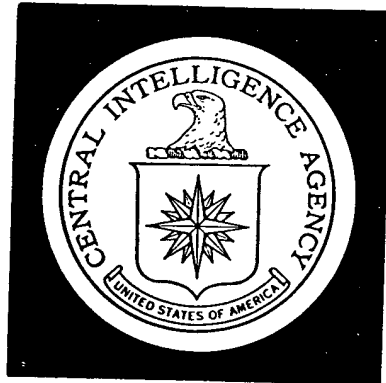


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# Intelligence Memorandum

*Soviet ABM Defenses--Status and Prospects*

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SR IM 70-27

August 1970

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CENTRAL INTELLIGENCE AGENCY  
Directorate of Intelligence  
August 1970

INTELLIGENCE MEMORANDUM

Soviet ABM Defenses--Status and Prospects

Introduction

The Soviets brought the last of the eight ABM launch sites which defend Moscow to operational status early this year. With the exception of a second target acquisition and tracking radar--on which construction is continuing--all elements of the present Moscow defenses are operational.

But the Soviets continue to mark time on ABM deployment elsewhere. They may be awaiting, in part, the outcome of their active research and development program. The first deployed units of a follow-on ABM system resulting from this effort could reach operational status as early as 1974-75. The Soviets may also be awaiting the results of the discussions with the US on limiting strategic arms, which have included consideration of banning or limiting ABM deployment.

This memorandum examines the current status, operational readiness, and cost of the Moscow ABM defenses. It also presents the prospects for future ABM deployment. A summary begins on page 20.

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*Note: This memorandum was produced solely by CIA. It was prepared by the Office of Strategic Research and coordinated with the Offices of National Estimates and Scientific Intelligence.*

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Status of the Moscow ABM Defenses

