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13 September 1979

MEMORANDUM FOR: Director, NFAC

SUBJECT : The Soviet Defense Buildup
(A Contribution to DDR&E Posture Statement)
SR M 79-10127, 11 September 1979

1. The attached contribution to the annual DDR&E posture statement was requested by Dr. Paul J. Berenson, Deputy Assistant to the Secretary of Defense (Atomic Energy) (Assessment). This is essentially an updated version of last year's contribution.

2. Contributions were received from OWI, OSI, OSR, and NIO/SS. There was no external dissemination other than to the addressee.

OSR/

Attachment:
As stated

This memorandum is unclassified when separated from the attachment.

MEMORANDUM FOR: Dr. Paul J. Berenson
Deputy Assistant to the Secretary
of Defense (AE) (Assessment)
Room 3E1074 The Pentagon

Attached is the update of the Chapter II contribution. It was prepared by [redacted] although it is based on contributions from other parts of NFAC as well. If you have questions or comments, let me know or call [redacted]

[redacted]

R. M. HUFFSTUTLER
Director
Strategic Research

Attachment:
As Stated

Date 13 September 1979

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The Soviet Defense Buildup

(A Contribution to DDR&E Posture Statement)

National Foreign Assessment Center

Central Intelligence Agency

11 September 1979

SR M 79-10127

The Soviet Defense Buildup

Contents

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The Soviet Defense Buildup

I. General

A. Goals

1. Soviet goals, objectives, and views on the use of strategic and tactical forces are a prime determinant of the number and type of weapons development programs that are undertaken. The US Intelligence Community has estimated that in the area of strategic force development, the Soviets are in a phase emphasizing technological improvement. In pursuing this phase, the Soviets are striving to:

   a. continue to improve overall war-fighting and war-survival capabilities, including what US strategists would call counterforce and damage-limiting capabilities;

   b. ensure that their strategic forces and supporting elements will appear powerful in comparison with those of other nations;

c. increase the chances that the Soviet Union could emerge from a nuclear war in a better position than the United States;

d. emphasize quality in strategic weapons development and deployment, but go slow on sacrificing quantity;

e. improve operational warning and command and control systems and increase readiness, targeting, and attack assessment capabilities.

In the area of general purpose forces, Soviet objectives are to:

a. keep a clear numerical edge over NATO, especially in Central Europe, while striving to introduce high-performance equipment;

b. control East European allies by the proximity of large well equipped Soviet forces;

c. maintain a strong in-depth defense of the homeland.

2. These estimated objectives describe broadly the kinds of flexibility that the Soviets hope to derive from their forces, but provide little basis for gauging which

weapon programs will receive the go ahead. For this type of assessment, we must look at how the Soviets have conducted their military RDT&E and procurement programs during the past ten years or so, and how they have organized their military-industrial establishment for the execution of defense programs.

B. Ingredients

During the last decade, the Soviets have conducted a vigorous buildup of their military forces. Although the US leads the USSR in many areas of military technology, the Soviets have developed and deployed an impressive array of military hardware that has provided them with a formidable military capability. Some of the factors instrumental in the success of the Soviet competition with the US have been:

1. *Commitment*: In the past, the Soviet leadership has accorded top priority to the defense establishment, and has undertaken broadly based programs for research, development, and production of military systems.

2. *Quantity*: In a number of cases they have deployed large numbers of weapons with modest capabilities as a

means of countering a smaller number of technically superior weapons.

3. *Incremental Improvement*: The Soviets stress timely fulfillment of an operational requirement, accepting adequate short run capabilities and initiating frequent improvement programs to upgrade system effectiveness.

4. *Innovation*: Although the Soviet system appears to have some built-in resistance to major innovations in weapons design, in selected areas they have shown an ability to circumvent technological limitations with unconventional designs.

C. Support for Military Programs

The underpinning of the Soviet military establishment has been the overriding priority accorded defense programs by the national leadership.

1. Soviet defense expenditures are large and growing. The cost of Soviet military activities measured in dollars has grown at a fairly constant rate of about three percent a year over the past ten years, and about four to five percent per year when measured in

rubles. The effort absorbs an estimated 11-13 percent of the gross national product.

