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Intelligence Report

Soviet Fleet Logistics: Capabilities and Limitations

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Soviet Fleet Logistics: Capabilities and Limitations

Key Findings

The Soviet concept for providing supplies to naval forces differs markedly from that of Western navies. The Soviet replenishment force is structured primarily to support the peacetime operations of the fleet, which it does effectively, rather than to support extended combat operations as in the West.

Enough naval logistic ships and naval-subordinated merchant ships are available to sustain large-scale noncombat operations. During exercises and crisis situations, the Soviets have demonstrated the capability to provide supplies for large numbers of warships for periods of up to 45 days. A model developed to analyze Soviet logistic capabilities indicates that Soviet naval oilers would have enough fuel to support for at least 60 days 40 warships deployed to the Norwegian Sea during a period of rising tensions. Submarines can operate largely without support for at least two months.

The fleet logistic system would be largely ineffective, however, if the USSR were engaged in sustained combat operations. Most support ships are unarmed and are too slow to keep up with Soviet warships, which in any event have only a limited capability to protect them from air and submarine attacks. Almost all resupply operations would have to be performed in protected anchorages or ports outside the immediate combat area. Furthermore, the navy has virtually no capability for underway replenishment of munitions—a serious shortcoming in a prolonged engagement, because Soviet warships carry few reloads for their major weapon systems.

During the next decade the navy will try to improve its underway supply capablities. A few modern supply ships are now under construction. It remains to be seen, however, how many will be produced and how well they will perform the high-speed replenishment operations necessary under combat conditions. Even if the Soviets choose to develop a navy capable of prolonged combat at sea, they will not have a fleet of logistic ships capable of supporting extensive combat operations for the next five to ten years.

CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
August 1976

INTELLIGENCE REPORT

Soviet Fleet Logistics: Capabilities and Limitations

Preface

This study examines the characteristics of the Soviet system for resupply and repair of ships at sea. It discusses such logistic procedures during peacetime and estimates fleet logistic capabilities during combat operations. The study is focused primarily on surface ships, because individual submarines are largely self-supporting at sea for at least two months.

Soviet military doctrine in the mid-1950s had led to the creation of what has been termed a "one-shot" navy--a force which would be called on at the beginning of hostilities to fight a single intense engagement in the maritime approaches to the USSR. By the mid-1960s the Soviets had augmented their makeshift logistic force with seagoing supply ships which could support the fleet in distant areas, but the emphasis still was on speed and firepower rather than on endurance or refire capability. The military doctrine may now be evolving to encompass preparations for the possibility of a prolonged conflict. Since modern naval supply ships are essential to the success of prolonged combat operations at sea, the structure of the fleet logistics system should enable us to better understand Soviet concepts concerning the nature of future combat operations.

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Satellite photography of shipyards, reports of contract arrangements, and occasional press articles provide a reasonable basis for estimating the development of logistic ships for three to five years. Over the longer term, significant changes in the direction and capabilities of the logistic force will depend on shifts in Soviet naval strategy. Such changes are difficult to foresee; the Soviets themselves may not have completed plans for their navy in the 1980s.

A model of possible Soviet naval operations in the Norwegian Sea was devised for this study to determine whether Soviet support ships could deliver enough fuel to sustain extended operations. The assumptions used for the model and the results obtained are described in this report.

Contents

Tables and Graphics

Characteristics of the Naval Logistics System

Organization

The logistics system of the Soviet Navy is controlled by the chief of Navy Rear Services, who is responsible primarily to the commander in chief of the Navy but also reports to the Deputy Minister of Defense for Rear Services. The chain of command passes from the chief of Navy Rear Services through the various fleet commanders to their deputies for rear services, who administer the supply of ships at naval bases through regional naval base commanders. Operational control of naval logistic ships is vested in the fleet commander, who can delegate control to other commands within the fleet. Ship repair, munitions, fuel, general supply, and other associated services are provided to ships at the naval bases. Ships of frigate size and larger have an officer who is responsible for maintaining supplies from stocks afloat or in port.

A career in the rear services requires specialized training for both officers and enlisted men. Naval officers attend special supply training schools, and on graduation they become specialized supply officers. Enlisted men are trained in even more narrow specialties, such as transportation of supplies or quality control of fuel.

Needs of the Fleet

Any fleet logistics system is concerned with providing ships with the necessary energy and supplies to fulfill their missions. Such supplies normally include food, water, fuel, munitions, and spare parts. In addition, all navies need the technical capability to repair and maintain ships at sea and require some means for resting crews during long periods at sea.

In the Soviet Navy, fresh water is required not only for crews but in even greater quantities for boilers of steam-driven ships. Ships usually have evaporators to distill or purify sea water for shipboard requirements, but evaporators on older ships have not worked well, and resupply of water remains a major requirement.

Each of the four fleets is allocated a supply of fuel each year, and it is important that individual ships not exceed planned requirements. Ship commanders are often exhorted in the Soviet press to economize on fuel consumption.

Soviet warships have a minimal weapons-reload capability. For extended combat operations, they would have to rely heavily on weapons support from shore or shipborne sources.

The Soviets also do not appear to carry a large stock of repair parts; they may be more willing than the US to tolerate equipment malfunctions for extended periods or to accept a lower state of readiness.

The Soviet Navy generally puts less emphasis on crew rest than does the US Navy. Rest and relaxation are most often provided to crews while on board ship at anchor. In recent years, however, greater liberty privileges have been granted to crews during port visits.

Support Facilities

At Home. It is assumed that there is adequate fuel in storage to support naval operations of long duration, but it is difficult to estimate the total amount, as much of it is stored underground. Additional fuel could be provided by pipeline to refill tanks. Petroleum stored at commercial facilities presumably would also be available to the navy in an emergency.

Munitions are stored in every major naval port, and storage facilities seem adequate for all fleets. Each fleet has at least one missile support facility. Nuclear weapons storage facilities appear adequate for the Northern and Pacific Fleets, but none has been identified in Baltic or Black Sea Fleet areas.

All four fleets have adequate facilities for performing major repairs on submarines and surface ships returning from distant operations. Facilities in the Black Sea, however, are not equipped to handle major repairs to nuclear submarines. Thus, nuclear submarines operating in the Mediterranean must return to other fleet bases for major repairs.

Overseas. The USSR has access to and some control over naval facilities in Somalia, and until recently had similar rights in Egypt.* The Soviets use "floating bases" to provide most of the replenishment and minor repair for their ships in distant areas. A "floating base" is a group of seagoing support ships such as repair ships, tenders, and replenishment ships. They can operate in open anchorages in international waters, in sheltered harbor anchorages, or within the territorial waters of a client state. In some areas, such as Syria and Somalia, floating bases are stationed in a foreign port to provide logistic services to the fleet. Soviet naval ships also frequently take on supplies during calls at a number of ports, such as Conakry, Guinea, and Aden, South Yemen.

Naval ships outside home waters rely almost entirely on fuel from the USSR carried in Soviet naval oilers and merchant tankers. Water and fresh food are often obtained during visits to foreign ports.