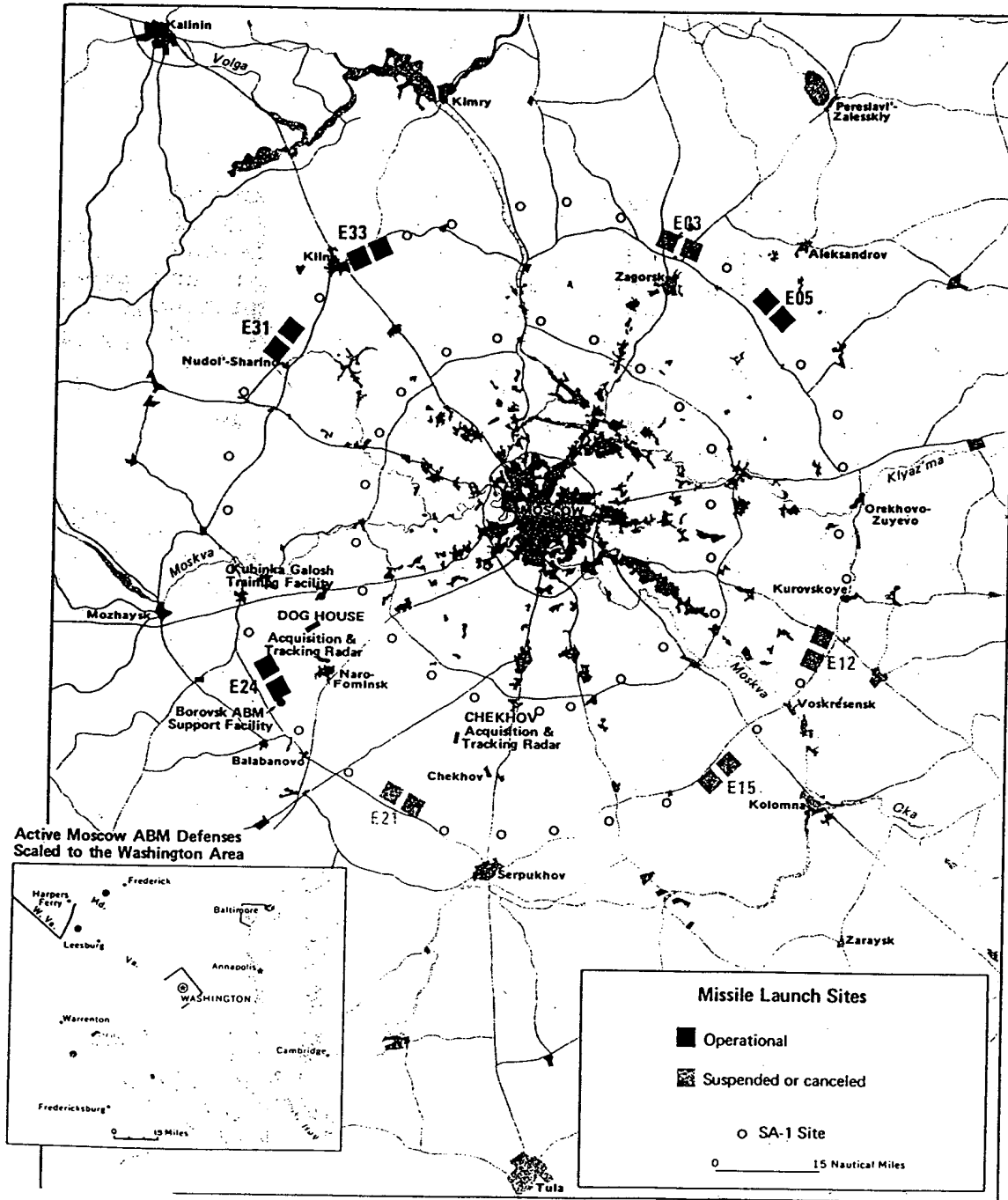
Launch Sites

The last of the eight ABM launch sites around Moscow became operational in early 1970. Each of these sites--deployed in pairs at four complexes--is composed of one large target tracking radar and two smaller defensive missile tracking and guidance radars (the set of three nicknamed a Try Add) and eight Galosh antimissile missile launchers. The disposition of the Moscow ABM defenses and a typical launch site are shown on the map and photograph on the next two pages.

The Soviets originally planned to deploy twice as many ABM launch sites around Moscow. Work on some of the original sites was suspended or canceled in 1964 and on others in 1967, however, and has not been resumed. This cutback in deployment was probably based on the recognition that the system could be defeated by a determined attack using tactics of either saturation (more attacking missiles than the defenses could handle simultaneously) or exhaustion (more total attacking missiles than defensive missiles).

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### THE MOSCOW ABM DEFENSES



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Eight operational ABM launch sites are deployed in pairs at four complexes around Moscow. Each of the sites consists of one large target tracking radar and two smaller defensive missile tracking and guidance radars (the set of three nicknamed a Try Add) and eight Galosh antimissile missile launchers.

The Soviets originally planned to deploy twice as many ABM launch sites around Moscow, but work on the other sites was suspended or canceled in 1964 and 1967.

The other key elements of the Moscow ABM defenses are the Dog House acquisition and tracking radar and a radar under construction at Chekhov which will probably have the same mission. The Borovsk support facility is used to prepare the Galosh missiles for deployment at the launch sites.

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Acquisition and Tracking Radars

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The Chekhov radar, like the Dog House, will have separate transmitter and receiver antennas (see the

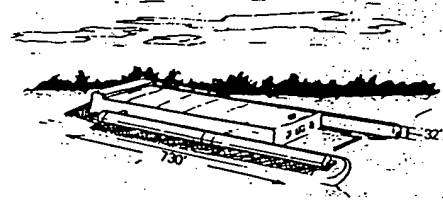
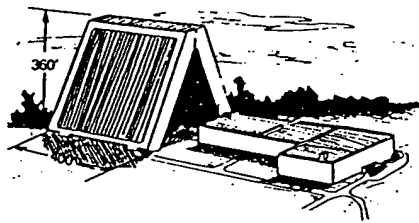
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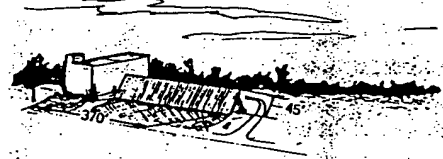


SOVIET ABM RADARS

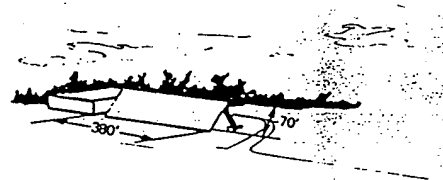
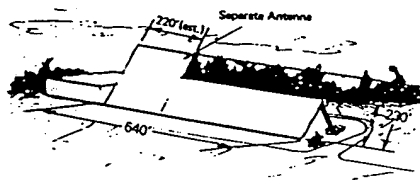
Dog House



