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DIRECTORATE OF
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Intelligence Memorandum

The Soviet Attack Submarine Force: Evolution and Operations

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September 1971

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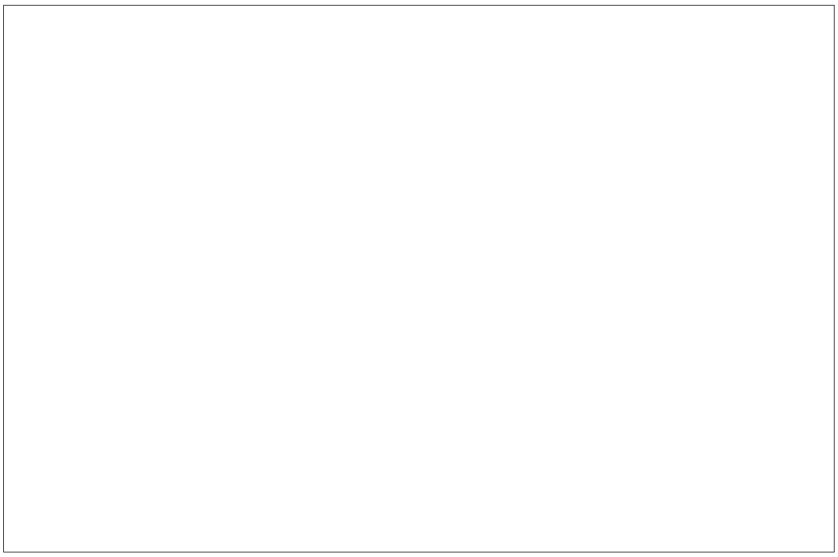

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CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
September 1971

INTELLIGENCE MEMORANDUM

The Soviet Attack Submarine Force: Evolution and Operations

Introduction

The Soviets view the submarine as their primary naval weapon system. The Soviet navy now has some 335 submarines, the largest submarine fleet in the world. About 55 of these have a strategic strike mission. The remainder--some 280 attack submarines--is the principal force for strategic defense against Polaris ballistic missile submarines, for countering aircraft carriers, and for interdicting sea lines of communication. The attack submarine force is also an important contributor to ocean surveillance.

About 150 of the attack submarines are obsolete by today's standards, but 130 are modern long range diesel and nuclear powered units. The Soviet Union now has about 60 nuclear powered attack submarines, slightly more than the United States. The proportion of first line attack submarines is increasing, however, through a large construction program and the retirement of obsolescent units.

Since 1963, the number of days on distant patrol by the Soviet attack submarine force has increased sevenfold. The most dramatic increase has been in the Mediterranean where a small representation in the early Sixties has grown to the most concentrated and continuous Soviet submarine patrol effort. Deployments into the Indian Ocean began in 1968 and into the Caribbean Sea the following year.

Note: This memorandum was prepared by the Office of Strategic Research and coordinated within CIA.

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This report traces the evolution in the missions of the Soviet attack submarine force since 1950 and describes the various classes of attack submarines the Soviets have built. It briefly describes the operations and capabilities of the force and speculates on trends in force composition, capabilities, and operations. Selected characteristics of Soviet attack submarines are presented in an annex on pages 38 and 39. A summary begins on page 40.

Contents

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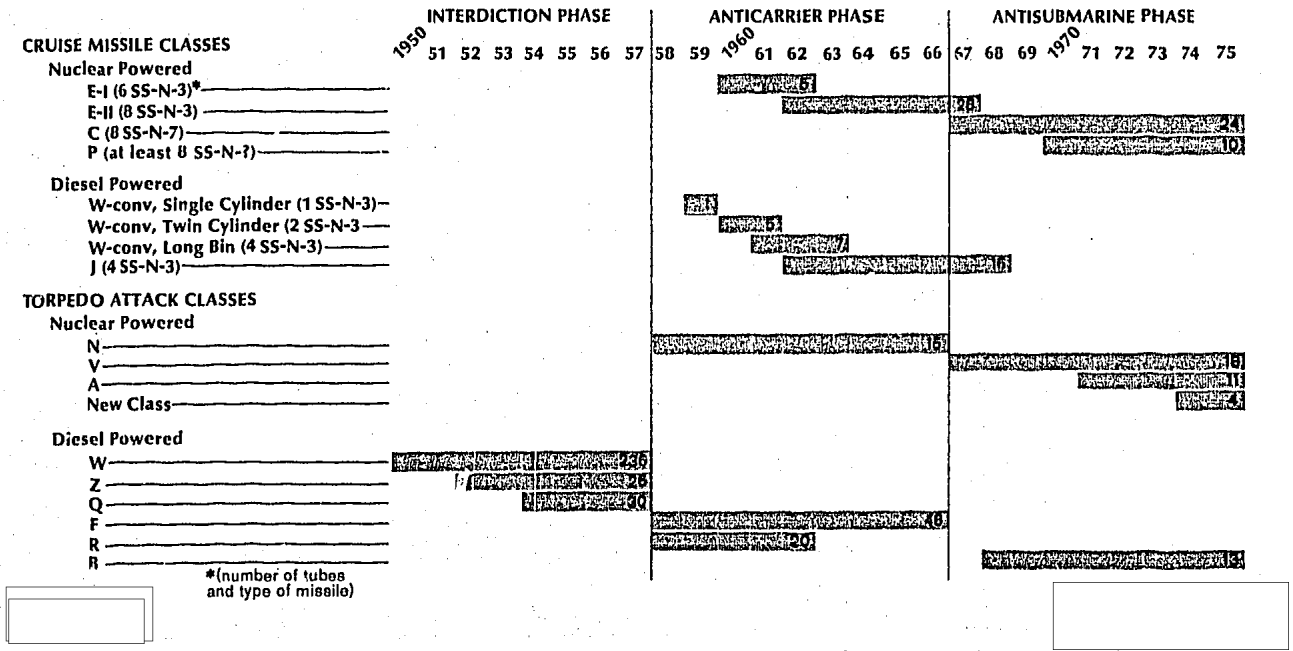
Evolution of the Attack Submarine Force and Its Missions

During the past 20 years, the Soviet attack submarine force has developed in three general phases (see chart below). Before 1957 the Soviets procured a large number of submarines to provide a sea line interdiction capability. From that time until about 1966, however, the focus of their efforts shifted to the development of a force of cruise missile submarines to cope with the threat of US aircraft carriers. Another shift in emphasis became apparent in 1967 when the Soviets introduced the first in a series of attack submarines evidently designed for antisubmarine warfare--a natural response to the large Polaris force which the US acquired during the early Sixties.

Chronology of Soviet Attack Submarine Procurement 1950-1975



The figures within the bars are the estimated numbers of submarines of the indicated class procured or to be procured within the time periods covered. These numbers do not represent units now operational in the Soviet attack submarine force. Many older units have been sold or transferred to other countries, retired, lost at sea, or converted to different configurations, and some of the newer submarines are still undergoing fitting-out, testing, and trials. Table 1, on page 23, shows the current fleet distribution of the Soviet attack submarine force.

Growth of Interdiction Force, 1950-1957

After World War II, the Soviets recognized that the outcome of a future war with the West might depend on Soviet ability to disrupt or sever the US supply route to Europe and to defend the sea approaches to the USSR.

Impressed with the success of German interdiction efforts during World War II, Stalin evidently decided on a massive submarine procurement program as his solution to this problem of interdiction--possibly as many as 1,000 new submarines were planned to be built. The Soviets also studied German construction methods and designs and used expatriated Germans to work on the program.

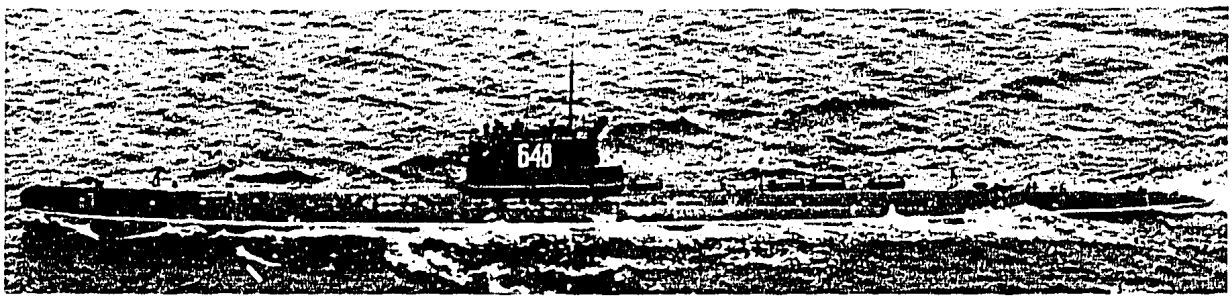
In 1957 the Soviets stopped far short of their goal of 1,000 units. As shown in the tabulation below, 292 submarines of the W, Z, and Q classes (see photographs on page 7) had been constructed, fewer than a third of those originally planned:

Class	Number built	Days on station per patrol	Patrol radius (nm)
W	236 *a*	20	1,200
Z	26 *b*	20	2,400
Q	30	25	coastal operations

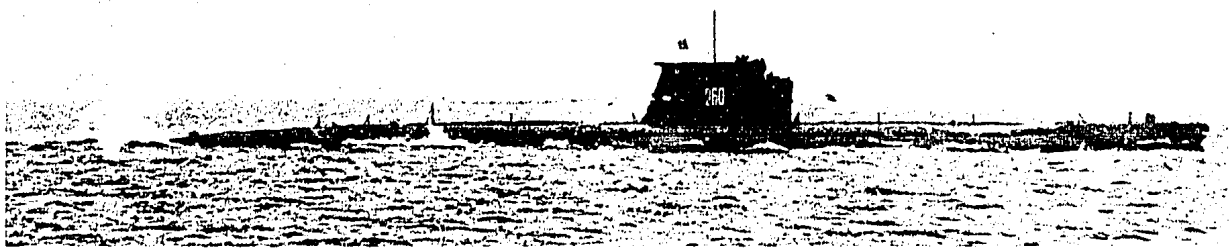
a. Thirteen units were converted to fire cruise missiles.

b. Six of these units were converted to fire ballistic missiles during 1955-1957, but three were later reconverted to attack types.