2. Measured in 1978 dollars, the estimated costs of Soviet military programs have exceeded expenditures for US defense programs since 1971, and in 1978 exceeded the US effort by about 50 percent.

3. The cost of Soviet defense investment programs--the procurement of weapons and military equipment and the construction of facilities--show a similar trend. Over the 1968-1978 period, the estimated dollar cost of Soviet investment activities was about 30 percent greater than comparable US activities; in 1978 it was about 80 percent greater than US military investment.

4. In spite of the projected Soviet economic difficulties in the 1980s, we believe that in the future the Soviets will continue to increase defense spending in real terms through 1985, probably at about the current rate.

D. Resources Devoted to Military RDT&E

The Soviets have established a vast base of facilities for designing, developing, and testing military systems. It is

not possible to describe the dimensions of the whole establishment but, it is clear from the steady expansion of RDT&E facilities and the steady output of new weapons that R&D expenditures are large and growing.

The largest share of RDT&E resources go to aerospace programs. There are 13 major Soviet organizations--integrating contractors--responsible for managing all missile and space development programs. Each of these organizations has a number of assigned specialities. Since about 1960, these organizations have demonstrated the capability to conduct 45 to 50 missile and space programs simultaneously. During this period the Soviets have developed well over 100 different missile systems of all kinds, and more than half of these have been new designs. Although the level of program activity has declined some from the high levels of the 1960s, the floorspace and manpower invested in missile development programs has grown steadily. Present indications are that development in all major product lines is continuing.

There are several general design bureaus performing airframe and aircraft engine design work plus many other smaller bureaus designing various types of aircraft subsystems.

These organizations have developed more than 100 new models of Soviet aircraft since 1960. About half of these have been new designs. Slightly less than half have been fighters and bombers.

The size and output of the naval ship R&D establishment is also impressive. More than two dozen scientific research institutes, shipyard, and special design bureaus, and specialized planning authorities support the efforts of the central design bureaus dedicated to warship design. Since 1960 the Soviets have introduced more than 30 new or modified submarine designs and about 60 new combatants, many of new design or incorporating innovative technology. These ships are produced at 13 major shipyards engaged in naval construction.

II. Soviet Force Developments Over the Past Ten Years

A. Strategic Offensive Forces

1. *Investment and Operating Costs:* Over the past decade dollar estimates of Soviet investment and operating costs for strategic offensive forces (including peripheral attack) have been over twice that of the US.

From 1974 through 1978 the yearly Soviet total has averaged two and a half times that of the US.

2. *Key Developments*: With this investment in strategic offensive forces, the Soviets:

a. surpassed the US in the number of operational ICBM launchers, and acquired a substantial margin over the US in ICBM throw weight;

b. improved the accuracy of their ICBM force by using guidance systems with digital computers, and improved counterforce potential by introducing MIRVs;

c. improved the potential survivability of their ICBM forces through an extensive silo hardening program, the development of a mobile ICBM and through redundancy of C^3;

d. increased the size of the SSBN force and increased the range of this force with the introduction of the SS-N-8 and SS-N-18 SLBMs;

e. improved the accuracy, survivability, and readiness of their SLBMs by developing stellar-inertial guidance systems;

f. augmented their peripheral strike capabilities with the deployment of the Backfire bomber and the mobile SS-20 MIRVed IRBM.

3. *Outlook*

a. *ICBMs*: As many as five new or modified ICBM systems are currently under development for the Strategic Rocket Forces, all of which are intended as replacements for existing systems. These programs should incorporate accuracy improvements that would provide high single shot probability of kill against hardened targets such as US missile silos or MPS shelters.

We anticipate further improvements in the accuracy of these future systems. Improvements which appear already to have been incorporated in the newly modified SS-18 and SS-19, suggest that subsequent ICBM accuracies will be somewhat better than we anticipated last year. Individual SS-18 and SS-19 RVs are projected to have damage expectancies (DEs) on the order of 50 percent against US Minuteman silos in the early 1980s. With two-on-one targeting tactics to compound the probability of damage, DEs

on the order of 80 percent could be achieved against such silos. The large yields of Soviet ICBM MIRVs, combined with the accuracies we anticipate by the mid-to-late 1980s, could reduce the requirement to use two RVs to compound damage on a hard target, although reliability considerations would probably still require the use of two weapons per target.