Sary Shagan Prototype



Chekhov



Dimensions have been rounded

Receivers

Transmitters



Construction of the Dog House radar, the key acquisition and tracking element of the Moscow ABM defenses, was started in 1962 and the northwest face [

Another radar (near Chekhov, about 35 nm south of Moscow) is now at midstage of construction. It has been under construction since mid-196E [

A radar similar to the Chekhov radar was constructed at the Sary Shagan missile test range during the period 1966-68 [

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comparative sketches on page 9). The transmitter antenna is in the late stage of construction. The receiver antenna, about 8,500 feet from the transmitter antenna, is in an earlier stage of construction. The receiver facility will apparently contain both a receiver antenna and a separate radar whose role and capabilities are unknown.

Although the coverage of the Chekhov radar will include potential Polaris missile launch areas in northern waters as well as parts of western Europe--complementing that of the Dog House--important gaps in coverage of potential threats to Moscow will remain (see inset map on page 9). There is no evidence that additional radars of this type are being deployed to complete coverage of the ballistic missile threat to Moscow.

#### Early Warning Radars

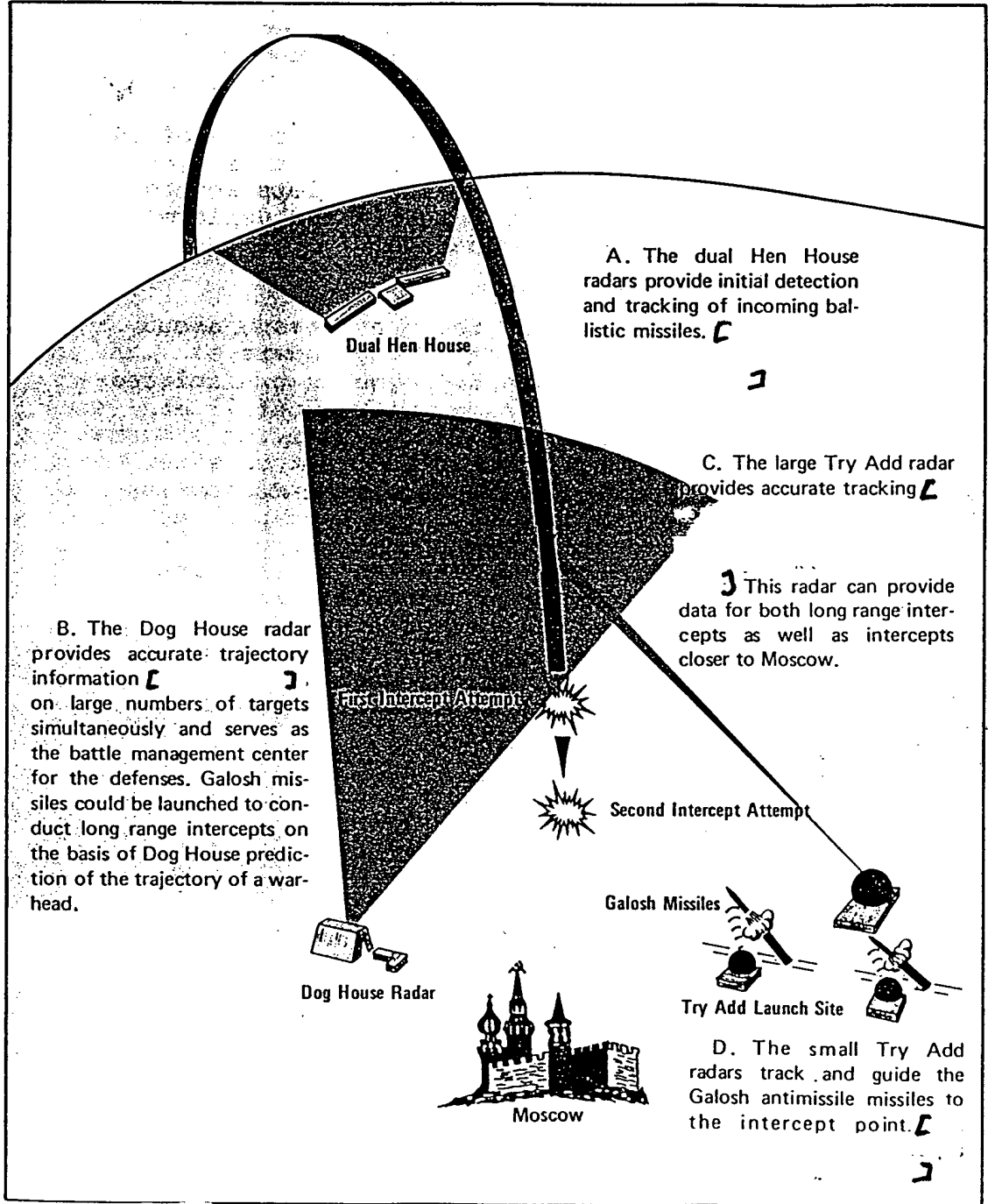
Since 1964 the Soviets have been deploying large, advanced radars--nicknamed dual Hen Houses--to detect a strategic missile attack against the USSR.

