AR 70-14

28970

Top Secret

[redacted]

DIRECTORATE OF
INTELLIGENCE

SR IR 71/19

Intelligence Report

The Soviet Naval Cruise Missile Force:
Development and Operational Employment

[redacted]

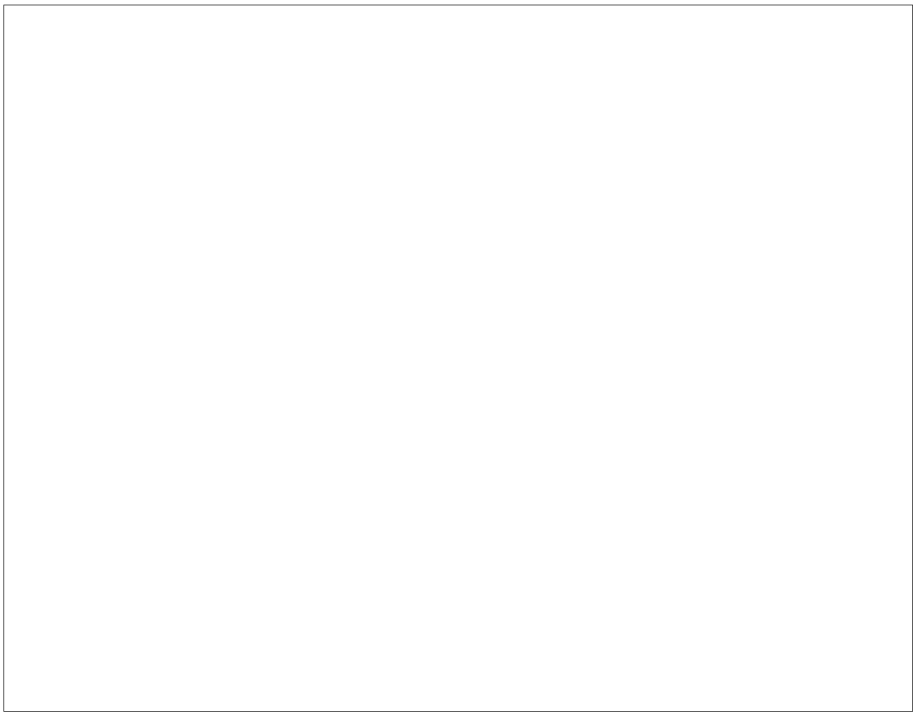
Top Secret

SR IR 71-19

[redacted]

December 1971

Copy 198



~~TOP SECRET~~

CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
December 1971

INTELLIGENCE REPORT

The Soviet Naval Cruise Missile Force: Development and Operational Employment

Introduction

In the mid-Fifties the growth of the strategic threat posed by Western aircraft carriers called for a response by Soviet naval defenses. Western carriers could launch aircraft against the Soviet Union from beyond the effective operating areas of the Soviet Navy, which was then organized to protect the coasts and to support the flanks of the army. Soviet ships, aircraft, and submarines were designed for short-range operations and lacked armament which would permit an effective defense against the carrier. A new weapon or weapon system was needed to cope with the carrier.

The Soviets chose a weapon system--the cruise missile--with the range necessary to counter the carrier threat. Cruise missiles are rocket- or jet-powered aerodynamic vehicles controlled remotely and by self-contained guidance systems. They provide greater range and weight of explosive charge than traditional naval weapons and can be launched from surface ships, submarines, or aircraft. Their homing systems make them more accurate than naval guns.

Since the mid-Sixties the Soviets have accelerated the development of their cruise missile forces: they have increased the size of the force, introduced

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

~~TOP SECRET~~

new models, and retained older models in the inventory.

This report discusses Soviet cruise missiles and their missions in the Soviet Navy, and describes current and projected cruise missile force levels.

A summary begins on page 40.

* * * * *

Contents

Contents (continued)

Table

Illustrations

The Soviet Navy's Choice: Cruise Missiles

In the early Fifties the Soviet Navy was tasked to protect the coasts of the USSR and to support the flanks of the army. The Navy seldom operated more than a few hundred miles from the coastline. The surface force lacked sufficient armament to operate safely beyond land-based air cover in the face of Western carrier-borne air power. The naval air arm was composed mainly of land-based fighter aircraft and light bombers with short range.

Only a few of the Soviets' 300 diesel-powered submarines armed with torpedoes exercised beyond home waters. These were available for the protection of coastal areas and for interdiction of sea lanes in wartime. Because these submarines were slow, had limited submerged range, and had to penetrate the aircraft carrier's large screening force before they could launch torpedoes against it, their usefulness against the carrier was marginal.

In the mid-Fifties, the Soviet Navy, primarily to counter the nuclear threat of the carrier, had to extend its defense perimeters. The alternatives were to construct aircraft carriers or to develop a strike weapon of sufficient range. The Soviets chose cruise missiles as their strike weapon.

Cruise missile technology had been acquired from Germany after World War II, and the development and production of cruise missiles did not require either the research and development, the resource base, or the lead time of six to eight years for aircraft carriers. The Soviets had no experience in building or operating carriers and were already committed to a large and costly surface ship construction program for coastal defense.

The Soviets probably calculated that cruise missiles offered several favorable characteristics in addition to lower costs and shorter construction lead times. Soviet training manuals claim that missiles have an overall hit probability of from 60 to 90 percent, as compared with under 10 percent for naval guns and 10 to 25 percent for torpedoes. One direct hit with a high-explosive SS-N-2 Styx missile, according to the manuals, can destroy a transport or a destroyer-size warship. Three hits will destroy a cruiser-size ship. If this textbook ratio is continued, an estimated five to seven hits will destroy an aircraft carrier, but one hit--in the hangar deck, for instance--possibly could prevent the carrier from launching its aircraft.

Also, cruise missiles are difficult to counter because of their flight characteristics. Their speed, ranging from slightly under Mach 1 for some to as high as Mach 3 for other missiles, allows defensive weapons little reaction time. Some missiles in their final approach to a target fly at low altitudes and present only a small radar return that may be lost in surface clutter.

Soviet Cruise Missiles

The Soviet Navy has deployed four major classes of air-to-surface cruise missiles and seven main classes of surface-to-surface cruise missiles. At least two other missiles--one air-to-surface and one surface-to-surface--are believed to be in the developmental stage. This section includes brief descriptions of these various classes of missiles.

On pages 8 and 9 are diagrams of the air-to-surface missiles with their dimensions, performance characteristics, and years they entered service. These pages also include information on two other ASMs which are operational only in Long Range Aviation but which are believed capable of antiship operations.

Similar data and illustrations for the surface-to-surface missiles appear on pages 12 and 13.