Although crews sometimes perform minor repairs themselves, most warships normally return to shipyards in the USSR for repairs. Until recently, Soviet diesel-powered submarines and some support ships were routinely overhauled in Egypt. Some major repairs on similar ships have also been performed in Yugoslavia. In the Pacific area, Soviet naval support ships and commercial vessels are regularly overhauled at a shipyard in Singapore. The delivery of a floating drydock to Somalia in late 1975 will enable the Soviets to make major repairs to warships in the Indian Ocean.

Mobile Support Forces

Development of Naval Support. Prior to 1955, Soviet naval support ships were pre-World War II units, converted merchant ships, and ships acquired through lend-lease or war reparations. In the first decade after the war, the emphasis in rebuilding the navy was almost completely on warships.

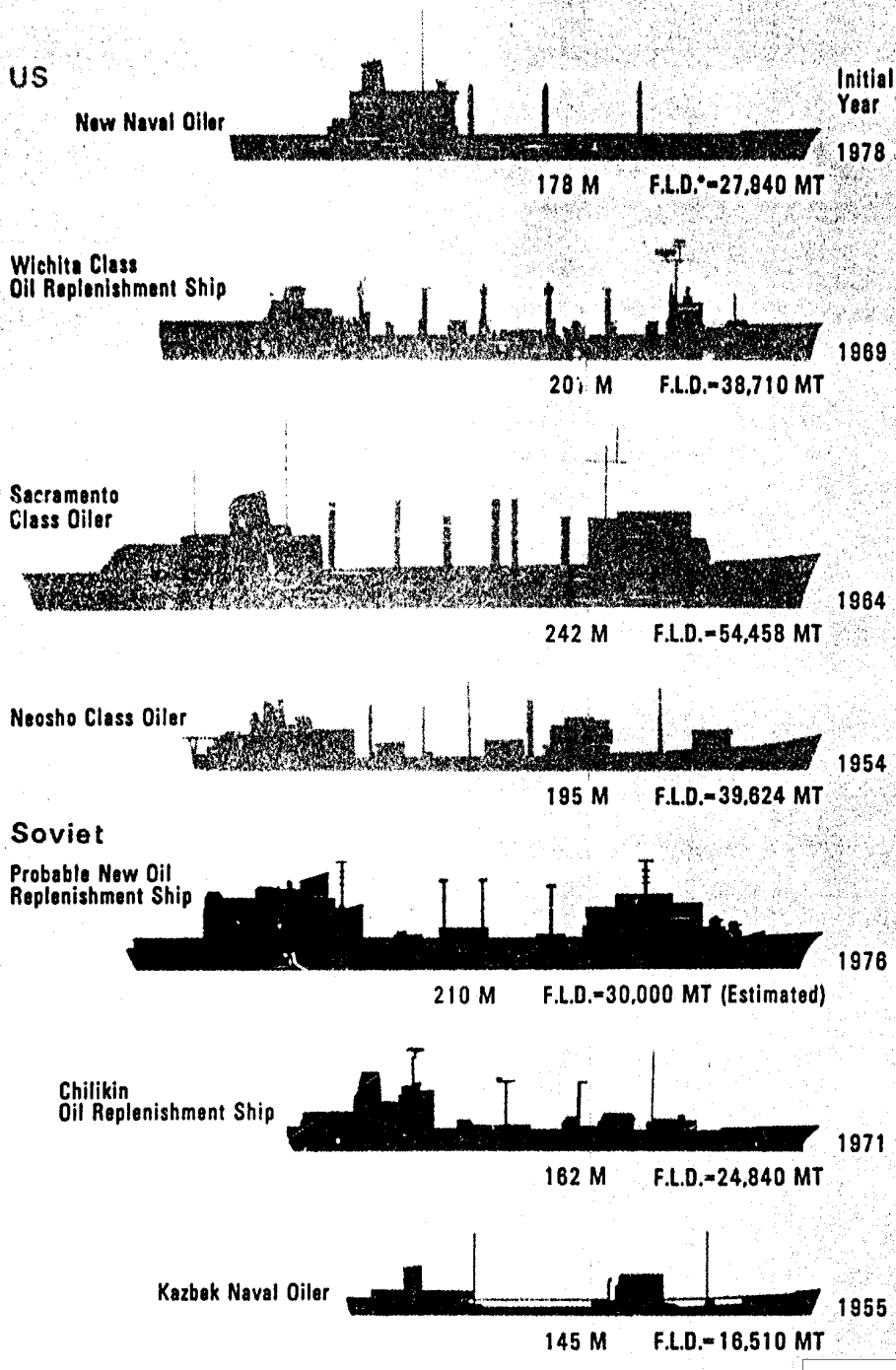
In the late fifties the Soviets began to give more attention to logistics. They started modifying merchant tankers for naval use and began constructing small cargo ships, water carriers, and a few submarine support ships.

This trend continued throughout the sixties, with increases primarily in the number of submarine tenders and repair ships *(See table below)*. During this period the first missile-support ships were constructed. Poland and Finland built many of the oilers and repair ships for the Soviets and continue to do so. By the end of the 1960s the Soviets had the necessary logistic forces to support their expanding peacetime naval presence in distant areas. In the early 1970s the navy continued to obtain many repair ships and submarine tenders, but inventories of such units have stabilized in the past three years.

Major Naval Support Ship Inventory
1955-1975

	Fleet Oilers	Repair Ships & Sub Tenders	Cargo Ships	Water Carriers	Missile Carriers	Total
1955	22	4	23	0	0	49
1956	28	10	23	1	0	62
1957	33	14	23	5	0	75
1958	37	21	29	8	0	95
1959	41	23	32	10	0	106
1960	45	29	37	13	0	124
1961	45	27	36	13	0	121
1962	47	27	38	13	0	125
1963	49	28	39	13	0	129
1964	46	32	40	15	2	135
1965	48	31	41	17	2	139
1966	47	38	35	15	3	138
1967	50	41	37	15	4	147
1968	51	39	37	15	4	146
1969	56	41	41	15	5	158
1970	51	45	42	15	6	159
1971	52	49	46	15	6	168
1972	53	53	46	15	6	173
1973	54	53	46	15	7	175
1974	55	53	46	15	7	176
1975	55	55	47	15	8	180

Comparison of Sizes of US and Soviet Naval Oilers



*Full Load Displacement In Metric Tons

The Soviets have been making an effort to improve the navy's oil and solid-stores replenishment capability by developing three types of modern oilers. These do not appear to be entirely satisfactory, as fewer than a half dozen have been built and one unit has been converted to a water carrier. US naval oilers have always been two to three times larger than their Soviet counterparts *(see illustration on page 11)*, but because of economy measures new US oilers are smaller than earlier classes. A US oiler planned for the 1980s will be only slightly larger than the Chilikin class ship introduced by the Soviets in 1970, and smaller than a Soviet oiler expected to be operational this year.

Present Force. Today the Soviet Navy has an auxiliary fleet of some 180 logistic ships capable of supporting warships operating in distant areas. The ratio of ships with a surface ship support mission to major surface combatants is approximately 7 to 10.

Methods of Refueling

There are two basic methods of refueling ships while under way:

- The alongside method reduces refueling time and enables ships to steam at relatively high speeds while the fuel is being transferred. Using this method, an oiler can refuel two ships simultaneously and may use more than one transfer station on each side of the ship to speed up delivery time. The alongside method reduces the vulnerability of ships to attack during refueling and enables combatants to maintain high transit speeds over long periods.