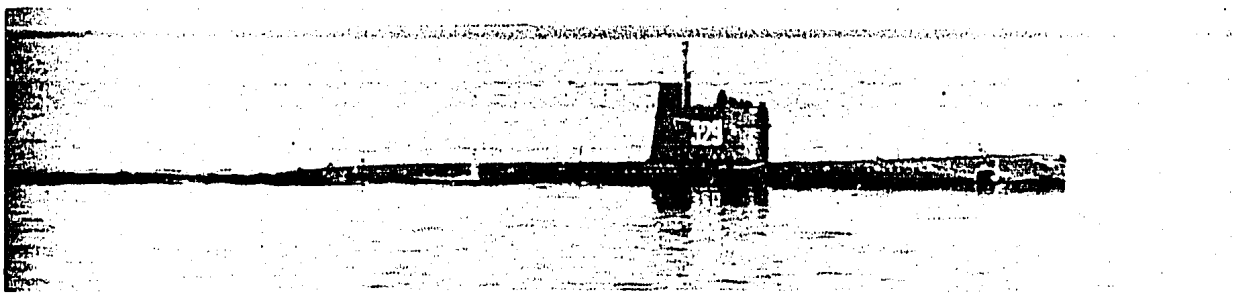
Torpedo Attack Submarines
Procured During Interdiction Phase, 1950-1957



The procurement program for the medium range W class diesel powered submarine was the largest ever undertaken by the Soviets. About 95 units are still operational.



The Z Class diesel powered submarine was the first Soviet long range attack submarine. A conversion of this class in 1955-1957 resulted in the first Soviet ballistic missile submarine—six units were so converted. Three of these were subsequently reconverted to attack types, and there remain 23 such types now in operation.



The Q class diesel powered submarine is a coastal patrol unit and because of its short range has been limited to operations in the Baltic and Black Sea areas. Some 9 units remain operational.

W and Q class submarines, operating from the Northern Fleet, could not be effective against US sea lines of communication to Europe--which are some 1,800 to 2,400 nm distant. The W class, under optimum conditions, can remain on a patrol station located about 1,800 nm from its base for about 10 days. It is better able to defend the sea approaches to the USSR and interdict naval vessels in the Norwegian Sea, however. Soviet submarines in the Baltic probably would be denied access to the open sea. Of the submarines built during this phase, only the few long range Z class units are suited to reach US sea lines to Europe and conduct lengthy operations. (See annex on pages 38 and 39 for selected characteristics of Soviet attack submarines.)

The development of nuclear powered submarines in the US undoubtedly hastened the end of the large Z, W, and Q class procurement program. The Soviets were aware of the capabilities of nuclear submarines and were proceeding with the development of the N class--capable of operating 20 days on station with a 5,800 nm patrol radius, or 30 days at 4,300 nm.

The Soviets have continued to improve their sea line interdiction capability, but in the late Fifties a more serious threat was recognized--the US aircraft carriers and their potential for nuclear strike on the Soviet Union.

Development of Anticarrier Capability, 1958-1966

To meet the carrier threat, the Soviets developed cruise missile submarines capable of striking

a carrier before its aircraft could be launched (see photographs on pages 10 and 11).

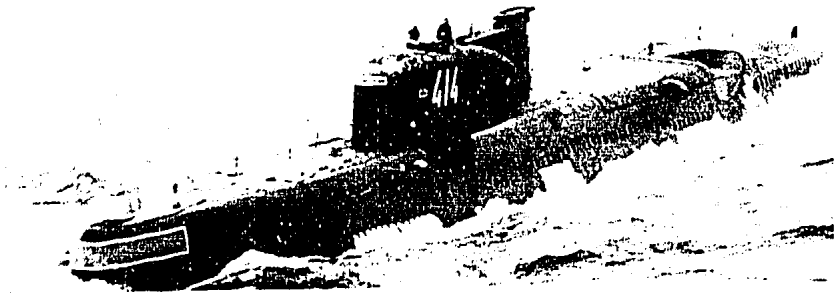
Soviet efforts to launch cruise missiles from submarines began about 1959 with the conversion of W class units to carry one, two, and four launch tubes. Some units had four launch tubes built in the sail, others had launch tubes mounted on the deck. The Soviets converted 13 W class submarines to carry a total of 39 launch tubes.

Several new classes of cruise missile submarines were being designed while the conversions to the W class submarines were under way. First was the nuclear powered E-I class capable of firing six cruise missiles. Only five E-I units were produced. Before the E-I program was completed, two new cruise missile submarine classes appeared--the nuclear powered E-II and the diesel powered J. The E-II has eight missile tubes but otherwise is similar to the E-I. The Soviets built 28 E-II units and 16 of the J class, which has four launch tubes.

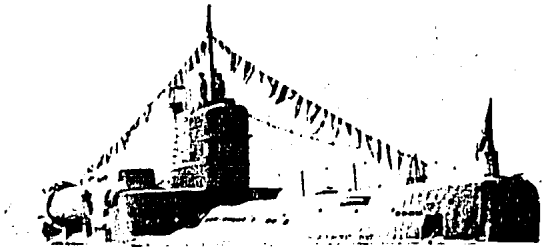
In all, 49 E-I, E-II, and J class submarines with a total of 318 launch tubes were produced by 1968. All were equipped with the SS-N-3 cruise missile with a range of about 250 nm.

The Soviets did not neglect interdiction while they were developing the anticarrier capability. Three classes of torpedo attack submarines totaling 83 units were built: 15 units of the N class, the first Soviet nuclear powered submarine; 48 units of the long range diesel F class; and 20 units of the

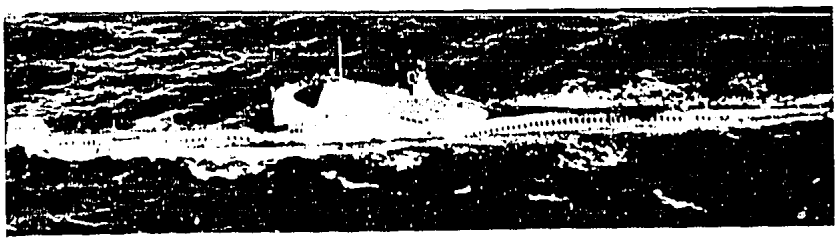
Diesel Powered Cruise Missile Submarines Procured During Anticarrier Phase, 1958-1966



The J class is a diesel powered cruise missile submarine and has four missile tubes for surface launching. All 16 units are still operational.



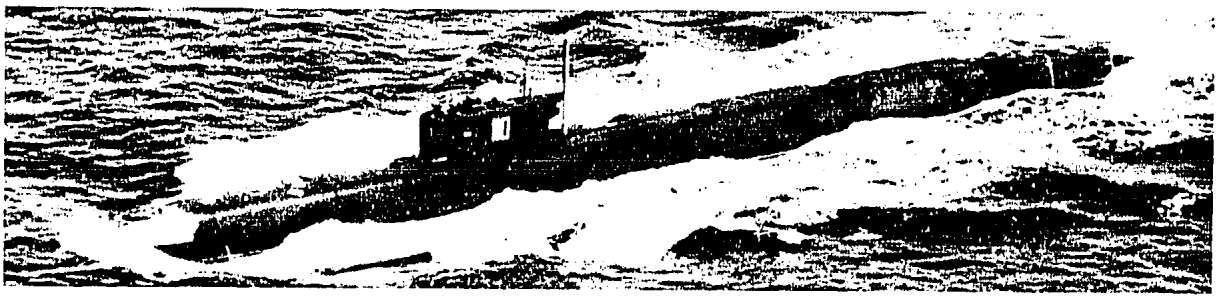
Some W class submarines were converted to fire cruise missiles from a surfaced position. The Twin Cylinder conversion, shown above, had two missile tubes on deck behind the sail. Five units were converted, and all are still operational.



Long Bin was another W class conversion to fire cruise missiles while surfaced. It had four missile tubes built into an oversized sail. Only seven units—all still operational—were converted.

