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Intelligence Report

*New Interceptors Increase Effectiveness
of Soviet Air Defense*

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CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
March 1969

INTELLIGENCE REPORT

New Interceptors Increase Effectiveness
of Soviet Air Defense

Summary

The introduction of new fighters is adding significantly to the Soviet air defense posture. Three new high-performance interceptors--the YAK-28P Firebar, the TU-28 Fiddler, and the Sukhoy-designed Flagon A--have entered service since 1964 and more than 500 are in operational units. All three are all-weather fighters equipped with air-to-air missiles.

The Firebar is thought to be based on the periphery of the USSR along the seaward and lowland approaches to strategic targets for defense against low-altitude penetration. The long-range Fiddler has been deployed to cover areas that were only lightly defended and to intercept enemy stand-off missile carriers before they arrive within the limits of their launch range. The Flagon has been placed around strategic targets for high-altitude point defense. Despite a decrease in the total number of interceptors, this new deployment has increased the overall capabilities of the force.

The most serious problem facing the Soviet air defense system continues to be its ineffectiveness against low-level attack. Although deployment of the Firebar has strengthened low-altitude defenses, additional

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improvements are needed. Because Soviet interceptors are not equipped with look-down radar capable of tracking targets through ground clutter, they must attack from an altitude equal to or below that of the target.

To correct this deficiency the Soviets are expected to produce and deploy another new fighter, the Foxbat, which probably will be equipped with look-down radar and air-to-air missiles that can be fired at low-altitude targets from higher altitudes.

- 2 -

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Development of New-Generation Interceptors

1. In 1964 four-fifths of the aircraft in the Soviet Fighter Aviation of Air Defense (IAPVO) were subsonic or low supersonic interceptors equipped with guns, rockets, or short-range AA-1 Alkali air-to-air missiles (AAMs). The most advanced interceptor in the force was the Mach-2, all-weather SU-9 Fishpot, which accounted for about 15 percent of the 1964 force. This interceptor is armed with four Alkali missiles and has a good capability against such targets as the B-47 and B-52 flying at medium and high altitudes.

2. The 1964 force had several shortcomings. Only about one-third of the interceptors had a true all-weather capability, and their air intercept radar was ineffective against low-flying targets. Against high-altitude, high-performance targets, chances for a successful interception decreased as the target speed approached Mach 2. Moreover, the force lacked a long-range interceptor that could engage stand-off missile carriers before they could approach to within missile launch range of Soviet territory.

3. These deficiencies were clearly unacceptable to Soviet military planners. In the early 1960s they began development of a new generation of interceptor aircraft as part of an overall program of air defense improvement, which has also included new surface-to-air missile systems, better radar surveillance and tracking facilities, and more effective command and control systems. The first of the new interceptors--the YAK-28P Firebar--began to be deployed about 1964, and by 1967 two additional models--the TU-28 Fiddler and the Sukhoi Flagon A--are believed to have entered the operational inventory.

4. Each of the new fighters meets a particular need of the air defense system. The Firebar appears to have been designed with the low-altitude problem in mind. The Flagon A is a Mach-2.5 high-performance interceptor that appears destined to replace the Fishpot as the Soviets' primary high-performance point

- 3 -

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interceptor. The Fiddler is a large two-place, extended-range interceptor which, when used with an airborne warning and control system, will improve their capability against stand-off missile carriers approaching to within launch range of Soviet territory.