We believe that some ICBMs could achieve sufficient accuracy by the mid-to-late 1980s to reduce possible Soviet incentives to develop terminally guided maneuverable reentry vehicles (MaRVs) for the purpose of improving damage expectancies against hard targets. In light of the relatively large yields of most Soviet ballistic RVs and the relatively low warhead yield and reliability likely to characterize a MaRV, Soviet ballistic RVs using conventional technology could probably achieve damage expectancies against hard targets equivalent to those achievable with MaRVs.

b. *SLBMs*: The Soviets have at least three new or modified SLBMs under development, all with MIRV payloads. In addition, they are developing the

Typhoon submarine, an SSBN believed to be comparable to the Trident class, which will house one of the new missiles.

Soviet SLBM force application options are presently constrained by accuracy limitations imposed largely by submarine navigation and missile guidance systems. The SLBM systems presently under development will probably incorporate some modest improvement. Even coupled with low-yield, high-fractionated SLBM payloads, these improvements could provide high levels of lethality against relatively soft counterforce targets.

The degree of accuracy required to make SLBMs effective against US ICBM silos would depend on development of the same technologies mentioned as critical to improving ICBM guidance. However, until the Soviets find more effective means of determining submarine launch position, velocity, and azimuth, they can expect only marginal improvements in overall system accuracy.

The Soviets will probably attempt to reduce the ASW threat to their SSBN force by quieting their

submarines. Techniques and technologies appropriate to SSBN quieting, such as precision machinery, will be incorporated into future submarines, but the development of long-range SLBMs which permit patrols in protected waters will reduce vulnerability the most.

c. *LRA*: The overall size of Soviet Long Range Aviation is unlikely to change appreciably during the next decade, but the capabilities of this force will be increased as aging aircraft are replaced with new aircraft--including the Backfire and possibly a new heavy bomber and a transport capable of carrying a cruise missile. These aircraft probably will carry larger numbers of air-to-surface missiles than present models. In addition, the Soviets apparently are developing a long-range cruise missile.

R&D that will improve the capabilities of Soviet LRA is underway in a number of areas. These include accurate aircraft inertial navigation instruments and more efficient propulsion systems. The Soviets have already mastered some of the guidance technologies required for long-range cruise missiles (LRCM), but if they want to build small, *very accurate* cruise

missiles similar to those developed in the US, they will have to make additional advances in guidance, navigation, and propulsion. Such advances could be made so that by 1985 the Soviets could begin testing a LRCM similar to the US Tomahawk in size and accuracy.

B. Strategic Defensive Forces

1. *Investment and Operating Costs*: Largely in response to the US strategic bomber forces, the Soviets continue to emphasize strategic defensive forces. Over the past decade, estimated dollar costs for these Soviet forces has been approximately seven times that for comparable US forces.

2. *Key Developments*: This investment in strategic defense enabled the Soviets to:

   a. deploy three new interceptor aircraft;

   b. expand deployment of two strategic SAM systems, while improving the overall firepower and performance characteristics of the deployed force;

c. improve capabilities to counter air attack at medium and high altitudes;

d. make major improvements in the ECCM capabilities of the weapon systems radars;

e. deploy the Moscow ABM system;

f. complete BMEW coverage of the current ballistic missile threat to the western USSR;

g. develop and have ready for operational use an ASAT interceptor capable of destroying US satellites at altitudes up to 2,500 nautical miles;

h. begin investigating exotic technologies for strategic defense.

3. *Outlook:* We expect that the Soviets will continue to devote substantial resources to defensive capabilities during the next decade because of continuing gaps in their present defenses and the prospect of a US decision to develop and deploy the long-range cruise missile.

Soviet interceptor and SAM forces have good capabilities against medium-and high-altitude attackers, but are deficient in their capabilities against low-altitude

targets, whether bombers or cruise missiles. These deficiencies include ground-based surveillance and control against low-altitude targets, the lack of an effective airborne warning and control system (AWACS), and the inability of most Soviet interceptors to detect and engage low-altitude targets. The PVO has a number of programs in development designed to overcome these problems. They are currently working on at least one, and possibly two, new interceptor aircraft designs and are developing a new strategic SAM system, some of which could begin deployment by the early 1980s. In addition, we anticipate that the Soviets probably will deploy new ground-based air surveillance radars, improved airborne warning and control aircraft, and lookdown/shootdown interceptors (in addition to the Foxbat) and missiles. They also are modifying their fighter tactics to better use the modern equipment entering the force.