Nuclear Powered Cruise Missile Submarines Procured During Anticarrier Phase, 1958-1966

The E-I class was the first Soviet nuclear powered cruise missile submarine. The submarine has to surface to fire its missile. Five units of this class were constructed but are now being converted to torpedo attack submarines by removal of their missile tubes. Three converted units are probably now operational.



The E-II class nuclear powered cruise missile submarine is similar to the E-I but has eight missile tubes. All 28 units remain operational.

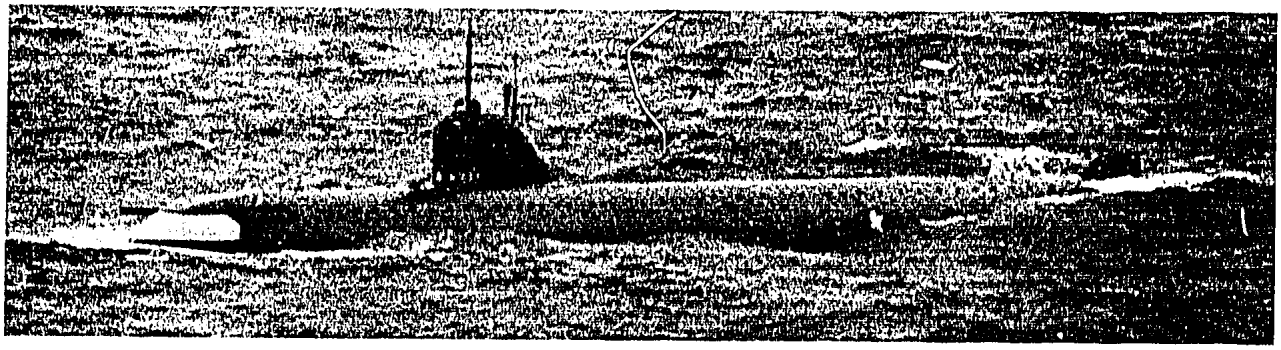
medium range diesel R class. (See photographs on page 13.) Two of these new classes, the N and F, improved Soviet interdiction capability because of their greater range and endurance. The R class was an improvement over the W class in that it could operate at increased depth for greater periods of time.

In addition to the 13 W class units converted to carry cruise missiles, a total of 132 new attack submarines for anticarrier and interdiction operations were built during the period 1958-1968, as shown in the following tabulation:

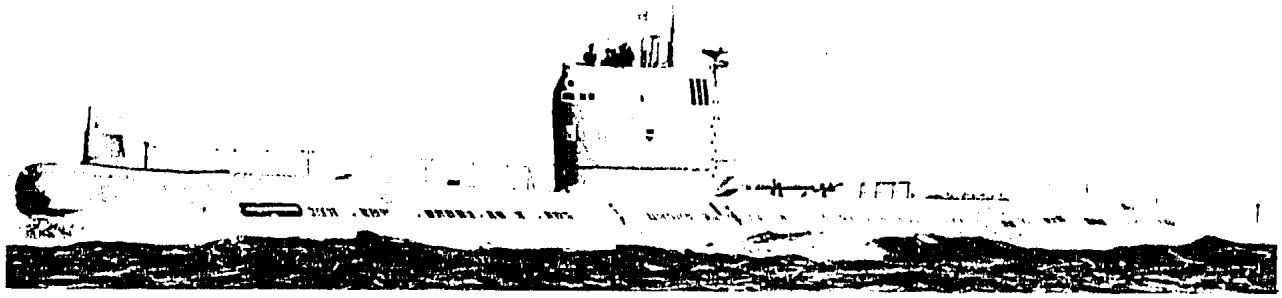
Class	Type	Launch tubes per unit	Propulsion	Number built
E-I	Cruise missile	6	Nuclear	5
E-II	Cruise missile	8	Nuclear	28
J	Cruise missile	4	Diesel	16
N	Torpedo attack	-	Nuclear	15
F	Torpedo attack	-	Diesel	48
R	Torpedo attack	-	Diesel	20
			Total	132

The Soviets continued to build diesel as well as nuclear powered submarines during this period. Diesel submarines are cheaper to produce and operate--about one-third the cost of a nuclear powered unit--but economics alone may not have been the reason. The Soviets may have concluded that these diesel submarines might be needed in case of setbacks in their nuclear program. Their first nuclear powered class--the N--did have difficulties, occasioned by breakdowns of its propulsion system. Early operations of the N class were cautious, with the submarines being shepherded closely by surface units for assistance when needed.

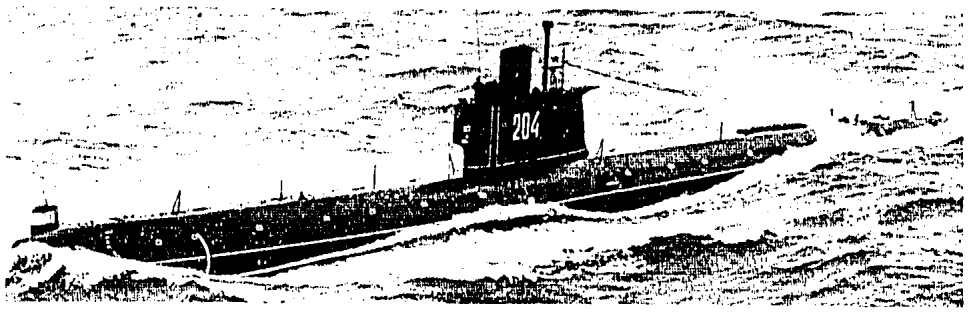
Torpedo Attack Submarines Procured During Anticarrier Phase, 1958-1966



The N class was the first Soviet nuclear powered submarine. Bow diving planes are shown extended in this photo. One unit of the N class was lost in the Atlantic in 1970. The remaining 14 units built are still operational.



The F class, the Soviets' second long range diesel powered submarine, probably is an improved version of its precursor, the Z class. Of the 48 units built, at least 45 are known to be still operational.



The R class diesel powered submarine is an improved version of the W class—it can dive deeper and remain submerged longer. Six of these units were sold to the UAR. The remaining 14 are still operational in the Soviet fleet.

The Soviets improved their anticarrier capability with nuclear propulsion and cruise missiles, but their achievements were overtaken by a naval threat more potent than the aircraft carrier--the Polaris ballistic missile submarine. These submarines not only have more strategic attack potential than aircraft carriers, but also are more difficult to detect and track. The Soviet attack submarines developed for interdiction and anticarrier missions had only limited ASW capabilities and had no capability to cope with the Polaris force.

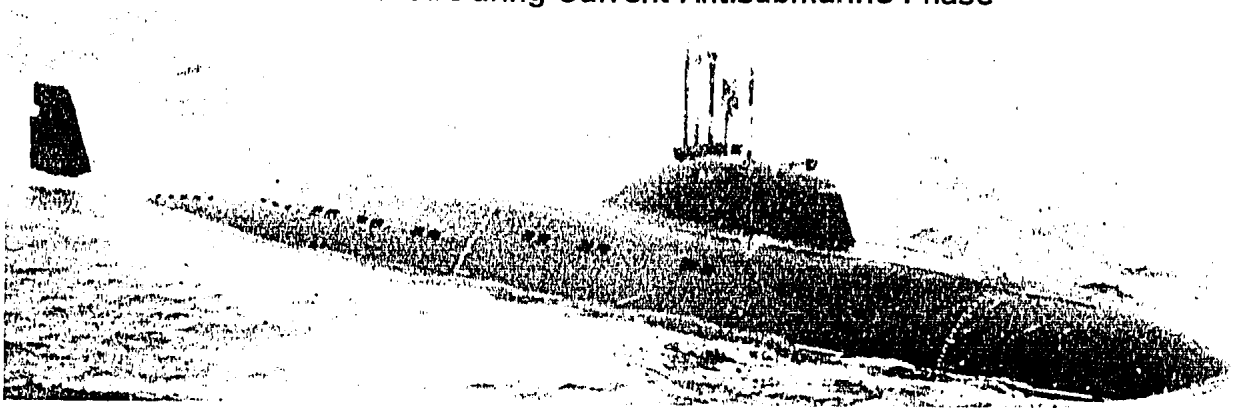
Search for Antisubmarine Capability: The New Attack Classes

To counter the Polaris threat, which developed in the early Sixties, the Soviets have improved their surface ships and naval aviation force, but the emphasis has shifted toward developing advanced antisubmarine warfare submarines. This has been evident in the introduction of five new attack submarine classes since 1967. Three of the new classes (see page 15) are evidently designed for an ASW role. The two other identified new classes carry cruise missiles, but could be employed in either an anticarrier or ASW role.

