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Intelligence Report

# The Role of Interdiction at Sea in Soviet Naval Strategy and Operations

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# The Role of Interdiction at Sea in Soviet Naval Strategy and Operations

## Key Judgments

This report assesses the level of resources the Soviets are likely to assign to attacks on merchant shipping in a war with NATO. It also assesses the Soviets' capabilities for such interdiction irrespective of their intentions. Major findings of this study are:

--The Soviet Navy has three principal missions--strategic strike, antisubmarine warfare, and anticarrier warfare--to which it would allocate the majority of its forces in wartime.

--The Soviet Navy would, in addition, conduct selected attacks on merchant shipping over a wide area of ocean, partly as a means of dispersing Western naval resources. The Soviets would probably allocate a small portion--perhaps 10 percent--of their attack submarine force toward this task.

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--The Soviets consider disruption of Western shipping an important objective in a protracted general war. They hope to achieve this by launching strategic attacks on ports and harbors, sinking merchant ships at sea, and mining heavily traveled waters. It seems unlikely, however, that the submarine force would carry out extensive interdiction operations until Western carrier strike groups and ballistic missile submarines (SSBNs) had been neutralized.

--The Soviets probably would attempt a total interdiction of NATO's close-in maritime shipping in areas such as the North Sea if such a move were directly relevant to the land battle. This would support Warsaw Pact ground forces operating on a coastal axis and would involve a wider variety of forces concentrated in a specific area for a limited period.

Although Soviet naval writers list interdiction as one of the Navy's many wartime missions, they argue against assigning large forces to attack merchant shipping in the open ocean. Soviet naval forces--

especially their large fleet of attack submarines--have the capability to pose such a threat, however, and intentions can change rapidly, whereas capabilities are modified only gradually. Accordingly, we have assessed the capability of Soviet naval forces assigned to the Northern Fleet to interdict the flow of merchant shipping between the United States and Western Europe. We used three scenarios, in which, respectively, about 10 percent, 33 percent, and 100 percent of all of the long-range attack submarines operationally available in the Northern Fleet were given interdiction as their primary mission.

We found that the number of merchant ships likely to be sunk over an extended period--four months--indicates that the Soviets have only a limited capability to impair the flow of shipping across the Atlantic, even if they were to reorder their priorities and allocate large forces to interdiction. Our findings are summarized in the table below and are discussed in detail in Annex F of this report.

Western Merchant Ship Losses to Soviet Submarines in a 120-Day Interdiction Campaign in the North Atlantic

| Scenarios | Participating Submarines | Ships Sunk or Disabled | Percentage of Available Ships |
|---|---|---|---|
| 1 | 7 | 27 | .3 |
| 2 | 21 | 106 | 1.1 |
| 3 | 64 | 273 | 2.8 |

We believe that the level of effort represented by Scenario 1 would be the more likely in the opening phases of war with NATO. The Soviets could not make the larger allocations envisioned in Scenarios 2 and 3 without significantly reducing their capabilities against Western SSBNs and aircraft carriers--forces capable of striking vital targets in the USSR with nuclear weapons or altering the course of war in Europe.

The primary factors limiting the capabilities of Soviet naval forces to carry out an interdiction campaign at sea are:

--Soviet attack submarines carry few torpedoes, have low operational availability, and in wartime would receive little logistic support. Their crews lack the necessary training in attacking maneuvering targets screened by

escorts. In addition, the location of most Soviet bases and the submarines' long transit routes through geographically constricted waters make the submarines vulnerable to counteraction during deployment and return to base.

--Soviet Naval Aviation is not well suited to operate at the ranges necessary to interdict ships in the major sea lanes.

--The West has such an extensive inventory of merchant ships that a large number would have to be sunk before losses became militarily significant. Moreover, the magnitude and diversity of the commerce they handle would make it difficult for the Soviets to distinguish between ships carrying routine commercial cargoes and those loaded with war materiel.

Present trends in Soviet naval strategy probably will continue for at least the next decade. As long as Western SSBNs and aircraft carriers

remain a credible threat to the USSR, the Soviets are unlikely to reorder their priorities for force allocations to upgrade the role of interdiction in the open ocean. As more nuclear-powered units enter the force, additional older units may be assigned an interdiction mission. The numbers involved in such a reassignment, however, are expected to be small and would not significantly change Soviet capabilities against Western shipping.

# The Role of Interdiction at Sea in Soviet Naval Strategy and Operations

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# The Role of Interdiction at Sea in Soviet Naval Strategy and Operations

## Preface

A number of national security issues have recently focused attention on Soviet capabilities and intentions to interdict Western sea lines of communication in a general war. The USSR has the world's largest fleet of general purpose submarines, giving it the capability to threaten the shipping lanes on which the United States and its allies are economically and militarily dependent. There are, however, markedly different interpretations of how many forces the Soviets would allocate to this mission.

The Soviets note that interdiction of sea lines of communication can be accomplished in a variety of ways using a variety of forces including disruption or destruction of ports of embarkation and destination, attacking ships at sea, and mining sea lanes and approaches to ports and harbors.* Units of the Navy,

*This paper does not examine Soviet capabilities to disrupt shipping by attacking ports and mining heavily traveled waters, but focuses on Soviet ability to mount an open ocean interdiction campaign.*

Strategic Rocket Forces, Long Range Aviation, and, in some cases, of the Ground and Tactical Air Forces could be used to accomplish these objectives.

The Soviets clearly believe that the most effective means to interdict shipping is through attacks on ports and harbors. In a general nuclear war, such attacks require the least forces, offer the highest probability of success, are difficult to defend against, and permit other forces capable of interdiction to be given higher priority tasks.

In a conventional war in Europe or localized conflicts outside the European theater, on the other hand, the capabilities of the forces as well as political factors limit the efficacy of attacks on ports and harbors as the principal means of interdiction. If interdiction remained a goal under such circumstances, the importance of attacking ships on the open ocean probably would increase as the scale of conflict decreased.

Thus, Soviet capability to conduct an at-sea interdiction campaign is a key element in an assessment of Soviet options in a variety of potential conflict scenarios.

This paper studies the evidence bearing on the role of interdiction in Soviet naval policy. It examines Soviet mission priorities and estimates the composition and capabilities of the forces the Soviets would likely use for interdiction. It also considers the possibility that they might adopt a strategy of interdiction in situations short of total war.

In this paper, interdiction is defined as the disruption of merchant shipping in the open ocean. Such ships could be carrying economic goods, military cargo, or troops from one NATO country to another. Warships, military logistic ships and amphibious landing forces are excluded from our definition.

Classified Soviet and Warsaw Pact writings, documents, and manuals have provided insight into Soviet war planning. These materials, however, have certain limitations:

--Much of the documentation dealing specifically with the USSR was published before 1971. Nonetheless, it seems to remain valid because it is largely consistent with the limited documentary material and other forms of intelligence which continue to be available.

--Much of the material often is argumentative in nature, prepared by advocates of one course or another, and may not necessarily represent official doctrine and policy.

--Contrary to most Western usage, the Soviets sometimes use terms such as "interdiction," "transports," and "convoy" in reference to naval support ships, auxiliaries, and even amphibious landing craft, as well as merchant ships and troop transports. The term "naval blockade" for the Soviets can comprise geographically diffused interdiction operations of the kind employed by Germany during World Wars I and II. Lack of a clear definition of certain expressions and differences from common Western usage thus introduces ambiguity into Soviet writings and occasionally appears to inflate the importance of at-sea interdiction for them. Where appropriate, these conceptual and semantic difficulties are noted in this report.

Analysis of Soviet plans for interdiction is complicated by the paucity of information dealing directly with the subject. Detailed discussion of interdiction in Soviet military writings is comparatively rare (except in a historical context), and the Soviets seldom practice anticonvoy tactics except in amphibious landing exercises.

A model was used to examine Soviet capabilities to interdict Western shipping in several possible scenarios. The assumptions used in the model and the results obtained are described in Annex F of this report.

## Part I - Assessment of Intentions

### Current Soviet Naval Mission Priorities

Soviet attack submarines, the main strike forces for use against merchant ships, are also needed to perform a variety of other important naval missions. These missions reflect Soviet plans on how they would use their forces in wartime. Understanding Soviet mission priorities, then, is essential to estimating the level of effort that the USSR would expend against Western shipping.*

#### Principal Wartime Missions

Clear statements of the relative standings of the missions of Soviet naval forces date back to the 1960s. They list main tasks**--antisubmarine warfare, anticarrier warfare and deployment of Soviet SSBNs to launch areas--that the Navy would attempt to carry out even in a conventional war. Missions which the Soviets list as less critical include:

-- support of the seaward flanks of the ground forces;

-- interdiction of Western sea lines of communication;

*See Annex A for a discussion of Soviet military writings regarding naval mission priorities.

**While Soviet military literature often distinguishes between "main" and "secondary" missions, the Russian language lacks the articles a, an, and the. Thus, Soviet statements frequently contain no explicit differentation between missions within each category, and ranking of missions must be inferred by the order in which tasks are consistently listed and from rare instances when explicit references are made by authoritative writers..

-- coastal defense; and

-- protection of Soviet shipping,

The priority of the secondary missions would be the same in the early stages of both conventional and nuclear war. The Soviets believe interdiction, however, could assume greater importance late in war after Western strike forces had exhausted most of their strategic weapons.

Soviet military writings indicate that regardless of how a war begins, they would attempt to direct their general purpose naval forces first of all toward the destruction of enemy aircraft carriers and ballistic missile submarines. A critique of a Warsaw Pact planning exercise held in 1970 stated:

> We must keep in mind that the basic purpose of [Warsaw Pact] naval actions is to destroy the enemy's naval nuclear forces, first and foremost his nuclear missile submarines and strike carriers, and also his naval surface forces.
>
> [In addition] an important task of navies is to support the fronts,...wage combat against enemy [sea] communication routes, and deliver strikes against naval bases, ports, airfields, and aircraft bases.

Importance of the Anti-SSBN Mission. Peacetime Soviet naval operations reflect the high priority assigned to the anti-SSBN mission. The Soviets have

stationed intelligence collection ships (AGIs) near Western SSBN bases since 1964--and have in more recent years operated their newer nuclear-powered attack submarines in an attempt--apparently fruitless so far--to detect and trail Western SSBNs.

The Soviets consistently acknowledge the difficulty of defeating Western SSBNs. Although they stipulate that the struggle with SSBNs would require large and diversified general purpose forces, they also acknowledge that they may not be able to prevent many submarine-launched ballistic missiles from being fired at the Soviet Union. They believe that even after firing its missiles, the SSBN should still be a priority target in order to prevent it from being reused after rearming. The threat this force poses is evidently regarded so seriously that Soviet planners feel even partial success fully justifies the concentration of resources against it.

In addition to the unsolved problem of initially detecting the SSBN, Soviet strategy could be further complicated by the poor capability to classify submarines that might be detected--a critical deficiency if the Soviets wished deliberately to delay or avoid operations against SSBNs in a conventional war to avoid the escalatory potential of such a strategy. Because of these difficulties and the continuing threat posed by Western SSBNs, strategic ASW will probably continue to occupy important Soviet naval resources for the foreseeable future.

Tactical Support for Soviet SSBNs. Consistent with the high priority assigned to destroying Western SSBNs, the Soviets place a high value on securing the operating areas of their own. Some torpedo attack submarines probably would be assigned to that task in wartime. When Y-class SSBNs began to enter the fleet in large numbers in the late 1960s, some Soviet naval officers argued that protection of Soviet strategic submarines would be particularly important during the conventional and limited nuclear phases of a general war--when these submarines would have to remain passively on station awaiting the launch order. Naval operations, writings, and exercises since that time continue to reflect a concern for the security of the Soviet SSBN force. The Soviets frequently practice for and use their attack submarines to conduct delousing* of their transiting SSBNs. Recently, they also have assigned attack submarines to accompany SSBNs on patrol on several occasions.

Continued Emphasis on Anticarrier Warfare. The Soviets regard the carrier as the key element of Western

*In such delousing operations, a passing submarine is checked for covert trailers by another submarine.

general purpose naval forces, as a reserve strategic nuclear force, and apparently as an integral part of amphibious landing forces. Most of the Navy's cruise missile submarines and ASM aircraft were procured primarily to counter Western aircraft carriers although these forces could be employed against any ships at sea. As the US deployed large numbers of intercontinental and submarine-launched ballistic missiles, however, the strategic strike role of carriers declined, and in about 1964 the Soviets began to focus on the Polaris submarine as the primary strategic naval threat to the USSR.

Their respect for the carrier's importance in NATO military strategy has not diminished, however. Soviet writings and exercises still indicate that the Soviets would attempt to attack carriers with large forces as soon as possible after a war begins, before carrier-based strike aircraft could be launched against land targets in the USSR or against Warsaw Pact forces.