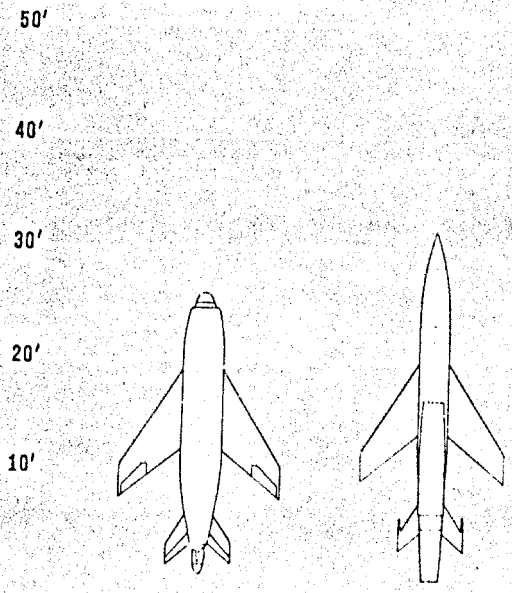
Air-to-Surface Missiles

AS-1 Kennel

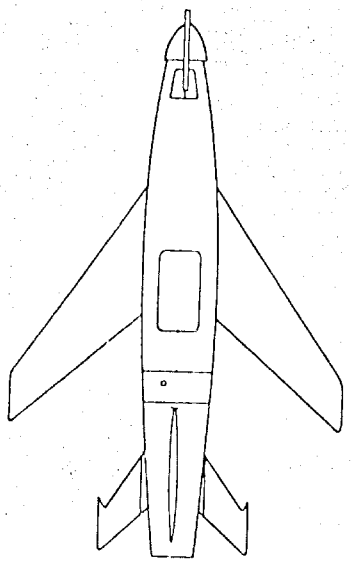
The AS-1 was the first antiship cruise missile operational in the Soviet Navy, entering service in 1957. The missile design is based on the Soviet MIG-15 Fagot jet fighter and has the same engine as the YAK-23 Flora fighter. It has a range of about 55 nautical miles and a speed of about Mach 0.85.

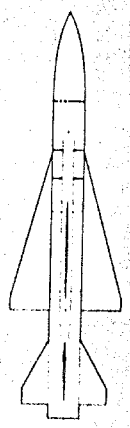
The AS-1 is guided to its target by a beam-riding method following a radar beam from the launching aircraft. After launch, the missile is controlled initially by an autopilot until it flies into and begins to follow the radar beam from the launching aircraft. The aircraft and missile are aligned with the target until the missile is about ten miles from the target. There the missile's nose-mounted radar receiver picks up the launch aircraft's radar signals reflected from the target, and uses these reflected signals to home on the target.

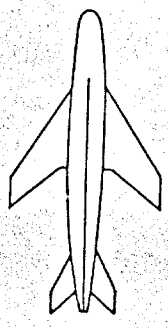
Estimated Characteristics of Operational Soviet Air-to-Surface Cruise Missiles

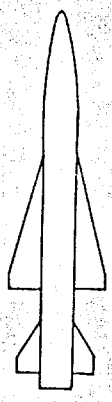


	AS-1 Kennel	AS-2 Kipper
Year entered service	1957	1960-1961
Carriers (number of launchers)	TU-16 Badger (2)	TU-16 Badger (1)
Warhead type and weight (lbs)	HE 2,200	HE or nuclear 2,200
Guidance	Beam rider with semiactive radar homing	Autopilot with command guidance and probably active radar homing.
Maximum speed	Mach 0.85	Mach 1.6
Maximum range (nm)	55	110









	AS-3 Kangaroo*	AS-4 Kitchen*	AS-5 Kelt	AS-6
	1960-1961	1968	1965	1970
	TU-95 Bear (1)	TU-22 Blinder (1)	TU-16 Badger (2)	TU-16 Badger (2)
	Nuclear 5,000	Nuclear 2,200	HE or nuclear 1,100-2,200	HE or nuclear 1,100-2,200
	Autopilot with command override, possibly with active radar homing in antiship role.	Autopilot with command guidance and possible active radar homing in antiship role.	Probably autopilut with active radar homing.	Probably autopilot with command guidance and radar homing.
	Mach 1.8	Mach 3.5	Mach 1.2	Mach 3.0
	350	300	120	300

The AS-3 Kangaroo and AS-4 Kitchen are operational only in Long Range Aviation. Both are believed capable of antiship operations and LRA Bears have simulated AS-3 launches against ships in naval exercises.

The AS-1 has been retired from operational service probably because of limitations of the missile which increased the vulnerability of the launching aircraft to air defenses. Not only did the missile's guidance system require the launching aircraft to fly toward the target during most of the missile's flight time, but the TU-16 Badger aircraft had to slow to about half its normal cruise speed and descend to about 15,000 feet to launch the missile.

AS-2 Kipper

The Soviets first displayed the AS-2 air-to-surface missile in 1961 at an air show in Moscow. The AS-2 was an improvement over the AS-1 in that it did not impose a vulnerable flight pattern on the launch aircraft. The missile was controlled after launch by a preprogramed autopilot. In addition, the missile's own active homing radar did not require the launch aircraft's radar to illuminate the target. The AS-2's speed of Mach 1.6 and the range of 110 nm also exceeded those of the AS-1 (the AS-2 has basically the same engine as the Soviet MIG-19 Farmer fighter). The principal drawback of the AS-2 design was that, while the Badger aircraft could carry two AS-1s, it could carry only one AS-2.

The Soviets apparently are pleased with the AS-2/Badger combination as there are no signs of either being phased out even though the system now is ten years old and newer air-to-surface missiles have come into the force.

AS-5 Kelt

The AS-5 air-to-surface missile became operational about 1965 and replaced the AS-1 in Soviet naval aviation. The missile is probably guided in flight by autopilot and active radar homing. The aircraft probably can send flight path corrections to the missile in flight.

The AS-5 cruise speed is Mach 1.2 and its maximum range is about 120 nm. Two AS-5 missiles can be carried on the Badger.

AS-6

Soviet naval aviation's fourth air-to-surface missile, the AS-6, became operational in 1970. The speed of the AS-6 is estimated at Mach 3, which is faster than all other Soviet naval air-to-surface cruise missiles. Its maximum range is estimated to be 300 nm, which is also better than its predecessors. Satellite photography has shown that the missile is rocket propelled, Two AS-6 missiles can be carried on the Badger.