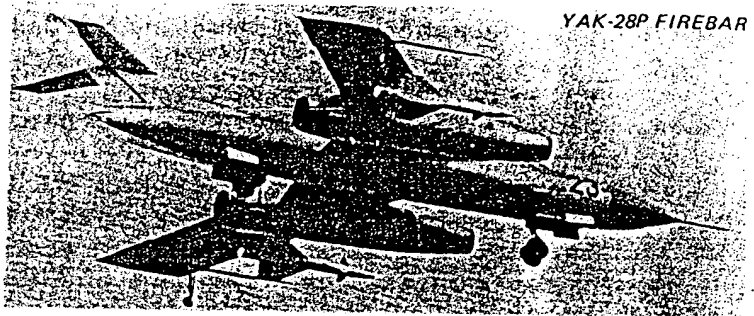
Capabilities Against the Low-Altitude Threat

5. Until 1964 the YAK-25 Flashlight, armed only with guns, was considered the Soviets' primary all-weather low-altitude interceptor, although the MIG-17 Fresco was also capable of performing low-level intercepts. The Flashlight is believed capable of performing intercepts down to altitudes of approximately 3,000 feet. Because the Flashlight is gun armed and has a short radar lock-on range at low altitudes, about two to three miles, ground control must vector the aircraft to within very close range of the target before it can begin an attack. The subsonic speed of the Flashlight further contributes to its difficulties.

6. To improve their low-altitude defense, the Soviets developed the YAK-28P Firebar interceptor as a replacement for the Flashlight. About 500 of these aircraft were produced between 1964 and 1966 at Airframe Plant 153 at Novosibirsk. Of these, about 370 are thought to be in operational units, mostly on the periphery of the USSR along the seaward and lowland approaches to strategic targets as a barrier against low-altitude penetration. (See Figure 1, opposite page.)

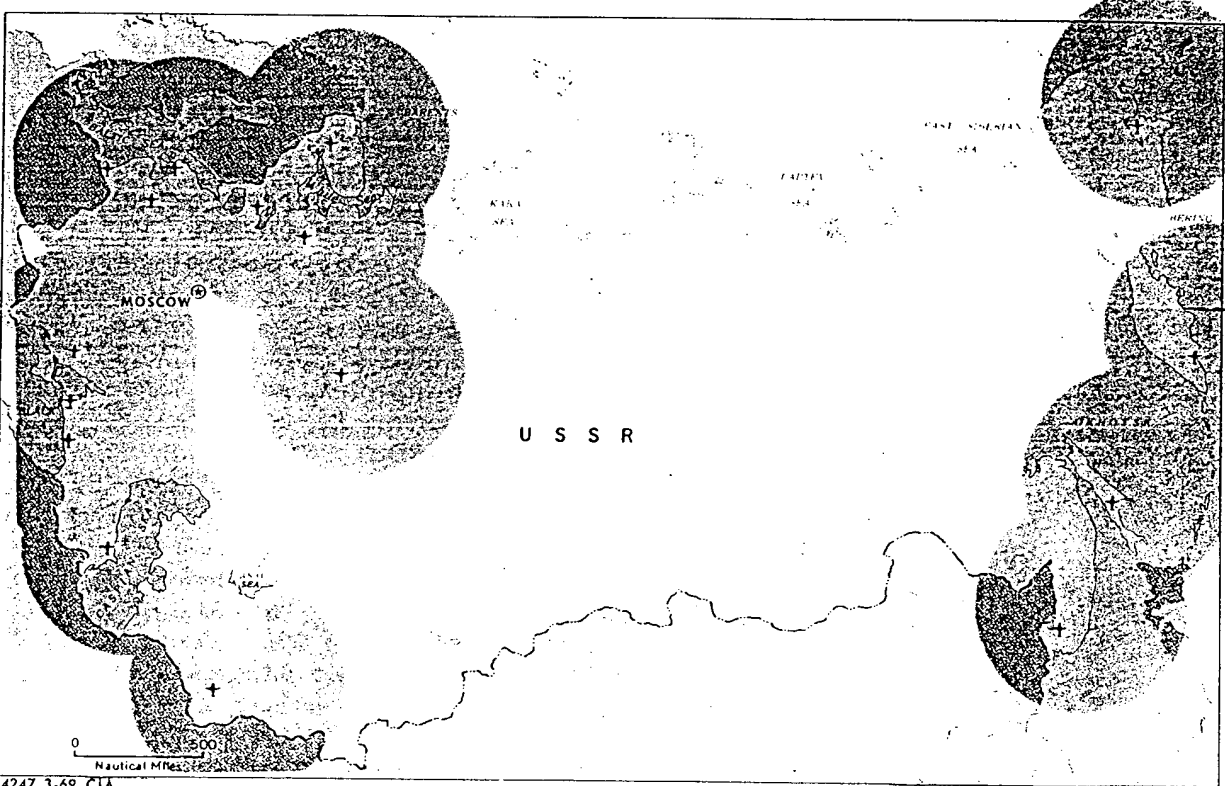
7. The Firebar is capable of performing all-weather intercepts at altitudes down to about 1,000 feet. Although it is believed that several design features of the Firebar radar could be used to suppress ground clutter, it probably does not have a true downward-looking radar, and must therefore perform its low-altitude intercepts from a position nearly level with or below the targets. Against extremely low targets, the Firebar could achieve such an attack position only over level land or water.