The attainment of high clutter rejection radars is required for a low-altitude SAM, for AWACS, and for an interceptor with a lookdown/shootdown capability. The Soviets are working hard to improve signal processing, a critical technology in the development of such a radar, and are estimated to be capable of developing a good

AWACS radar by the early 1980s. Such developments, while they may be more effective against a low-altitude bomber, may be insufficient at first, to defend against a low-altitude, low cross-section cruise missile.

In an effort to overcome the limitations of existing ballistic missile warning systems, the Soviets are developing and deploying OTH radars, a satellite launch detection system, and new, large phased-array radars. These programs will increase warning time, and improve the Soviet ability to determine the size, nature, and objectives of a ballistic missile attack. In addition, work continues on a new ABM system which incorporates a high-acceleration interceptor for endo-atmospheric intercepts.

They are conducting basic R&D technologies related to high time-bandwidth product radars for bulk filtering and discrimination, sensors for discrimination above the atmosphere and improved parallel processors and software, although they have not yet progressed to the prototype hardware stage.

The Soviets have a large and growing research and development effort which might lead to new kinds of

weapon systems for strategic defense. In particular, they are conducting R&D which could lead to directed energy weapons including a broad-based research and development program in lasers and basic research in technologies relevant to non-nuclear electromagnetic pulse (EMP) weapons and particle beam weapons (PBW). The directed energy weapon application closest to being realized is the ground-based laser weapon which could be developed for antisatellite (ASAT) missions, air defense, or possibly for ABM applications. A space-based prototype laser ASAT system of several hundred kilowatts power could be launched as early as 1983-1985. There is no hard evidence which points to the existence of a PBW or non-nuclear EMP weapon program. Moreover, considerable uncertainties remain regarding the feasibility and viability of these weapons. In any case, directed energy ABM defense missions are the most difficult, with realization, if feasible, more than a decade away.

C. Ground and Tactical Air Forces

1. *Investment and Operating Costs:* Since 1968, dollar estimates of Soviet investment and operating costs for

ground forces was over twice that of the US. The Soviet total for tactical air forces was two-thirds the US level, although it has grown faster in the USSR than in the US. Early in the period, dollar estimates of Soviet investments and operating costs for the tactical air force were only a fourth of corresponding US outlays, but are now at 85 percent of the US.

2. *Key Developments:* With these estimated outlays on ground and tactical air forces the Soviets have:

a. increased the number of ground forces divisions along the Sino-Soviet border from 19 to 44, and the number of tactical aircraft by over fivefold;

b. modernized the ground forces by introducing new tanks, armored personnel carriers, self-propelled artillery, and tactical SAMs, by increasing the number of tanks, armored personnel carriers and artillery pieces in maneuver units, and by providing more helicopter support for antitank and close air support missions;

c. deployed large numbers of new types of aircraft with improved range and payload characteristics. By 1977, over 60 percent of the aircraft in Frontal

Aviation were third-generation models produced after 1969;

d. introduced substantially improved short-range ballistic missiles;

e. enhanced the survivability and dispersal capabilities of their tactical aircraft with the construction of new airfields, aircraft shelters, and improvements to existing airfields;

f. introduced four new tactical air-to-surface missiles including systems with electro-optical guidance--and anti-radiation capabilities;

g. deployed in the USSR their first nuclear-capable field artillery.

3. *Outlook*: During the next five to ten years we expect the Soviets to deploy some of the systems currently under development, including a new tank, new mobile tactical SAMs, tactical missiles, ATGMs, and possibly high energy laser applications. The Soviets are also testing a new tactical fighter bomber, which they are expected to deploy by about 1980, and two new air superiority fighters which could be operational by the mid-1980s. Incremental improvements to tactical

aircraft currently in production could include better target acquisition and weapons delivery systems, navigation and bombing radars, tactical air-to-surface missiles, and precision guided munitions as well as improved conventional munitions.