AS-?, New Air-to-Surface Missile

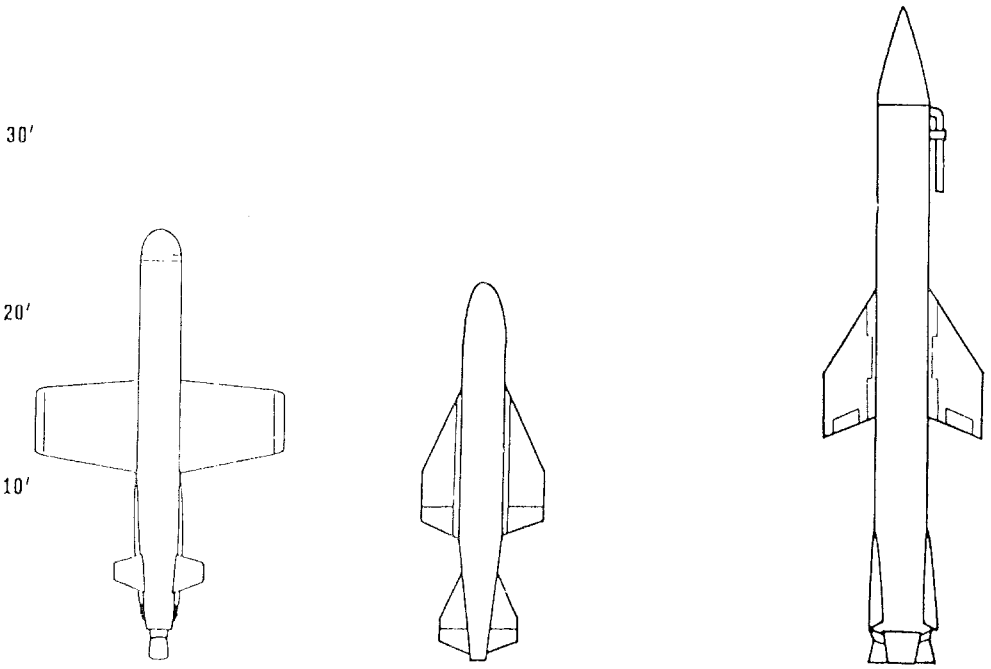
Recent photography of the Ivankovskiy guided missile plant shows that the Soviets are continuing research on new air-to-surface missiles. It is possible that a new missile will be for the new Backfire swing-wing aircraft after it becomes operational (see page 27). On the other hand, it may be that the AS-6, a modified AS-4, or a variant of these supersonic missiles is planned for the Backfire.

Surface-to-Surface Missiles

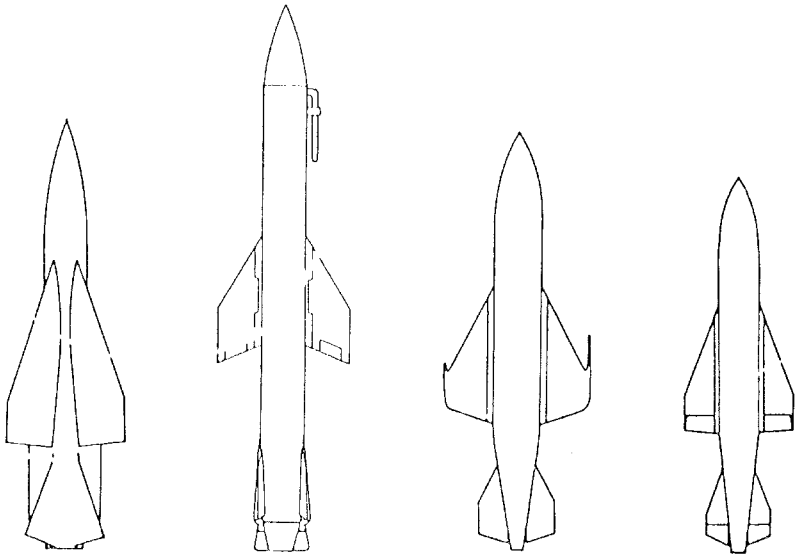
SS-N-1 Scrubber

SS-N-1 Scrubber, the first surface-to-surface cruise missile to be deployed by the Soviet Navy, was first seen on a Kildin class destroyer in 1958. The missile has a cruising speed of Mach 0.7 and a maximum range of 130 nm.

Estimated Characteristics of Operatinnal Soviet Naval Surface-to-Surface Cruise Missiles*



	SS-N-1 Scrubber	SS-N-2a Styx	SS-N-2b Styx (folded-wing variant)	SS-N-3a Shaddock	SS-N-3b Shaddock	SS-N-3c Shaddock
Year entered service	1958	1959	1964	1961	1962	1960
Carriers (number of launchers)	Krupnyy (2), Kildin (1)	Osa I (4), Komar (2)	Osa I (4), Osa II (4), Komar (2)	E-II (8), J (4) submarines	Kynda (8) Kresta I (4)	E-I (6), E-II (8), W (1,2, or 4), J (4)
Warhead type and weight (lbs)	HE or nuclear 500-2,000	HE 1,100	HE 1,100	HE or nuclear 1,100-2,200		Nuclear 2,200
Guidance	Autopilot with active radar homing.	Autopilot with active radar homing.	Autopilot with active radar homing. May have infrared homing backup.	Autopilot with command guidance and active radar homing.		Inertial with no terminal homing
Maximum speed	Mach 0.7	Mach 0.9	Mach 0.9	Mach 1.2	Mach 1.2	Mach 1.2
Maximum range (nm)	130	25	25	220	150	250



SS-N-7	SS-N-9	SS-N-10	SS-N-11
1968	1969	1970	1969
C (8) submarine	J (4) submarine, Nanuchka (6)	Kresta II (8), Krivak (4)	Osa I (4) Osa II (4)
Mach 1.0	Mach 1.4	Mach 1.2	Mach 1.2
30	150	45	25

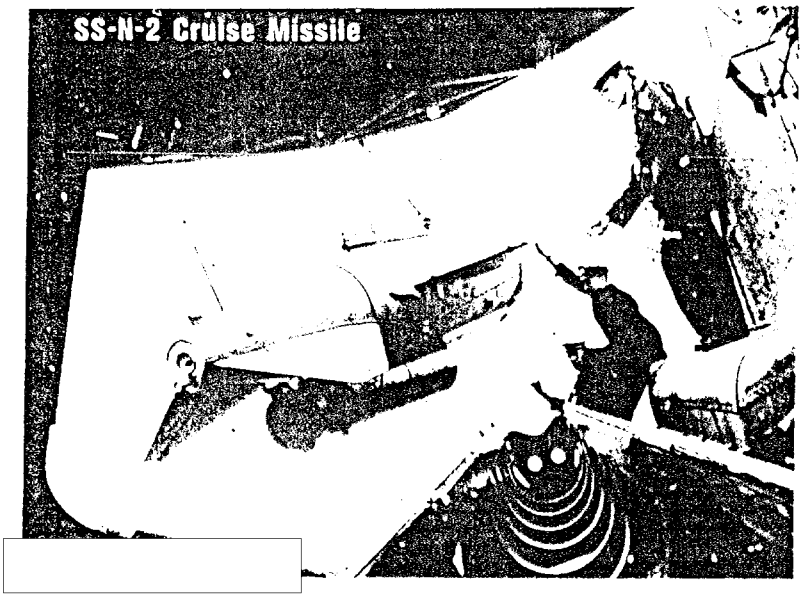
are tentative.