Eight dual Hen House radars with a missile early warning role are either operational or under construction at five locations on the periphery of the Soviet Union. They have been deployed in two phases--first to provide coverage of the US ICBM threat and then to cover northern submarine launch areas, China, and the submarine launch areas in the western Pacific and eastern Mediterranean. [

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OPERATIONAL CONCEPT OF MOSCOW ABM DEFENSES



A. The dual Hen House radars provide initial detection and tracking of incoming ballistic missiles. [

C. The large Try Add radar provides accurate tracking [

B. The Dog House radar provides accurate trajectory information [ ] on large numbers of targets simultaneously and serves as the battle management center for the defenses. Galosh missiles could be launched to conduct long range intercepts on the basis of Dog House prediction of the trajectory of a warhead.

] This radar can provide data for both long range intercepts as well as intercepts closer to Moscow.

Galosh Missiles

Try Add Launch Site

D. The small Try Add radars track and guide the Galosh antimissile missiles to the intercept point. [

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The first two dual Hen Houses deployed, one at Olenegorsk near Murmansk and one at Skrunda on the Latvian coast, are oriented to detect ICBMs launched from the continental US against targets in the western USSR. The decision to provide radar coverage of US ICBM approaches to the western USSR first is consistent with the high priority the Soviets accord this threat, a priority reflected in the deployment pattern of the Moscow ABM defenses.

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Despite important gaps in coverage of the potential threat to the USSR--especially from submarine-launched missiles from the western Mediterranean--there is no evidence the Soviets have started any dual Hen House radars since mid-1968. Deployment of three to five additional radars would provide complete coverage of all ballistic missile threats to any part of the Soviet Union (see map, facing).