In view of the emphasis on anticarrier warfare and the multiple hits with conventional weapons which the Soviets deem necessary to sink a carrier, it seems

unlikely that many submarines and aircraft armed with cruise missiles would be diverted from this task. Moreover, there is mounting evidence that Soviet cruise missile submarines do not carry many, if any, torpedo reloads. This would limit their immediate utility after carrying out their anticarrier mission.

Protection of Soviet Peripheral Waters. In addition to defending Soviet territory from sea-based missile and air attack, the maritime defense of the USSR includes securing Soviet coastal waters from naval attack. Soviet naval writers devote comparatively little space in their doctrinal literature to discussing this traditional mission, which clearly has been supplanted in Soviet debate by the more difficult problem of fighting naval strike forces farther away.*

*Many of the forces devoted to countering SSBNs and carriers would be deployed in such a fashion as to fulfill both the strategic defensive mission as well as defense of peripheral waters. Naval forces deployed to the Greenland-Iceland-United Kingdom gap and Norwegian Sea are examples.*

Generally, these exercises include simulated, hostile amphibious and carrier task forces, seeking to land troops on the USSR. Typically, the [redacted] force is subjected to attack by Soviet surface, submarine, and air forces, with missile-equipped aircraft delivering the decisive attack. These exercises suggest that in war large forces, including diesel-powered submarines armed with cruise missiles, probably would be held in or near the Barents Sea--far from major shipping lanes --as part of these defensive forces.

## Interdiction at Sea

Compared to antifleet operations, Soviet military literature and exercises devote little attention to interdiction of sea lines of communication. What information is available, however, suggests that the Soviets, from the outset of hostilities, would conduct some attacks on shipping to tie down substantial Western naval forces.

Nonetheless, interdiction at sea probably does not figure prominently in Soviet war plans, except as a means of occupying and dispersing enemy naval assets and forcing NATO to take defensive measures which would reduce the efficiency of shipping. The Soviets, however, do accord somewhat more importance in a general war to interdicting the NATO-US lines of communication by operations against port areas. Reaffirming this view, Adm. Gorshkov in his 1976 book, Sea Power of the State, stated that the character of interdiction operations has changed and that interdiction is now subsumed in the "overall system of naval operations against the shore." These judgments rest on evidence from a

variety of Soviet sources--writings, exercises, submarine operations, the structure and capabilities of their attack submarine and naval air forces, and the continuing emphasis on the likelihood of nuclear war.

Soviet naval opinion, however, is far from unanimous on the subject of interdiction.* Classified Soviet writings indicate that as early as 1963 there were "various points of view about combat on the ocean lanes" in the Soviet Navy. The authoritative view seems to strike a balance between the opinions of those who believed that interdiction had no significance and of those who believe that attacks on shipping would play an important role in the "initial period" of war "by undermining the enemy's military-economic potential." One authoritative writer stated that a "part" of Soviet naval forces, particularly diesel-powered submarines, would operate on the major sea lanes to prevent NATO military forces from being reinforced or evacuated, but noted that this allocation of forces must not "divert the main elements from combat against the enemy's strike groupings at sea."

*See Annex A for discussion of internal debate within the Soviet naval command on what the role of interdiction should be.*

In the late 1960s, interdiction gained in importance for some authors because of the shift in military doctrine to include the possibility of protracted war. Nonetheless, as late as 1970, one Soviet officer--a proponent of increasing the attention paid to interdiction--believed that the USSR had not done the preparatory work necessary to conduct interdiction operations effectively.

Taken as a whole, Soviet writings suggest that the USSR is hedging its bets on interdiction. Most Soviets do not expect to have to fight the kind of war in which attacks against shipping would be significant. They believe that the opening phases of the war probably would be brief and decisive, culminating in a nuclear exchange which, in any case, would destroy the ports upon which shipping depended. This belief relegates an attrition-based strategy, such as interdiction at sea, to a position of secondary importance. Yet they recognize that under certain circumstances--particularly a prolonged war--cutting the sea lanes could play an important role. As the war progresses, the Soviets probably believe that forces may become available as other missions are accomplished. We, however, believe

it unlikely that many ASW forces could be reassigned during a conflict. Moreover, Soviet forces probably would suffer heavy losses in attacks against Western aircraft carriers and SSBNs. Western attack submarines, ASW aircraft, and mines probably also would subject Soviet submarines to heavy losses as they funneled through geographic chokepoints to reach the open ocean.

Information from Soviet writings on mission priorities has declined after 1970, but evidence from recent Warsaw Pact and occasional Soviet documents and other sources suggests that no fundamental change has occurred. The weapons carried by Soviet attack submarines reflect their continued belief in the escalatory potential of conflicts at sea.*

The Soviets would not lightly discard the basic precepts which have guided their operational planning for the last two decades. To do so would require a major break with past doctrine, a body of military thought characterized by slow, evolutionary change.

*See Annex D.

Even more important, they could not allocate more forces to interdiction at sea without reducing their capabilities against Western SSBNs and aircraft carriers --forces capable of striking vital targets in the Soviet Union with nuclear weapons.

Exercises

The Soviets rarely practice attacks against convoyed merchant ships except as part of amphibious landing exercises. Soviet writings emphasize the importance of carrying out coordinated air and submarine operations in any campaign to interdict shipping [redacted] There is no evidence of a Soviet torpedo attack submarine conducting joint search and attack operations with a TU-95 Bear D reconnaissance airplane--the only Soviet reconnaissance aircraft with sufficient range to operate over the North Atlantic sea routes and locate targets for submarines. If interdiction were a priority mission, such joint operations would seem to be desirable because submarines on their own have limited ability to find merchant ships.

[redacted]

Soviet naval exercises and routine training, instead, have focused on ASW and anticarrier warfare.*

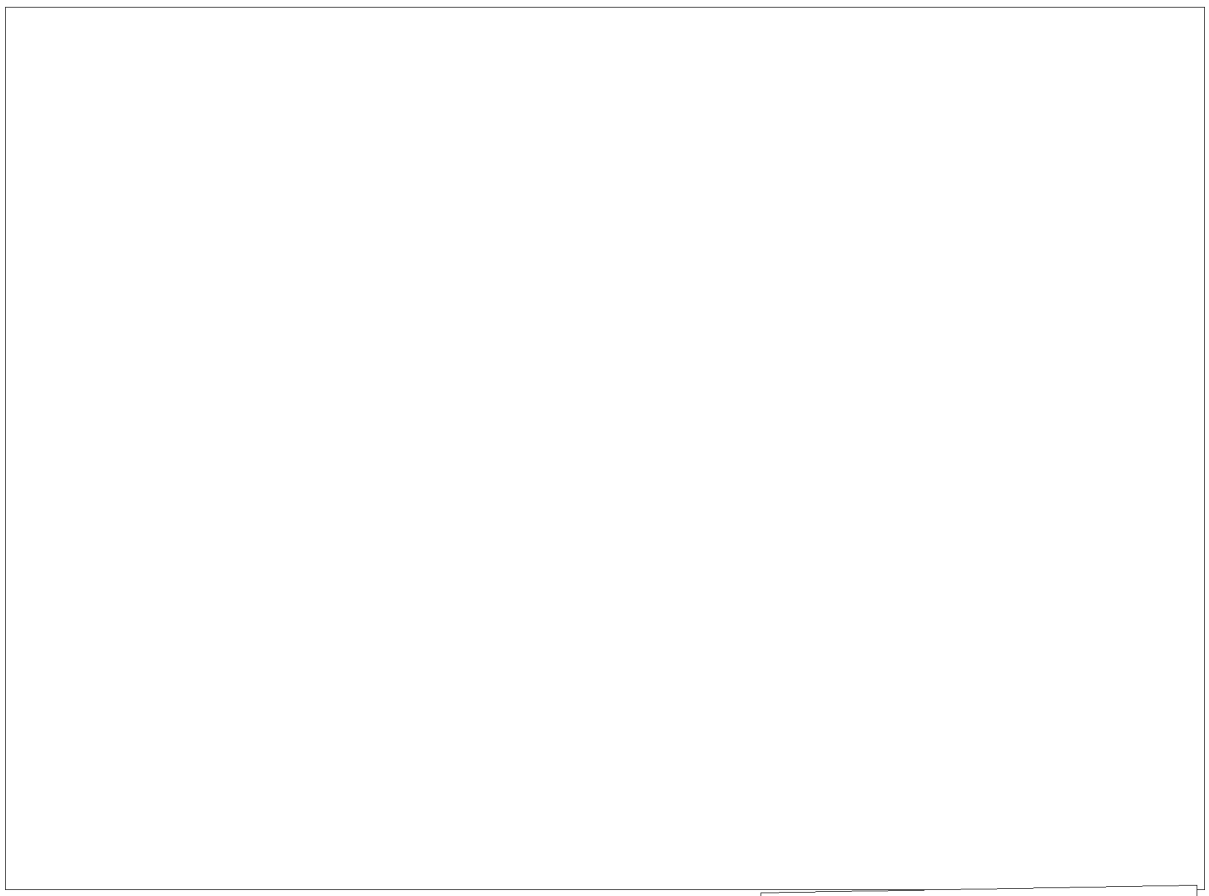
In exercises, which do not involve actual forces of either side, the relative effort expended against naval and non-naval targets is clear.

Beginning conventionally (for "training" purposes), the exercise wargamed a theater conflict with NATO in the eastern Mediterranean Sea and contiguous areas. According to the scenario, the Pact could have achieved its objectives without use of nuclear weapons. After three days of fighting, however, NATO--faced with defeat --escalated the conflict.

*By contrast, Adm. Doenitz, architect of the German U-boat campaign during World War II, believed that interdiction required thorough and specialized training. Doenitz insisted that U-boat crews undergo rigid training before being released to prey on Allied shipping. On 1 September 1940, for example, Germany had only 27 U-boats available for Atlantic duty, partly because a large number of additional submarines had been detailed for training (Doenitz, Memoirs, pp. 107-9). Soviet naval officers appear to agree with this assessment: their writings stress that open-ocean interdiction operations would be complex and difficult, and criticize the Germans for the decline in U-boat training that occurred late in World War II.*

From the onset of hostilities, the Pact's "main" naval forces were directed against Western aircraft carriers and SSBNs operating in the Mediterranean. The scenario assumed a highly optimistic view of Pact capabilities: Pact forces were credited with sinking five of the six NATO SSBNs located in the Mediterranean and "routing" Western carrier and other surface forces.

In addition, the Soviet and Bulgarian Navies also provided fire support for Pact ground forces, destroyed enemy naval forces (presumably Turkish) in the Black Sea, and helped secure the Turkish Straits.



Trends in Force Procurement

The Soviets have not structured their military forces to interdict merchant ships in the open ocean.

-- Most of their naval aircraft armed with ASMs lack the range to operate effectively over the major sea lanes (see map on p. ____).

-- Their submarine force lacks the afloat logistic support necessary to resupply out of area in wartime. Soviet authors write that logistic support, dispersed over a wide area, is necessary to sustain distant submarine operations. The lack of such support has been noted repeatedly and is consistent with the findings of Warsaw Pact exercises.

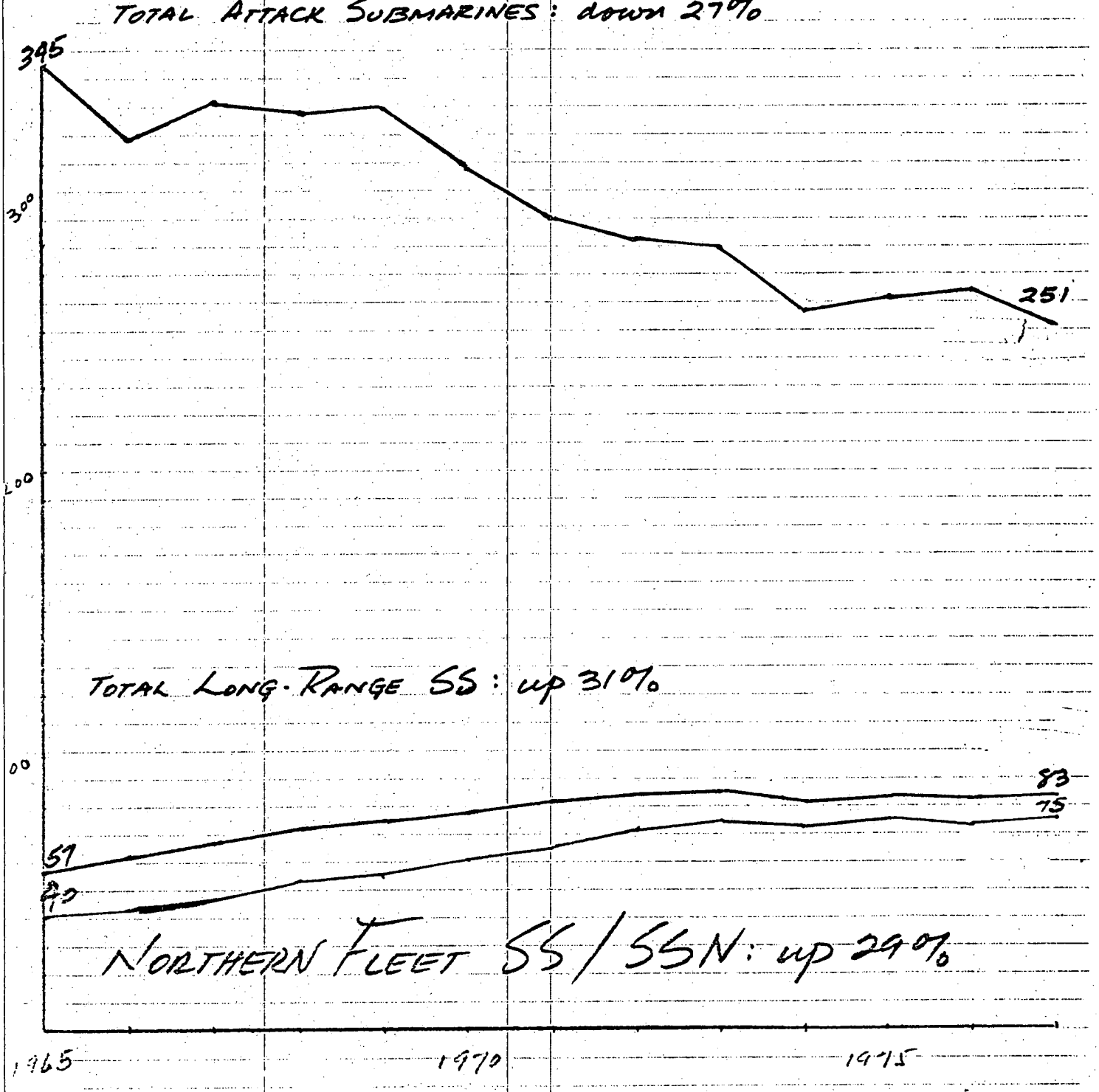
-- The size of the attack submarine force also has declined by nearly 30 percent since 1965