- The astern method involves using a single hose over the bow or stern of the receiving ships. Soviet ships usually use this method at speeds of less than 10 knots. *(See photographs on pages 14 and 15.)*

In addition to the general categories listed in the table on page 10, other ships such as fleet tugs and merchant ships could, if necessary, provide supplies or repair assistance to naval combatants. Some ships whose primary function is to support space vehicle recovery have also been used in a naval support role, particularly in the Indian Ocean.

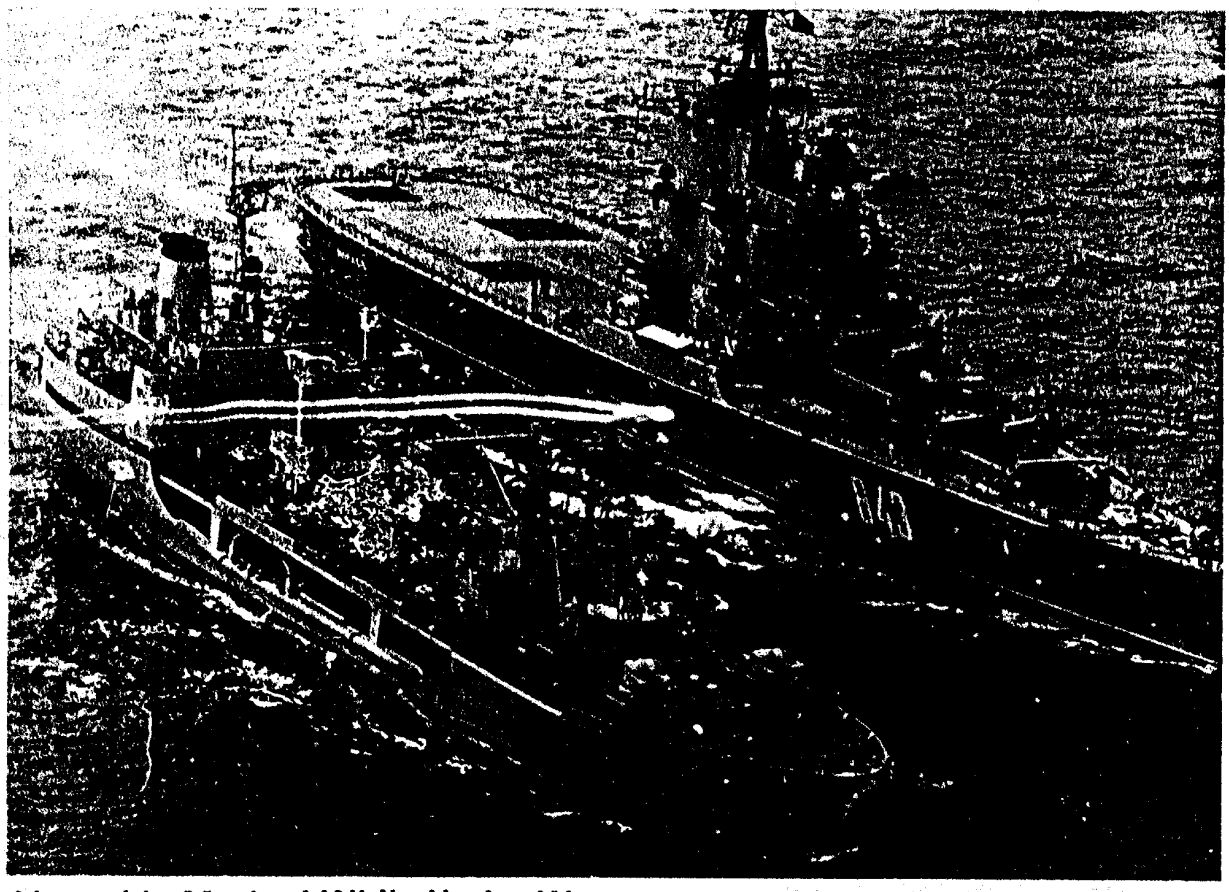
Of the 55 oilers in the Soviet Navy, only six can be called modern underway replenishment ships. These six, plus about a dozen older ships, are the only ones capable of refueling warships by the alongside method while under way.

The six modern ships also have a limited capability for underway transfer of solid stores. US ships can transfer solid stores or cargo while under way either by the alongside method or by helicopter. Soviet dry cargo and refrigerator ships, on the other hand, are not able to transfer stores while under way, nor do they have helicopters for vertical replenishment. Furthermore, none of the eight missile-support ships can transfer missiles at sea.

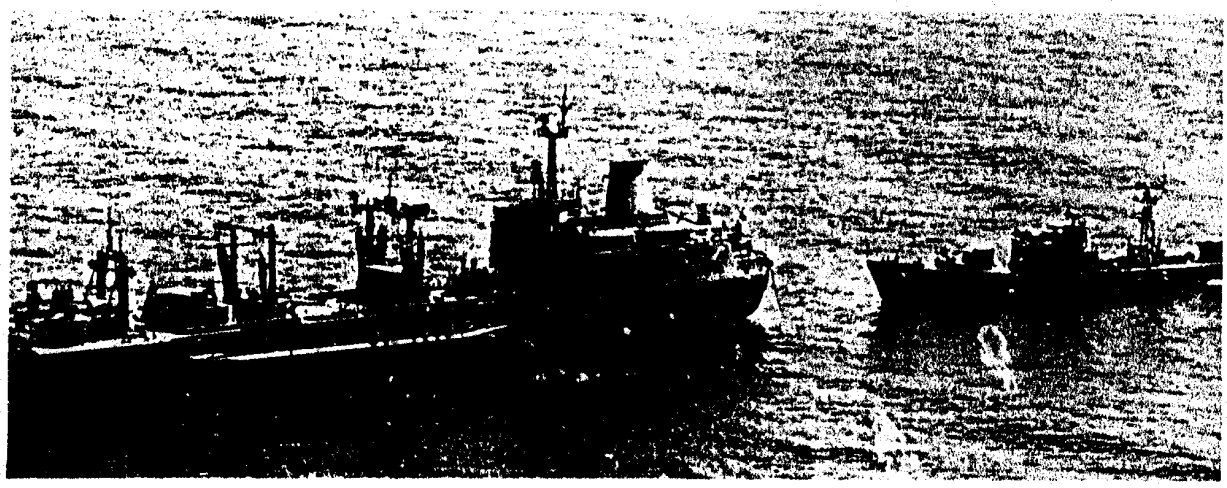
Few Soviet support ships are capable of defending themselves, and the majority lack the speed and endurance necessary to keep up with a modern naval task force. Only the munitions ships, submarine tenders, and Chilikin class oilers (less than 15 percent of the 180 support ships) have guns installed, and none has antiship or antiaircraft missiles for self-defense. In contrast, almost all US naval supply ships are armed, and some have air defense missiles.

Merchant Ships. Because the navy lacks a sufficient number of oilers to carry out its refueling mission, it must rely on merchant ships for a substantial part of its logistic support. During 1974 the portion of naval fuel supplied by merchant tankers rose to about 60 percent. The navy regularly charters merchant tankers to augment its own oilers for refueling. In the past five years, over two-thirds of all chartered ships have been Kazbek class tankers, which are similar to some oilers and are readily available for naval missions.