The SS-N-1 is guided by a preset autopilot until the missile's terminal homing radar controls the missile in its final approach to the target.

The ships armed with the SS-N-1 carry an estimated eight reloads per launcher, but the system has a slow reload time which probably does not allow it to fire more than four rounds each hour. The system also is bulky, consisting of a large quonset-hut-like launch housing, a deckhouse ready hangar, and an underdeck magazine. This imposes a limit on the other weapons and electronics the ships with SS-N-1s can carry. Because of these inherent shortcomings, the Soviets are slowly retiring the SS-N-1 missile and converting its associated ships to other purposes.

SS-N-2 Styx

The Soviet Navy followed the SS-N-1 with the SS-N-2, deployed on fast, relatively small patrol craft (see photograph below). The SS-N-2 is a comparatively short-range missile--25 nm maximum--with a speed of about Mach 0.9.



The missile patrol craft locates its target visually or with surface search radar. The observed data are fed into a computer for a fire control solution, and the patrol craft heads directly toward the target for about two minutes to stabilize the free reference gyros in the missile before the missile is launched. The SS-N-2 flies according to instructions preset in its autopilot until its radar begins to direct the missile's flight.

The SS-N-2 is difficult to maneuver and must have its launcher pointed at the target for launch. These limitations do not significantly degrade the overall capabilities of the missile and its patrol craft launcher. The SS-N-2 system is still widely deployed in the Soviet Navy and has been exported to several countries. The Soviets are slowly replacing their own SS-N-2s with a rocket-propelled missile--the SS-N-11 (see page 18).

SS-N-3 Shaddock

The SS-N-3 Shaddock is the longest range surface-launched cruise missile in the Soviet Navy. It has a maximum range of 250 nm at a speed of Mach 1.2. It is fired from a variety of ships and submarines and is built in at least three major variants. The SS-N-3 probably has the same turbojet engine as the MIG-19 Farmer fighter.

When fired, the missile follows a flight path determined by its preset autopilot.

The SS-N-3 has a homing radar for terminal guidance

One variant of the SS-N-3 may have inertial homing and be designed for use against coastal targets.

The Shaddock is designed to hit targets at long range beyond the horizon of the launcher.

The SS-N-3 system may be limited by an inability to fire effectively at close ranges. The missile's trajectory and guidance system design are such that the missile may have to travel at least 10 nm before its homing radar can acquire a target.

The SS-N-3 missile in midcourse flight is not a difficult target for air defense. It flies at an altitude and speed comparable to that of early jet fighters and it lacks evasive maneuverability.

On a few ships SS-N-3s are possibly being replaced by the SS-N-9 (see below) or another missile.

SS-N-7

The SS-N-7 is the first operational submarine cruise missile capable of being launched underwater and perhaps requiring no external guidance.

Less than 25 feet long, it has solid booster and sustainer engines with possibly supersonic flight speeds. It probably can be fired at targets at ranges as short as 5 or as long as 30 nm. Target acquisition and fire control data apparently can be obtained independently using the launching submarine's own sonar in passive and active modes. A capability may also exist to receive target data via underwater communications from a surface ship or submarine acting as a forward observer. A Soviet military press article published in the summer of 1970 indicated that the cruise missile could be fired in salvo.

Little is known about the guidance of the SS-N-7 missile. It probably is guided by a preprogramed autopilot without the command override capability common to many other Soviet cruise missiles. The missile probably has a terminal homing radar or it may be able to home on infrared radiation from the target.

SS-N-9

The SS-N-9 missile was observed in 1969. It apparently resembles the SS-N-3 Shaddock but is estimated to be superior to

it. Its maximum range is not known but its size and state-of-the-art comparisons with other Soviet antiship missiles indicate that the missile can fly beyond the radar horizon, possibly to a distance of 150 nm at a maximum speed of Mach 1.4. A forward target spotter is needed if the missile is to be accurate beyond about 30 nm,

Little is known about the engines or guidance of the SS-N-9. The missile may have a jet sustainer engine and rocket boosters like those on the SS-N-3, and it probably is guided by a preprogramed autopilot that can be superseded by commands from the launch ship.

SS-N-10

In 1970 a new cruise missile system, the SS-N-10, appeared on a new cruiser, the Kresta II. The missile itself has not been seen. Estimates of the size and performance of the SS-N-10 are based on launcher size, associated equipment, and Soviet practice. Its size--about 25 feet long--suggests a similarity to the SS-N-7 missile which in turn suggests that the SS-N-10 is propelled by a two-stage solid-fueled rocket engine.

the likely modes of target acquisition and guidance for the missile may limit the operational range to about 25 nm. It is most likely guided by a preprogramed autopilot and a missile-mounted radar for homing on the target. A passive infrared seeking device may provide backup homing guidance.