Figure 1



Deployment Areas of YAK-28P Firebar

† Air base
⊞ Present operational area



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8. The Firebar is equipped with longer range radar and weapons than the Flashlight. The range of the Anab AAM is several times that of the Flashlight's guns, while the search and track range of the Firebar radar is about twice that of the older type radars.

9. While the Firebar improves the Soviets' capability for low-altitude interception, this remains their weakest area of air defense. The geographic locations where the Firebar can be effectively deployed are limited, since the aircraft in a low-altitude mode is most effective over flat terrain or water. Furthermore, continuous tracking and communication between interceptor and ground control are degraded at low altitudes, making it more difficult for the interceptor to be directed to its target.

10. These problems will probably be solved only by the deployment of airborne radar systems which can search for and track targets from a position above the target. The development of this downward-looking radar, together with a downward-firing air-to-air missile, would give the interceptor a great advantage in attacking low-flying aircraft, enabling it to search, track, and fire while maintaining an efficient flying altitude. While the Firebar and Fiddler probably will be fitted with a look-down radar when available, the first application of this type of radar is expected to be on the new interceptor, the Foxbat, which is expected to be deployed in IAPVO in the early 1970s.

11. The Foxbat (see photograph, next page) is a large Mikoyan-designed fighter which has been under development since 1964. Series production could begin at any time at Gor'kiy Airframe Plant 21. When it was displayed for the first time at the Moscow air show in 1967, the Soviets said that one of its roles would be that of an interceptor. Technical assessments indicate that it is capable of sustained high-speed flight, near Mach 3, at high altitudes.

12. Deployment of the Foxbat as an interceptor would not appear to be justified if it were equipped primarily for a high-altitude role. Its superior performance would add somewhat to IAPVO's capabili-

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Foxbat

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ties for this mission, but the Soviets already have a good capability for high-altitude air defense with advanced systems such as the new SA-5 missile and the Flagon and Fiddler interceptors. Furthermore, the Foxbat is constructed mainly of titanium and will be more expensive to produce than earlier fighters. It is expected, therefore, that the Foxbat will be equipped for low-altitude defense as well.

13. With a long-range look-down radar and missiles able to home on a target while shooting toward the ground, the Foxbat would add significant new capabilities against the low-altitude threat. Flying at altitudes above 50,000 feet, it could search an area 50 to 60 miles wide along its flight path and detect aircraft flying at lower altitudes. It would need only rough positional information on the target from the air surveillance network, as opposed to the rather exact information now needed by other interceptors. Once the target is acquired by the aircraft radar, the Foxbat could fire its missiles while maintaining its cruise altitude.

- 7 -

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Stand-Off Missile Threat

14. In the early 1960s the long-range bomber threat to the Soviets began to include stand-off or air-to-surface missiles (ASMs). Missiles such as the US Hound Dog carried by the B-52 can fly either a low-altitude subsonic or a high-altitude supersonic profile at ranges of about 350 and almost 700 miles respectively. Stand-off ASMs can thus be launched at Soviet targets from outside the present radar-early-warning range.