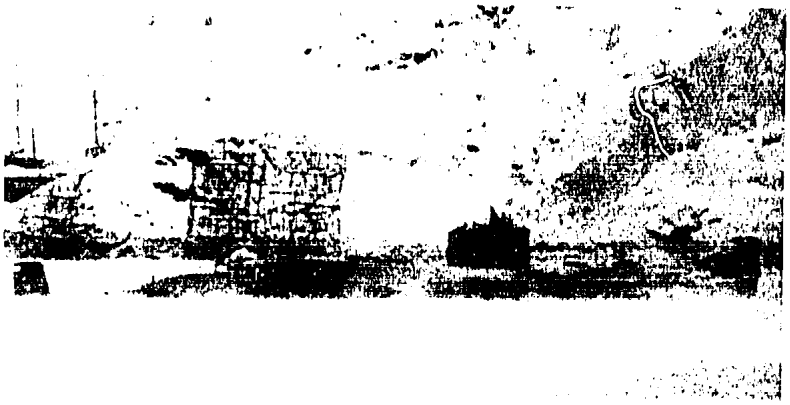
The Soviets have stated publicly and in classified journals that the submarine is the most effective counter to the Polaris threat. To this end they have incorporated greater speed, advanced sonar, and possibly increased depth capability and new weapons in their new classes of submarines.

Because ballistic missile submarines are difficult to detect in the open ocean, one method of maintaining contact with or countering them is to trail them from their operating bases. Two prerequisites for trailing other submarines are sufficient speed and a sonar system capable of maintaining continuous contact with the target--with active or passive tracking devices.

Attack Submarines
Procured During Current Antisubmarine Phase



The nuclear powered V class—the best Soviet ASW submarine—is the fastest operational submarine in the world—about 32 knots. There are eight operational units of this class.



The B class submarine is the newest diesel powered submarine built by the Soviets. The photograph shows a temporary ice breaker fitted to the bow.

The A class is the smallest of the new nuclear powered attack classes—about 250 feet long. It appears to be intended for deep diving and high speed. The first unit is not yet operational.

V Class

The V class torpedo attack submarine, the first unit of which became operational in 1968, may represent the first Soviet attempt to develop an antisubmarine submarine. There are now eight V class units operational, and, at current production rates, eight more will be operational by 1975. This class is nuclear powered and is probably capable of speeds up to 32 knots. A submarine believed to be a V class has engaged in operations with a Y class nuclear powered ballistic missile submarine which may have been an ASW escort operation. The V class also has frequently patrolled Western submarine transit routes. The Soviets have made some progress in quieting these submarines, but their noise levels are still higher than those of US nuclear submarines, and too high for covert trailing operations.

B Class

The ability of the B class diesel submarine to get under way quickly and its quiet operational aspects are advantageous in detecting submarines approaching waters contiguous to the USSR. A diesel submarine can get under way without time-consuming preparations, providing quick response to a coastal ASW alert. In contrast, nuclear submarines require several hours for propulsion plant startup. Moreover, a diesel submarine, submerged and operating on its battery, is inherently quieter than a nuclear submarine. Its lack of speed and endurance, however--a maximum of 20 knots for one hour--weighs against the use of the B class as a trailing submarine. This class became operational in 1968, and five are now in service. If production continues, a total of 13 units is projected for 1975.

A Class

The A class is the smallest Soviet nuclear powered submarine, about 250 feet long.

The first submarine of this class was launched in April 1969 in Leningrad. It spent about 18 months in a fitting out position between two barges used to support fitting out activities in connection with nuclear powered attack submarines. In October 1970, this unit and its support barges departed the shipyard and probably were transferred through the inland waterway system to the Northern Fleet area where nuclear submarines built in the Baltic area normally undergo trials.

It is suspected that the A class may have characteristics different from those of other new classes of submarines. This is suggested because of its long fitting out period at the building yard and the fact that a second unit has not been launched. The long fitting out period could mean that either advanced weapons, sensors, or other technical systems may be involved. It is also possible that production has been delayed because of "bugs" related to hull or propulsion systems.

The A class may represent a further step in the Soviet search for a suitable ASW submarine. At present, the V class is the best candidate but Soviet naval statements indicate a continuing interest in submarines that are faster, quieter, deeper diving, and equipped with better sensors than earlier models.

The first A class probably will be operational by the end of the year. A possible nine units could be operational by 1975.

Possible New ASW Weapon

The large bow torpedo tube shutters on at least two and possibly all of the new classes of attack submarines may indicate that they carry a new or larger weapon that could have ASW applications. These shutters are about three feet in diameter, in contrast to the older attack submarines which have two-foot shutters.

The new or larger weapon may be rocket propelled. The Soviets are known to have worked for nearly a decade on a rocket-torpedo. If there is a new weapon on the new attack submarines, it could be similar to the US MK-48 torpedo or possibly a SUBROC.

Continued Concern for Carrier Threat

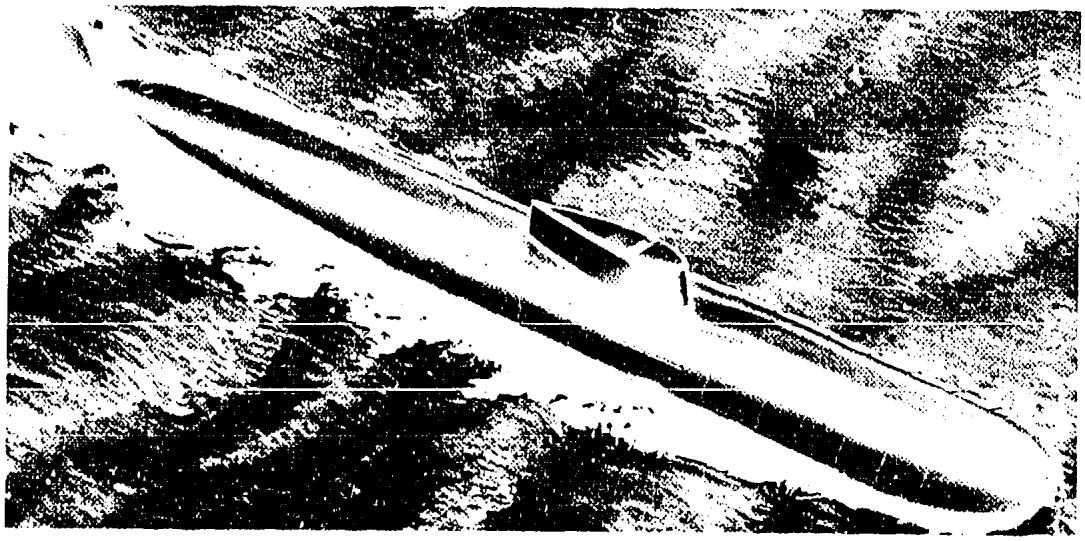
Despite the recent interest in the ASW mission, the Soviets continue to demonstrate their concern over US aircraft carriers. They probably view the carriers as a many-sided threat--a nuclear strike potential against the USSR, a threat to Soviet naval forces, and an intervention force. The C and P classes (see page 19) represent a continuation of the cruise missile response to the carrier, giving the attack submarine force a submerged-launched cruise missile capability in addition to the surface-launched one.

C Class

The nuclear powered C class is an improved antiship or ASW submarine, the first unit of

New Cruise Missile Submarines

The C class nuclear powered cruise missile submarine is the first Soviet submarine able to fire its cruise missiles from a submerged position. It carries eight SS-N-7 antiship cruise missiles. It probably also has an ASW capability. Seven units of this class are now operational.



The P class is the largest of the new nuclear powered attack classes—348 feet long—and carries at least 8 cruise missiles. It is believed to have an ASW capability. One unit of this class is operational.

which became operational in 1968. Seven are now operational and as many as 21 units could be operational by 1975. This submarine carries eight SS-N-7 antiship cruise missiles which have a range of about 30 nm. They can be submerged launched and require no external target acquisition platform. Earlier cruise missile submarines had to receive target information from another source and had to surface to fire their missiles. The C class probably has ASW capabilities also, either for self-protection or for a secondary role as an ASW submarine. It appears to be similar to the V class in such characteristics as hull streamlining, torpedo weapons system, and propulsion. The C class, with a speed of 27 knots, is probably slower than the V class.

P Class

Little is known about the speed, noise characteristics, and sonar of the P class. It probably has antiship and ASW capabilities similar to those of the C class. The P class is larger than the C class, is nuclear powered, and is believed to carry at least 8 cruise missiles. Information on the characteristics of the missile carried by this submarine is lacking. The first P class became operational in 1971. A total of seven operational units is projected by 1975.

Conversion Programs

Conversion of older attack submarines may also contribute to Soviet ASW and interdiction

capabilities. Cruise missile launch tubes are being removed from the E-I class submarines and it is possible that a new sonar is being added. Also, three of the six Z class units that were originally converted to fire ballistic missiles have been reconverted to torpedo attack submarines by removing their missile launch tubes. Although the specific purpose of these conversion programs is not known, both appear to be ASW related.

Possible New Class

Possible Soviet intentions to develop and build a new class of attack submarine in the next five years or so are not clear. Because the characteristics of the newest attack submarine--the A class--are not known, it is difficult to determine whether another new class will be required soon.

By 1975, the C, V, and B classes will have been in production for about nine years and should be ready to be phased out of production during the mid-Seventies leaving only the P and A classes still under construction. If the C, V, and B classes phase out of production, it seems likely that one of the three shipyards building these submarines--Gor'kiy, Admiralty Leningrad, or Komsomol'sk--would continue to build submarines, but of a more advanced type, based on operational experience gained from the present classes.