Despite the demonstrated ability to develop and produce high-technology weapon systems which have high priorities, the Soviets continue to have problems in mass-producing and maintaining certain high-technology systems. The Soviets did not field proximity fuzes with field artillery systems until recently, and they appear to be behind the West in precision guided munitions. Soviet aircraft are overweight by Western standards and have less sophisticated avionics, although they do appear to meet Soviet design goals and may confer some cost advantages.

Promising technological areas for future improvements in theater force equipment include microelectronics and electro-optics. The USSR is expected to increase the use of these devices and techniques for more compact and reliable electronics equipment for tactical military applications. Soviet capabilities in the theory of solid state devices are good, and improvements are

expected in their capability to produce quantities of such devices for use in such military systems. Within the next ten years, increased miniaturization and integrated circuit applications to weapon systems are expected. Spectrum utilization throughout this period probably will be toward lightly used frequency bands for reasons of greater bandwidth and security.

The Soviets are currently in the middle of a long-range plan, begun in the early 1960s, to upgrade both their strategic and tactical command and control systems. The most important technology developments needed to support these upgrades are: (1) secure, survivable communications using spread spectrum which can handle large volumes of voice and data traffic with high speed and reliability; and, (2) reliable field deployable computers with associated software and peripherals.

It is expected that the Soviets will continue their current rapid rate of developing EW capabilities to counter US radars and communications networks. Soviet equipment and techniques for radar and communications (including secure communications) deception and jamming of advanced radar fuzes will become increasingly sophisticated. Reaction times for electronic countermeasures

devices are expected to be shortened, and the capabilities for multiple-target jamming increased. Equipment for confusing and denying the use of navigational devices is likely to be expanded.

The Soviets have a large effort directed toward developing and producing electro-optical systems for their armed forces. These systems include active and passive devices such as lasers and light source receivers using the portion of the electromagnetic spectrum from the ultraviolet to the far infrared. In the future, we would expect to see greater use of electro-optics for ranging, target designation, fire control, and night observation devices.

D. General Purpose Naval Forces

1. *Investment and Operating Costs:* During the past decade, estimated Soviet dollar costs of general purpose naval forces have been about equal to corresponding US outlays if US multipurpose aircraft carriers are not included. If these carriers and their associated aircraft are considered general purpose navy instead of part of tactical air forces, US outlays exceed estimated Soviet dollar costs by almost 45 percent for the total 1968-1978 period.

2. *Key Developments*: The bulk of investment for these forces went for ships and naval aircraft associated with open ocean antisubmarine warfare (ASW) and open ocean antiship missions. During this period the Soviets acquired:

   a. improved capabilities against aircraft carriers operating within range of Soviet naval strike aircraft;

   b. a diversified inventory of antiship missiles on nuclear-powered submarines and surface combatants;

   c. their first aircraft carriers.

3. *Outlook*: During the next decade some Soviet naval procurement will be directed at relieving continuing deficiencies. Soviet capabilities are limited for air defense of deployed surface forces, to provide logistical support to forces at sea, and to project power ashore in distant areas. Their fleet air defense should benefit from deployment of improved SAMs and additional aircraft carriers. The new carriers may have strike aircraft. In addition, the Soviets probably will improve their capabilities for operation in distant areas

by continuing to modernize their amphibious forces and logistic support forces. The EORSAT and RORSAT satellites and new SSGN submerged launched missile systems will provide the Soviets the ability to target US carrier task forces on a near real-time basis with greater survivability than current anticarrier forces.

Although they have acquired substantial forces for ASW, Soviet ASW is currently weak. Continued investment in nuclear-powered attack submarines and other ASW forces will improve their capability only marginally.

Soviet R&D in ASW is devoted both to acoustical and nonacoustical detection sensors. They are working toward the development of optimal linear arrays which have applications to advanced towed array sonar systems, but success in developing these systems depends on attainment of high-speed digital or optical processors. It is not likely, however, that such processing ability will be available to the Soviets before the late 1980s. Some Soviet long-range acoustic R&D seems oriented toward development of distributed passive arrays but success in this area is unlikely to occur in the next ten years. The Soviets are conducting wake detection R&D using both

remote and *in situ* sensors. The nonacoustic sensor systems that appear to hold the greatest potential are the remote radar sensing of surface effects caused by internal wave wakes and the *in situ* sensing of turbulence or temperature in the wake. For the development of remote nonacoustic detection systems the critical technology area is signal processing, an area the Soviets are actively investigating. Despite their efforts, the Soviets probably have little chance of developing effective systems for deployment utilizing these concepts during the next ten years.