15. Because of the difficulty of intercepting stand-off missiles after they are launched, the best Soviet defense against them would appear to be to intercept the bombers before they approach to within launch range of Soviet territory. This requires deployment of long-range interceptors and improved means of detecting approaching aircraft. These are the roles of the Fiddler interceptor and of the Moss early warning and fighter control aircraft.

16. After an extended period of testing, the Fiddler entered series production about 1965 at Voronezh Plant 64. The production of the Fiddler since has proceeded slowly and now is estimated to be about three aircraft per month. It is not known whether the slow rate is deliberate or the result of problems experienced in the production of the aircraft and its electronic systems. Since the Fiddler will probably be used with the Moss, it may be that the Soviets have scheduled the production of the Fiddler to keep pace with that of the Moss.

17. At present about 70 Fiddlers are believed to be operational at three bases. (See Figure 2, opposite page) The first deployment probably occurred sometime in 1966 at Arkhangel'sk Talagi Airfield. Deployments to the other airfields were begun in 1967 and are continuing. Since late 1967, however, the Soviets are not believed to have deployed Fiddlers permanently to any other airfield.

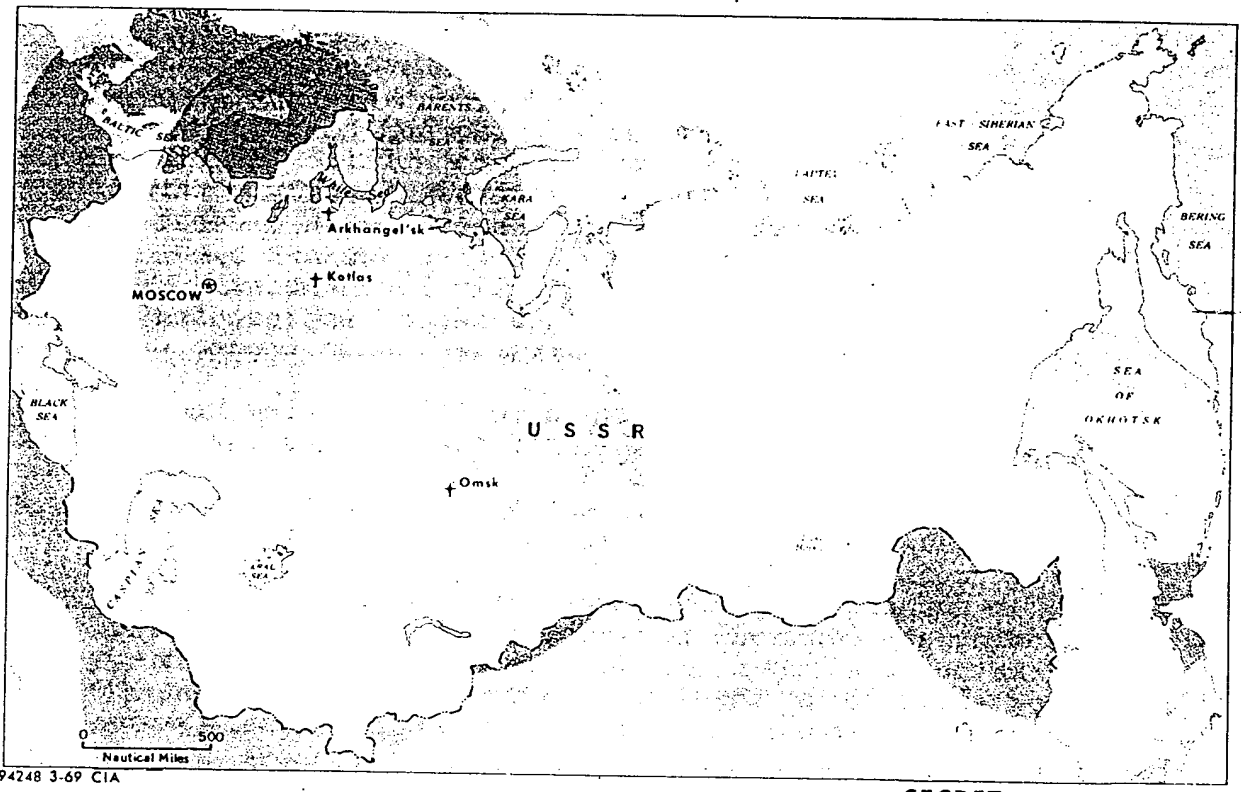
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Figure 2