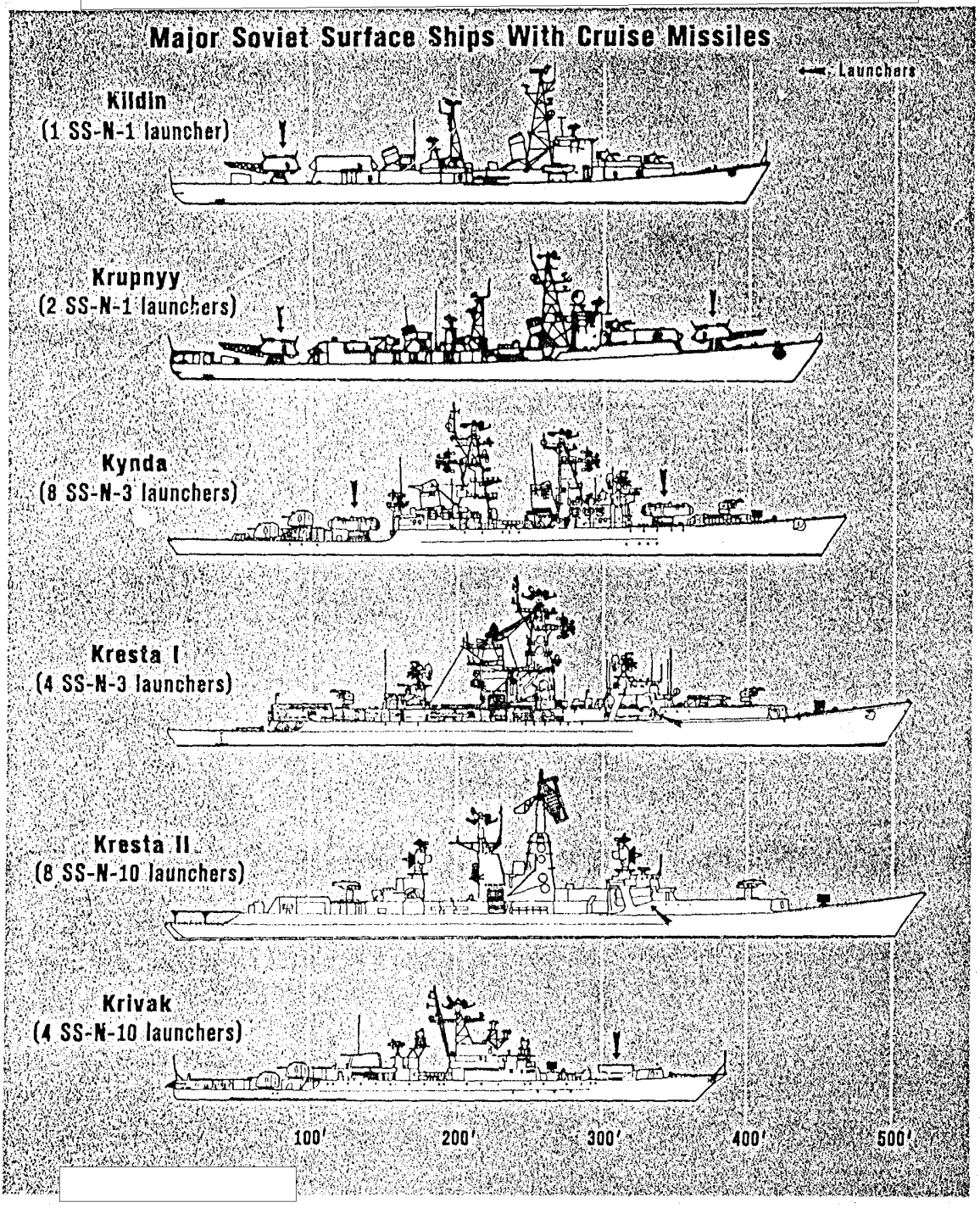
SS-N-11

The SS-N-11 is believed to be similar to the SS-N-2 in size because both are launched from tubes of about the same size. In place of the SS-N-2's

liquid-fueled rocket sustainer engine, however, the SS-N-11 is believed to have a solid-propellant rocket sustainer engine. Little else is known of the missile, but it is presumed to have improvements in guidance and flight characteristics possibly allowing the launching ship to launch while not heading straight at the target. It may also have alternate means of terminal homing--such as infrared--in addition to active radar. The date of the missile's initial operational capability is estimated to be 1969. More information will probably be forthcoming if the Soviets begin deploying the missile outside of the USSR and exporting it to other nations as they have the SS-N-2.

SS-NX-?, New Surface-to-Surface Missile

Nothing is known about the size, the warhead, the guidance speed, or maximum distance capabilities of this missile. The similarity of the missile tubes on the P class to those on the C class submarine suggests that both may launch their missile while submerged. The means used by the P class to obtain target data for ranges of 100 nm or more, however, are not known.



Cruise Missile Systems

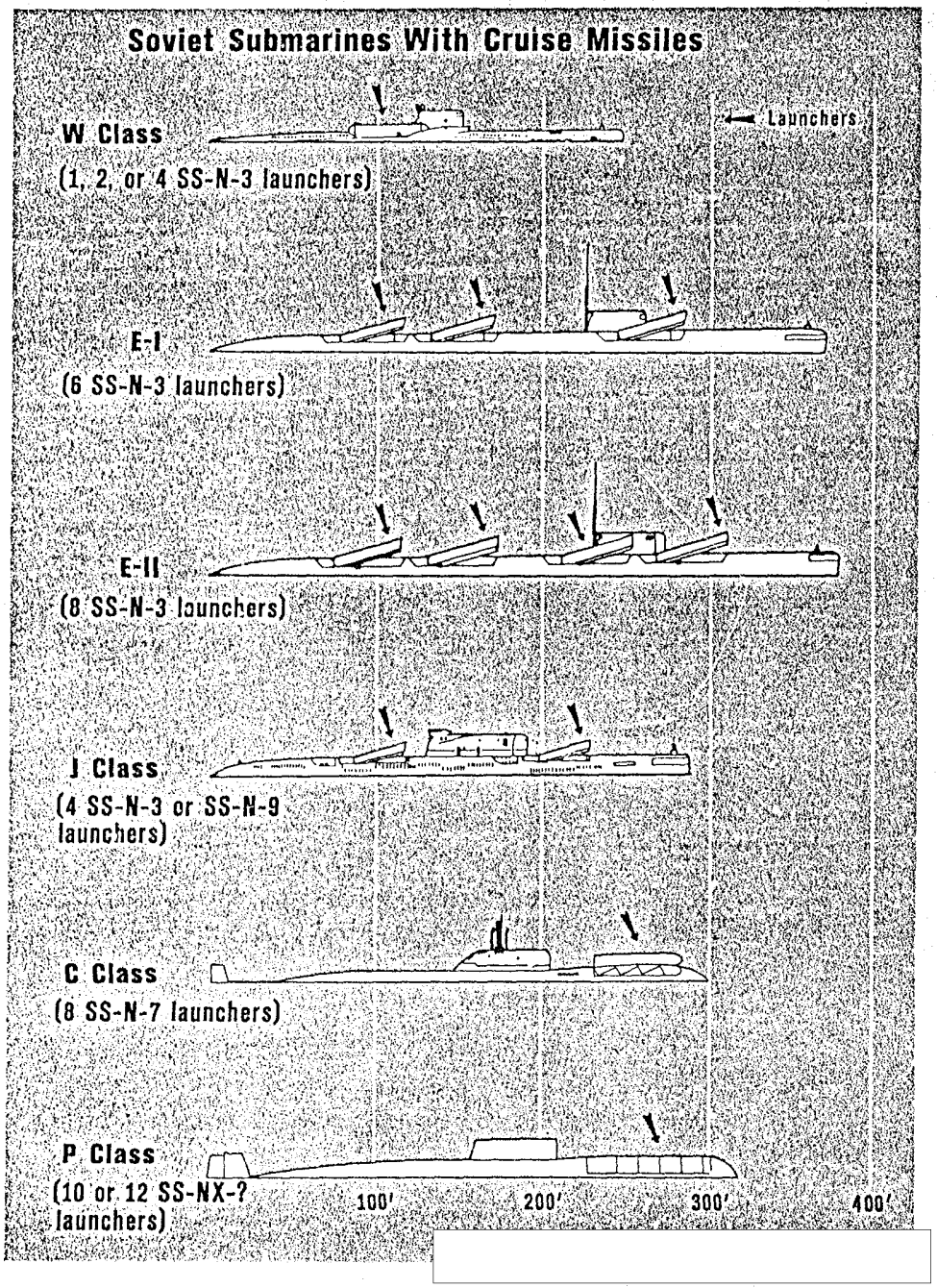
Major Surface Ship Systems

The SS-N-1 was first deployed on the Kildin class destroyers in 1958 and a year later it appeared on the Krupnyy class. (See page 20 for diagrams of the major surface combatants that carry cruise missiles.) The Kildin class destroyers are modified Kotlin class destroyers that have a single SS-N-1 launcher. The Krupnyy class ships were designed to have two SS-N-1 launchers. The large bulky missile installation on the Krupnyy and Kildin ships limited the number of missions these ships could undertake. In the past few years the SS-N-1 has begun to phase out of service as several Krupnyys and Kildins have entered a slow-paced reconversion program.