(see graph on p. ____). However, the loss in numbers is offset somewhat for interdiction by the greater speed and range of new submarines entering the fleet.

Finally, if sinking merchant ships were a key objective, one would have expected the Soviets to have produced large numbers of submarines optimized for that role. The Soviets would have been able, for example, to mass produce submarines which combined simplicity of design, relatively inexpensive diesel propulsion, high endurance, and large torpedo capacity.* They have instead concentrated resources on fewer, more expensive submarines with relatively small torpedo loads that are optimized for ASW and anticarrier operations.

*The Soviets had unused construction capacity during the production run for the diesel-powered F-class submarine--the second largest class in the Soviet submarine force--which spanned more than a decade and averaged less than five new units a year. By comparison, production of the medium-range W-class submarine reached more than 60 units a year before the program was canceled in the mid-1950s.*

# The Soviet Attack Submarine Force
## 1965 - September 1977



In their classified writings, they have indicated that the principal interdiction weapon system would be diesel submarines. Interdiction-type submarines, mostly F-class units, presently make up about a third of the attack submarine force, a percentage that has been fairly stable in recent years as obsolescent submarines have been retired and new T-class units have entered service.

Current submarine operations* and Soviet doctrinal writings and exercises indicate that these submarines also would be heavily committed in wartime to anti-fleet operations. The slow underwater speed

*The F-class is used more extensively than other classes of Soviet attack submarines. Normally, these submarines are deployed in the Mediterranean where they primarily conduct barrier operations directed against naval ships of the US Sixth Fleet. The only other F-class unit routinely deployed out of area is in the Indian Ocean, where it spends most of its time in the Gulf of Aden. Operations in the major sea lanes by long-range diesel submarines are rare.

of the F- and T-class units dictates that they lie in wait for targets or patrol in relatively restricted areas; thus many submarines would be necessary for pre-positioning along geographic chokepoints from which they could intercept Western naval forces. This would leave relatively few available to interdict shipping in the open ocean sea lanes.

## Part II - Assessment of Capabilities

### Soviet Interdiction Operations Against Western Merchant Ships in the Open Ocean in A General War

The Soviets would try to use a variety of techniques to make shipping difficult. These include disrupting port operations, sinking merchant and troop transport ships in the open ocean and in coastal waters, and mining harbor entrances. This section, however, deals only with Soviet capabilities to destroy shipping in the open ocean.

### Capability of Soviet Attack Submarines in the Atlantic and Contiguous Seas

The USSR currently maintains in its western fleets an active inventory of 178 attack submarines, most of which are based in the Northern Fleet (see following table). Of these, 123 are long-range units with the endurance to operate on the major shipping lanes. Nuclear-powered submarines, , make up nearly one-third of the force. Long-range diesel submarines, constitute another third. The remaining third are medium-range R- and W-class submarines,

Fleet Distribution of Soviet Attack Submarines, February 1978[1]

| | | Estimated Torpedo Loads[2] | Northern Fleet | Baltic Fleet | Black Sea Fleet | Total Atlantic & West | Pacific Fleet |
|---|---|---|---|---|---|---|---|
| **Cruise Missile** | | | | | | | |
| **Nuclear-Powered** | | | | | | | |
| Class | Missiles | | | | | | |
| C-I | 8 SS-N-7 | 12 | 9 | -- | -- | 9 | 2 |
| C-II | 8 SS-N-7 | 12 | 3 | -- | -- | 3 | -- |
| E-II | 8 SS-N-3/12 | 8 | 15 | -- | -- | 15 | 14 |
| P | Unknown | Unk | 1 | -- | -- | 1 | -- |
| TOTAL SSGN | | | 28 | | | 28 | 16 |
| **Diesel-Electric** | | | | | | | |
| J | 4 SS-N-3 | 6 | 12 | -- | -- | 12 | 4 |
| W Long Bin | 4 SS-N-3[3] | 10 | -- | 2 | 1 | 3 | 3 |
| W Twin Cyl. | 2 SS-N-3[3] | 12 | -- | -- | 3 | 3 | -- |
| TOTAL SSG | | | 12 | 2 | 4 | 18 | 7 |
| TOTAL CRUISE MISSILE SUBMARINES | | | 40 | 2 | 4 | 46 | 23 |
| **Torpedo** | | | | | | | |
| **Nuclear-Powered** | | | | | | | |
| Class | | | | | | | |
| A[6] | | Unk | -- | -- | -- | -- | -- |
| E | | 8 | -- | -- | -- | -- | 5 |
| N | | 18[4] | 8 | -- | -- | 8 | 4 |
| V-I | | 16[5] | 13 | -- | -- | 13 | 3 |
| V-II | | 16[5] | 5 | -- | -- | 5 | -- |
| TOTAL SSN | | | 26 | | | 26 | 12 |

Fleet Distribution of Soviet Attack Submarines, February 1978[1]

| | Estimated Torpedo Loads[2] | Northern Fleet | Baltic Fleet | Black Sea Fleet | Total Atlantic & West | Pacific Fleet |
|---|---|---|---|---|---|---|
| Torpedo (cont'd) | | | | | | |
| Diesel-Electric | | | | | | |
| Class | | | | | | |
| B[7] | Unk | 1 | -- | 2 | 3 | 1 |
| F | 22 | 36 | 5 | -- | 41 | 19 |
| G | 6 | -- | -- | -- | -- | 2 |
| Q[7] | 8 | -- | 2 | 2 | 4 | -- |
| R[3] | 14 | 10 | -- | 2 | 12 | -- |
| T | 22 | 3 | -- | 5 | 8 | -- |
| W[3] | 12 | 5 | 15 | 10 | 30 | 15 |
| Z | 22 | 3 | 4 | 1 | 8 | 5 |
| TOTAL SS | | 58 | 26 | 22 | 106 | 42 |
| TOTAL TORPEDO ATTACK SUBMARINES | | 84 | 26 | 22 | 132 | 54 |
| Total Long-Range Attack Submarines | | 108 | 9 | 6 | 123 | 58 |
| Total Short- and Medium-Range Attack Submarines | | 16 | 19 | 20 | 55 | 19 |
| GRAND TOTAL | | 124 | 28 | 26 | 178 | 77 |

1/ Numbers include submarines in repair, but not auxiliary, radar picket, or reserve units.
2/ Torpedo estimates assume that Soviet submarines are loaded with standard 21-inch torpedoes. There is some evidence that submarines which lack torpedo reloads, such as the J-class, could increase their loadings by carrying two small weapons in place of a large one (see p. D-5).
3/ Medium-range submarines with a patrol radius of 1,800 nm and 10 days on station, or 1,200 nm and 20 days on station--too little endurance to be effective against Western shipping.
4/ N-class submarines could carry 20 torpedoes if they have after torpedo tubes.
5/ V-class submarines also carry two SS-N-15 rocket-assisted nuclear depth bombs for use against other submarines.
6/ The Soviets have built four A-class SSNs. Of these, one has been dismantled, two are fitting out, and one is undergoing sea trials.
7/ Submarines suited only for coastal or inland sea operations.

with an endurance [redacted] they would not be effective against the major shipping lanes to Europe.* These shorter range submarines could be more effectively used in barrier operations in areas closer to the USSR. W-class submarines based in the Baltic and Black Seas probably would be denied access to the North and Mediterranean Seas, Soviet plans ultimately to control these areas notwithstanding.

The focal point for a Soviet campaign against Western shipping most likely would be the North Atlantic. The main threat to the North Atlantic sea routes consists of the 108 long-range attack submarines based in the Northern Fleet, supplemented perhaps by a few long-range units predeployed from the Baltic and Black Sea Fleets. Although this force is large, there are several factors which limit its capability against the flow of NATO merchant shipping.

Competing Mission Requirements. One of the most important factors limiting the effectiveness of a Soviet

*See map on page ____.

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interdiction campaign would be the competing naval missions that would have a prior claim on attack submarines. Even without diverting forces to an interdiction campaign, the Soviets do not have the submarines they believe they would need to perform the critical naval missions of strategic ASW and defense against carrier strike forces.

Documentary evidence indicates that the Soviets anticipate requirements of some 80-100 nuclear or 320-400 diesel submarines in order to have a 70 percent probability of destroying the NATO SSBNs in the Atlantic area even after localizing the SSBNs to within 100-square-mile areas.* Although our own analysis of Soviet ASW capabilities indicates that even these numbers would not suffice, their planning factors show the level of effort the Soviets feel is necessary.

Similarly, the Soviets believe that mass forces would be required to counter Western aircraft carriers. In addition to ASM aircraft, they have estimated that three

**Because of the low noise levels of US and UK SSBNs compared to those of Soviet submarines and the poor quality of Soviet sensors, it is unlikely that the initial detection and localization would be accomplished.*

to four nuclear-powered submarines or 12 to 15 diesels would be required to detect an aircraft carrier task group in time to prevent the launch of aircraft.

They have estimated that they would need to salvo eight submarine-launched cruise missiles in order to penetrate the air defenses of a carrier task force, and that 12 to 15 hits with conventional torpedoes would be required to sink an aircraft carrier. In a nuclear conflict, one writer noted, three SSNs--each armed with three torpedoes with nuclear warheads--would be needed to destroy a carrier group consisting of one strike carrier, an antiaircraft guided missile cruiser, and escorts. If submarines were unavailable against this group, he noted, the equivalent number of airplanes would be two regiments--more than 40 aircraft--equipped with air-to-surface missiles, six of which would have nuclear warheads.

Some submarines probably would be positioned where they could attack a variety of targets, especially those in the Norwegian Sea and in the Greenland-Iceland-United Kingdom (G-I-UK) gap. Others could conduct attacks on shipping as targets of opportunity while waiting for NATO naval forces to cross their path or after completing primary missions, such as attacking carriers.

Operational Availability. The low operational availability of their submarines also would impact on

Soviet capabilities to carry out an interdiction campaign. This low availability stems from poor quality control and inefficiencies in the design, production and maintenance of the submarines; from block obsolescence of part of the force; and from the expansion of the submarine fleet--with emphasis on SSBNs--at a faster rate than facilities and trained personnel have been prepared for their repair.

Based on empirical evidence, we estimate that in an emergency some 60 percent of the submarine fleet could conduct operations with varying degrees of combat effectiveness. The Soviets would find it difficult to sustain the initial level of deployment, not only because of combat attrition, but also because the increased use of the submarines could lead to more of the materiel failures that have plagued their submarines in the past.

Torpedo Reloads. Another limiting factor would be the small number of torpedoes carried by some classes of Soviet submarines. Cruise missile-armed units, in particular, would be limited in carrying out a secondary, antishipping, role because of the few torpedoes that they evidently carry.* In addition, all deployed Soviet

*See Annex D.

submarines, regardless of class, apparently carry as part of their load at least two nuclear torpedoes and some ASW torpedoes.

In a long conventional conflict, the Soviets probably could not rearm their submarines without returning them to home waters, which in the Atlantic would force them to exit and return through chokepoints where they probably would be subject to heavy attrition.