Deployment Areas of TU-28 Fiddler

- † Air base
- * Present operational area
- Projected operational area



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18. The slow rate of introduction to operational units indicates that the rate of production has declined to about three aircraft per month since about October 1967. Production is believed to have reached a rate of about four per month in late 1966.

19. It is believed that the AA-5 Ash missile carried by the Fiddler can be fired from any angle relative to the target. The Ash is estimated to have a maximum range of 12 to 16 miles and can be fired upward to intercept targets flying as high as 90,000 feet.

20. The 760-mile combat radius of the Fiddler (with four missiles and no external fuel) enables it to cover large areas in the USSR which were only lightly defended previously and to intercept stand-off missile carriers before they reach launch range. Improvements in the Soviet warning and control systems will be required, however, to utilize the Fiddler's range effectively. The present early warning system based on mainland radar sites--with a detection range of no more than 250 miles against high-altitude targets and substantially less against targets at low altitude--cannot detect approaching aircraft before they reach missile-launch range.

21. The Soviets' solution to this problem has been to develop an aerial radar platform equipped for early warning and for direction of fighter interceptions. At present, the Soviets have about ten Moss aircraft, which are modified Cleat turbo-prop transports fitted with a large rotodome-type radar and the electronic systems needed for early warning and control (see photograph, opposite page). It is believed that the Soviets will eventually deploy about 35 of these Moss aircraft along major attack approaches, thereby about doubling their present early warning and control ranges in those areas. The Moss probably has a limited look-down capability over water and will thereby extend the low-altitude warning capability as well.

- 10 -

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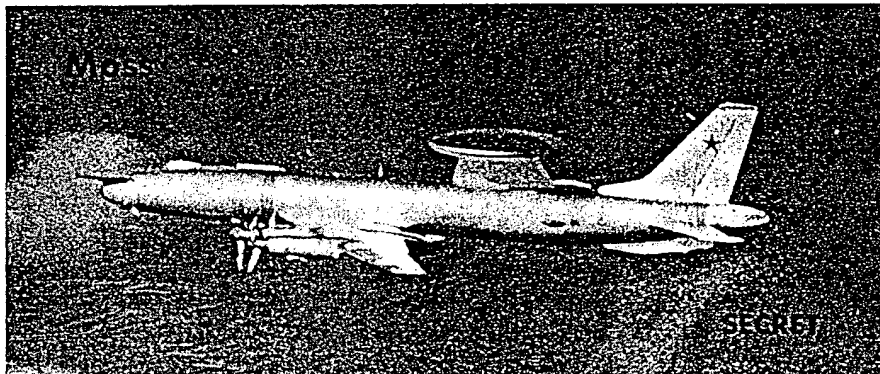
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22. Developments during the past year indicates that the Moss, which may have been under development since about 1963, is reaching a limited operational status. A Moss aircraft demonstrated its early warning capability during exercises in June 1968 when it flew missions off the coast of Norway in close proximity to a NATO exercise.

23. The Foxbat, which is calculated to have an 800-mile combat radius (subsonic without external fuel), also may be used against stand-off weapons. Like the Fiddler, the Foxbat could operate in conjunction with early warning and fighter control aircraft.

High-Altitude Threat

24. Since it was first deployed in 1959, the SU-9 Fishpot has been the primary Soviet high-altitude point interceptor. It has been widely deployed throughout the Soviet Union for protection of important strategic targets and for border defense against high-altitude penetration. Although it is capable of Mach-2 speed, the effectiveness of the aircraft against high-speed, maneuvering targets is limited by the short range of its intercept radar and the performance of its AA-1 Alkali missile.



