility. In addition, sole responsibility was assigned to Aeroflot to provide support for all agricultural activities (crop spraying, aerial seeding and dressing, air survey and photography, etc.). In other words, Aeroflot became the organization for every line of aeronautical activity not directly concerned with the Soviet Air Force, its missions and its facilities. Aeroflot, nevertheless, remains a semi-military organization and it is significant that Soviet Air Force officers of high rank are heavily represented in Aeroflot. As is the case in USA and in most of Europe, Soviet Air Force aircraft are allowed to land at and use civil airport facilities, but Aeroflot is not allowed to land at or use military airport facilities without prior permission from Soviet military authorities.

From 1935 through 1939, Aeroflot grew at a fast rate. In early 1940, the 1939 traffic statistics were published and showed an estimated 307,000 passengers (US airlines carried 2 million) and 49,650 tons of freight (US carried 4,500 tons freight). Thus, Aeroflot carried 1/7 of the passengers carried in the United States but over ten-times the air-freight tonnage. This is due to the fact that Aeroflot was often used to transport raw materials to critically-short industries, irrespective of the economics involved. There are stories, most probably true, of Aeroflot's transports being converted to carry coal, bauxite, precision bearings and other material urgently required to keep a refining plant or engine factory operating. The lack of adequate roads and the simultaneous expansion of Soviet industry behind the Urals forced Aeroflot to run airlift operations repeatedly in order to supply materials which could not be gotten to the remote industrial centers being set up in any other way.

During World War II the thousand-odd Aeroflot aircraft were absorbed into the Soviet Air Force. They carried VIP's, mail, wounded and were quite often used to airlift ammunition and weapons to Soviet partisans operating behind the German lines. At the end of World War II, the Aeroflot activity continued as regards political support. There is no doubt that even today, Aeroflot operates a great many "sensitive" missions which could not be executed by the Soviet Air Force without major political repercussions. The Aeroflot transport photograph in Laos in 1961 while air-dropping arms to the Laotion communists is a recent example of this type of activity.

The post war Aeroflot started with a mixed fleet of 1200 single and twin engined aircraft, all of World War II vintage. A great boon were approximately 600 C-47 Dakotas delivered to the Soviet as part of US military aid.

With Soviet-built copies of the DC-3, as well as the IL-12 and IL-14 (copies of the Convair 240 and 340) Aeroflot started on a fantastic expansion. Scheduled services were extended into Central Asia and into the Far East. In October 1947, the first scheduled trans-continental service was inaugerated between Moscow and Vladivostok via the industrial center of Khabarovsk, a distance of 4,225 miles (New York - Rome or Chicago - Hawaii). The service consisted of high priority cargo first, then in May 1948 scheduled night flights started into the central Asian cities on the route and May 1949 scheduled passenger services were officially opened to the public. Coincident with this expansion into Asia, Aeroflot began to systematically build up its Arctic know-how. Several cities were created north of the Arctic circle and air-service was inaugerated to these areas on a "weather permitting" basis.

In 1956 Aeroflot started crew check-outs in the TU-16 badger bombers. The crew check-outs were intensified during the late summer and in early fall of 1956, Aeroflot received the first of the TU-104 transports. By the end of 1956, Aeroflot had something over six of these aircraft in service. The original version was a "quick and dirty" conversion from the badger and carried only 50 passengers. Even by Soviet standards, this was a terribly uneconomic aircraft. In 1957, larger quantities of the stretched TU-104A were delivered to Aeroflot. The stretched "A" carried 70 passengers. Quantities of these aircraft were also offered to other Communist-block airlines, but CSA Czechoslovakian airlines was the only customer who purchased same. In 1958 increasing quantities of TU-104's were seen and the TU-114 turboprop entered airline service. This passenger conversion of the "Bear" turboprop bomber was by far the biggest (220 passengers) and heaviest (410,000 lbs) aircraft in the world. Though limited quantities of the aircraft were seen, there is no doubt that this aircraft (and the 12,000 HP turboprops) were a major engineering achievement.