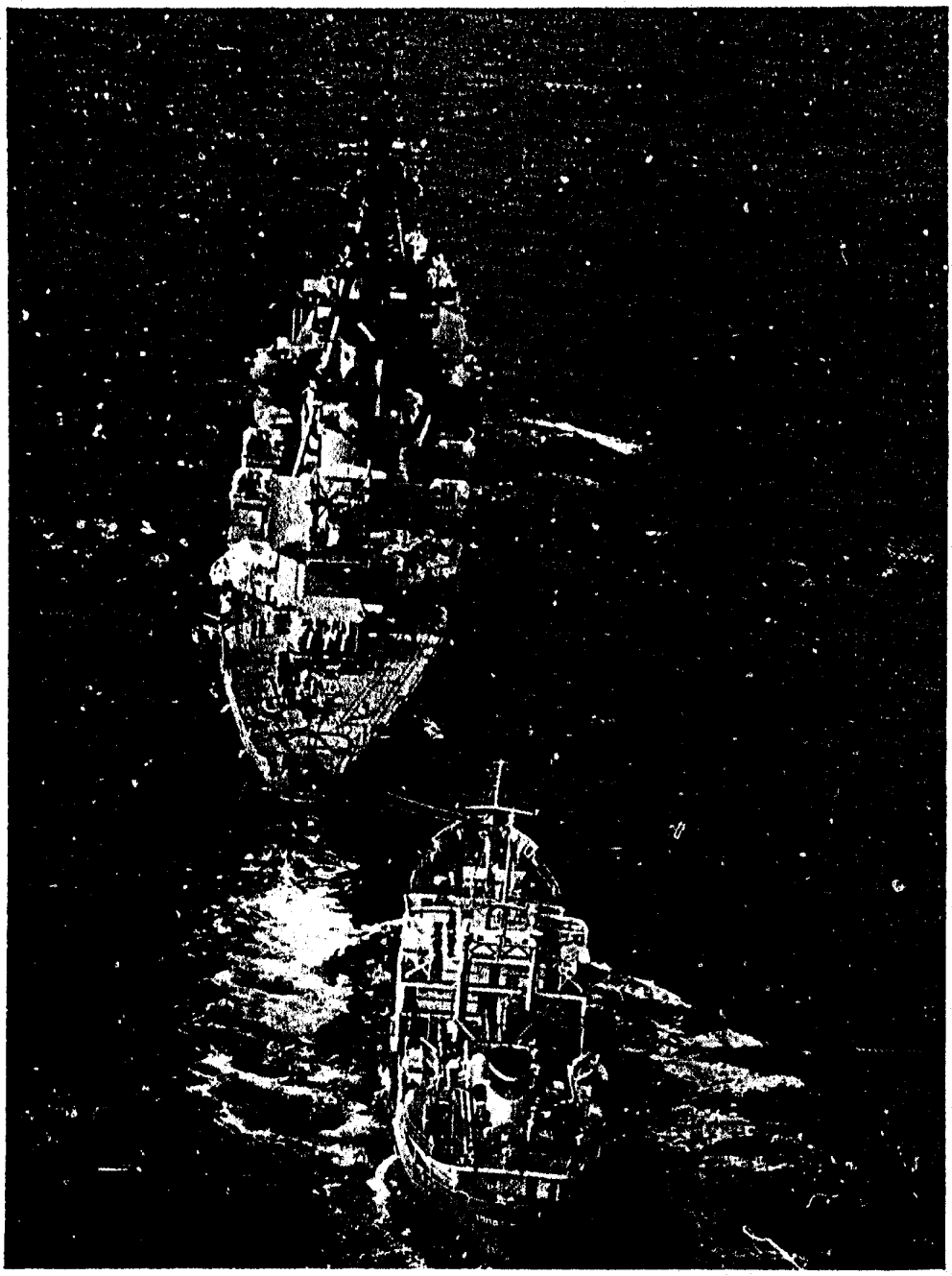
The USSR has over 300 merchant and fishing ship support tankers which could be put into naval service.



Alongside Method While Under Way



Replenishment at Anchor



Astern Method While Under Way

Ship Refueling Methods

Taking only the classes of merchant tankers used by the navy in recent years, some 122 such tankers might be used to support the fleet. The merchant tankers listed below could contribute over 1.8 million metric tons (1.75 million cargo tons) of oil lift capacity, compared with some 264,000 metric tons (260,000 cargo tons) for the naval oiler fleet.

Selected Merchant Tankers

Class	Baltic Sea	Black Sea	Pacific Ocean	Total
Kazbek	3	45	9	57
Alagir	5	6	9	20
Altay	5	6	6	17
Sofiya	0	21	0	21
Pevek	4	0	3	7
Total	17	78	27	122
Oil Lift Capacity (Metric Tons)	95,500	1,540,000	180,000	1,815,500

Because of the substantial requirements of the Mediterranean Squadron, the navy uses more tankers from the Black Sea than from other fleet areas. No merchant tankers operate from the Northern Fleet area.

The Soviets have taken measures which add to the readiness of merchant ships for naval tasks. A commissioned naval officer, often the radio officer, usually is aboard a Soviet merchant ship even when the ship is not under charter, and many crewmen have experience in the navy. These measures have proved useful when merchant ships have come to the aid of naval ships in distress. In 1972, a Soviet merchant tanker was the first ship to report to Moscow the status of a Soviet ballistic missile submarine that had had a fire while on patrol in the North Atlantic. During the initial rescue operations, the master of a merchant cargo ship commanded a rescue force that was directed to establish a tow, transfer equipment to the submarine, and evacuate the crew.

Not all merchant tankers would be available for naval use at any given time. Some would be in com-

mercial trade far from Soviet ports with cargoes that would require offloading. Furthermore, tank cleaning would take a couple of days if the tanks were fouled with the residue of dirty cargo such as crude oil. Most Kazbek class tankers would not experience this delay, however, because they normally transport clean cargo.

Tankers provide astern refueling of navy ships, but none has the deck machinery, support posts, or trained personnel necessary for underway replenishment alongside.

Merchant cargo ships also are used in support of naval operations, but not as regularly as tankers. In the event of increased deployment, a large force of merchant ships could be drawn upon to meet stepped-up fleet requirements for dry stores.

Aircraft. If the navy is to operate effectively in distant areas, some method is required for delivering high-priority supplies and spare parts to units away from home. Soviet aircraft, either civil or military, periodically fly to airfields near foreign ports used by Soviet ships. There are monthly and sometimes weekly military flights to Syria and Somalia. The Soviet commercial airline Aeroflot conducts flights almost every day to cities near Soviet naval ports of call, where supplies can be transferred to naval units. Soviet long-range naval reconnaissance aircraft and military transports frequently fly to Cuba and Guinea. On several of these occasions Soviet naval ships were in port in those countries. These flights almost certainly have been used at one time or another to transport mail and spare parts for delivery to the ships.