The Soviets have not stockpiled naval weapons near the Atlantic sea lanes. They do have a fleet of submarine tenders and missile support ships which could transfer torpedoes at open anchorages and cruise missiles at sheltered anchorages and in port. If operated outside Soviet-controlled waters in wartime, however, these resupply ships would be vulnerable to attack, and the Soviets probably would not count heavily on them for replenishment.

Weapons Effectiveness. Soviet weapons reliability apparently would not be a seriously limiting factor. Tests performed on recovered Soviet torpedoes suggest that they are technically reliable (about .85).

Weapons reliability, however, is only one of several factors that figure in the "kill" rate for torpedo attacks, and the others tend to degrade Soviet

capabilities. Even though the Soviets appear to be fairly proficient in their routine torpedo firing exercises, their exercises usually lack realism, and typically occur against unprotected, straight-running ships. When target protection is expected, Soviet submarines usually fire from outside the escort screen at long ranges--often 10,000 yards. Together with the few available writings on attacking surface ships with torpedoes, this firing practice suggests that they plan on firing outside a convoy's screen in wartime--a practice which would seriously reduce accuracy.

Primarily because of this practice, the Soviet hit rate in wartime probably would be low. In Western navies there evidently would be about a .5 probability that a single non-homing torpedo would hit a straight-running surface ship at 2,000 yards. (Most Soviet antiship torpedoes lack a homing capability.) This level of proficiency would drop quickly against a fast-moving, maneuvering target protected by escorts. An increase in distance generally is the most important factor in reducing accuracy. Accordingly, we estimate the Soviet hit rate in wartime at no better than about 25 percent for each torpedo fired (.85 technical reliability times an optimistic .3 probability of hitting the target).

The Soviets might be diverted into firing some torpedoes against escorts--fast, highly maneuverable, shallow draft ships that would make difficult targets. They probably have high respect for Western ASW ships. On occasion, their submarines have been matched against such ships and have found it difficult to escape once they were detected. Operational experience, such as that gained by E-II- and F-class submarines recently in the Mediterranean, probably reinforces the Soviet preference for attacking surface ships from long distances.

Difficulties in discriminating between merchant ships carrying important military equipment and those loaded with routine commercial cargoes would also reduce effectiveness. Soviet writings stress the importance of target selectivity, without indicating how it is to be accomplished. Submarines are poor reconnaissance platforms; the major sea lanes are crowded with ships; and measures could be taken by NATO that would complicate target discrimination further.

Submarines Committed to Interdiction. Despite the high priority and heavy requirements of strategic defense and the difficulties inherent in a large-scale

interdiction campaign, the Soviets probably would assign some submarines to attack shipping from the outset of hostilities. They apparently believe that a relatively small commitment of submarines against shipping could draw off a disproportionate number of enemy naval forces from combat with important Soviet fleet components, particularly SSBNs. Moreover, by threatening merchant shipping, they expect to force NATO to adopt convoying, the inefficiencies of which by themselves could reduce the effectiveness of shipping by some 20 percent in Soviet estimates.*

The number of submarines earmarked for interdiction is unknown. In the initial stages of a war, however, we believe that the total would be not more than about 10 percent of those operationally available because of other force commitments. Many cruise missile-equipped submarines evidently would be positioned away from the major sea lanes and in the principal avenues of approach to the USSR to defend against raids by carrier strike forces; those deployed near the sea lanes might be prohibited from attacking targets other than carriers. The more capable ASW submarines (the V-class) probably

*Both Adm. Doenitz and Winston Churchill estimated that 33 percent of British tonnage was wasted during World War II because of defensive measures made necessary by the U-boat threat.

would be seeking Western SSBNs and protecting Soviet ones; and some of the remainder would be conducting barrier operations. If so, relatively few submarines --mostly N-class SSNs and long-range diesels--would be in the major sea lanes, assigned to engage merchant ships.

Torpedo Launch Capacity in the Sea Lanes. Assuming that the Soviets gave at-sea interdiction the same priority as that accorded ASW and anticarrier warfare, they could assign 21 long-range torpedo attack submarines (33 percent of the inventory of general purpose submarines in the Northern Fleet at 60 percent availability) to interdict shipping in the Northern Atlantic. Over a 120-day period, these submarines under favorable operating conditions could sink or disable some 100 merchant ships, or about one percent of NATO-flag shipping. Additional merchant ships flying Panamanian and Liberian flags of convenience probably also would be available for sealift if necessary.*

After the first interdiction patrol Soviet capabilities could be expected to decline, unless more

*These numbers were derived from a set of assumptions which included: .2 attrition of force per submarine patrol evolution; each submarine withholds two torpedoes for self-protection; all others are expended against merchant ships; necessary on-station time is 15 days; .85 technical reliability for Soviet torpedoes; .3 probability of a hit per single firing; one hit is sufficient to disable a target. See Annex F for additional discussion.

submarines subsequently were given merchant ships as their principal targets. To replenish their torpedo loads, the submarines would have to pass through the Greenland-Iceland-United Kingdom gap where they probably would be especially vulnerable to attrition from NATO ASW forces. Once rearmed, they would have to return through the gap. In addition, the increased demands placed on the older submarines likely to be used in an interdiction campaign--combined with minimal time in port for replenishment and maintenance--probably would result in significant materiel failures, which would seriously reduce the submarines' combat effectiveness and/or lengthen time between patrols.

How much time Soviet submariners plan to spend in the sea lanes per patrol is unknown, but a rule of thumb that the Soviets seem to accept implicitly comes from the German experience during World War II when the Germans--operating new submarines from forward bases in France and Norway--were unable to keep more than one-third of their force at a time on station; from the USSR's distant bases in the Northern Fleet less time could be spent on station.

Deploying out of Northern Fleet bases at the high average speed of 12 knots, Soviet nuclear-powered submarines would spend nearly 15 days in transit to and from the sea lanes, while diesels averaging five knots would spend 35 days in transit.* If no actions were taken to inhibit the operation of Soviet ocean reconnaissance systems, the Soviets probably would be more limited by the number of torpedoes they carried than by the endurance of their submarines. Without help in finding targets, however, particularly if they intend to be as selective as their writings imply, patrols by diesel submarines might be limited by the endurance of platform and crew.

The estimate of turnaround time is also based on the German experience. The Germans averaged more than three weeks between patrols. If the Soviets spent a like amount of time between patrols, their nuclear submarines could operate on the sea lanes about 40 percent of the time, and their diesel submarines about 30 percent. In a long campaign, additional time would also be required for extended maintenance--an area characterized by poor Soviet performance in peacetime. (The Germans--using newer, simpler submarines--found it necessary to make extensive repairs after seven or eight patrols.)

**This calculation assumes that the submarines travel to an area in the North Atlantic, some 2,100 nm from their Kola Gulf bases.*

To ensure that our estimates of Soviet capabilities were not unrealistically low, our calculations credit the Soviets with the same level of efficiency in turning their submarines around as that obtained in World War II by the Germans and, generally, by the US in the Pacific.

Annex F, with the help of a model, discusses alternative interdiction scenarios in more detail.

## Capability of ASM-Equipped Aircraft

Naval Aviation. Soviet Naval Aviation (SNA)--the primary Soviet air force that would be involved in antiship attacks--is not well suited for interdicting most of the Western sea lines of communication. Soviet naval ASM-equipped aircraft have relatively short combat radii, which rule out their use in antiship attacks over most of the major sea lanes in the North Atlantic.* They do have some capability near the United Kingdom but ground-based air defenses make strikes there particularly hazardous.

SNA has some 310 ASM-equipped aircraft assigned to the four Soviet fleets.** Most of these aircraft are aging medium-range TU-16 Badgers, which

*See map on page ____.
**See table on page ____.

## Maximum Combat Radii of Naval ASM-Equipped Aircraft Under Optimum Conditions*

| | Weapon Load | Unrefueled Radius | Radius with One Pre-Strike Refueling |
|---|---|---|---|
| Badger C | 1 AS-2 | 1,450 nm | 2,050 nm |
| Modified Badger C | 2 AS-6 | 1,050 nm | 1,600 nm |
| Badger G | 2 AS-5 | 1,150 nm | 1,850 nm |
| Backfire | 1 AS-4** | 1,750-2,075 nm*** | 2,700-3,100 nm **** |

*These radii apply only to flight profiles optimized for maximum range, and they should be considered upper bounds. Such flight profiles allow only for a minimum fuel reserve, and they do not allow for loitering, low-altitude flight, high speed, or combat maneuvering.

**The Backfire can carry two, possibly three, ASMs but only with significant reduction in combat radius.

[redacted]

****Naval Aviation currently has no tanker force to support Backfire operations. However, there is some evidence that the Soviets are developing a tanker aircraft which could support the Backfire. With one pre-strike refueling under optimum conditions the Backfire radius could be improved by as much as 50 percent for some missions.



[redacted]

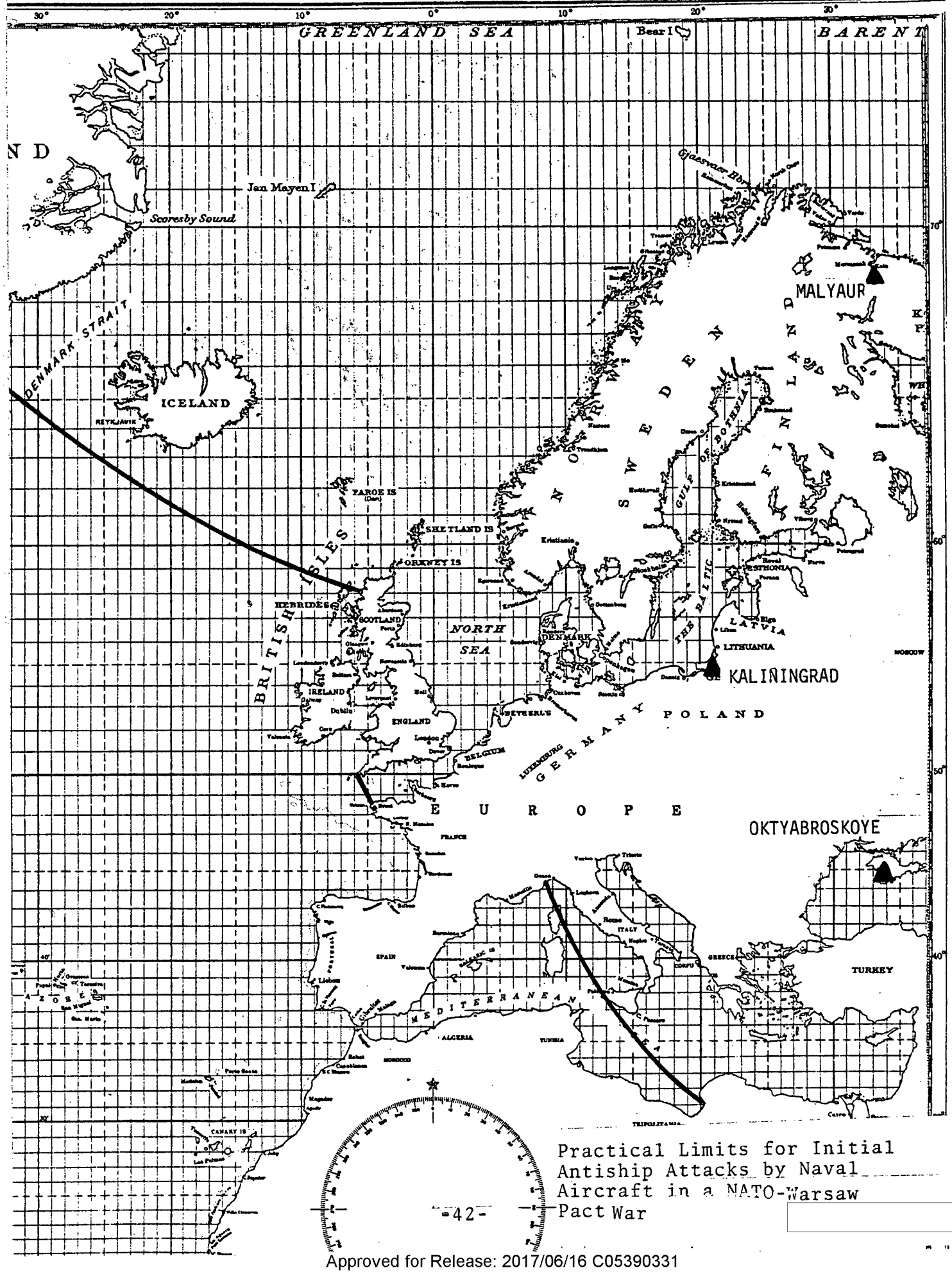


[redacted]

are especially vulernable to modern air defenses. About 67 Badger tanker aircraft are assigned to Badger strike regiments for refueling support. The supersonic Backfire bomber was first introduced into SNA in late 1974, and about 35 of these aircraft are now operational in the Baltic and Black Sea Fleets.

Some 200 ASM-equipped Backfires probably will be in naval service in the mid- to late 1980s. The Backfire can fly to greater distances than the Badger, and it is better able to penetrate air defenses because of its high speed and low-altitude flight capabilities.