In 1959, the IL-18 started schedule passenger service after about 8 months of shakedown flying with mail and airfreight. The AN-10 aircraft, which was designed to back-up the Ilyushin went into Aeroflot evaluation. By June the TU-114 was already far enough in its development to justify the Soviets to use it to carry Frol Kosloff, first Vice Chairman of the USSR, his staff and senior Aeroflot officials non-stop from Moscow to New York in 11 hours 6 minutes. The distance was approximately 5092 miles. Later that year, Chruschtschow also flew on the same aircraft non-stop Moscow to Washington.

By 1959, the first semi-realistic statistics became available from the Soviet Union. Soviet technical missions accredited to Aeroflot visited a number of foreign countries and a preliminary "feel" for the Soviet Aeroflot performance was gathered. From various sources it became apparent that Aeroflot was already, in a number of respects, the world's biggest airline operation. It was serving 129 major airports, 329 smaller "local fields" (many little more than a grass field and a small hangar) and had a route mileage of nearly 350,000 miles. Passengers carried in 1958 are estimated as between 8.2 and 9 million.

In 1960 Aeroflot development continued following the dictates laid down in the first seven year plan, which sets goals for the Soviet economy from 1959 through 1965. The introduction of increasing numbers of turbine-powered aircraft resulted in as dramatic an increase in the transport potential of the

Soviet airline as was the case in the United States and Europe with the introduction of turbine-powered aircraft. In August the Ilyushin Il-18 was grounded, following an engine fire in mid-air which burnt a wing off and resulted in a bad crash near Kiev. This crash had unpleasant after-effects, because of a number of victims were members of an African trade delegation visiting the Soviet Union. An intensive investigation (in its own way, as urgent as that which followed the series of Electra crashes in the States) soon determined that the engine fuel system was at fault. Following suitable modifications the Ilyushin aircraft returned into airline service later that same year and Aeroflot's development continued upwards. Soviet services quoted a 30% increase over 1959 in passengers and airfreight; 1960 passenger totals were reliably estimated at 12-14 million passengers.

1961 saw the previous years' performance exceeded by 28% more passengers carried and 16% more airfreight carried. The Il-18 was defintely out of trouble; proof of that was the use of these aircraft to carry Nikita Chruschtschow on repeated official visits from Moscow to Soviet Republics (in May to Armenia, June from the Vienna discussions with Kennedy and later that same month to Alma-Ata). Soviets were still reluctant to release exact passenger and ton-km figures at that time but Western experts were beginning to gather a fairly accurate picture by extrapolating Soviet "percentage gains" annually reported. The following figures based on available data represent one expert opinion regarding scheduled Aeroflot services during calender 1961: Passenger volume 22 million, freight ton-miles 455 million, route mileage (unduplicated) 240,000. Aircraft in service were estimated at 200 turbine-powered aircraft and about 1600 piston-engined aircraft. Performance logged in 1961 from another source tallies closely with the general impression; with Aeroflot carrying 21.8 million passengers against 58.4 million in the USA. Average 1961 trip length in Aeroflot was 467 miles against 681 miles in the USA. Average aircraft utilization had climbed to 12 hours per day but only on aircraft assigned to long range operations.

1962

After a two-year shakedown, the TU-124 was placed in service. This was the first of the short-haul jets and appeared in service significantly earlier than either the BAC 111 or the Boeing 727. From another ICAO source, the 1962 Aeroflot fleet was estimated to be as follows:

- TU-104, -A and -B, 135 in service, 130 with Aeroflot, 5 with CSA. The first TU-104 production run ended with probably aircraft registry CCCPL 5460; approximately 120 individual aircraft registrations have been noticed.

- TU-114, estimated 8-12 in service with Aeroflot. British source which has kept careful track of aircraft registration numbers estimates that in addition to the prototype TU-114, CCCPL 5611, 13 additional TU-114 registry numbers have been "spotted", ranging from CCCP 76460 to CCCP 76482.