Peacetime Operating Practices

Routine Operations

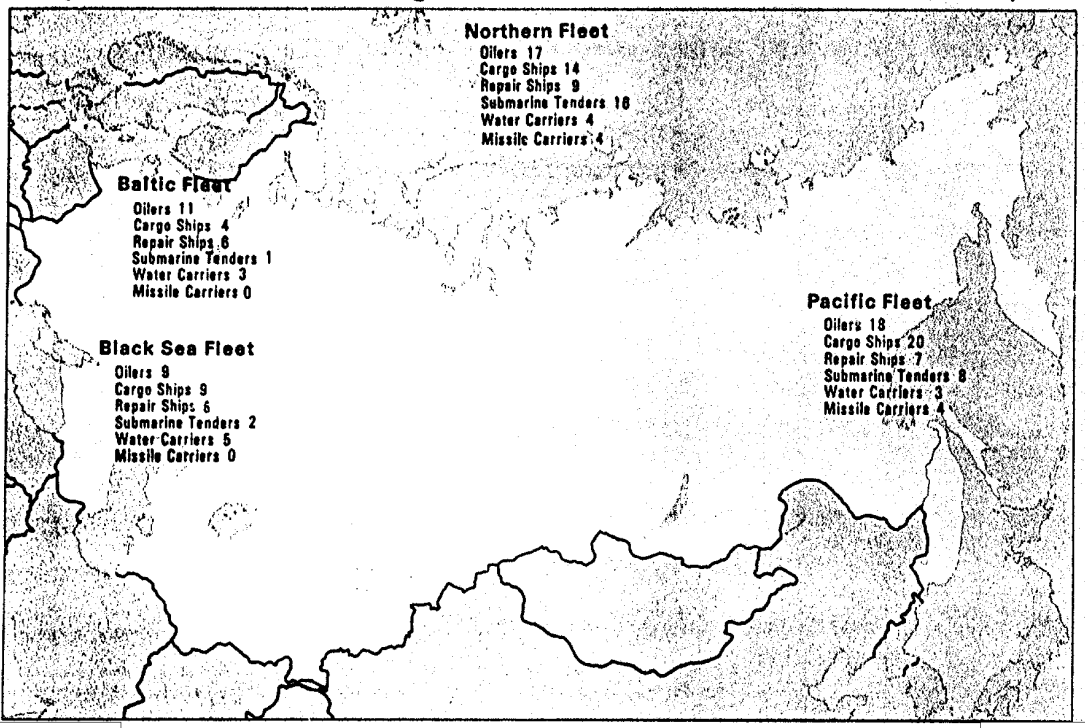
During the sixties the Soviet Rear Services, in order to support expanded naval operations, developed

a supply system centered on floating bases. Food, fuel, stores, ammunition, and spare parts usually are transferred while units are alongside a floating base. Fuel is the only supply item that to any extent is transferred while units are under way.

Major support ships are assigned to fleet areas in rough proportion to the fleet strength in principal surface and submarine combat units. A greater number of submarine support ships are in the Northern and Pacific Fleets, where most Soviet submarines are based *(see map below)*.

The main exception to this combatant-to-support ship pattern is that Pacific Fleet naval support ships have an oil cargo capacity almost double that of any of the other fleets. This is because the other fleets place greater reliance on merchant ship support. It also is in part a result of the presence in the Pacific Fleet of the largest Soviet naval oiler, the Akhtuba, which represents more than one-third of the total capacity of Pacific Fleet oilers. Formerly a merchant tanker,

Disposition of Soviet Logistic Forces 1 July 1976



this ship often supports long-term operations of naval ships in the Indian Ocean.

While in their home waters, Soviet naval support ships normally stay in port. Repair ships and submarine tenders provide daily support to ships in the harbor. Some small tankers deliver fuel to various ports in coastal areas, but most oilers usually remain in port preparing for their next cruise to distant areas.

Naval oilers and other support ships from all four fleets regularly support naval combatants in distant areas. Sometimes these support ships deploy in company with the combatants, while at other times they travel independently, rendezvousing periodically with ships in a broad operating area such as the Mediterranean Sea.

Throughout most of the year, about 10 percent of the logistic force is deployed in distant areas. In recent years the navy's larger oilers have been used far from home, with the result that they have a comparatively high rate of employment--about 30 percent at any given time.

The Atlantic. The Soviets normally station two naval oilers and one merchant tanker in the Atlantic. These units often refuel combatant ships that are transiting or operating in the North Atlantic or the Norwegian Sea. One naval oiler usually supports combatant units which operate from the port of Conakry.

Other types of logistic support ships usually do not provide services in the Atlantic. In an emergency, some rescue services or minor repair work, such as welding, probably could be provided by the Soviet fleet tug often on station in the Atlantic, or by the fleet tug in Cuba.* Numerous intelligence collection and hydrographic ships that often operate in the Atlantic also could provide some emergency support.

The Mediterranean. Soviet naval ships do not have unrestricted access to a major support facility in the Mediterranean. About a dozen major logistic support ships operate with the Soviet squadron there. A submarine tender, three merchant tankers, two naval oilers, a water carrier, and two cargo ships usually

* The navy has stationed a tug in Cuba for contingency purposes since 1970.

service ships in anchorage areas. A repair ship normally is present in Tartus, Syria, and the Gulf of Sollum anchorage in the eastern Mediterranean. The large storage barge, small ammunition ship, and other small support ships previously in Alexandria have relocated in Syria since President Sadat ousted Soviet ships from Egyptian ports in April 1976. Repair work on a limited number of ships can be carried out at the Tivat shipyard in Yugoslavia, but most ships must return to the Soviet Union for major repairs.

The Indian Ocean. There are no major shore-based repair facilities regularly available to Soviet naval ships in the Indian Ocean. Repairs can be performed, however, using the repair barge or the floating dry-dock in Berbera, Somalia.

Soviet ships could also be supported by the repair ship normally in the Persian Gulf or near the Horn of Africa.

Other support ships usually include at least one naval oiler, one merchant tanker, and a refrigerated cargo ship. The Soviets do not keep a water carrier in the Indian Ocean, even though most of their combat ships there are older units with poor distilling capabilities. They satisfy their needs by purchasing large amounts of water from Aden. Oilers sometimes take on water in Aden and later transfer it to combat ships.

The Pacific. Few support ships operate beyond the local waters of the Pacific Fleet, unless they are in transit to the Indian Ocean. One naval oiler normally supports a warship stationed in the Tsushima Strait, and on occasion an oiler operates with small task groups conducting exercises in the Philippine Sea or mid-Pacific area. A fleet tug is usually stationed in the mid-Pacific to provide emergency support to submarines. Merchant tankers seldom support naval operations in the Pacific. Some repair facilities, fresh food, and water are available in Singapore to naval auxiliaries but not to Soviet combat ships.

Availability of Supplies

Repair ships or tenders operating from an anchorage or a friendly port can provide most routine maintenance requirements. A recent article in a Soviet periodical pointed out that crews of Soviet combatant ships perform repairs at sea. The author also noted that some oilers and fleet tugs have welding and repair capabilities, but that there is a shortage of spare parts. Shortages that may exist do not appear to be a critical problem for routine operations in peacetime.

Munitions resupply is a negligible requirement for such operations, as cruise missiles and other types of ordnance are rarely expended by units outside home waters. Food and water usually come from naval and merchant support ships, but such supplies are also obtained during port visits.