The long-range SS-N-3 Shaddock was placed on the Kynda and Kresta I classes of cruisers as they entered service in 1962 and 1967. The Kynda carries eight launchers and the Kresta I has four.

Cruise missile systems for surface ships introduced after the SS-N-3 have been comparatively small, allowing even destroyer-type ships to carry a variety of equipment for other than antiship tasks. For instance, the relatively small Kresta II light cruiser--about the size of a US destroyer at 6,800 tons full displacement--is armed with eight SS-N-10 missiles, but also carries two twin-rail surface-to-air missile launchers, two twin-mounted 57mm guns, ten torpedo tubes, two antisubmarine rocket launchers, a variety of radar, sonar, and other electronic equipment, and a helicopter.

The SS-N-10 may also be deployed on the new Krivak destroyer, but the evidence is not conclusive. Four missile tubes about the length of the SS-N-10's launch tubes are located on the bow. The Krivak, in contrast to the Kresta II, appears to rotate its missile tubes and apparently has a different type of surface-to-surface missile guidance radar. This may



indicate that the cruise missile on the Krivak is not the SS-N-10, but another cruise missile system.

A new Soviet warship now undergoing sea trials, tentatively identified as the 445B and resembling but larger than the Krestas, may also be equipped with eight SS-N-10 missiles. Its cruise missile launchers resemble those of the Kresta II and are placed on the main deck on each side of the bridge, as are the Kresta's launchers.

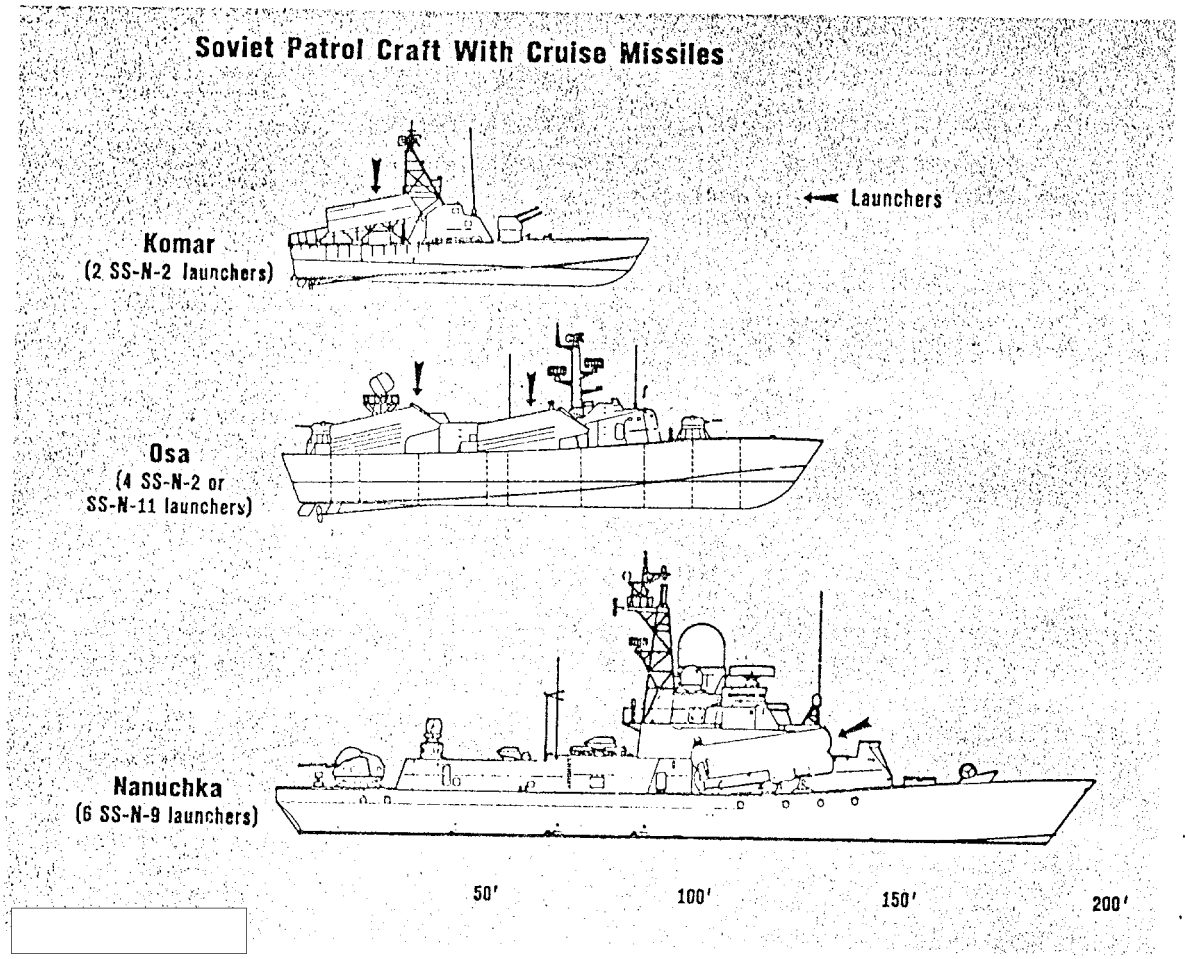
The Soviets are attempting to increase the operational capability of their cruise-missile-armed surface combatants by using shipborne helicopters equipped with Drambuie to provide information on targets beyond the line-of-sight horizon.

Submarine Systems

The first Soviet submarine cruise missile system was a combination of the SS-N-3 and the W class submarines. These submarines were modified to carry one, two, or four launch tubes. In some cases, the launch tubes were on the deck and in other cases they were built in the sail. The first submarine specifically constructed to carry cruise missiles was the nuclear-powered E-I, with six missile tubes built into the superstructure of the submarine. This program was followed by the nuclear-powered E-II, with eight missile tubes, and the diesel-powered J submarine, with four missile tubes. All of these submarines carried variants of the SS-N-3 missile. (See page 22 for diagrams of the submarines that carry cruise missiles.)

Submarines carrying the SS-N-3 missiles must surface before they can launch the missile. A surfaced submarine is vulnerable to detection and attack, and rough seas can prevent the missile launch. The Soviets at times attempt to counter the submarine's vulnerability while launching on the surface by keeping surface-to-air missile ships in or near the submarine launch areas.