The first unit of a new class of attack submarine--if begun this year--could be completed in 1974 and operational the following year.

Current Inventory of New Attack Classes

As shown in the following tabulation, 21 units of the new attack classes have now been built and the total Soviet force of attack submarines consists of some 280 units, nearly three times the current US force of about 100. By 1975, nearly 70 units of five new classes probably will be operational, including one unit of a possible sixth class.

Class	Type	Launch tubes per unit	Propulsion	Number built 1 June 71	Number projected operational by mid-1975
C	Cruise missile	8	Nuclear	7	21
P	Cruise missile	at least 8	Nuclear	1	7
V	Torpedo attack	-	Nuclear	8	16
A	Torpedo attack	-	Nuclear	0	9
B	Torpedo attack	-	Diesel	5	13
New	Torpedo attack	-	Nuclear	0	1
			Total	21	67

Fleet Distribution

Soviet attack submarines are assigned to four fleet areas (see Table 1 on page 23) but priority in assignment of first line units is given to the two major areas--the Northern and Pacific Fleets. In these two areas, Soviet submarines have access to the open sea. The Baltic and Black Sea areas require that Soviet submarines transit restricted

Table 1

Fleet Distribution of Soviet Attack Submarines

1 June 1971

	Northern	Baltic	Black	Pacific	Total
Cruise missile classes					
Nuclear powered					
E-I				2	2
E-II	14			14	28
C	7				7
P	1				1
Diesel					
W conversion (TC)[a]	1		3	1	5
W conversion (LB)[b]		3	2	2	7
J	12			4	16
Total	35	3	5	23	66
Torpedo classes					
Nuclear powered					
N	9			5	14
V	8				8
E-I conversion[c]				3	3
Diesel powered					
W	26	20	12	37	95
Z	12	3		8	23
Q		4	5		9
F	26	3		16	45
R	9	2	3		14
B	1		1	3	5
Total	91	32	21	72	216
Grand Total	126	35	26	95	282

a. *Twin cylinder, a converted W class unit with 2 missile tubes.*
b. *Long Bin, a converted W class unit with 4 missile tubes.*
c. *E-I, a cruise missile unit converted to torpedo attack by removing its missile tubes.*

waters under foreign control. All 63 nuclear powered attack submarines now are based in the Northern and Pacific fleets.

Of the 66 cruise missile units in the attack submarine force, 35 are stationed in the Northern Fleet and 23 in the Pacific. Of the remaining eight cruise missile units--all of the old converted types--5 are assigned to the Black Sea Fleet and 3 to the Baltic.

Torpedo attack submarines are distributed among the Soviet fleet areas in a similar pattern. Of the 216 units, 91 (including 17 nuclear powered) are in the Northern Fleet and 72 (8 nuclear) in the Pacific. The remaining 53 (all diesel) units are distributed nearly evenly between the Baltic and Black Sea fleets.

Operations within the four fleet areas normally are in support of training and tactical development. Attack submarines in all the fleets are frequently involved in ASW exercises, torpedo firings, and evaluating new weapons and equipment. Baltic and Black Sea units also frequently participate in coastal defense, local interdiction, and local ASW exercises.

Most distant operations originate from the Northern and Pacific Fleets from bases located in the Kola Gulf area in the North and the Petropavlovsk and Vladivostok areas in the Pacific. Submarines from the Baltic and Black Sea fleets deploy outside their fleet areas in distant operations only occasionally.

Scope of Distant Submarine Operations

In the Sixties, the Soviet attack submarine force departed from its pattern of short range operations and began deploying to the world's oceans in a deliberate program to gain experience in long range operations. By 1969, the number of identified out-of-area long range patrols by attack submarines had grown to 145 per year from fewer than 40 in 1963. The following tabulation shows a sevenfold increase in distant area patrol days at sea from 1963 to 1969, reflecting the Soviets' growing confidence in their ability to operate away from home waters.

	Identified distant area patrol days at sea				
Year	Atlantic	Mediterranean	Pacific	Indian	Total
1963	500	200	600	0	1,300
1969	4,700	4,100	1,700	200	10,700

Year in which initial patrol detected			
Atlantic	Mediterranean	Pacific	Indian
1955*	1958	1956*	1968

The greatest change occurred in the Mediterranean as a result of the reinforcement of the Soviet naval squadron following the 1967 Arab-Israeli War. The growth of operational activity in the Atlantic and Pacific can be related to anti-Polaris operations and tracking US carrier transits. The purpose of other patrols has not been clear. (The operating regions of Soviet attack submarines are shown in the maps following page 30.)

The character of attack submarine operations has grown more complex, more mission oriented, and more innovative. In the early Sixties Soviet submarines ventured into the open ocean only in company of a rescue vessel. Now, unattended attack submarines observe and stalk Western naval forces. At the beginning of the decade the attack submarine force began under-ice transfers from the Northern Fleet to the Pacific Fleet. In 1966 the Soviet Union conducted a submerged fleet transfer of two submarines from the Kola Gulf to Petropavlovsk around South America--a distance of some 18,000 nm. In 1963, out-of-area patrols averaged about 30 days. In 1969, they averaged about 70 days. This increase is due in part to the long duration of Mediterranean patrols.

To support the expanded scope of operations, the Soviets have built a mobile support system with capabilities for replenishment and minor repairs at sea. They have not inaugurated a system of foreign bases on the US pattern, and to do so would be to condone what they have long condemned. The Soviets have, however, used joint facilities in Egypt--such as those currently at Alexandria and potentially at Mersa Matruh--to provide limited support. In the future, these facilities may be used for intensive support of submarines. Soviet repair ships and tenders have serviced attack submarines in the Caribbean and the Mediterranean with little apparent reliance on shore facilities. Soviet anchorages in international waters suitable for deployed submarine tenders have been identified in the Indian Ocean and the Pacific Ocean near Guam.

The Soviets have experimented with servicing submarines without mooring or anchoring. In 1967, a Soviet submarine tender on the high seas carried out a successful six-month submarine support operation near the Cape Verde Islands, off Dakar in West Africa, servicing both nuclear and diesel submarines. Because of their limited capacity, present submarine tenders probably cannot provide comprehensive support

to nuclear submarines for more than about two consecutive patrols. Tenders with greater capability are not known to be under construction in the Soviet Union.

Pacific

A focal point for Soviet attack submarine operations in the Pacific has evolved in the Philippine Sea [redacted] Patrols have been maintained in the region since 1965, and in 1968 the Soviets laid mooring buoys in international waters 300 nm north of the Polaris base in Guam. The moorage is well positioned for a tender to support anti-Polaris operations. [redacted]

In addition to the ASW activity, cruise missile submarines from Pacific Fleet areas and mid-ocean patrol zones have reacted to US carrier transits to and from the west coast of the US, by conducting simulated strikes.

In wartime a submarine defensive barrier would probably be established in the Kuril region and the three entrances to the Sea of Japan. The barrier deployment could serve the dual function of anti-surface and ASW defense.

Atlantic

Attack submarine patrol areas have been established in the Norwegian Sea along the critical gap between Greenland, Iceland, and the United Kingdom (G-I-UK gap) and northern Norway. These patrol zones are occupied sporadically--usually in response to US activity or in conjunction with Soviet exercises. Submarines in these areas would probably be used during a crisis to track ships, or during a war to interdict US fleet movements.

Some of the exercise activities in the Norwegian Sea have been linked to anti-Polaris operations. During the Soviet naval exercise Okean in April 1970, nuclear and diesel powered submarines engaged in ASW tactics against a Y class ballistic missile submarine which appears to have simulated a Polaris unit in the Norwegian Sea. Nearly continuous operations west of the British Isles conducted by Baltic-based diesel submarines are probably related to surveillance of Polaris operations and British naval exercises. Many North Atlantic patrols are conducted by diesel powered submarines, suggesting that they are primarily tasked for surveillance operations rather than prosecution of contacts.

The new V class submarines have deployed to an operating area south of Iceland, a position which permits surveillance of US submarine transits, and "delousing"* of inbound and outbound Y class ballistic missile submarines. What was possibly a V class accompanied a Y class through the Norwegian Sea in December 1970 in an apparent escort role. It probably took station in the operations area south of Iceland and escorted the Y class back to port in late February 1971.

Mediterranean

More than one-third of all Soviet distant submarine operations have been carried on in the Mediterranean in an effort to cover NATO carrier operations and to maintain surveillance of Sixth Fleet movements and Polaris operations. Most submarines assigned to the Mediterranean are based in the Northern Fleet. About three cruise missile

* *Delousing is a procedure in which the presence of a trailing submarine is ascertained by a third unit.*

submarines, usually including one of the new C class, are maintained on station and are targeted against carriers. Six diesel torpedo attack submarines deploy there on a six-month rotational basis for surveillance. These submarines have also formed barriers in the Gibraltar and Sicilian straits during crises. The concentration of Sixth Fleet units and Polaris submarines in confined Mediterranean waters offers many opportunities for Soviet surveillance and tracking operations.