The map on page ____ shows the practical limits for at least initial antiship attacks by naval aircraft in a NATO-Warsaw Pact war. Antiship attacks to the maximum combat radius shown in the table on page ____ would be virtually impossible because of the requirement to penetrate Western land-based and fleet air defenses. Unless Western air defenses had been eliminated early in the war, Soviet mission planners would have to allow adequate fuel for combat maneuvering, high speeds, and indirect routing and low-altitude flight to avoid detection and improve the survivability of the aircraft. These factors would reduce considerably the range at which antiship attacks could be conducted.




Practical Limits for Initial Antiship Attacks by Naval Aircraft in a NATO-Warsaw Pact War

# Practical Limits for Initial Antiship Attacks by Naval Aircraft in a NATO-Warsaw Pact War

## Rationale

1. Limits are based on the performance of the Backfire bomber--the most capable naval strike aircraft--armed with a single AS-4 ASM.*
2. Flights originate from forward naval airfields in the USSR or from airfields in other Warsaw Pact countries.
3. Flight routes are selected to avoid or minimize overflying Western land-based air defenses.
4. Strike missions are based on the following Hi-Lo-Hi-Lo-Hi flight profile, except for areas in which the aircraft encounters extensive land-based air defenses for most of the flight:
   - -- The aircraft initially flies at its most efficient cruise altitude and speeds.
   - -- As the aircraft approaches the intended target, it descends to low altitude for 200 nm to avoid detection.

*The performance characteristics used here are based on CIA's appraisal of the Backfire

-- The aircraft then climbs to high altitude to launch its AS-4 missile

-- After missile launch the aircraft reverses course and descends to low altitude to escape.

-- After 200 nm at low altitude, the aircraft climbs to its most efficient cruise altitude and returns to its base.

5. For areas where the aircraft confronts extensive land-based air defenses--such as the Baltic and Eastern Mediterranean regions--the aircraft is assumed to fly at low altitude for most or all of its mission.

6. Backfires do not fly at supersonic speeds. Use of this tactic would reduce combat radius.

7. Backfires do not refuel in flight. Naval Aviation currently has no tanker force to support Backfire operations. However, there is some evidence that the Soviets are developing a tanker aircraft whith could support the Backfire. With refueling in the Norwegian Sea, the Backfire range limits for antiship attacks could be extended several hundred miles into the North Atlantic, depending on where

the aircraft was refueled. Refueling in the Baltic and Mediterranean regions is not considered feasible --except over friendly territory--because of the hostile air defense environment.

8. The Backfire aerodynamic design is assumed to be optimized for subsonic flight. A less efficient design would reduce the combat radius by some 15 percent.

## Soviet Order of Battle of Naval ASM-Equipped Aircraft, January 1978

| | Northern Fleet | Baltic Fleet | Black Sea Fleet | Pacific Fleet | Total |
|---|---|---|---|---|---|
| Backfire | -- | 14 | 20 | -- | 34 |
| Badger C* | 33 | 21 | 22 | 23 | 99 |
| Modified Badger C* | 33 | 21 | 23 | 23 | 100 |
| Badger G | -- | 22 | 10 | 45 | 77 |
| Total | 66 | 78 | 75 | 91 | 310 |

**The size of the Badger C modification program is unknown. It is assumed arbitrarily that one half of the Badger Cs have been modified thus far.*

The areas shown on the map are keyed to the capabilities of the Backfire, but some attacks by Badgers --with aerial refueling--also would be possible at the outer reaches. Badger strikes at long ranges would be limited by the dearth of tanker aircraft and their small fuel transfer capacity. Only about six tanker aircraft are attached to each strike regiment to support some 25 strike and ECM aircraft. The Soviets thus far have not pooled naval tankers from several regiments to support large strike formations.

Long-Range Aviation. Antiship attack is a secondary mission of the LRA. Some LRA aircraft usually participate in major naval exercises, and they practice reconnaissance and antiship strikes. The intermediate range bombers, similar in type to those of Soviet Naval Aviation, could perform antiship strikes in the nearer reaches of those areas shown on the map on page ____. Only about 10 tankers are available in LRA for refueling the intermediate range bombers. Of some 190 heavy

bombers in the LRA, 70 TU-95 Bear bombers are equipped with ASMs. Attacks by these aircraft would be limited to nuclear strikes since the AS-3 missiles they carry were designed for use against large-area targets rather than for direct hits on ships.

Capability of Surface Ships

The capability of Soviet surface combatants to interdict sea lines of communication is restricted, not only by the primacy accorded to such other missions as ASW, but also by the risks inherent in any attempt to operate in open ocean areas. Of particular importance is the vulnerability of such vessels to NATO air power, both carrier- and land-based, when operating in areas beyond the range of Soviet air support. The Soviets are well aware of the vulnerability of their surface ships. In his critique of a 1970 exercise, Marshal Yakubovskiy, then Commander in Chief of Warsaw Pact Forces, cautioned naval planners that they could not count on using their surface ships against Western carriers in the Mediterranean after the second day of hostilities.

Another drawback for the Soviets in using surface combatants for interdiction would be their inability to provide adequate logistic support. In the Atlantic, Soviet combatants would either have to return to Northern Fleet bases for replenishment, or rely on logistic support ships deploying from such bases. In either case, they would have to transit from the Norwegian Sea during which they would be highly vulnerable to attack from Western aircraft and attack submarines. Soviet support ships would be subject to very heavy attrition. They are poorly armed and too slow to keep up with Soviet warships. Moreover, they have little capability for providing warships with underway replenishment of munitions. In addition, most Soviet surface combatants are equipped with missiles which are designed primarily for ASW and air defense rather than for use against other surface vessels.

In any case, Soviet writers do not regard surface ships as important strike platforms against merchant ships, except in coastal waters. Rather, they regard surface ships as important for defending the sea approaches to the USSR, their own shipping, and safeguarding the passage of their submarines to and from operational waters. Other writers also have said that surface

ships could be one means of keeping slow-moving convoys "continuously under observation." We believe it unlikely that they effectively could use surface ships for surveillance after the outbreak of hostilities, however, unless such operations took place in areas where the Soviets had air superiority.

NATO Sealift Resources. A major Soviet interdiction campaign at sea probably would founder on one of the same problems that plagued the U-boats: the large number of merchant ships available to the West. Western commerce rides on the keels of thousands of ships.* Moreover, construction of merchant ships--and the consequent potential replenishment of the merchant ship inventory--is high: Lloyd's Register of Shipping reported that over 1,000 merchant ships, totalling nearly 30 million tons, were constructed in

**According to Lloyd's, in 1976 there were over 9,600 NATO-flag merchant ships displacing over 1,000 tons. A recent study by Headquarters, US Command in Europe, concluded that, of these, over 5,000 would be suitable for sealift of supplies and materiel to Europe. Additional Western-owned merchant ships flying Panamanian and Liberian flags of convenience also would be available for sealift if necessary. An older study estimated that about 11,500 merchant ships could be used for the resupply of NATO Europe.*

the Free World in 1976. Down four million tons from the peak 1975 level, the 1976 output of merchant ships is expected to be followed by further reductions as a result of overbuilding in the early 1970s, economic recession, and a lessening of demand for new tankers.* These figures, nonetheless, indicate a formidable capacity to replace losses for shipping.

The Soviets emphasize the importance of target selectivity--probably reflecting an awareness that it would be difficult otherwise to achieve much impact on thousands of ships. In practice, however, distinguishing ships carrying military cargoes bound for NATO forces in Western Europe from the large number of ships loaded commercially would be difficult--some 3,200 Free World merchant ships are estimated to ply the sea lanes of the North Atlantic on a typical day. Time consumed in the target selection process itself also could reduce the effectiveness of Soviet at-sea interdiction operations.

US Plans for the Resupply of NATO

The size of a likely US resupply effort, while providing numerous targets for Soviet submarines, would

*See ER 77-1068, November 1977 (Unclassified), for details.

work against a Soviet interdiction campaign. US plans for resupplying NATO in a conventional war assume a large scale of support shipping that increases steadily during the war.

Convoys totaling approximately 350 ships could be enroute to Europe during the first 30 days of hostilities. During the next 30 days, more than 500 additional ships would probably depart for Europe. US projections for later phases of the war assume that over 1,100 additional ships sail for Europe, for a total of 2,000 ships with military cargoes in the first 120 days of war.

By the early 1980s, the pool of shipping committed to the resupply of Europe is expected to be increased substantially by additional allocations of West European ships. To reduce this pool appreciably (by say 25 percent) the Soviets first would have to identify the ships carrying military cargoes among the thousands of those loaded commercially, and then maintain large, continuously deployed strike forces in the sea lanes. We believe that present Soviet forces clearly are inadequate to accomplish these tasks.

## Part III - Outlook

Contemporary documentation, exercises, and naval force trends do not indicate that there is likely to be a militarily significant increase either in Soviet willingness to allocate forces to the interdiction mission, or in the interdiction capabilities of the forces themselves for at least the next five to 10 years. This judgment is predicated on:

--The continuing threat of strong Western SSBN and carrier strike forces capable of attacking targets in the USSR with nuclear weapons which requires the Soviets to commit strong forces in counteraction.

--Maintenance of strong NATO air defenses that could and probably would deny Soviet aircraft free access to the sea lanes in wartime.

A key element in deterring the Soviets from fully exploiting Western dependence on long sea lines of communication is the credibility of the

carrier and SSBN threats to the USSR. The specter of US carrier task groups in areas such as the Norwegian Sea and the eastern Mediterranean would almost certainly continue to cause the Soviets to assign large forces in those areas--well away from the major sea lanes. On the other hand, should the West in wartime position high-value targets like carriers on the major shipping routes, Soviet naval strike forces would tend to be attracted to these targets and could threaten Western convoys with heavy attacks.

Soviet ASW forces have little capability against US SSBNs. To improve their antisubmarine defenses, the Soviets first would have to enlarge their ASW forces and solve the difficult problems of detecting and classifying contacts. This raises the possibility that the Soviets, confronted with persistent failure, might reorder their submarine force allocations to take advantage of easier targets, including merchant ships. All of the available evidence, however, suggests that, while the Soviets recognize their deficiencies in ASW, they have chosen to intensify their efforts in this area. Further, they could not easily change course because of the design and construction lead times required and because of their considerable investment in present forces.

A reallocation of Soviet naval forces to increase the effort against Western sea lines of communication probably would depend on the outcome of the initial battles at sea--and on land. If NATO successfully checks the Pact advance in Central Europe and if the war is prolonged, Soviet interest in interdiction probably would increase because cutting the sea lanes--particularly in waters adjacent to a theater of military operations--could then affect the outcome of the war. This would be particularly true if attrition or Western strategy reduced the threat from aircraft carriers, thereby freeing more forces to attack merchant ships. If the war in Europe were stalemated and Western task forces remained largely intact, however, the Soviets would face a hard choice: whether to try to interrupt the US resupply of Europe, or to continue to concentrate their remaining naval forces against SSBNs and carriers. The Soviet propensity to assign higher priority to military targets leads us to conclude that under these circumstances the Soviets would continue to concentrate most of their efforts against NATO's offensive naval forces. Should they elect to send most of their surviving attack submarines and ASM aircraft against merchant ships, however, they

would leave highly mobile Western attack carrier forces free to strike important Pact ground and naval targets.

Faced with a choice between attacking carriers and merchant ships, the Soviets evidently would solve the dilemma by directing other forces against what they regard as shipping's most vulnerable point--ports of embarkation and destination--by mining harbor entrances and systematically attacking the ports with bombs and missiles. Soviet capabilities against US ports, however, probably would be limited in the conventional and limited nuclear phases of war.

ANNEX A

## The Role of Interdiction in Nuclear War: Soviet Military Viewpoint*

In classified articles written in the late 1960s, the then chief of the Soviet General Staff, Marshal Zakharov, and his deputy for operations, Colonel General Povaliy--the two men who would be most closely involved in planning, coordinating, and executing Soviet military operations in wartime--laid down the basic principles of how the Soviets then expected to fight a modern war.**

Both men regarded interdiction as secondary to the performance of strategic missions, except possibly in the final stage of a nuclear war. They believed that some attacks on merchant shipping, however, should be performed concurrently with strategic missions from the outset of hostilities.

*This annex is based on a much larger volume of material than that directly cited. The Povaliy and Zakharov articles are highlighted because, although dated, they are the most authoritative and detailed articles available which discuss interdiction within the phased development of a general war, beginning with conventional hostilities and progressing through a limited nuclear period to full nuclear war. The limited, relevant writings presently available which postdate these articles have remained consistent with the principles expressed by Povaliy and Zakharov.

**The General Staff, referred to in the USSR as the "military brain" of the Soviet State, would be the executive agency for the Stavka in war. Within the General Staff, the Main Operations Directorate is an elite group responsible for operations planning and control, the performance of strategic targeting, and--with others--the formulation of military strategy. Povaliy served as head of the operations directorate from 1963 to 1970.