The C class submarine, with eight SS-N-7 missiles, is the first operational submarine that can launch



cruise missiles underwater. The submarine's sonar or radio direction finder may provide sufficient target location information for the missiles to eliminate the need for a forward observer. The C class submarine and its new missile system evidently are not intended to replace the older SS-N-3 submarine systems. These other systems are still being deployed--although some are being modified. Some of the older submarines are receiving upgraded weapons systems, but they are still limited to firing on the surface. There are a few indications in photography that the diesel-powered J class submarine is being modified to fire the new SS-N-9 missile in place of the SS-N-3.

The P class submarine, a large nuclear-powered cruise missile submarine that entered operational service in 1971, has at least ten launch tubes for cruise missiles. The submarine's missile tubes appear similar in design but larger than the tubes for the SS-N-7 on the C class. The P class submarine's missile may be a long-range submerged-launch cruise missile.

Patrol Craft Systems

The Soviet patrol craft force is made up of Osas, Komars, and Nanuchkas. (See diagrams on page 24). Osa patrol craft, first built in the late Fifties, carry four SS-N-2 missiles. They are still being produced and some now carry the improved SS-N-11 missiles. The small Komar missile boats which entered service in 1960 carry two SS-N-2 missiles. The Komars are being phased out of the Soviet inventory probably because of the difficulty in maintaining their wooden hulls. The Nanuchka complements rather than replaces the smaller Osa missile patrol boat. The new Nanuchka cruise missile patrol craft carrying six SS-N-9 missiles may be intended to provide additional defense in depth of Soviet coasts.

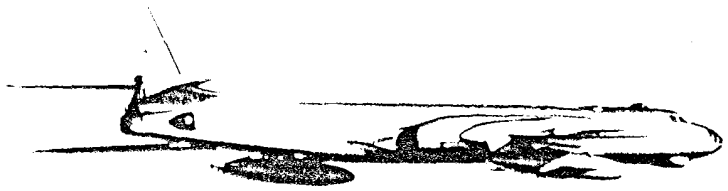
The Nanuchka can patrol the sea approaches to the USSR out to a distance of about 500 nm. Its speed, size, and endurance indicate that it is capable of performing in enclosed seas like the Baltic, the Sea of Okhotsk, or the Mediterranean. Although the Nanuchka is not suited for sustained open-ocean operations, its use in enclosed waters might release Soviet cruisers and destroyers for employment in the open ocean.

Aircraft and ships based in the USSR and Egypt can provide target information for firing beyond about 30 nm.

Aircraft Systems

The naval air force deployed antiship guided missiles in the late Fifties when the AS-1 Kennel was installed on Bull and Badger bombers. The AS-1 was followed by the AS-2 in 1960-1961 and was replaced in operational units by the AS-5 in the mid-Sixties. The Badger (see photograph below) was the carrier aircraft for these missiles.

TU-16 Badger With AS-5 Kelt Missiles



The recent introduction into naval aviation of the AS-6 missile for the Badger indicates that the Soviet Navy intends to retain its Badger ASM strike force until at least the late Seventies despite the age of the Badger aircraft. The last Badger was produced in early 1959.

The Backfire swing-wing aircraft currently being flight-tested could be operational in the Soviet Navy by mid-1974. Its dash speed of about Mach 2 and range with an ASM exceed the performance of the Badger medium bomber (which has a maximum speed of 540 knots and a range of 2,100 nm with two ASMs). There is no evidence as to what air-to-surface missile the Backfire will carry. If the Backfire carries a new missile and not the AS-6, it may not enter operational service with the Navy until 1975.

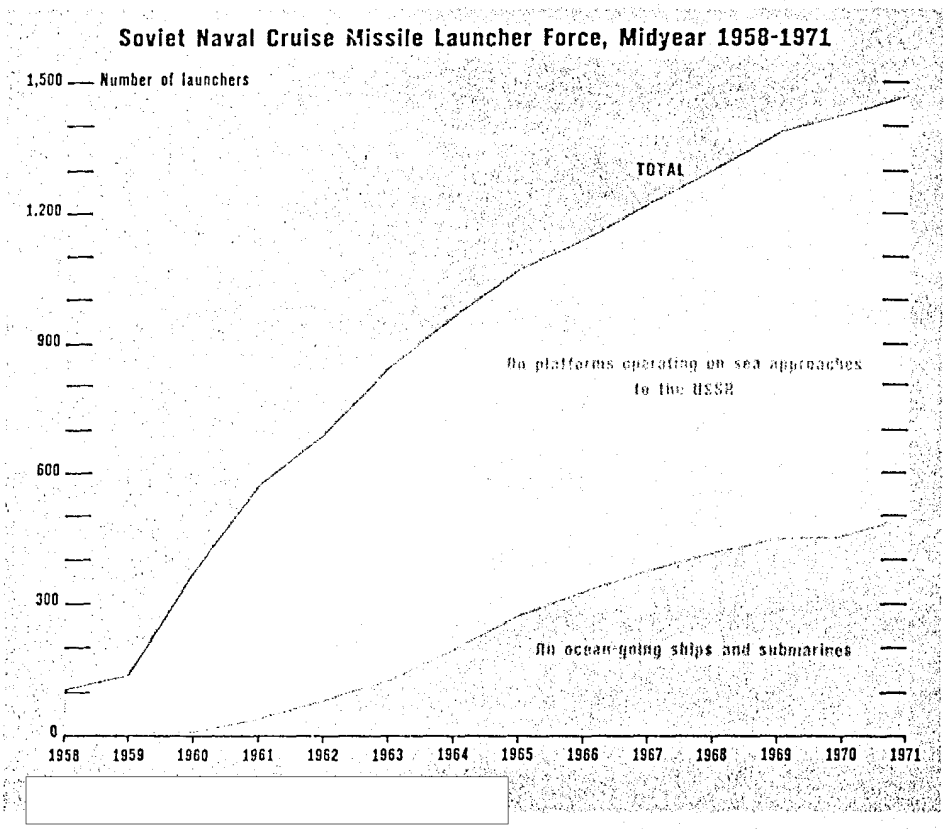
Naval Role for the AS-3 Kangaroo

The cruise missile system normally employed as a strategic attack weapon with Long Range Aviation aircraft has a secondary antiship role. LRA Bear aircraft armed with the AS-3 have increased their participation in naval exercises during the past few years. The Bears have simulated missile attacks against ship formations far at sea. There are approximately 75 Bears in the LRA equipped to carry the AS-3. Exercise activity by the Bears indicates that they launch the Kangaroo against ships at ranges of less than 200 nm, whereas the missile's maximum range against land targets may be as great as 350 nm.

Current Force and Disposition

Launchers for ship and airborne cruise missiles in the Soviet Navy have increased from about 100 in 1958 to about 1,460 in mid-1971. (Launchers are used in this report to measure the size of the missile force because information on refire capability for the various platforms is lacking. Only a few ships--the Kynda, Krupnyy, and Kilden classes--are known to have a refire capability.)

The chart below shows the force levels from mid-1958 to mid-1971. Platforms for these launchers include 20 major surface ships, 275 aircraft, 160 coastal craft, and 66 submarines. The table on page 29 shows the cruise missile force at mid-1971 by type of carrier and number of launchers.