- Il-18 well over 80 of these aircraft were operating with Aeroflot, starting with the prototype, CCCPL 5811 and ending about CCCPL 5821; a second batch of registry numbers runs from CCCP 75639 to CCCP 75835. British sources estimate at least 80 individual Il-18 registrations have been identified. Another 40-plus aircraft are in service with satellite airlines.

- AN-10A, -12A, approximately 25 in service with Aeroflot and one with Gana.

- Il-14 It is estimated that some 1000 of these aircraft are still in service (or available) including possibly 100 of the over 600 C-47's given during World War II to the Soviets.

Aeroflot's explosive growth can also be explained by Government planning and support:

1) Soviet Government is making a concentrated effort to replace the rail road by the airline as the main transportation of passengers. This relieves the Soviet rail system (chronically a weak point in Soviet economic and military potential) for its primary job of freight transportation.

2) Aeroflot practices very low fares; for example the Moscow - Leningrad run takes 55 minutes by air and costs 130 Rubels. The same run by train takes 12 hours and costs 150 Rubels.

3) Aeroflot scrapped, in 1959, the two-class domestic service; all Soviet citizens now fly "standard economy". In addition, all sorts of discount plans are in effect to allow the factory worker on vacation to fly at reduced fare; a 25% reduction for students travelling to or from their home on vacation, and various other promotional ideas.

4) Strongly stressed in the first 7 year plan (1959 - 1965) has been the expansion of feeder routes into the less-developed areas of central and Asiatic Russia. To accomplish this, special emphasis is being placed on development of small, STOL-type aircraft able to operate from primitive, unprepared air fields.

In 1962 and 1963, Aeroflot intensified its operations into the near East and into Africa. Though not successful in selling aircraft to the new nations, Aeroflot has been penetrating Africa directly, as well as by means of the satellite airlines.

Aeroflot is, through the Soviet Government, increasing pressure on various South American areas in order to get landing rights. It has been operating a bi-weekly service from Moscow to Havanna which is being flown with the Turboprop TU-114. The approximately 7,000 mile flight is done in 13 1/2 hours but passenger load is reduced from 180 to about 60 passengers.

Aeroflot is also a military weapon; the number of aircraft assigned to any one area far exceeds the number of aircraft actually needed. In 1960, a visiting American delegation noted an almost 3 to 1 surplus of aircraft over those required for the schedules of that particular area. Even allowing for special flights and maintenance, it is safe to conclude that Aeroflot has at least a 50% surplus which is in effect a reserve air transport fleet for military operations. In this connection, Soviet military spokesmen have repeatedly stated that the Soviet Aviation is capable of airlifting 100,000 soldiers to any spot in Europe in the case of military necessity.

Soviet satellite airlines, until recently were captive customers of the Soviet Aero industry, but recent purchases of Western aircraft show a new trend which may have very interesting repercussions in the future.

- LOT (Polish Airlines) operated four CV-240's; recently re-equipped with three Viscount 800's despite strong pressure to buy the Il-18 turboprop.
- CSA (Czech National Airlines) purchased one Britannia 310 from BOAC.
- Communist China has recently (July 1963) ordered six Viscounts.

Chinese delegations are reported to be negotiating for the possible purchase of the VC-10. Though these rumors are, as yet, unconfirmed a marked interest in Western commercial aircraft is becoming apparent and could signal the opening of a major new market area, both in China and in Eastern Europe.

Aware of increasing competition, as well as for prestige reasons, the Soviets are making major efforts to develop commercially-attractive aircraft.

- The Turboprop Il-18 has been "stretched" to allow space for 14 more passengers (for a total of 125 tourist-class). Integral wing fuel tanks (wet wings) have increased range to 5000 miles. The Il-18 seems to be the first truly commercial aircraft developed in the Soviet Union, but its operating costs are still such as to make it less attractive than similar Western aircraft.

- Late September of 1962, the Soviets displayed the giant Il-62 transport. It is probably the biggest jet airliner currently known, and is being groomed for the Moscow - New York run; 5000 miles non-stop carrying up to 180 passengers. It resembles the VC-10, with four Kusnetsov turbo-fan engines aft-mounted, each reported to deliver 23,000 lbs thrust.