Although the Soviets have enough fuel and tanker capacity to support routine peacetime operations, the navy has at times been exhorted to conserve fuel. In 1972, for example, an editorial in a naval journal noted that the crew of a certain cruiser was obligated to save at least 7,600 rubles' worth of fuel during the coming year. Last fall, Moscow began an overall campaign to conserve fuel by reducing waste and inefficiency. An editorial in *Pravda* urged that "every kilogram of fuel be treated carefully and its loss prevented."

Thus, resupply capabilities are not a critical factor in the conduct of routine operations in peacetime. The primary constraint to extended operations is likely to be budgetary.

Nonroutine Operations

Exercises. Each spring, naval ships of the four fleets conduct exercises of one to three weeks' duration outside their local operating areas. These exercises vary in intensity from year to year and from fleet to fleet.

The first major exercise, called Sever, occurred in 1968 in the Norwegian Sea. Two task groups, each

composed of three to five warships and one naval oiler, deployed from the Northern and Baltic Fleets. An amphibious landing group of 13 minor combatant ships which sailed from the Baltic to the Barents Sea was supported by six naval oilers, a cargo ship, a water carrier, and a repair ship. Only one merchant tanker was involved in supporting these ships during the exercise. No logistic constraints were apparent, but Sever was not a real test of the logistics system because of the relatively small scope of the exercise.

In 1970, Exercise Okean provided the first realistic test of resupply in a large-scale Soviet exercise. Logistic forces including repair ships, submarine tenders, cargo ships, water carriers, and naval and merchant oilers supported over 75 surface combatant ships operating as far as 2,000 nautical miles from Soviet bases for up to three weeks. Support ships deployed with exercise task groups. Two naval oilers and two merchant tankers sailed from the Black Sea to the Atlantic with a task group of five warships. Nine additional naval oilers from the Northern and Baltic Fleets supplied fuel for combatant ships in the North Atlantic and the Norwegian Sea. Seven merchant tankers and three naval oilers from the Black Sea supported operations in the Mediterranean.

Once some support ships reached forward positions, such as areas near the Faroe and Shetland Islands, they remained in an anchorage and occasionally rendezvoused with the surface combatant ships. Enough oilers were deployed so that it was unnecessary to shuttle them to home ports for resupply. Combatant ships interrupted their activity every two to four days to meet supply ships for fuel and water near the anchorages. (During routine operations Soviet warships refuel almost every day.)

In order to be flexible and responsive during a crisis or combat situation, Soviet warships almost certainly would try to maintain a larger reserve of fuel.

Resupply of food and munitions was not a factor in Exercise Okean because of its short duration and the

limited number of "live" firings. Repair capabilities, however, were somewhat limited.

(b)(7)(d)

Two other major exercises in the seventies have showed that logistic forces can support significant increases in Soviet naval operations away from home waters for periods of less than 30 days without serious degradation in overall combat readiness. In the spring of 1973, logistic forces supported more than 20 warships operating in the Norwegian and Mediterranean Seas and the North Atlantic. In 1975, during the second Okean exercise, more than 75 surface combatant ships operating worldwide were supported. Oilers provided fuel and water in the manner demonstrated in Okean 1970.

Crisis Periods. So far in the seventies, the Soviet logistics system has supported augmented forces of various sizes during periods of tension in the eastern Mediterranean, the Indian Ocean, the western Pacific, and off the west African coast. These forces have been smaller in number than those supported during the Okean exercises, but in most cases the units have been maintained for longer periods.

During the Jordanian crisis in the fall of 1970, the number of major Soviet surface combatant ships in the Mediterranean Sea more than doubled--increasing to 17 units--while the logistic force increased to 19 with the addition of 5 support ships, mostly oilers. Three years later, at the height of the Arab-Israeli war, the Soviets supported an expanded naval presence of 42 surface combatant ships in the Mediterranean by adding a cargo ship, a cruise-missile support ship, two naval oilers, and two merchant tankers to the 25 support ships already there. Throughout a 45-day period the Soviets provided fuel to combatant ships by shuttling tankers to and from Black Sea Fleet ports with no apparent limitation on the operations of the combat units.

In other parts of the world, the deployment of naval units in response to crisis situations has been less dramatic and thus less of a burden on logistics. Increases in naval forces in the Indian Ocean during

the Indo-Pakistani War in 1971, in the western Pacific during the mining of Haiphong harbor in 1972, and off the west African coast during the Angolan civil war in 1976 were small: two to six surface combatant ships, supported by two or three naval oilers or merchant tankers. The combatant ships did not appear to suffer from deficiencies in logistic support.

Major exercises and naval reactions during crises have demonstrated that the Soviet Navy is capable of supporting increased levels of out-of-area deployments for up to 45 days--at least so long as combat operations are not involved. Fuel, water, food, and other stores can be supplied as necessary, but maintenance and resupply of spare parts and munitions cannot be performed as effectively.

Estimated Wartime Capabilities

In wartime, the effectiveness of the Soviet naval logistics system would decrease sharply as combat operations progressed. Most support ships are unarmed and are too slow to keep up with Soviet combatants. Even in a limited war, supply ships would probably have to minimize their time in combat areas. Over an extended period, fuel, food, stores, and spare parts probably would have to be supplied in protected anchorages or ports outside the immediate combat area.

Once Soviet combatants expended their initial weapons load, they would be particularly vulnerable. Most Soviet warships carry relatively few reloads for their major weapons systems, and most support ships do not have the equipment for underway resupply of munitions.

During Period of Rising Tensions

In a period of rising tensions, the Soviets could deploy about 160 (some 75 percent) of their major surface combatant ships within 30 days. It appears that prior to an outbreak of hostilities the Soviet logistics

system could support such a force for about 60 days. After that period, the limited availability of supplies would necessitate a reduction in the size of the force.