A key objective of their articles apparently was to promulgate changes in Soviet strategy relating to a broader range of conflict possibilities than were incorporated in Soviet strategy when Khrushchev was in power.

Povaliy wrote that by the mid-1960s the US and USSR each had the means to apply military force "in various sequences and in any desired combination, depending on the military-political situation." This statement acknowledged Soviet awareness of the need for a "flexible response" doctrine. The Soviet view of that doctrine, however, differed from the US interpretation in several important ways: the conventional phase of a war was held to be brief, lasting from hours to a few days if war began in Europe, and not much longer if it had its origins in a secondary theater. The possible limited nuclear period--as well as the decisive nuclear period--also were expected to be brief. Both Povaliy and Zakharov indicated that wars fought with only conventional or tactical nuclear weapons were possible, but neither man "nourished any illusions" regarding the feasibility of limiting

a war with NATO because, according to Zakharov, "the losing side will begin ceaselessly building up its strike to restore the situation."

Zakharov wrote that in the conventional and limited nuclear phases of war the "main effort...[would] be... to inflict maximum destruction on the enemy, especially on his nuclear groupings...." The Navy, with help from the Long Range Aviation, would concentrate its efforts against enemy submarines and aircraft carriers. These brief, opening phases of war were important because they helped "set the stage" for the subsequent use of strategic nuclear weapons.

Zakharov and Povaliy believed that the period of warfare following a nuclear exchange could be protracted, unlike the earlier, decisive stages; that military operations at this time would be conducted mainly by surviving general purpose forces; and that naval forces, because they could be dispersed, would survive in significant numbers to play an important role in this period.

According to Warsaw Pact lecture notes on strategy for war in Europe, residual naval forces in the final stage of war would:

-- deliver strikes against coastal and theater targets;

-- complete the destruction of fleet strike forces;

-- interdict enemy sea communications; and

-- render aid to fronts by conducting amphibious landings, seizing straits, and supporting their own shipping.

Other classified Warsaw Pact and Soviet writings have provided varying views on how a NATO-Pact war might develop. They have differed mainly over whether there would be a limited nuclear phase, and--less frequently --over whether a lengthy conventional phase is possible. The authors assume that war could begin either with a surprise attack, using nuclear or conventional weapons, or after a period of rising tension.

All of the writings emphasize that the major objective of the conventional phase would be to destroy the enemy's nuclear-capable forces--SSBNs, carriers, forward-deployed tactical nuclear weapons and storage areas, and shore-based facilities which support enemy SSBN and ASW operations.

Should a "limited" nuclear phase occur, naval writers argue that their tactical forces should launch immediately all of their nuclear weapons--including SLBMs with yields

of less than one megaton--against high-priority enemy naval targets and some land targets. Land targets discussed include airfields, tactical nuclear weapons sites, storage facilities, naval bases, and harbors. Population centers and "strategic shore installations" (undefined) would be excluded from these attacks.

The Soviets, clearly believing that the first strategic nuclear strike would be the decisive act of the war, indicate that they would conduct nuclear operations during any conventional or limited/phases as if the transition to nuclear war could occur at any time. They acknowledge that the requirement to prepare for both kinds of war entails demands which reduce the effectiveness of general purpose naval forces for either kind of war.

Evidence of Internal Debate

Since the early 1960s, some Soviet writers have argued that the naval command was either paying too little or too much attention to interdiction. Briefly, writers who believed open-ocean interdiction operations were not important stressed:

-- Disruption of shipping by attacking land targets. Reaffirming this view, Admiral

Gorshkov in his 1976 book, Sea Power of the State, stated that the character of interdiction operations has changed and that interdiction is now subsumed in the "overall system of naval operations against the shore."

-- Concentration on strategic missions. Most Soviet writers appear to believe that in a general war oceans should no longer be viewed as an arena of action against shipping, but rather as a vast operating area for sea-based nuclear strike forces.

-- The power of nuclear strikes and fast pace of modern war. These factors render large scale shipments across the sea largely unnecessary.

-- Effect of stockpiling. NATO dependence on the sea lanes, some argue, has been reduced by stockpiling supplies and equipment in Europe and by the development of capability to airlift "minimum consumables."

-- Irrelevance of interdiction in a nuclear conflict. The sheer devastation of nuclear

war, in this view, would make interdiction irrelevant. Not only military forces, but also millions of people and thousands of industrial enterprises--all consumers of supplies, finished products, and raw materials--would disappear.

-- Enhanced submarine capabilities for other missions. In the past, their then limited endurance and slow speed made submarines comparatively ineffective against warships, according to some writers, who argue that today submarines are "totally adequate" for attacking the main battle forces of enemy navies.

-- The indecisive character of interdiction. Almost all naval officers, including Gorshkov, who have written about interdiction, consider that it alone could not determine the outcome of a war.

On the other hand, arguments stressing the importance of interdiction* emphasize:

*These statements are not confined to our definition of interdiction as being limited to at-sea operations but are from the more general Soviet expression which would include blockade by mining, and destruction of ports. They also could include damage to land transportation, storage facilities and defense industries.

-- The enormous logistic requirements of fighting a modern war with conventional arms.

-- The utility of interdiction operations in facilitating the attainment of other war objectives. Although not "decisive" in itself, several authors write that interdiction contributes to victory by "undermining a country's military-economic potential...[by] depriving the enemy of freedom of operation in specific areas of the ocean," and by forcing a diversion of enemy naval resources.

-- Improvements in capabilities to conduct interdiction operations. Technical improvements to submarines, submarine armament and ocean surveillance systems would make a modern interdiction campaign more effective than heretofore. Convoying would no longer suffice to protect merchant ships, according to some naval officers, because modern submarine-launched torpedoes and cruise missiles have sufficient range to be fired from outside a convoy's defense perimenter.

-- Nuclear war could be protracted. Were nuclear war protracted, it would require additional merchant shipping to offset large-scale losses in Europe. Moreover, one writer observed that a NATO-Warsaw Pact war need not be nuclear inasmuch as chemical and biological weapons were available to belligerents in World War II, but were not employed on a mass scale in that war.

We believe that the authoritative Soviet view is that contained in writings, such as the Povaliy and Zakharov articles, and General Staff planning documents. These indicate that interdiction is a mission of the Soviet Navy, but that it is less critical than defeat of enemy nuclear strike forces, particularly in the opening phases of war.

ANNEX B

## Interpretations of Soviet Naval Exercise Activity

Soviet naval exercises involving merchant ships and convoy-type activity have been rare but some recent occurrences have evoked considerable interest and debate among intelligence analysts. Interest focused especially on the activity in Okean-75 (a major exercise which took place in April 1975 involving air, submarine, surface, and reconnaissance forces of all four Soviet fleets) and, to a lesser extent, on annual exercises involving amphibious forces.

### Okean-75

The first major Soviet naval exercise that involved merchant ships, Okean-75 has been cited by analysts as a demonstration of Soviet intent to interdict Western maritime communications in wartime. This annex summarizes the arguments of those who hold that Okean-75 provides evidence which supports or refutes that interpretation.

Some 200 surface ships, divided into 11 task forces, participated in the exercise, which took place in April 1975. The activity of four of the task forces was sufficiently ambiguous to raise concern that some or all of them represented targets for other forces practicing attacks against merchant shipping. Contributing to this supposition, two of the task forces--one in the North Pacific and one in the Barents Sea--included merchant ships.

Merchant Ship Participation. The task force in the North Pacific consisted of four naval ships and four cargo ships. An intelligence ship, the Izmeritel', trailed the group as it moved from an area east of Japan northward toward Kamchatka. This formation has been assessed variously as a simulated Western carrier task force and as a merchant ship convoy. The formation was supported by ASW aircraft and was stalked either by a C-class nuclear-powered cruise missile submarine--which would tend to support the carrier task force hypothesis--or by a V-class submarine, a modern torpedo attack unit which is thought to be

primarily assigned ASW missions but which could be used also against carriers or merchant convoys.

Another task force operated primarily in the Barents Sea and was composed of seven merchant ships and four naval ships. The presence of a tank landing ship in this group suggests that it represented a hostile amphibious task force, consistent with past exercise activity in this area. The steaming formation for this group--with the combatants traveling in a forward screen, and the LST singled out for special protection--supports this conclusion. Moreover, the ships in this group were attacked repeatedly by waves of aircraft equipped with air-to-surface missiles, but apparently attracted little attention from submarines.

The actual role played by the merchant ships is unclear. The following page lists the arguments that can be made both for and against the thesis that the involvement of merchant ships in Okean-75 demonstrated that Moscow gives high priority to interdiction of Western shipping.

## Merchant Ship Participation in Okean-75: Two Views

| Interdiction Was Given High Priority | Interdiction Was Given Little Priority |
|---|---|
| Merchant ships participated in convoy exercises. | Merchant ships may have represented warships or troop ships. |
| The intelligence collection ship Izmeritel' may have been a member of the convoy in the Northern Pacific for at least part of the exercise.* | The Izmeritel', in trailing the Northern Pacific group, probably was acting as a "tattletale," a common Soviet tactic whereby a ship shadows a carrier task force in order to provide targeting information for strike aircraft and cruise missile submarines and surface ships.* |
| Convoys moved at slow speeds more typical of merchant ships than of naval task forces. | The Barents Sea group apparently simulated passage through a minefield, which would have slowed its progress. |
| Convoy maneuvers were more typical of merchant ships seeking to evade attack by submarines than of a naval task force. | |
| | The exercises both in the Barents Sea and in the North Pacific took place relatively close to the USSR rather than in major sea lanes between the US and its NATO allies and Japan. |
| Since only a small percentage (e.g., 12 percent in the Northern Fleet) of available naval surface ships participated in Okean-75, it seems unlikely that the Soviets would have had to divert cargo ships, as they did, simply to provide additional targets for surveillance systems and aircraft. | |
| | Both groups were subjected to repeated simulated attacks by ASM-equipped aircraft, primarily TU-16 Badgers which, with one refueling, would barely have the range to reach the sea lanes between the US and Europe. The intensity of the ASM attacks exceeded what probably would be necessary to interdict merchant ships. The ASM strikes against the North Pacific group took place at the same time as those against more obvious simulated carrier task forces. |
| | No attempt was made to protect the merchant ships by placing them in the center of the convoys, as would have been expected if the ships were simulating wartime convoys to provide realistic targets for interdiction. |

**Alternatively, the Izmeritel' may have functioned as an exercise referee.*

Operations Off Africa. During Okean-75 the Soviets also operated in the merchant shipping lanes between the Indian Ocean and Western Europe. At least two submarines were deployed from the Mediterranean to an area west of Africa near the Canary Islands, where they may have established a barrier patrol. About the same time, a destroyer and an oceanographic ship, which had been located west of Africa, began moving northward. The roles played by these ships are unclear. One interpretation is that they were simulating oil tankers enroute to Western Europe. Another is that they joined a tank landing ship operating in the same area and simulated an amphibious task force. The ships eventually reached the area where the submarines were located, but we do not know whether the submarines simulated attacks against them. Soviet reconnaissance aircraft using Guinean airfields frequently flew over the ships and could have updated their position for the submarines,

Also unclear was the role of a group of surface ships consisting of about four major combatants and seven hydrographic ships that operated together northeast of the Azores. The suspected presence of Soviet submarines nearby and the group's steaming formation--in four rows with the hydrographic ships in the center two--suggest that the group may have portrayed a US convoy or amphibious task group enroute to Europe. This group was subjected to regular reconnaissance by Soviet aircraft and to simulated air and submarine attacks. The lack of positive movement toward Western Europe could argue against this group's simulating a convoy. However, in fact they were simulating a "convoy," a term that in the Soviet usage can include naval auxiliaries and amphibious ships as well as merchant ships. ship was "torpedoed" and that two F-class submarines were in the general area.

This case represents the least ambiguous example and its purpose may indeed have been to practice anti-convoy tactics. Even so,

it also could have represented a troop transfer movement--a class of targets which the Soviets have clearly indicated has high priority for interdiction and which probably falls within the "some attacks on shipping" category that Marshal Zakharov noted should be conducted (see page A-2).

On balance, we believe that the two formations involving merchant ships probably simulated naval task forces. In the early stages of the exercise, the merchant ships in the Barents group most likely were intended initially to give the Soviet Navy practice in protecting coastal shipping or their own amphibious task groups. Subsequently, this group probably represented a Western amphibious landing force attacking the homeland. The group in the North Pacific probably simulated an attacking Western force of naval combatants.

The activity west of Africa and north of the Azores is more difficult to interpret. Either or both of these could have served as merchant convoys as well as targets for ocean surveillance. If they were convoy-associated, the submarines apparently targeted against these groups--

at least four diesels--would represent about 10 percent of all attack submarines deployed for Okean.