Mediterranean deployments have been extended and the efficiency of the operations has been improved by the placement of a Soviet repair ship at an anchorage in the Gulf of Sollum to provide replenishment services and maintenance for diesel submarines. The USSR also takes advantage of a loophole in the Montreux Convention of 1936 which forbids submarine transits of the Turkish straits except for repairs, by annually "repairing" two submarines in the Baltic area and returning them to the Black Sea, conducting patrols in the Mediterranean before and after.

Caribbean

Submarine operations in the Caribbean represent the most recent introduction of the Soviet attack submarine force into new areas. In 1969, two F class submarines entered Havana, the first such visits by any Soviet submarines. An ocean tug and two barges of a type associated with nuclear submarine maintenance were positioned in Cienfuegos late in 1970. From September 1970 to June 1971, a submarine tender visited Cuba three times--twice in company with an E-II class submarine, once accompanied by an N class unit.

The reasons for the Soviet interest in the Caribbean seem to be both political and military. Politically, Soviet naval visits to the Caribbean may be intended to acclimate the United States and

Latin America to a Soviet presence--a presence which may increase in frequency and numbers. The military value of a submarine support anchorage in Cienfuegos to the Soviets could be:

-- Provision of an anchorage for emergency repair of damaged or disabled submarines which are deployed off the US east coast. The presence of the Soviet ocean salvage tug there suggests this. Similar tugs usually deploy to the vicinity of Soviet submarine operating areas.

-- As a forward contingency facility to which attack submarines could be deployed in advance of a crisis, for eventual operations against east coast naval targets and Gulf of Mexico shipping. These submarines would be beyond the US barrier forces along the G-I-UK gap.

-- Provision of a convenient peacetime facility for attack submarines engaged in surveillance operations against east coast naval forces, including Polaris submarines.

Indian Ocean

Soviet attack submarines, both nuclear and diesel powered, have patrolled on occasion in the Indian Ocean since 1968. Submarine patrols, which may have been conducted largely for familiarization of the crews in this new operating area, are evidently a hedge against possible future large scale deployment of US or UK naval forces. The Soviets have conducted extensive hydrographic operations in the Indian Ocean--another sign of their interest in future submarine operations there. If the West were to increase its presence, particularly through the introduction of ballistic missile submarine patrols in the Indian Ocean, the level of Soviet attack submarine activity would probably increase significantly.

Force Capabilities

Interdicting Sea Lines of Communication

The attack submarine force has gained experience in the conduct of long patrols and the techniques of surveillance at sea, and frequently exercises anti-ship tactics and torpedo firings, but the effectiveness of Soviet submarine weapons and the degree of skill of the crews are largely unknown. The number of submarines potentially available and the increasing proportion of nuclear powered units among them suggest an effective interdiction capability, however.

As an example of the attack force potential, the Northern Fleet could maintain 23 long range submarines of the F, N, Z, E, J, and C classes on continuous patrol in the North Atlantic (assuming a readiness posture of 50 percent and an allowance for transit time). The Pacific Fleet could maintain about 13 long range attack submarines of the same classes on continuous patrol.

Contending With Carriers

Soviet cruise missile and torpedo attack submarines are sufficient in number and armament and fast enough to stalk and attack the US carrier force at sea. There are currently about 54 first line cruise missile submarines (all but 16 are nuclear powered), and the number is increasing by two to three per year. The number of US attack carriers, about 14, presents the Soviets with the opportunity for concentrating the operations of several submarines on each US carrier.

The cruise missile submarine confronts the carrier with a complex defensive problem. While most

of these submarines must fire from the surface, the 250 nm range of the SS-N-3 missile affords the attacker some 200,000 square nautical miles from which to launch. Although this long range missile requires target data assistance, such data can be obtained and transmitted by another submarine or an aircraft. Observations of some cruise missile attack exercises indicate the Soviets have developed tactics for coordinated surprise raids carried out by submarines and aircraft or surface ships.

The potential for a coordinated surprise raid is enhanced in the Mediterranean where carriers are under constant surveillance and their locations are usually known. Sonar conditions favor the submarine there, and the continuous presence of "crowded" naval forces contributes to uncertainties in recognizing the beginning of an attack.

Cruise missile attacks on carriers in the Pacific and Atlantic would be more difficult because US ocean surveillance is generally more effective there than in the Mediterranean. The great distances involved and the existence of SOSUS* arrays in many areas increase the probability of detecting a cruise missile submarine attempting to intercept a carrier group. The submarine would probably stalk the carrier for some time before a coordinated strike to assure itself of contact with the target at the moment a strike is ordered.

Soviet submarine exercises and reactions to carrier task forces indicate that the greatest strike effort would be concentrated against those

** SOSUS (sound surveillance system): A stationary ocean bottom acoustic submarine monitoring system with wide area detection capability.*

carriers within, or nearest to, aircraft launch range of potential strategic targets in the Soviet Union. As indicated in exercise Okean, an echelon of cruise missile submarines would deploy in defensive barriers presumably to interdict other surface forces and carriers which might have escaped attack.

Antisubmarine Operations

Soviet antisubmarine operations are hampered by inadequate surveillance. A wide area ocean surveillance system such as SOSUS is not a practicable system for the USSR. Soviet technology is believed to be incapable of producing the sensitive hydrophones or cables which could reach from potential SOSUS areas to the USSR mainland. Although overt and covert trailing offer some promise, both methods are susceptible to countermeasures such as delousing.

Soviet submarines are too noisy for covert detection of the quieter US submarines. Barring an unsuspected technological breakthrough, improved sonars installed on quieter submarines would still be limited to the short detection ranges imposed by oceanographic conditions and the low noise emissions of US submarines.

Overt trailing provides temporary surveillance but it is unlikely that it will be attempted on a number of US submarines at once--either routinely or sporadically. Such an occurrence would be perceived as an immediate threat to the US strategic deterrent and therefore would likely be avoided by the Soviets except in extraordinary circumstances.

Soviet submarine ASW operations are evidently now focused on reconnaissance of Western submarine patrol areas and transit routes. As the confidence and the ability of their crews improve, Soviet attack submarines might attempt more involved operations--possibly including trailing of Western submarines. Soviet intentions in this area are not known, however.

It may be Soviet policy to avoid any deliberate contacts with the Polaris deterrent system. The Soviets might assume that this stance would encourage a similar US attitude toward Soviet ballistic missile submarines. Furthermore, such a policy would eliminate a source of misunderstanding in a crisis environment. Soviet submarines will probably develop trailing tactics among themselves for those crisis situations in which the advantages derived from overt trailing would seem to outweigh the risks.

Outlook--Future Developments in the Attack Submarine Force

Operations

As the attack force acquires more new submarines and experience in distant waters, its operations will probably involve closer and more frequent surveillance of US naval operations in and near US coastal waters and near US foreign bases. US aircraft carriers probably will encounter an increasing number of Soviet submarines with surface- and submerged-launched cruise missile capability.

Developments in the US Undersea Long Range Missile System (ULMS) will probably cause the Soviets to intensify efforts in distant ASW missions. The expanding operational areas and refinement and improvement in tactics and capabilities might further encourage the Soviets to favor submarine trailing tactics over surface search with aircraft and surface ships. For the next five years or so the emphasis in submarine developments almost certainly will remain on ASW. Attack submarines will continue to patrol in Polaris related or suspected areas, and the V class probably will be used to protect the Soviet Y class strategic submarine force by delousing.

The Soviet navy probably will continue to support submarine activities on a world-wide scale without acquisition of foreign bases. Protected anchorages similar to those in the Mediterranean and at Cienfuegos--rather than "bases"--will be established where the USSR requires them. Support facilities will continue to provide routine maintenance and resupply in the absence of shore bases.

Soviet efforts may be under way to develop titanium for use in pressure hull construction for submarines. The Soviet Union has a large titanium industry and uses this metal extensively in its shipbuilding industry. The lightness and strength of titanium offer an increased depth capability, which could result in extended sonar ranges and evasion potential.

There is also evidence that the Soviets are attempting to improve submarine command and control systems and on-board tactical and machinery systems through the use of computers.

A prime area of interest will continue to be noise quieting. Soviet military literature has recognized quieting as a vital element in the achievement of a submarine ASW capability. Submarine construction during the last five years has shown noise quieting improvements over earlier submarines.

Operational Units

On the basis of observed and projected production rates, and rapid retirement of older diesel powered units, the Soviet attack submarine force will probably consist of about 235 operational units by mid-1975, down from 280 in mid-1971. Some 75 will be cruise missile types with 520 launch tubes--300 surface and 220 submerged. About 160 submarines will be torpedo attack types and probably about 45 of these will be nuclear powered. Continued construction of the new classes will probably be accompanied by rapid retirement of older diesel powered units. The composition of the projected 1975 force is shown in Table 2 on page 37.