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25. Recognizing these deficiencies, the Soviets converted a limited number of Fishpots into an improved variant. This model was equipped with an improved radar and the AA-3 Anab missile. Only a few Fishpots are believed to have been converted, however, before the higher performance Flagon A interceptor began to be deployed with air defense units.

26. The Flagon A (see Figure 3, opposite page) is expected to become the primary Soviet point interceptor, replacing the SU-9 Fishpot in this role. The Fishpots are expected to remain in the force but probably will be assigned to protect secondary targets and to provide protection in depth. Two of the airfields where a Flagon A squadron has been assigned were previously equipped with Fishpots, and a decline in the number of Fishpots at these facilities is expected.

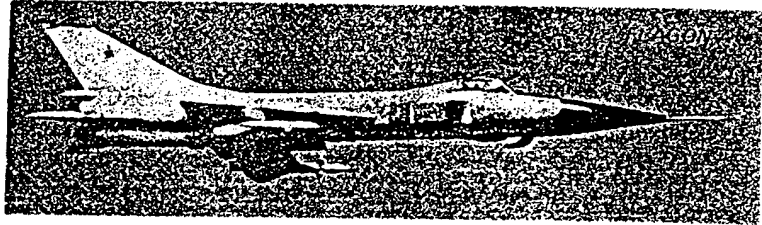
27. In contrast to the Fiddler, production of the Flagon A has increased rapidly since series production was initiated about mid-1966. The Soviets are estimated to have produced about 280 aircraft to date, currently at about 15 per month. This rate of production probably will be maintained until 1973. Ultimate production is expected to total about 1,000 aircraft.

28. Introduction of the Flagon A into operational service probably began about mid-1967. Of the twelve bases that are believed to have received Flagon A, five are in the Moscow air defense district, two each are in the Southwestern, Western, and Tashkent air defense districts, and one in the Baku air defense district.

29. The Flagon A is expected to be deployed in the same manner as the Fishpot, to protect all important strategic centers in the interior of the country as well as to provide a barrier against high-altitude penetration at the periphery. The present and projected areas of deployment are shown on the map (Figure 3). A maximum operational deployment of about 750 Flagons is expected.

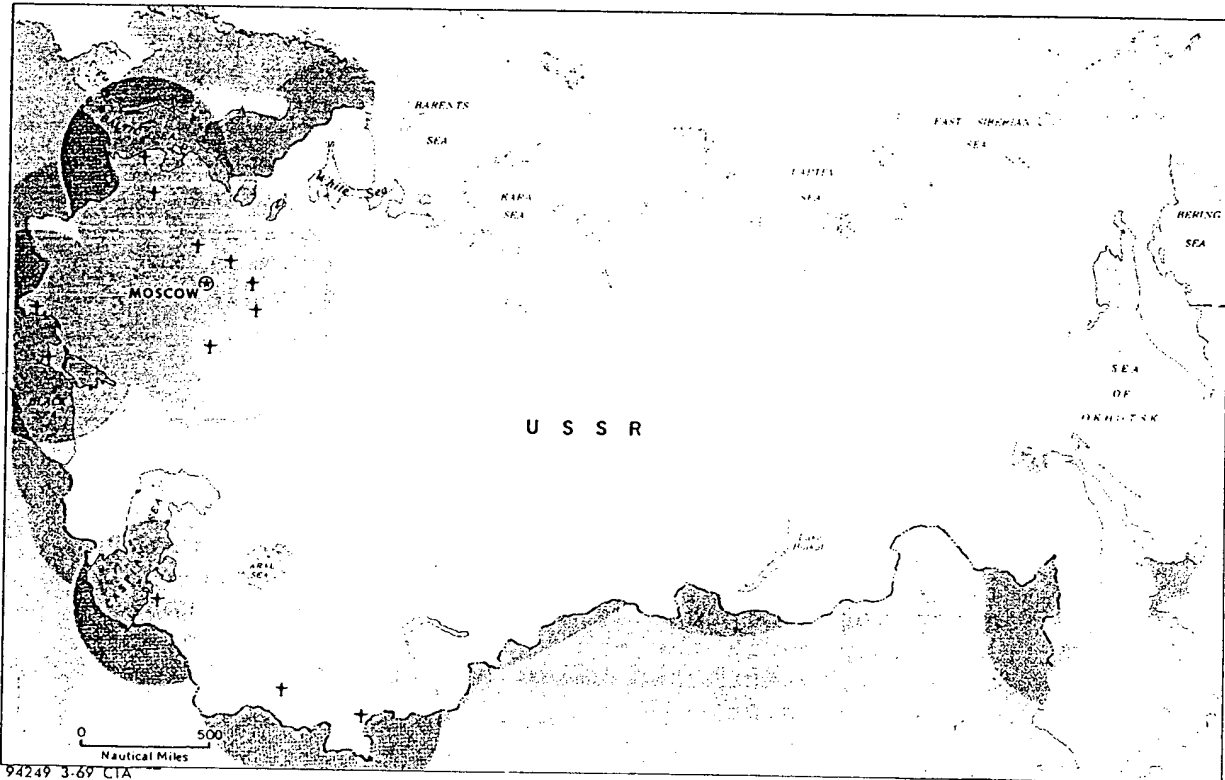
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Figure 3