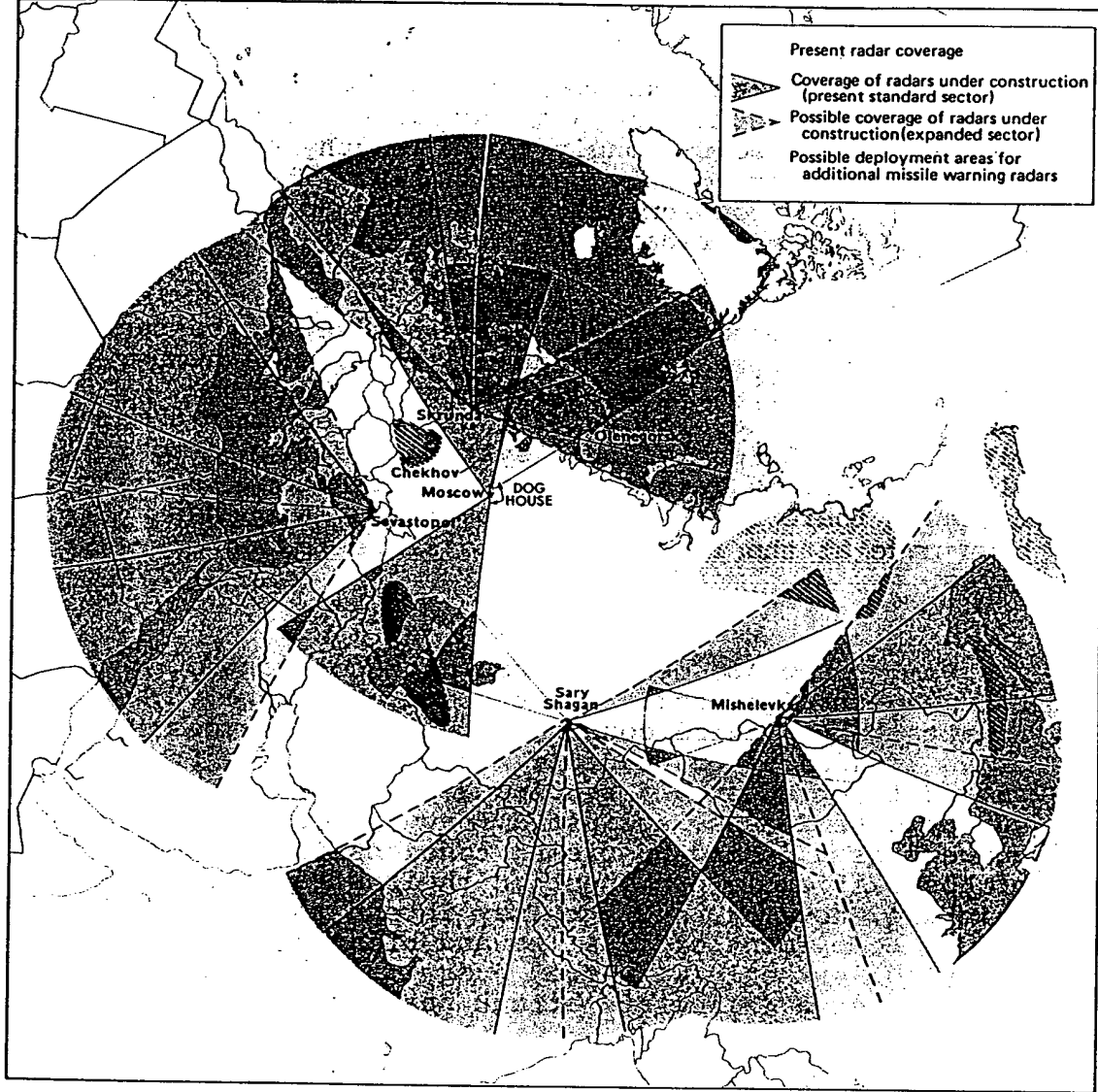
Operational Readiness

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SOVIET BALLISTIC MISSILE AND SATELLITE TRACKING RADARS



This map shows the coverage of the Soviet Hen House ballistic missile early warning and satellite tracking networks as well as coverage by the Dog House and Chekhov radars which are part of the Moscow ABM defenses. Possible deployment areas are indicated for the three to five additional missile early warning radars needed to provide complete coverage of all ballistic missile threats to any part of the USSR.

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A full complement of missiles has yet to be seen at any of the operational launch sites. The number of Galosh missiles at the launch sites, and the launchers they have occupied, have varied over time. Although the Galosh missile system is designed to allow for reload [

] there is no evidence that provision has been made at the launch sites to store reload missiles.

The Moscow ABM defenses could be confronted by three sorts of attack: a heavy attack by the US; an attack by a third country with limited forces; or an accidental or unauthorized launch. The Soviets have not yet adopted a readiness posture commensurate with defense against a heavy attack. The concept of a period of rising tensions in advance of hostilities is prominent in their strategic thinking, however, and they may intend to deploy a full complement of missiles and bring the system to full alert only when they judge that the possibility of a deliberate attack has increased.

If this is their operational concept, only a small alert force of missiles on launchers would be required under ordinary circumstances. This alert force would be adequate for defense against one or a few missiles. Only chance warning of a surprise attack or accidental launch will be available to the Soviets, however, as long as they operate both their dual Hen House detection radars and

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the Dog House target acquisition radar on an irregular schedule.

Costs

During the period 1961-69, the Soviets invested an estimated 810 million rubles (the equivalent of 1.5 billion dollars) on deployment of their present ABM defenses at Moscow.\* To complete the Moscow defenses will require an additional 65 million rubles (110 million dollars), bringing total estimated investment to 875 million rubles (1.6 billion dollars) for the period 1961-71. This estimate does not include an investment of 105 million rubles (205 million dollars) during 1963-71 for constructing the network of dual Hen House radars, which can supply ballistic missile early warning and tracking information but are not believed to be an essential element of the Moscow ABM defenses.

As a share of the Soviet investment in strategic defense forces during the 1961-71 period, the estimated

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\* All expenditure data in this report are estimates of Soviet investment and operating costs. Costs for research and development are excluded. Investment costs are expenditures for procurement of equipment and construction of facilities. Operating costs are expenditures for personnel and operation and maintenance of equipment.