Table 2

Operational Units of the
Soviet Attack Submarine Force

		1 June 1971	Estimated Mid-1975
Cruise missile classes			
Nuclear powered			
E-I	(6 SS-N-3)	2	0
E-II	(8 SS-N-3)	28	28
C	(8 SS-N-7)	7	21
P	(at least 8 SS-N-?)	1	7
Diesel powered			
W-conv	(2 SS-N-3)	5	0
W-conv	(4 SS-N-3)	7	3
J	(4 SS-N-3)	16	16
	Total	66	75
Torpedo classes			
Nuclear powered			
N		14	14
V		8	16
E-I conv		3	5
A		0	9
New class		0	1
Diesel powered			
W		95	30
Z		23	10
Q		9	5
F		45	45
R		14	14
B		5	13
	Total	216	162
	Grand Total	282	237

Annex

Selected Characteristics of Soviet Attack Submarines

Class	Length (ft)	Beam (ft)	Operating depth limit (ft) *a*	Maximum submerged speed (kts)	Patrol characteristics: Average transit speed (kts)	Patrol characteristics: Normal patrol duration (days) *b*	Weapons: Torpedoes *c*	Weapons: Missiles: No. of tubes	Weapons: Missiles: Type of missile
Nuclear powered									
N	360	30	1,000	30	12-14	60	32		
E-I	375	30	1,000	26	12	60	22	6	SS-N-3
E-I conversion	375	30	1,000	28	10-12	60	22		
E-II	385	30	1,000	24.5	12	60	22	8	SS-N-3
C	308	34	1,300	26.7	12-14	60	18	8	SS-N-7 *d*
V	308	33	1,300	32	12-14	60	32		*d*
A	250	32	at least 1,300	undetermined	12-14 *f*	60 *f*	undetermined		*d*
P	348	38	1,300	undetermined	12-14 *f*	60 *f*	undetermined	at least 8	SS-N-? *d e*
Diesel powered									
W	249	23	656	13.5 (1 hr)	5	40	12		
W (Long Bin)	275	23	656	12 (1 hr)	5	40	10	4	SS-N-3
W (Twin Cylinder)	249	23	656	12 (1 hr)	5	40	12	2	SS-N-3
Z	295	24.5	750	15 (1 hr)	5	60	22		
Q	185	18	450	undetermined	coastal operations	25	8		
F	300	24.5	920	16 (1 hr)	5	60	22		
R	250	23	920	15.5 (1 hr)	5	40	18		
J	285	33	1,300	14 (1 hr)	5	60	22	4	SS-N-3
B	230	32	900	20 (1 hr)	undetermined	60	undetermined		*d*

Footnotes

a. The operating depth limit is the depth to which a submarine may proceed during normal operations. During emergencies a submarine may exceed this depth by an indeterminate amount approaching collapse depth (which is substantially greater) and still survive.

b. Patrol duration is the normal length of time that a submarine could remain at sea without replenishment under combat conditions. It is estimated on the basis of crew endurance, general habitability, and consumption of food, spare parts, and other consumables including fuel.

c. Mines could be carried instead of or in combination with torpedoes.

d. A torpedo-like weapon may be operational and could be fired from the torpedo tubes on the new classes of attack submarines. This system may be similar to the US SUBROC system.

e. Type of missile is undetermined.

f. These figures are rough estimates based on other nuclear powered units under construction.

Summary

During the Sixties, the Soviet attack submarine force abandoned its pattern of local fleet area exercises for an ambitious program of distant area deployments. The force now maintains cruise missile coverage of aircraft carriers deployed to forward areas, conducts reconnaissance of Western naval forces, and is acquiring experience in long range patrols. Instead of procuring foreign bases for their operations, the Soviets have opted for a mobile independent system of repair ships, capable of operating from international waters.

The evolution of the Soviet attack submarine force reflects changing naval threats. Soviet response to new threats resulted in three general phases of submarine development. The first phase took place during 1950-1957 when nearly 300 diesel powered submarines were built for interdiction of sea lines of communication and for defense of the sea approaches to the USSR.

During the second phase, 1958-1966, nuclear propulsion and cruise missiles were incorporated into Soviet submarines to meet the threat of US aircraft carriers. Some 130 submarines were built in this phase; about 50 were cruise missile types. Soviet achievements in nuclear propulsion and cruise missiles were overtaken by the need for a counter-weapon to the Polaris type nuclear powered ballistic missile submarines.

The present phase, which began in 1967 and will probably extend at least until 1975, gives more attention to antisubmarine capabilities. High speed, advanced sonar, increased depth capability, and new weapons are being incorporated in new classes of submarines in an attempt to increase Soviet capabilities to detect, intercept, trail, and destroy hostile submarines.

Five new attack submarine classes are now being produced--the V, B, C, P, and A classes, which are

all nuclear powered with the exception of the B class. The V, B, and A classes appear to be better designed for antisubmarine warfare (ASW) than the older classes of Soviet submarines. The V class is capable of 32 knots and thus may have the capability to trail US submarines overtly. It is noisier than US attack submarines, however. Although limited in range and endurance, the B class can respond quickly to coastal ASW alert and has the advantages of quiet submerged operation. The A class is the smallest new Soviet nuclear submarine. It may represent a Soviet attempt to produce a deep diving, high speed submarine capable of operating at greater depths in order to enhance its capability to detect other submarines and to evade ASW weapons. The C and P cruise missile classes represent continuing efforts to meet the US carrier threat but both are estimated to have also an ASW capability--primarily for self-protection.

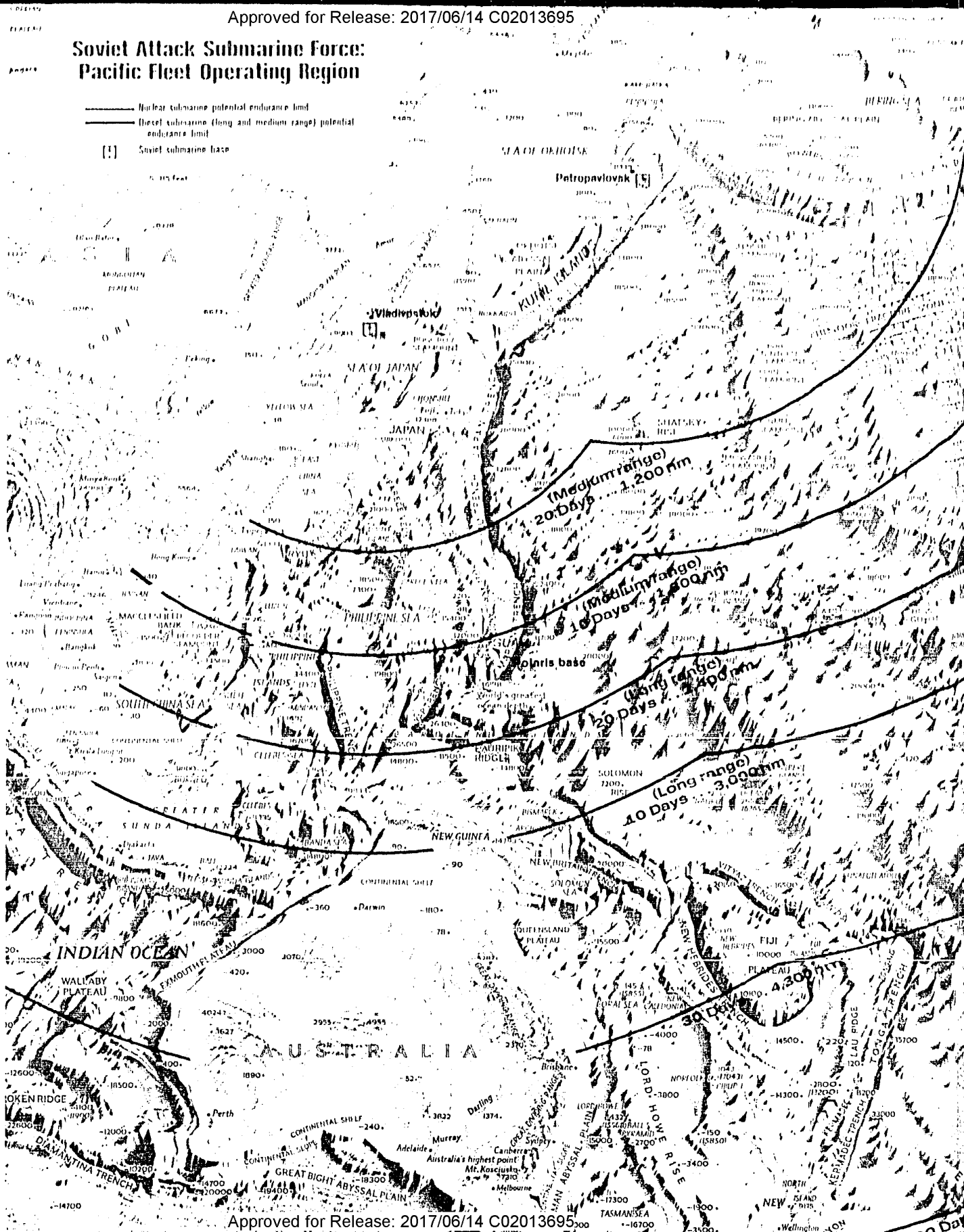
As of June 1971, 21 units of the new classes had been built and, by mid-1975, about 70 units are expected to be operational, including one unit of a possible sixth class.