Deployment Areas of Flagon A

- † Air base
- ⊕ Present operational area
- Projected operational area



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30. The Flagon is believed to be equipped with a longer range radar than the Fishpot and is armed with the AA-3 Anab missile. This, together with its better speed, gives the Flagon the ability to intercept high-performance targets with greater accuracy than the Fishpot and employ the head-on tactic.

31. The Anab is available in both heat-seeking and semiactive-radar-controlled versions, thus allowing the Flagon more versatility of tactics. The AA-1 Alkali missile carried by the Fishpot is a radar-beam-riding missile, and hence requires the interceptor to fly a relatively stable pursuit path and keep the radar beam on target until impact. The Flagon also has better maximum speed and high-altitude performance than the Fishpot.

32. The importance of the Flagon is indicated by the rapidity with which it was deployed around Moscow. As of August 1968, at least five bases in the Moscow area were probably equipped with Flagons, more than any other air defense district.

33. The Foxbat, with its higher performance and improved weaponry, will also contribute to the improvement of high-altitude defense. Because the downward-looking radar which the Foxbat is expected to have will be effective over land as well as water, it will probably be deployed in the interior as well as on the periphery of the USSR. Deployment sites will probably be in the attack approaches at a distance of several hundred miles from the targets the Foxbat is to defend.

- 14 -

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Present Force

34. Although the total number of interceptors deployed in 1968 as compared with 1964 has declined by about 1,000 aircraft, the capabilities of the force have increased. The number of all-weather interceptors, for example, has risen from about 1,400 in 1964 to approximately 1,700 in 1968. During the period the number of Mach-2 interceptors has risen from about 700 aircraft to about 1,300. A comparison of the numbers (rounded to two significant digits) and types of fighters assigned to IAPVO in 1964 and 1968 is presented in the following tabulation:

Type	Number		Initial Operational Capability	Armament
	1964	1968		
Fagot	85		1949	Guns
Fresco	2,400	1,400	1952	Guns (some Alkali AAM)
Farmer	800	380	1955	Guns (some Alkali AAM)
Flashlight	350	200	1955	Guns
Fitter	35	20	1959	Guns (probably)
Fishpot	680	770	1960	Alkali and Anab AAM
Firebar		370	1964	Anab AAM
Fiddler		70	1966	Ash AAM
Flagon A		150	1967	Anab AAM
Total	<u>4,400</u>	<u>3,400</u>		