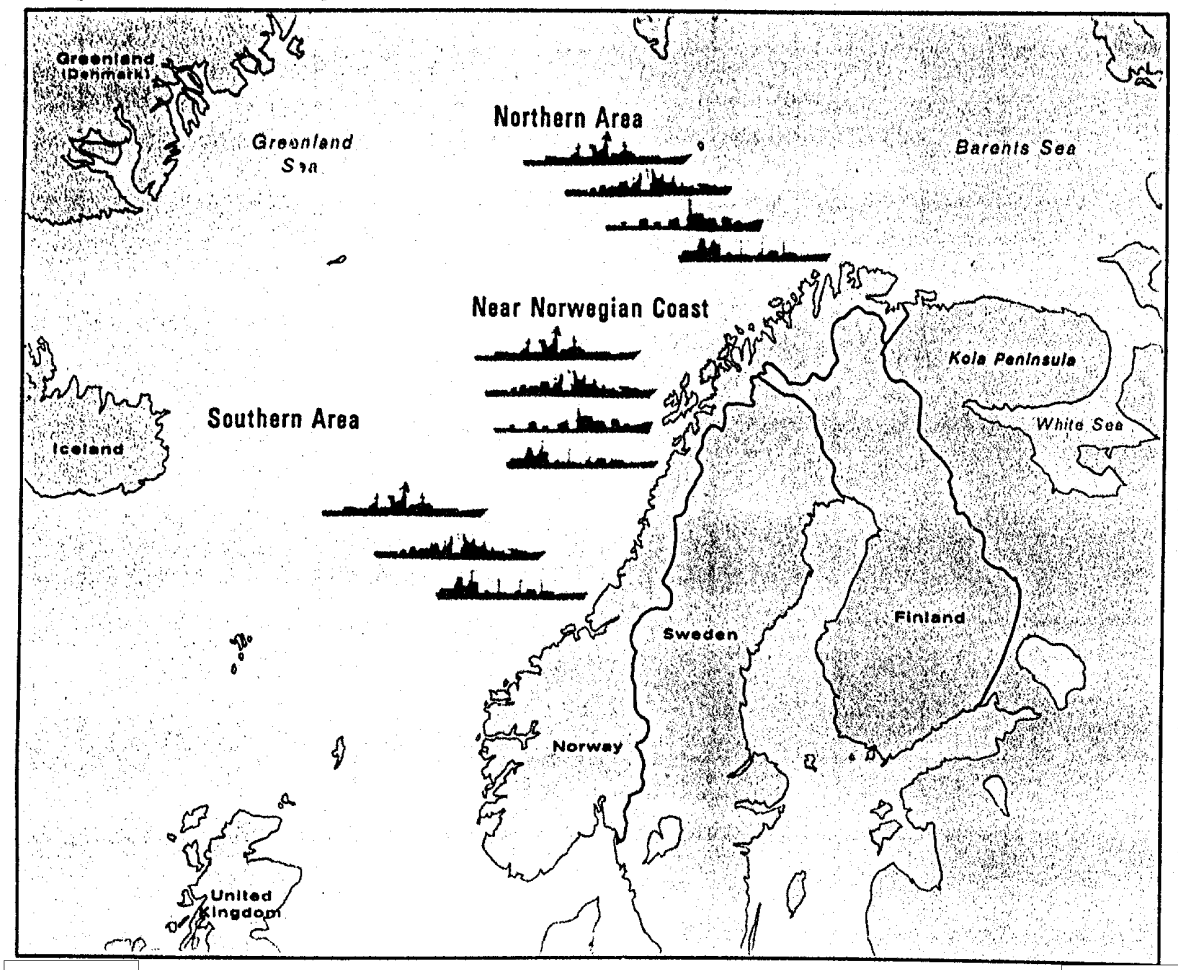
Model Scenario. In an attempt to assess Soviet resupply capabilities during a buildup of naval forces prior to the outbreak of a general war, a model of likely naval activity in the Atlantic theater was developed. The Atlantic would be a primary theater of naval combat in a general war, and is far enough from home bases to pose a realistic test of logistic capabilities. Activity in this area is treated apart from naval requirements in other geographic areas. Inputs to the model include estimates of fuel requirements for individual warships and fuel storage capacities of support ships.

The model assumes that a representative Soviet naval force in the Atlantic theater--given 30 days' warning--might include about 40 major surface combatant ships ranging in size from Sverdlov class cruisers to Petya class light frigates. A likely support force for these ships would comprise 14 naval oilers from the Northern and Baltic Fleets. The Soviets would still have resources to support operations within both fleet areas.

During this period the 40 combat ships would operate in three areas of the Norwegian Sea within 1,500 nm of the USSR *(see map on page 26)*, conducting antisubmarine and antiship surveillance operations and preparing for amphibious landings. In the southern Norwegian Sea, 10 warships would be supported by 5 support ships. In a broad area south of Bear Island in the northern part of the Norwegian Sea, 7 tankers would resupply 19 warships. The third group, consisting of 11 combat ships and 2 tankers, would support amphibious landings to be made on the northern coast of Norway. *(See table on page 27.)*

Most of the warships would not be accompanied by support ships while performing their missions. As necessary, the support ships would resupply the combat ships at

Disposition of Ships in Model Scenario



Ships in Model Scenario

	Warships	Support Ships
Southern Area		
	Class	**Class of Oiler**
	1 Kresta I Cruiser	1 Dubna
	2 Kresta II Cruisers	1 Chilikin
	2 Krivak Destroyers	1 Kazbek
	2 Kashin Destroyers	2 Uda
	2 Kanin Destroyers	
	1 Kotlin Destroyer	
Northern Area		
	1 Sverdlov Cruiser	1 Kazbek
	1 Kresta I Cruiser	1 Uda
	2 Kresta II Cruisers	2 Altay
	2 Krivak Destroyers	3 Khobi
	1 Kanin Destroyer	
	7 Petya Frigates	
	5 Riga Frigates	
Near Norwegian Coast		
	1 Sverdlov Cruiser	2 Khobi
	3 Kotlin Destroyers	
	5 Petya Frigates	
	2 Riga Frigates	
Total	40 Warships	14 Naval Oilers

rendezvous points. In the southern Norwegian Sea, some of the more modern support ships would stay with the naval combatants.

The following assumptions were made to facilitate computations:

-- All ships have a full load of fuel when they arrive on station in the Norwegian Sea.

-- Supply ships in each of the three support groups operate at a speed of 10 knots and travel in a convoy together to and from port.

-- Combat ships are required to keep a 50-percent reserve of fuel at all times.

-- An unlimited supply of fuel is available in port, and supply ships can refuel in port in less than one day.

-- Supply ships have a 15-percent fuel reserve requirement.

A model using this Norwegian Sea scenario has been designed to accept as inputs computations concerning the amount of fuel consumed daily by the combat ships at different speeds, the amount of fuel available in the supply ships, and the time it would take for the supply ships to transit to a port, refuel, and return to their respective combat forces. Transit times are based on the approximate distance of each group from ports in the Northern and Baltic Fleets.

Computations show that the endurance of the supply ships would not be a limitation in the conduct of most extended operations. The results of model simulation, using daily consumption rates and supply ship capacities, indicate that during an extended period of rising tensions, Soviet naval tankers would have enough fuel to support warship operations in the Norwegian Sea for at least 60 days. The logistic constraints of this scenario reflect the worst situation for the Soviets with regard to the availability of tankers. In most other theaters of potential major military conflict,

such as the eastern Mediterranean, Soviet naval and merchant tanker lift capacities are greater.

In the model scenario, the group of ships in the southern portion of the Norwegian Sea probably would be spread out--some would set up antiship barriers and others would be searching for foreign submarines. At times, these ships might steam at speeds of over 15 knots, but it seems unlikely that the average speed would be this high for long. Even if speeds of 15 knots were maintained, the study shows that enough fuel would be available for at least 90 days of operation in the southern area *(see table on page 30)*. It would take from 10 days to two weeks for a convoy of supply ships to reach port, refuel, and return to station, depending on whether Baltic or Northern Fleet ports were used. Some of the supply ships would have to return home independently after they delivered their fuel, or the warships would have to operate at reduced speeds, for the warships to maintain a 50-percent reserve fuel capacity after 91 days.

In the northern portion of the Norwegian Sea, similar antisubmarine operations and preparations for antiship engagements would be carried out. Soviet combat ships in this area would be able to operate for at least 35 days at average speeds of up to 15 knots before the naval tankers would have to return home for refueling. Because these ships would be close to Northern Fleet ports, the naval tankers would return to station in six days or less. During this period the combat ships would have consumed less than half of their fuel. Thus they could stay at sea indefinitely at average speeds of 15 knots or less.