The dollar figures (appearing in parentheses after rubles) are approximations of what it would cost in the US to purchase and operate the estimated Soviet forces. A specific ratio of rubles to dollars is used for each resource input to Soviet military programs. As the mix of these resources changes during a program, the overall ratios of spending change.

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outlays for the Moscow ABM defenses--even including the early warning radars--represent only about 10 percent of the total.

Cumulative operating costs through 1969 for the Moscow ABM defenses were minimal. When the Chekhov radar is added to the system in the early Seventies annual operating costs will probably average no more than 45 million rubles (120 million dollars).

#### Prospects for Future ABM Deployment

There are two factors which currently bear most directly on a future Soviet decision either to expand the current ABM deployment around Moscow or to extend ABM defenses to other areas. The first is the progress of research and development on a follow-on ABM system with improved capabilities. The second is the progress of the strategic arms limitation talks, which may lead to an agreement either prohibiting or limiting ABM deployment.

#### Research and Development

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SALT Negotiations

One of the topics the Soviets have explored during the strategic arms limitation talks (SALT) at Helsinki and Vienna is the possibility of concluding an agreement prohibiting or limiting ABM deployment. The outcome of the talks almost certainly will have an important impact on the future of Soviet ABM deployment.

The discussions at Vienna included possible agreements that would prohibit any ABM deployment or limit it to defense of the national command authorities at Moscow and Washington. A prohibition on ABM deployment would require the Soviets to dismantle the Moscow ABM defenses. An agreement permitting a limited ABM deployment around the two national capitals would probably place a ceiling on the number of launchers, missiles, and radars. Under this sort of agreement the current Moscow defenses would remain intact, and some additional deployment of launchers and radars might be allowed.

If the talks fail to produce an agreement on ABM deployment, the Soviets will probably deploy additional ABM defenses. The extent and pace of such deployment would depend on the progress of their research and development program and their analysis of the strategic balance between the US and the USSR. The Soviet emphasis on defense of the national capital and the current limitations of that defense probably would result in any additional ABM deployment beginning at Moscow.

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Summary

The last of the eight launch sites in the Moscow ABM defenses achieved an operational capability at the beginning of 1970. All but one of the elements of the defenses are now operational. The sole exception--a second acquisition and tracking radar under construction at Chekhov near Moscow--could be externally complete in 1971 and on the air in 1972.

Although the northwest face of the first acquisition and tracking radar started at Moscow--nicknamed Dog House--

Completion of this face may have been delayed because it is not oriented toward a major threat or because improvements resulting from testing of the northwest face are being incorporated.

Eight dual Hen House radars--either operational or under construction--are deployed at five locations on the periphery of the Soviet Union to provide early warning of missile attack. Two of these radars, at Olenegorsk near Murmansk and at Skrunda on the Latvian coast,

can provide warning to the Moscow ABM defenses of a US ICBM attack from the northwest. The other radars will cover China and submarine launch areas in the north, the western Pacific, and the eastern Mediterranean Sea. The currently deployed network of radars, however, cannot provide coverage of all threat approaches to the USSR, especially of submarine-launched missiles from the western Mediterranean Sea. Deployment of some three to five additional radars could close the currently existing gaps in coverage.

Because the concept of a period of rising tensions in advance of hostilities is prominent in Soviet

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strategic thinking, the Soviets may intend to bring the defenses to full alert only when they judge that the possibility of a deliberate attack has increased. A small alert force of missiles would be adequate for defense against accidental or unauthorized launches. Only chance warning of an unexpected attack will be available to the Soviets [

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Over the past year the Soviets have completed the limited deployment of the Moscow defenses, maintained an active ABM research and development program, and explored at Vienna the possibility of concluding an agreement prohibiting or limiting ABM deployment. The outcome of the strategic arms limitation talks almost certainly will have a great impact on the future of Soviet ABM deployment. Should the talks fail to produce an agreement on ABM deployment, the

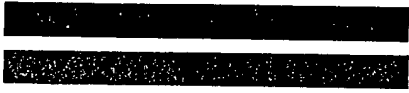
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Soviets will probably deploy additional ABM defenses if the progress of their research and development program and their analysis of the strategic balance between the US and USSR seem to warrant the major commitment of resources required.

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