- The TU-104 (always famous for high operating costs) should shortly be coming out as an aft-fan jet. The Tupolev design team is reported to be cleaning up the whole aircraft and hopes to have it rolled out in the winter of 1963-64, and in service by possibly summer 1965.

- In addition, a whole family of short-range jets and prop-driven aircraft are flowing from Soviet factories to comply with the goals of the Soviets first seven year plan. They include the TU-124, a short-haul jet at least two years ahead of the BAC 111 or the Boeing 727. Reported to be able to operate from grass runways, it carries 40-60 passengers at cruising speeds of 500-530 mph. The AN-10 and AN-12 series of high-wing turboprops are also entering service with Aeroflot; some 25 have been identified to date. Close behind comes the AN-24, in the class of the Fokker F-27, carrying 30-40 passengers at 290 mph. The AN-14 "Pchelka" (little bee), in low priority development since 1957, now seems to be in accelerated development status. Powered by two 300 HP piston engines, this super-STOL aircraft carries 7 passengers or 1,300 lbs payload up to 400 miles. Reported in production both in the USSR and in China.

- Speculation is increasing about a Soviet supersonic transport. Airframe and powerplant experience in supersonic flight is amply available in the USSR; "Bounder" has been flying since 1959. This supersonic monster grosses at over 136 tons and is capable of Mach 1.5 or slightly more. It is, to date, by far the largest and heaviest supersonic aircraft ever flown anywhere. At least two, possibly three test articles are rumored to exist. Repeated references by Soviet engineers would tend to confirm the impression that a supersonic transport will be shown in the near future.

That Aeroflot and Soviet airline traffic has now reached major proportions is evident from recent data published by ICAO in its latest annual report (Annual Report of the Council to the Assembly for 1962). Though ICAO's sources are not quoted, they must be fairly official, otherwise ICAO would not have published them. The figures show that Aeroflot carried:

- 20% of total passengers carried by all ICAO member airlines,
- 25% of total cargo/mail ton-miles carried by all ICAO member airlines.

The detailed ICAO report on Aeroflot growth during the current seven year plan is worthy of close study:

Development of Soviet Civil Air Transport
All services of Aeroflot 1958-61 (millions)

Years	Passengers carried	Passenger-kilometres (Passenger-miles)	Cargo and mail tonne-kilometres (Ton-miles)	Total+ Tonne-kilometres (Ton-miles) performed
1958	8.2	6,400 (3,977)	399 (273)	1,040 (710)
1959	12.2	9,100 (5,655)	439 (301)	1,350 (925)
1960	16.0	12,100 (7,519)	563 (386)	1,775 (1,215)
1961	21.8	16,400 (10,191)	802 (549)	2,440 (1,670)
Annual Percentage Increases				
1958-59	49%	42%	10%	30%
1959-60	31%	33%	28%	31%
1960-61	36%	36%	42%	38%

+ Approximate figures

Equally impressive are the detailed figures of Aeroflot percentage of the world's total traffic. Data furnished reflects total ICAO airline performance vs. Aeroflot, but excludes China, for which accurate data is not available:

A Comparison of Airline Traffic in 1961
(millions)

Total operations (international and domestic)	United States	USSR	United Kingdom	Total 98 ICAO States	USSR as percentage of total ICAO States
Passengers carried	59.0	21.8	7.8	111	20%
Passenger-kilometres	64,100	16,400	8,136	117,000	14%
Cargo and mail tonne-kilometres	1,670	802	198	3,200	25%
Total tonne-kilometres performed	7,257	2,4401+	908	13,440	18%

+ Approximate figure

Though Soviet airline operations are not as polished as those of Western nations, Aeroflot is generally doing the job given it by the Soviet economic planners. The past 30 years have been a period of "Quantity, not Quality" aircraft and services. This trend should reverse itself by the late 1960's and Soviet aircraft will become increasingly competitive while enjoying the export advantages of a 100% politically-oriented and directed trading policy. This could give Western aircraft industries major problems.