III. The Impact of Arms Control Negotiations

A. Strategic Arms Limitation Agreements

1. The interim SALT agreements have affected Soviet force levels, but had little impact on the type of weapon system developed. These agreements have affected only ABM and "central systems"--bombers, land ICBMs, and SLBMs.

2. The SALT II treaty, on the other hand, in addition to placing numerical limits on the number of strategic nuclear delivery vehicles, places qualitative controls on strategic weapons programs.

a. Under the Treaty's *quantitative* limitations, the Soviets will:

1) probably increase the total number of RVs on their offensive missiles, even if they are required to reduce the number of land-based missile launchers;

2) be required to reduce the number of ICBM launchers and nuclear-powered ballistic missile submarines. The latter would be accomplished by converting Yankee class submarines to SSNs;

b. The Treaty's *qualitative* limitations would:

1) restrict improvements on some systems to specific levels. The capabilities of new types of ICBMs would be limited;

2) ban outright some types of offensive weapons.

3. Unlike the Interim Agreements, SALT II will impact on the activities of the Soviet R&D establishment, but it is unlikely to have a major impact on the size of the R&D effort.

a. The Soviets RDT&E base has expanded steadily and even when constrained in certain R&D areas by treaty negotiations, resources have been shifted to other RDT&E areas.

b. Thus, future agreements may alter the mix of weapons going through the acquisition process, but will have little impact on the level of activity.

4. A SALT II agreement would have little impact on the level or trend of total defense spending projected through 1985. Spending for strategic attack forces makes up only about 10 to 15 percent of total defense expenditures. Thus, the effect of changes in strategic force allocation is muted.

B. MBFR

1. Current MBFR proposals seek *quantitative* constraints on manpower and certain equipment in Central Europe. Both NATO and the Warsaw Pact propose that some stationed Soviet tanks and personnel be withdrawn to the USSR as part of an MBFR agreement. These redeployed forces (from three to five divisions currently are being proposed, the Soviets preferring the lower number) could

be maintained at full strength in the Western USSR, or, more likely, they would be partially demobilized to cadre units ready for callup.

2. Thus far, multilateral MBFR negotiations have ruled out *qualitative* constraints.

a. The Pact forces are continuing their reorganization and modernization program begun in the late 1960s. There has been no explicit constraint proposed by either side pertaining to R&D. Even if there were qualitative constraints imposed in Eastern Europe under an MBFR agreement, the Soviets could continue R&D and equipment replacement within the USSR, which is outside the area of reductions.

b. In exchange for Eastern acceptance of Western negotiating proposals, including withdrawal of five Soviet divisions and acceptance of a common manpower ceiling of 700,000 ground and 900,000 ground and air personnel in Central Europe, the US has offered to reduce and limit some tactical nuclear delivery systems and warheads (Option III). The US has not offered to limit follow-on systems to those weapons

included in the package, nor is it seeking reciprocal constraints on Eastern systems in exchange. Gray area and peripheral systems such as the SS-20 and the Backfire are not currently, nor are they likely to be, the subject of MBFR negotiations.

3. Estimated cost savings under a 1979 MBFR agreement, assuming the Soviets redeployed the ground forces units withdrawn from the area of reduction to bases in the Soviet Union and maintained them at reduced strength, would permit a reduction of only a few tenths of a percent in total defense spending projected through 1985. If construction of new bases within the USSR is required to house the redeployed units, the potential savings would be smaller--perhaps non-existent.

C. CTB

Under an effective trilateral Comprehensive Test Ban (CTB) Treaty the Soviets could deploy warheads in sufficient yield/accuracy combinations to fulfill their nuclear requirements. Constraints would occur in the following areas:

1. There would be only minor *design improvements* of in-stockpile and future warheads with little, if any, change in yield.