The combat ships that would be prepared to provide gunfire support and antisubmarine protection for landing operations against Norway also would be able to stay on station indefinitely. These ships could operate at speeds of up to 20 knots, because their two supporting naval tankers could reach home port and be back on station in three days or less.

The total amount of fuel available for consumption in the 14 supply ships and 40 combat ships, assuming a 50-percent reserve requirement, is approximately 115,000 metric tons (113,000 cargo tons). This would be enough

Endurance of Ships in Model Scenario

	Warships' Average Speed (knots)	Supply Ship Transit Time to Home Port and Return (days)	Warships' Endurance Before Refueling (days)	Duration of Support Ship Supply (days)	Duration of Total Supply Before Returning to Port (days)
Southern Group					
	5	15	30	278	308
	10	15	16	151	167
	15	15	9	82	91
	20	15	5	44	49
	25	15	3	24	27
Northern Group					
	5	6	26	133	159
	10	6	14	69	83
	15	6	7	36	43
	20	6	4	18	22
	25	6	2	9	11
Group Off Norwegian Coast					
	5	3	24	17	41
	10	3	13	9	22
	15	3	7	5	12
	20	3	4	3	7
	25	3	2	1	3

fuel to satisfy the consumption requirements of all 40 combat ships for almost 60 days at average speeds of 15 knots *(see table below)*. This period of time could be expanded indefinitely if some of the supply ships returned home independently to refuel.

Warship Fuel Consumption
(Metric Tons)

Speed (Knots)	30 Days	45 Days	60 Days	90 Days
5	16,184	24,277	32,370	48,555
10	30,389	45,583	60,782	91,165
15	57,455	86,182	114,910	172,365
20	109,270	163,906	218,542	327,812
25	209,702	314,554	419,405	629,107

During Combat

Resupply efforts during general combat operations would be effective only in areas within protected lines of communication. Even if an enemy did not destroy Soviet support forces, naval combat operations would be restricted by long, slow-speed refuelings.

Most Soviet oilers have only one transfer station astern or one on each side of the ship. Because they are limited to the use of just one hose, it probably would take from four to six hours, at speeds of less than 10 knots, to refuel most ships that were half full. Observed Soviet refueling times are consistent with this estimate. This limits the ability of the warships to conduct operations and would make them vulnerable to attack. The support forces also would be particularly vulnerable in a conflict.

Soviet doctrine appears to favor resupply operations in harbors or other areas where enemy forces are not likely to be encountered. Any attempt to move supplies over the open ocean against opposition would require that Soviet combatant ships be diverted from other missions to protect the virtually defenseless support ships. It is doubtful that the Soviets could

provide adequate air defense for supply ships beyond range of land-based air cover.*

Repair ships and tenders do not carry enough spare parts and equipment for the major repairs that would be needed following combat. Similarly, most Soviet combatants could not obtain missile reloads. Thus it appears that the Soviet logistics system would be ineffective if the USSR were engaged in sustained general combat operations.

Prospects for the Future

Soviet writings reflect a certain displeasure with the capabilities of the navy's rear services. In 1970, one author noted that there was not enough underway replenishment during Exercise Okean, and he criticized theoreticians for not fully appreciating the problem of logistics. Soviet writings indicated in 1974 that the rear services had been reorganized to give more weight to mobile units, including complex supply and refrigerator ships. The need for better quality control over fuel also has been emphasized. Most calls for improvement or expansion come from officers in the rear services, but other authors as well--including Admiral Gorshkov, commander in chief of the Soviet Navy--have highlighted the importance of naval logistics.

The Western intelligence community has long recognized the Soviets' deficiencies in underway replenishment. For many years, construction of new and improved supply ships has been forecast, but only a few have appeared and even these have not made good use of their modern equipment. Whether the navy will be willing to allocate the funds and training time necessary to correct these deficiencies will depend a great deal

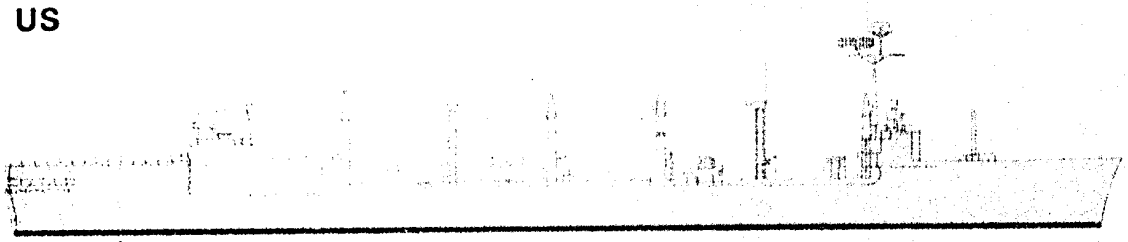
on the path that Soviet military strategy will take in the future.

The decision of the military to authorize the construction of at least three V/STOL aircraft carriers has already had some impact on the plans for the naval logistic force of the future. In 1975, the largest support ship ever constructed for the Soviet Navy was observed fitting out at a shipyard in the Black Sea. The ship is over 200 meters (almost 700 feet) long and about 25 meters (82 feet) wide. It will have a helicopter which, for the first time in the Soviet Navy, will permit airborne transfer of cargo. This ship bears a remarkable resemblance to the US Wichita class oiler, which provides rapid replenishment of petroleum and munitions at sea and has a limited capacity for dry stores.

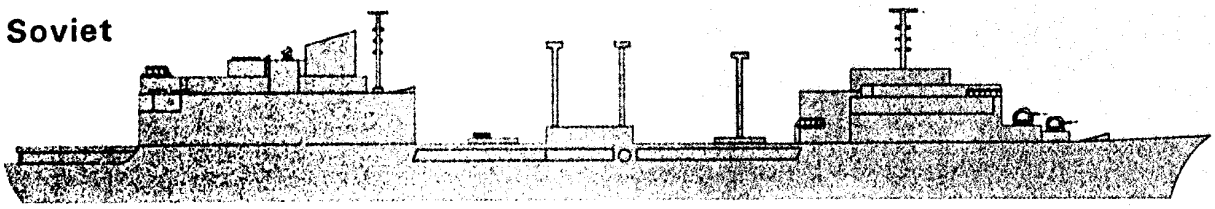
The timing of this Soviet support ship's development parallels that of the first Kiev class V/STOL aircraft carrier; the aircraft carrier is now operational and the support ship probably will be operational

Comparison of US Wichita Class Oiler and New Soviet Supply Ship

US



Soviet



later this year. What appears to be another naval support ship is in the early stages of construction. These ships will add to the navy's underway replenishment capability in distant areas, but we do not yet know how many will be produced or how well they will perform.

Other recent Soviet acquisition and construction activity, however, reflects a more traditional, limited investment approach to the logistic force. Modern, light replenishment oilers are being built in Finland, but the Soviets have ordered only two. A fourth Chilikin class replenishment oiler has finally been launched--five years after the first one was completed. There is no other evidence of construction of support ships that would be of particular utility in distant areas.

In summary, the quantity and quality of modern oilers will increase over the next five years, but Soviet underway replenishment deficiencies are unlikely to be overcome within this time. Shortcomings in repair capabilities and in the number of ammunition transfer ships will take even longer to correct.