Most of the events in Okean-75 could simply represent an exercise of fundamental naval skills: reconnaissance, intercept and attack by the offensive forces, and escort and evasion tactics by the defending forces. We would expect to see some antishipping activity in a multifleet exercise the scale of Okean-75. Because interdiction of the sea lanes is a mission of the Soviet Navy, there would be a requirement to practice tactics.

On the defensive side, the Soviets have an increasing need to defend their merchant ships as their merchant fleet expands its operations. The Soviets conduct extensive shipping between Soviet ports--which in 1975 accounted for 78 million tons of cargo--and also with East European ports. In wartime, this and other Soviet shipping would require naval escort. The Soviets also routinely co-opt merchant ships for naval operations. Together with amphibious ships, merchant ships also often are used to carry equipment for the ground forces. They regard protection of their own sea lines of communication as important, particularly in the northern and far eastern areas of the USSR where roads are bad or nonexistent. In the Far East,

where Soviet military operations would depend heavily on easily interdicted rail lines, they could believe that moving military supplies by ship would be important for supporting sustained combat against the Chinese. Thus, the participation of merchant ships in Okean-75 need not indicate a change in the priority of Soviet naval missions.

Amphibious Landing Exercises

Since 1965, the Soviets annually have conducted amphibious landing operations in the Northern Fleet area, which meet some of the US criteria for a convoy (see definition). These operations have provided the Soviets with ancillary opportunities to exercise convoy techniques and anti-convoy tactics. Defended by a screen of warships, the main body of the task forces in the exercises usually has consisted of relatively defenseless ships (often including merchantmen) and (about half of the time) a major surface combatant probably simulating an aircraft carrier. These ships are subjected to simulated

Definition of a Convoy

A number of merchant ships or naval auxiliaries, or both, usually escorted by warships and/or aircraft or a single merchant ship or naval auxiliary under surface escort, assembled and organized for purpose of passage together.

--JCS Dictionary of US Military Terms for Joint Usage, 1974

missile and torpedo attack by Soviet military forces. Because the primary purpose of the exercises is to provide training in conducting and countering amphibious landings, they usually take place in local Soviet waters, which would limit the utility of the exercises as training for interdiction in the open ocean. The composition of the screening forces--mostly coastal patrol and destroyer escorts, minesweepers, old destroyers, and small frigates--would further reduce the realism of the exercises as training for interdiction. These ships would have virtually no ASW capability until after enemy submarines disclosed their locations by attacking the ships protected by the screen.

With the allowances made for short distances involved, the tactics employed in these exercises may be relevant to how the Soviets would attack convoys. As the amphibious groups move toward shore in order to land naval infantry--and sometimes troops from the ground forces--they typically are subjected to pre-strike surveillance and then to simulated ASM, torpedo, and occasionally submarine-launched cruise missile attacks. The attacking strike aircraft sometimes are opposed by air defense interceptors. Surface ships rarely participate in the attacks except in coastal areas.

Large numbers of TU-16 Badgers armed with ASMs typically participate in simulated strikes against the amphibious groups. The TU-16s usually are accompanied for part of the flight by tanker aircraft for aerial refueling and are preceded by other aircraft which drop chaff and conduct electronic jamming to confuse the groups' defenses.

The number and composition of the submarines participating in these exercises have varied widely, but they often have included nearly as many submarines as there were surface ships under attack, indicating a preference for group submarine operations against amphibious task forces. An exercise [redacted] for example, may have been opposed by as many as 18 submarines. Although 11 of these carried cruise missiles as their primary armament, most attacked only with torpedoes during this exercise. A Y-class SSBN also participated in this exercise, probably to update its crew's torpedo training. Information on the submarine-related activity in these exercises is sparse, but again it appears that the classes most likely to be given interdiction assignments--such as the F-class--do not participate more than other classes in practicing torpedo attacks against surface ships. In landing exercises held during 1967-76, missile-armed submarines--primarily

the J- and C-classes--conducted more antiship attacks in the landing exercises than did submarines for which torpedoes were the primary armament.

Another interesting feature of these exercises is that attack submarines have operated in direct support of the amphibious task forces. It is uncertain whether this represents Soviet policy (if so, it could further decrease the number of submarines available for interdiction), or whether the Soviets occasionally assign submarines to groupings simulating US task forces for realism because they know that the US Navy sometimes uses attack submarines in a direct support role.

Other Convoy-Type Operations

Viewed against the totality of Soviet naval exercises, the amount of effort devoted to anticonvoy training is small. Much of what does occur either involves amphibious training or the Soviets' practicing of their own convoy tactics. Occasionally, convoy-type exercises do occur, however, which do not appear to be associated with landing operations or simulation of anticarrier warfare.

In April 1977, for example, as part of the spring exercise held annually by the Northern Fleet, a convoy consisting of three merchant ships, an oiler, and two warships operated off North Cape. Other than possibly serving as targets for ASM aircraft, the convoy's purpose is unknown.

More is known about "Val-74," a Warsaw Pact command staff exercise enacted with "skeleton" naval forces from East Germany, Poland, and the USSR. This exercise reflected Soviet Baltic Fleet preoccupation with close-in sea lanes, and indicated that the Pact probably would try to control the Baltic and North Seas in wartime. According to the exercise scenario, the Pact first "seized" the Danish Straits and then conducted a variety of naval operations, including convoying merchant ships and interdicting Western support shipping in the Baltic and North Seas. They also operated in the North Sea against Western amphibious forces and performed tactical ASW. These actions were considered necessary to control the approaches to the Baltic, to assist Pact ground forces advancing along the coast of the Baltic and North Seas, and to

protect the Pact's coastal shipping. Some of the strikes in the North Sea were made against "troop convoys."

Together with other evidence--including a recent classified Soviet discussion of conducting defensive operations in a continental theater--Val-74 indicates that

--The Soviets regard interdiction in selected off-shore waters as fairly important when it is tied to other objectives, such as supporting ground troops operating on a coastal front.

--Some of the convoy-type activity seen in Soviet exercises probably is training to protect Soviet shipping.

--Some of the references to attacking convoys in Soviet military literature and the appearance of convoys in exercises probably are related to countering landing ships screened by naval escorts and supported by carriers.

Coincident with attacks on enemy shipping, Soviet writings indicate that they would attempt to secure their own shipping--particularly in coastal waters--through a combination of selective sea control measures and convoying. According to a classified article published in 1974, a centralized board would be established to coordinate convoy operations for the Pact. The same article and others indicate that they apparently expect to have to assign 25 to 30 percent more escorts than noncombatants in forming convoys. The screening forces observed in Soviet peacetime exercises, however, usually have included a smaller number of ships, on the order of 75 percent as many as were in the main body.*

In addition to convoying merchant ships, the Pact would seek to control its local waters and especially important sectors of sea lanes. The Pact also would conduct "special operations"--which include preemptive strikes against enemy airfields and naval bases--as a means of protecting its own shipping.

Thus, what appears to be a growing involvement of commercial ships in Soviet naval operations may be a reflection of Soviet concern to improve naval protection

*In about half of these exercises, the main body has included a major surface combatant, probably to simulate a Western aircraft carrier.*

for these assets rather than an indication of increased attention to interdiction of Western sea lines of communications.

ANNEX C

## Interdiction in Local Wars

Soviet writings on interdiction focus on a NATO-Warsaw Pact war. This orientation toward Europe probably reflects the importance that area has for Soviet planners and also the belief that any conflict involving vital Western interests would elicit a strong response that could lead to general nuclear war.

The key factor in Soviet assessments of the risks of military involvement probably would be the degree to which the Soviets believe they could keep such conflicts from escalating. Thus, future Soviet involvement in local wars or use of interdiction as a form of naval blackmail is dependent upon the scenario.

Unless they felt confident that they could gain their ends by intimidation rather than by use of force, the Soviets probably would employ naval blackmail cautiously, if at all. Admiral Gorshkov has written, however, in a historical context that the "threat" of interrupting sea communications is a peacetime use of naval power. The Soviets probably would like to be able to use the same leverage, under favorable circumstances, to influence the foreign policy of small

countries. That they would move cautiously is indicated by their past behavior and by a later Gorshkov article in which he warned that limited wars in distant areas carry with them the danger of escalation.

Conducting local wars, according to Gorshkov, is general policy for "Imperialism." A key vulnerability for the West in fighting such wars is its dependence on sea communications. Gorshkov doubtlessly would like to acquire the means to deter the West from involvement in local wars that impinge on Soviet interests. He probably believes that the presence of Soviet naval forces--and the attendant publicity that they would receive in the Western press--could inhibit Western involvement in local wars except where vital interests were threatened.

On balance, there is little evidence that the Soviets contemplate limited use of their naval forces in peacetime to disrupt shipments of vital commodities, such as oil. Not only could such action endanger world peace, but it also could imperil the heavy investment that the Soviets have made in their own merchant and fishing fleets.

ANNEX D

## Weapons Carried by Soviet Attack Submarines

The evidence generally is consistent with recommendations for weapons loads contained in the classified Soviet writings of the mid- to late 1960s, when the Soviets began to grapple with problems raised by modifying their strategic doctrine to include the possibility that war with the West might be fought in all or in part without use of nuclear weapons. In their military literature the Soviets note the difficulty of being prepared for both nuclear and non-nuclear contingencies and emphasize the importance of

*See table on page ____.

maintaining their operational submarines in sea-ready condition and loaded with authorized levels of both nuclear and conventional armaments.

Soviet Doctrine

Recognition of the need to prepare simultaneously for both conventional and nuclear war raised several problems for the Soviet Navy. This need, which was not officially acknowledged in the Soviet Union until the mid-1960s, prompted several articles in classified Soviet journals on how to adapt naval forces to the new doctrine. These articles contained the following recommendations on submarine armament:

-- At least half of all the cruise missiles carried by Soviet submarines should be nuclear.
-- If a cruise missile submarine has a limited number of launchers and if group operations are impossible, all missiles should be nuclear.
-- ASW submarines should carry rocket-boosted antisubmarine weapons and two

to four nuclear torpedoes. These should be launched against Western SSBNs as soon as nuclear war begins.

-- Submarines need only conventional torpedoes for self-defense.

-- Torpedo attack submarines dedicated to anticarrier operations should carry up to 30 percent nuclear torpedoes. This would permit two "salvos" with conventional torpedoes and one with nuclear torpedoes against an aircraft carrier.

Implications of the Cruise Missile Loads

The high ratio of nuclear to conventional warheads on cruise missiles carried by the submarines suggests that the Soviets believe that war at sea may not remain conventional for long. In a conventional conflict, Soviet cruise missile submarines could be forced to wait on the sidelines as a contingency force in case of escalation, or be forced to brave Western antisubmarine barriers to replenish their few nonnuclear missiles.

To compensate for the small number of conventional weapons carried, the Soviets probably would try to

concentrate their forces against major targets. Group operations would offset weapons limitations, but would require large forces, decreasing the number of units available for other tasks.

The weapons loadings reflected in [redacted] doctrinal writings indicate a strong Soviet commitment to fighting naval engagements with tactical nuclear weapons. In a nuclear environment the small number of weapons carried would not be critical. A single hit with a nuclear weapon probably would be sufficient to sink any target at sea.

Speculations on the Torpedo Loads

There seems to be a requirement to arm front-line Soviet submarines, regardless of class, with at least two nuclear torpedoes--a small fraction of nuclear to conventional weapons compared to the cruise missile loads. One reason for this dissimilarity may be that some of the torpedoes are earmarked for self-defense, while all of the cruise missiles are offensive weapons intended for striking high-value surface ships. The Soviets also could use conventional weapons against targets in close engagements to avoid damaging the firing submarine.

ANNEX E

## How the Soviets Would Carry Out Interdiction Operations

The Soviets write that in wartime they would attempt to interdict Western sea lines of communication by conducting missile and air strikes against ports; by sinking merchant and troop transport ships on the high seas; and by sowing mines in heavily traveled waters.

Soviet emphasis on all three of these basic methods is a departure from the conduct of past interdiction campaigns. Soviet authors, for example, have stressed that a major flaw in German planning during World War II was their failure to mount "massed and systematic" attacks on cargo ports. The tone of Soviet discussion of German mistakes suggests that such attacks on European ports with conventional weapons could be launched if a war did not escalate into a nuclear conflict. Soviet theorists note that once the nuclear threshold is crossed, nuclear strikes against land targets are the most efficient means of interdicting shipping.

Similarly, the Soviets have stated that in the past mining has been underestimated as a means of disrupting shipping. Mine warfare in their view also is useful because it strains enemy naval resources and extends the amount of time that merchant ships must remain at sea, thus enhancing their vulnerability to other forms of attack.

Focusing on the military aspects of interdiction, Warsaw Pact authors distinguish between "ocean" communications and "close sea lines of communication." Disruption of the latter can become an "urgent task," the outcome of which could impact directly on the land campaign. This emphasis is consistent with Soviet planning guidance for use of submarines, aircraft, and surface ships in interdiction operations. "Experience indicates," according to a classified Pact document, that the best means of conducting interdiction operations in off-shore waters is through a combination of aircraft and surface ships.