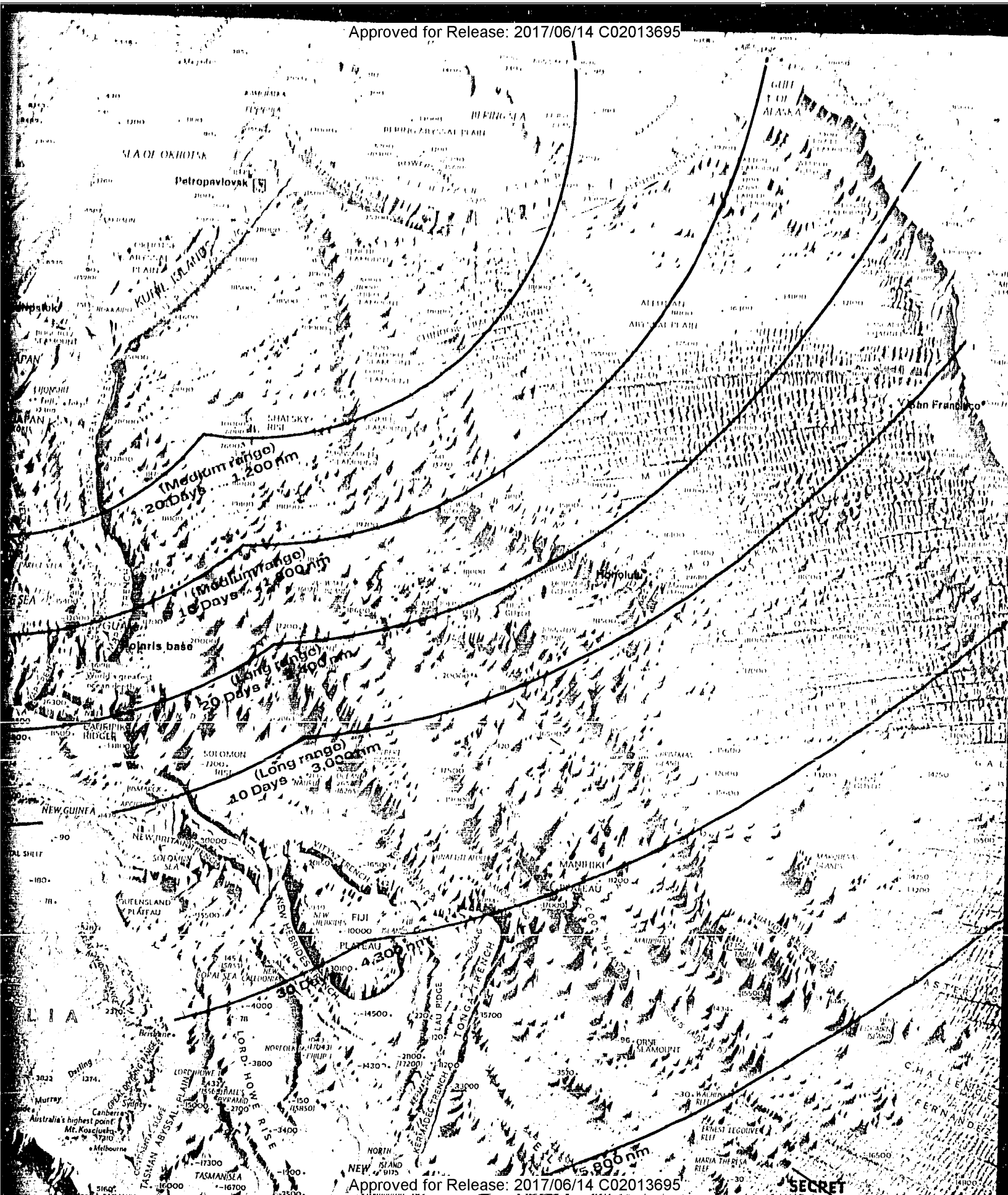
Half of the Soviet attack submarine force is too limited in range for effective use in interdiction of the major sea lines of communication in the Atlantic and Pacific. There are, however, enough long range units to maintain a continuous interdiction force of 20 to 25 submarines on station in the Atlantic and 10 to 15 in the Pacific. These numbers will increase as the production of nuclear powered submarines continues. Interdiction exercises are conducted frequently and the long range units of the submarine force probably have achieved an interdiction capability.

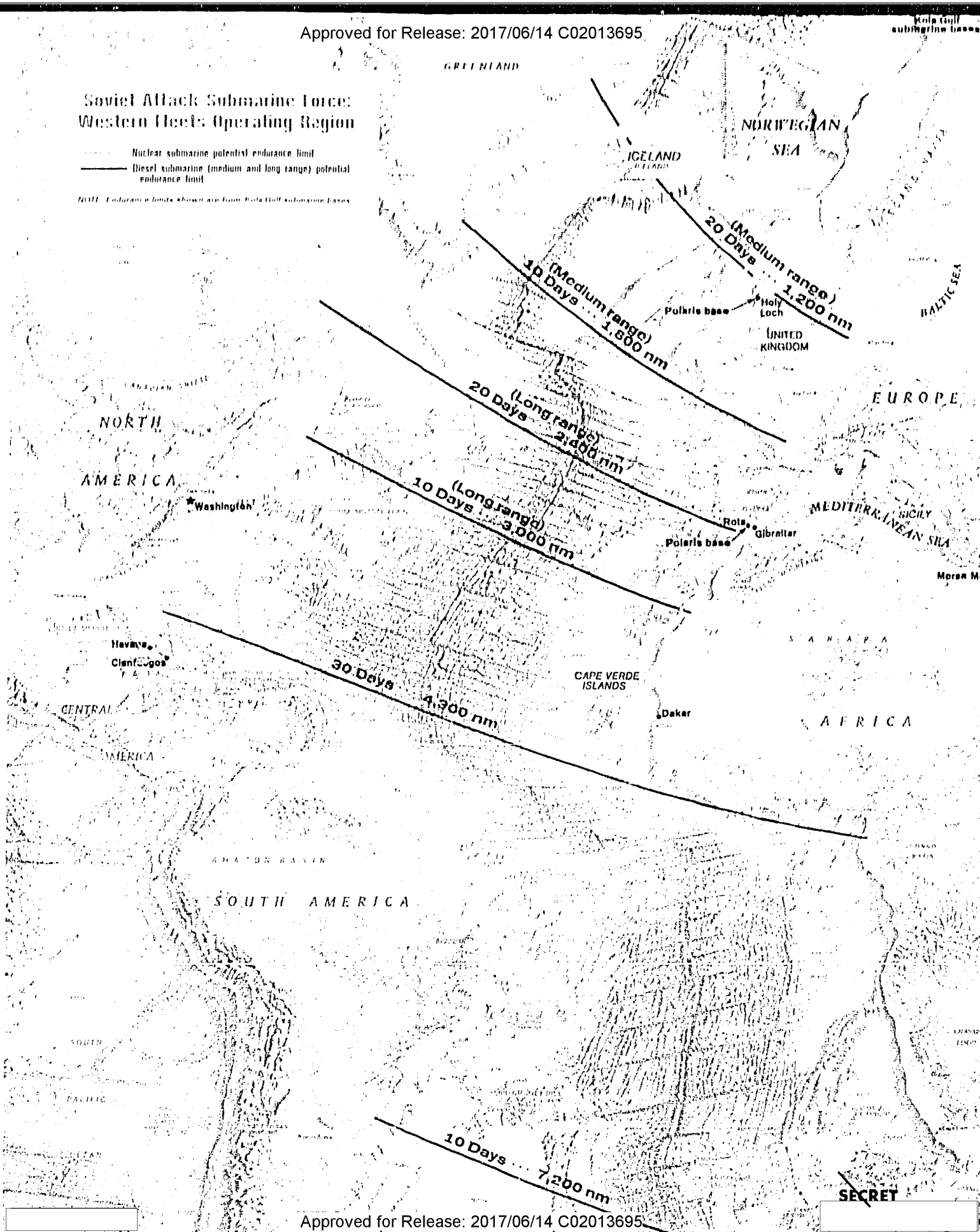
The cruise missile submarines pose a threat to US aircraft carriers, particularly if employed as preemption weapons. This type of submarine has been seen deployed in defensive barriers during exercises and shadowing US ships in the Mediterranean, Atlantic, and Pacific. The introduction of submerged launched missiles in 1968 has further enhanced the Soviet ability to effect a counter to the aircraft carrier.

The thrust of current Soviet attack submarine ASW activity appears to be in reconnaissance of Western submarine areas and active exercise and tactical development programs. While the USSR is evidently avoiding any action which might be construed as interfering with the US Polaris force, there is evidence that it is attempting to develop trailing tactics for contingency operations. Current Soviet attack submarines are too noisy to conduct trailing operations undetected. There are no indications that Soviet command and control systems can support the exacting requirements for simultaneously destroying a large portion of the Polaris force.

By mid-1975, the attack submarine force will probably decrease from its present size of about 280 operational units to some 235 operational units because of retirement of many older diesel submarines About 100 of those remaining will be nuclear powered. About 75 units probably will be cruise missile submarines with a total of 520 missiles of which 220 can be launched while submerged.







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