2. *Flexibility* in payload options would decline as they would be limited to the available warheads. This applies primarily to strategic weapons greater than several hundred KT.

3. Although it is likely that *reliability* of nuclear weapons in the Soviet stockpile will degrade under a CTB, we do not have sufficient experience or information to determine the extent to which that will occur.

D. ASAT

Bilateral ASAT negotiations with the Soviets have begun. The first exploratory round of talks was held in June of 1978. While the Soviets have been willing to discuss restricting their active ASAT program, including testing, no agreement to do so has been reached.

1. The Soviets *currently* have a variety of systems capable of antisatellite activities. This inventory includes an operational orbital ASAT interceptor, the GALOSH ABM

interceptor, a ground-based laser, and electronic countermeasures (the latter currently are not a subject of ASAT negotiations). Moreover, the Soviets are continuing developmental efforts on more sophisticated systems. They appear to perceive a continuing requirement to be able to attack satellites with a variety of means.

2. *Future* Soviet ASAT program direction, size, and force composition probably will be influenced by the success of current and projected R&D programs, Soviet assessment of relative US and Soviet technological capabilities to develop an effective ASAT system, and the scope and nature of ASAT limitation talks. While there may be some agreement on future constraints on ASAT testing and deployment, it is doubtful that any major limitations, except possibly space testing, will be accepted concerning future ASAT R&D.

IV. The Soviet Weapons Acquisition System

A. Principal Participants

The Soviets have established a vast military RDT&E and production base. Several sets of organizations participate

in the design, development, and procurement process and the division of labor among them is fairly clear cut. While there has been some evolution, the basic elements of the execution of defense programs have changed little since the mid-1960s.

1. Basic research is performed primarily in institutes subordinate to the Academy of Sciences.

2. Applied research and design/development of weapons is accomplished in institutes and design bureaus subordinate to the nine industrial ministries principally engaged in acquisition of defense systems.

3. Small numbers of integrating contractor design bureaus manage individual development programs including the efforts of subsystem designer and component suppliers.

4. Production of military hardware is carried out by the industrial ministries.

5. Overall management of the execution of defense programs is provided by the Military Industrial Commission (VPK). The State Committee for Science and Technology (GKNT) plays only a small role in military RDT&E.

B. Key Features

1. *Stability*: The ministers of the principal industrial ministries and the chief designers responsible for key programs all tend to have long tenures. Employment and the level of activity in the principal RDT&E installations either remains the same or grows steadily. There are no fluctuations in employment at the initiation and conclusion of programs as in the US. The enterprises involved with various categories of defense development and production programs generally remain the same. This stability:

a. provides a base of experienced design, developmental, and managerial personnel;

b. supplies leaders with a continuous stream of weapon system options;

c. facilitates long run planning;

d. has led to established procedures for doing business which probably tends to discourage alternative approaches and innovation;

e. means that program decisions tend to be final so that programs are not likely to be canceled once they reach the hardware stage.

2. *Design Philosophy:* The design approach emphasizes fulfilling an expressed requirement on time which results in comparatively simple systems intended for a single or narrow range of missions. Although there are exceptions, emphasis is on incremental improvement to existing weapons and use of common subsystems so that production initiation is simplified. Soviet weapons are designed to operate reliably for the expected combat life of the system with a minimum of front line maintenance. Great stress is placed on timely completion of projects, so that tradeoffs between time and innovation are usually made in favor of early completion.

a. This philosophy results in early deployment of a capability, a steadily improving force. It also minimizes problems associated with production and maintenance of current and succeeding generations, and reduces training requirements.

b. This approach causes resistance to innovation among participants which makes use of new technology more difficult.

c. Difficult technical problems are handled in multiple steps which increases time to acquire full capability. In some cases, ability to marshal resources for priorities helps.

3. *Implications*: Because of the nature and the relative success of the Soviet acquisition system as it has developed, over the next ten years military development is likely to:

a. continue along the same lines by constantly upgrading existing weapon system product lines resulting in steadily improving deployed capabilities;

b. continue, for the most part, to design systems for single mission or narrow range of missions in order to minimize problems of complex system integration, thereby achieving less costly systems which can be deployed earlier;

c. in selected areas, seek either to overcome technical deficiencies by priority effort or to develop alternative means of countering US advantage.