In open ocean interdiction, submarines would be the primary strike force. Aviation would have a dual role--to participate in antishipping strikes and to locate targets. Surface ships, in the Soviet view, would be needed to support and protect submarines

transiting to and from the sea lanes. The Soviets probably would only deploy their surface ships within effective range of their land-based aircraft. The emphasis on coordinated operations, coupled with the lack of air cover, might dictate concentration of Soviet forces within a few hundred miles from Europe, with only a few Soviet submarines operating alone in distant waters.

If sufficient forces were available, the Soviets probably would seek to create a submarine threat within an entire naval theater because they also view interdiction as a useful diversionary tactic. They know that it is much easier to attack than defend merchant ships, and, consequently, that a few submarines can tie up a disproportionate amount of enemy resources. In his writings of 1972 and again in 1976, Adm. Gorshkov noted that, for each German U-boat in World War II, the Allies were obliged to deploy 25 ASW ships and 100 aircraft.

Moreover, in a long war attacks against sea communications are useful because they impose "great stress" on defending naval forces. One officer argued that scattered worldwide attacks could force the enemy to

monitor the entire ocean. If these views were implemented, the Soviets might try to conduct strikes in unexpected areas--as well as against the main North Atlantic shipping lanes--to force as large a dispersion of Western naval resources as possible.

Other Soviets argue, however, that antishipping forces should be concentrated on "decisive axes"--probably close to shore--
/where they could produce quick results. There is no evidential basis for divining which course the Soviets might take but it seems most likely that they would hedge their bets and use both diversionary and concentration operations.

General Staff Planning

A classified Soviet manual, written in 1963 but apparently still in use by the General Staff for planning all types of naval operations, describes in some detail Soviet planning factors for interdiction. The manual does not indicate how the Soviets would apportion their forces in wartime. The planning information in this 15-year-old document also is consistent with the more general treatment of interdiction in a recent Warsaw Pact report.

The Soviets believe they would need:

-- To collect advance intelligence on the nature and importance of enemy shipments, as well as their defenses.

-- To reconnoiter "the entire depth of the enemy's [sea] communications."

-- To relieve submarines which have expended their weapons or to resupply them at sea.

-- To resolve the problem of hydrometeorological forecasting in distant areas.

-- To deploy interdiction forces covertly in advance along the expected routes of enemy convoys; and

-- To conduct timely shifts of forces to new areas if the enemy engages in evasive convoy routing.

The manual states that interdiction forces should be divided into three groups, consisting of:

-- Strike forces, primarily submarines, allocated to sink convoys and disrupt port operations.

-- Surface ships to safeguard submarines engaged in interdiction operations as

they deploy to and from their patrol areas.

-- A "reserve" of naval aircraft.*

The Soviets expect to begin an interdiction campaign by striking ports while convoys are being formed and ships loaded.** Then submarines and aircraft would strike convoys en route. If a diesel submarine detected a convoy, the submarine would surveil it, and report to the "fleet command post," which would order faster nuclear-powered submarines to join and then remain in contact with the convoy, presumably until sufficient forces were available to conduct a coordinated attack. Merchant ships would then be subjected to successive mine fields, which would be systematically replenished. As they neared their destination, the merchant ships would be attacked by aircraft and missile troops of the coastal front.

*In a more recent Warsaw Pact discussion of the three groups necessary to conduct interdiction operations, an air group dedicated to "reconnaissance" was substituted for the "reserve" of naval aircraft.

**The Soviets elsewhere have indicated that they believe it would take the United States between two and three weeks to organize convoys and that they would attempt to deliver strikes (presumably with nuclear weapons) against the ports toward the end of this period when the concentration of ships was highest.

Weapons Employed

The Soviets have the option of employing a variety of weapons against merchant ships at sea--air- and submarine-launched cruise missiles, torpedoes, and mines laid by aircraft and submarines. Because of range constraints on Soviet naval aircraft and their heavy commitment early in war against carrier task forces, we believe it unlikely that they would be used much against merchant shipping. The Soviets also could have difficulty laying and replenishing mines in areas of Western air superiority.

With regard to submarine-launched cruise missiles, the Soviets probably continue to believe as one admiral did in 1961 when he wrote that "there is no need to expend [cruise] missiles against transports since one or two torpedoes are sufficient to sink a merchant vessel." If, however, the convoys are well protected and are of high value, or if success against aircraft carriers permits the reassignment of cruise missile submarines, the Soviets probably would allocate some of these submarines against convoys.

Whether the Soviets would use submarine-launched cruise missiles or torpedoes with nuclear warheads

against merchant convoys is also unclear and probably would depend partly on how well the convoys were escorted. A long list of targets considered suitable for naval weapons with nuclear warheads contained in the General Staff manual does not include convoys. Elsewhere, in a discussion of tactics to be used in an interdiction campaign, however, the manual indicates that nuclear weapons could be used against merchant ships. Another classified documentary source stated that at the outbreak of war Soviet submarines should put to sea with "their complement" of nuclear weapons, which would be used only against "capital ships." A recent lecture on strategy, classified Top Secret by the Soviets, estimated that a shortage of nuclear weapons would develop as the war progresses and, consequently, that they would have to be used only against the most important targets.

ANNEX F

## Alternative Interdiction Scenarios

The analysis described in this Annex was performed to examine Soviet submarine capabilities against Western shipping in the North Atlantic. A model employing several sets of assumptions provided a range of outcomes.* The analysis considers the capabilities of Soviet submarines under different force levels to deliver torpedoes against US convoys to Europe. It assumes that most merchant ships are concentrated in the southern shipping lanes of the North Atlantic in order to route them beyond range of Soviet ASM aircraft for most of the distance. This would also extend transit times for Soviet submarines.

The analysis focuses on three scenarios which represent varying levels of commitment of attack submarines to interdiction of Western shipping in the North Atlantic over a 120-day period. The assumptions built into the model deliberately tend to "worst case" the situation for NATO and result in optimistic exchange ratios for the USSR.

*Called Firearm, the model, which is unclassified, was developed by Science Applications Incorporated of Englewood, Colorado.*

Key assumptions used in the model were:

-- Each submarine withholds two torpedoes for self-defense; otherwise all of its torpedoes are expended against merchant ships in a target-rich environment.

-- Submarines suffer 20 percent attrition-- during transit-per patrol. No additional submarine attrition was included.

-- Torpedoes with nuclear warheads and cruise missiles are not expended against merchant ships.

-- Nuclear submarines transit at 12 knots; diesels at five.

-- Turnaround time between patrols is 25 days.

-- Submarines average 15 days on station.

-- The Soviets maintain a continuous submarine presence in the shipping lanes.

-- Northern Fleet bases are undamaged and continue to support submarine operations.

-- Submarines must return to the Northern Fleet area for replenishment. NATO air superiority prevents the Soviets from

replenishing submarines from captured territory.

-- The Soviets achieve a hit rate of about .25 for each torpedo fired (.85 technical reliability times a deliberately optimistic probability of .3 for accuracy).

-- One hit is sufficient to disable a merchant ship.

The results of this analysis indicate that because of limitations such as long transits, low availability, small average torpedo loadings, and because of the large number of NATO-flag ships available for sealift in the North Atlantic, Soviet submarines in all three cases fail to sink ships at a level that would seriously affect the resupply of Europe. The results of the model are summarized in the following table.

Illustrative Ship Losses to Soviet Submarines in a 120-Day Open Ocean Interdiction Campaign in the North Atlantic

| Scenarios | Level of Effort | Percentage of Available Long-Range Attack Submarines in Northern Fleet | Composition of Soviet Interdiction Forces | Ships Sunk or Disabled*** | Percentage of NATO-Flag Ships**** |
|---|---|---|---|---|---|
| 1 | Anticipated | 11 | 5 F-class SS*<br>2 N-class SSN | 27 | .3 |
| 2 | All available long-range torpedo attack submarines except V-class | 33 | 12 F-class SS*<br>2 T-class SS<br>5 N-class SSN<br>2 Z-class SS | 106 | 1.1 |
| 3 | Maximum: All available submarines except ballistic missile | 100 | 6 C-class SSGN<br>8 E-II-class SSGN<br>7 J-class SSG<br>5 N-class SSN<br>12 V-class SSN<br>22 F-class SS**<br>2 T-class SS<br>2 Z-class SS | 273 | 2.8 |

*F-class submarines deployed to the Mediterranean are excluded from the strike forces in Scenarios 1 and 2.

**The Northern Fleet normally supplies about 10 attack submarines for the Soviet Mediterranean Squadron. Although unlikely, it is assumed for purposes of Scenario 3 that these forces would be available for operations in the North Atlantic.

***These numbers assume a Soviet hit probability of about 25 percent and that a single hit is sufficient to disable a target.

****These numbers include only NATO-flag ships, which displace over 1,000 tons. They exclude over 4,000 Liberian and Panamanian flag ships, some of which probably also would be used for sea lift if needed.

Scenario 1 (Anticipated Level of Effort)

This scenario assumes that the Soviets are interested mainly in attacking merchant ships in the open ocean in order to create a diversion and cause NATO to disperse its forces over the sea lanes. It represents the level of effort we believe likely in the early phases of war while Western aircraft carriers and SSBNs still posed a threat to the Soviet Union. Collectively, these submarines would commence their patrols with 132 torpedoes that could be expended against merchant ships.

The table on p. ____ shows that over a 120-day period this group could, under favorable operating conditions, sink or disable some 27 ships, or about .3 percent of the sealift resources available to NATO.

Scenario 2 (all available long-range torpedo attack submarines except V-class)

This scenario assumes that NATO armies have fought Pact forces to a standstill on the Rhine; that the Soviets preempted at sea, destroying some Western SSBNs at their bases and carriers with conventional weapons; and that this partial success plus an indefinite continuation of the conventional phase, persuaded Soviet leaders to risk sending one-third of the available long-range general purpose submarines in the Northern Fleet inventory against merchant ships. This level of effort by Northern Fleet submarines would be approximately the same as that expended against Western SSBNs and carriers.

Under favorable operating circumstances these submarines could destroy or disable 106 merchant ships, constituting about one percent of NATO-flag ships.

Scenario 3 (Maximum Effort)

All available long-range general purpose submarines in the Northern Fleet and Mediterranean Squadron are sent against merchant ships. This force could sink some 273 merchant ships, a level of attrition that would represent about three percent of the inventory NATO-flag ships.

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If in the maximum effort portrayed by Scenario 3 all submarines were predeployed to the sea lanes and began sinking merchant ships at the outset of hostilities, losses would rise by about 30 percent. This additional attrition, however, would include relatively few ships carrying military cargo because of the time required for convoy formation. Moreover, Soviet capabilities would drop rapidly and prevent them from maintaining a steady presence in the sea lanes.

Additional attrition could be inflicted on shipping in Scenario 3 by use of conventionally armed submarine-launched cruise missiles as well as torpedoes. Assuming that 50 percent of the missiles carried by C-, E-II-, and J-class submarines were conventional, this would be approximately the equivalent of 100 additional torpedoes that could be expended against merchant shipping in Scenario 3.

Failure to include cruise missiles in calculating losses in Scenario 3, however, is compensated for by assuming more effective antiship torpedo loadings than the evidence would indicate. [redacted] "alert" submarines in peacetime carry mixed weapons loads, including ASW and nuclear torpedoes. If, as seems

likely, this practice were carried over into wartime, the number of torpedoes that could be expended against merchant ships would be reduced and would result in fewer ships lost than postulated in Scenarios 1 and 2.

Other more realistic operating conditions likely to prevail in wartime for Soviet at-sea interdiction probably would contribute to lower ship losses than those attained in this analysis. Given the Soviet peacetime practice of firing at long range from outside escort screens, Soviet accuracy probably would be less than that postulated. Moreover, all hits would not disable or sink a target as we assumed.

Target acquisition, depending on the scenario, could also reduce Soviet capabilities and force their submarines to spend more time on station searching for targets. This would increase the vulnerability of the submarines, while reducing their effectiveness.

In any event, submarines would be subject to attrition during their entire patrols, not merely during transits. If submarine attrition were .3 to .5 per patrol, instead of .2 as assumed in this analysis, the Soviets, after 120 days of war, could sink only about 200-250 merchant ships in Scenario 3, and their capabilities

to continue an at-sea interdiction campaign would be sharply reduced.

If the higher attrition rates were used in Scenario 3, submarine losses would rise to about 35 to 50 percent of all long-range general purpose submarines maintained in the Northern Fleet as opposed to 25 percent at .2.

In any event, given the basic assumptions of this model, we can find no reasonable scenario that would appreciably increase the number of merchant ships sunk in any of the three cases examined. All three scenarios were constructed to the Soviets' advantage. Even if we were to further increase that advantage by assuming that the convoys were undefended--thus allowing about a .43 hit rate (.5 accuracy times .85 technical reliability)--in Scenario 3 the Soviets could still sink only about five percent of NATO-flag shipping in a favorable 120-day interdiction campaign.

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