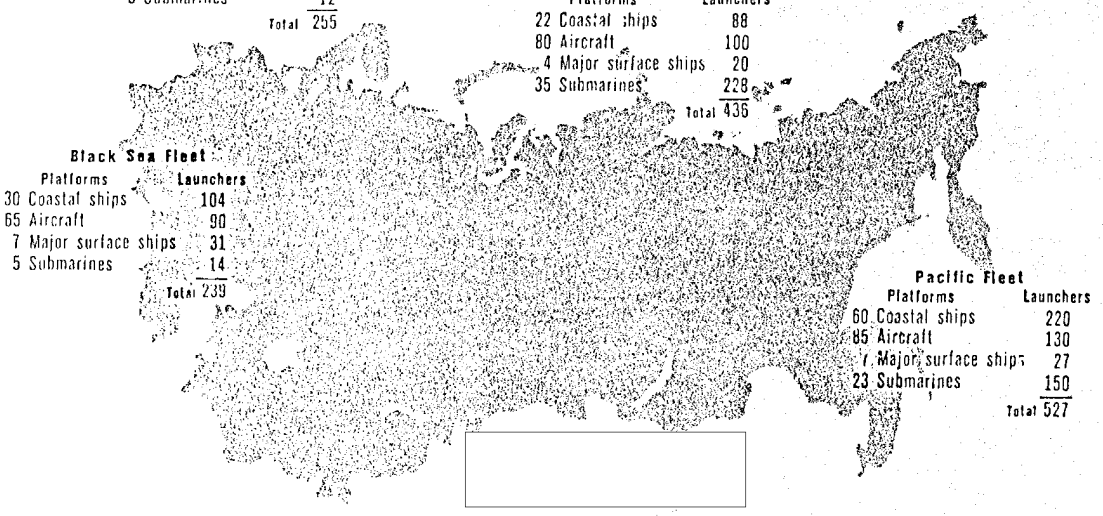
Soviet Naval Cruise Missile Force
As of 1 July 1971

	Number of units	Type of missile	Total number of launchers
Submarines	66		404
E-I	2	SS-N-3	12
E-II	28	SS-N-3	224
C	7	SS-N-7	56
J	16	SS-N-3	64
P	1	SS-NX-?	10*
W conversions	12	SS-N-3	38
Major surface ships	20		82
Kresta I	4	SS-N-3	16
Kresta II	2	SS-N-10	16
Kynda	4	SS-N-3	32
Krupnyy	5	SS-N-1	10
Kildin	4	SS-N-1	4
Krivak	1	SS-N-10	4
Coastal Ships	160		586
Nanuchka	3	SS-N-9	18
Osa	127	SS-N-2/ SS-N-11	508
Komar	30	SS-N-2	60
Aircraft**	275		385
TU-16 Badger	165	AS-2	165
TU-16 Badger	100	AS-5	200
TU-16 Badger	10	AS-6	20
Total	521		1,457

* *The P class submarine may carry 12 cruise missiles rather than the 10 indicated here.*

** *The TU-22 Blinder with the AS-4 Kitchen and the TU-95 Bear with the AS-3 Kangaroo are not included here because they are only in Long Range Aviation. Both systems are believed capable of antiship operations, however, and LRA Bears have simulated such attacks with the AS-3 in naval exercises.*

USSR: Disposition of Naval Cruise Missile Platforms and Launchers Mid-1971



Most of the cruise missile force has been oriented primarily toward defense of sea approaches to the coasts, but the ocean-going force is growing. Of the approximately 1,460 cruise missile launchers, about two-thirds are on coastal ships and medium-range aircraft. The remaining one-third represents the force of ocean-going launchers--about 400 on submarines and 80 on major surface ships.

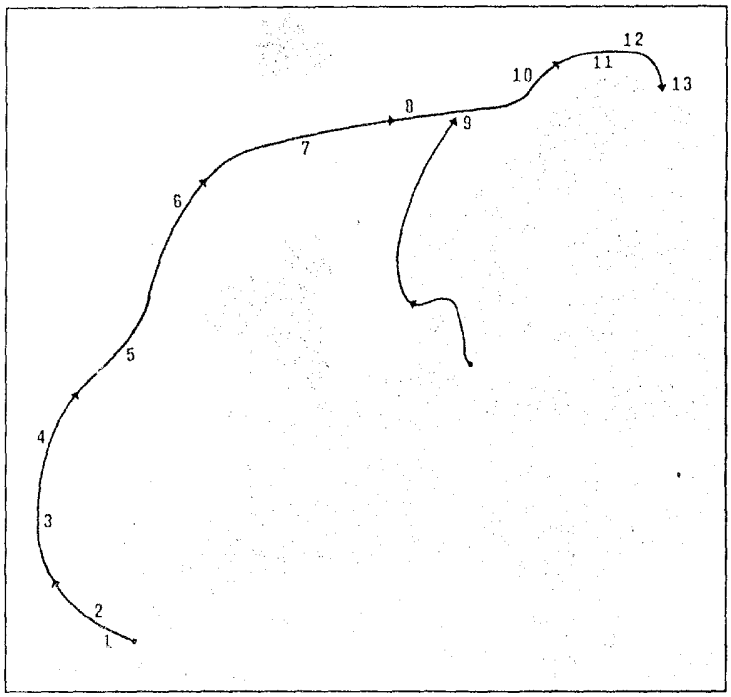
The disposition of cruise missile platforms and launchers by fleet as of mid-1971 is shown in the illustration on page 30. Two-thirds of the cruise missiles on naval platforms are based in the Northern and Pacific fleets, where they have better access to the open sea than in the Baltic and Black Sea fleets. Only eight cruise missile submarines are based in the Baltic and Black seas, where their exit could be blocked.

The 160 missile-armed coastal patrol boats are distributed unevenly among the fleets, the largest concentration is in the Pacific Fleet apparently to defend against possible naval air attack from the seas of Japan and Okhotsk. Only 22 are in the Northern Fleet, where open seas and harsh climatic conditions restrict their use.

The 275 missile-armed aircraft are distributed more evenly--about 30 percent are based in the Pacific Fleet, 30 percent in the Northern Fleet, 25 percent in the Black Sea Fleet, and the remaining 15 percent in the Baltic Fleet. The dispatching of ten air-to-surface missile configured Badger medium bombers to Egypt in November 1971 provided the Soviets with a new element of forward basing, enhancing their anti-ship capabilities in the Mediterranean area.

About half of the missile-armed ocean-going warships are home-based in the Baltic and Black seas where repair and building yards and test ranges are located. Ships home-based in these areas, however, spend much of their time in the Mediterranean or in operational areas where they are in a position, if required, to counter Western fleets.

Cruise Missile Defense of Sea Approaches in Soviet Exercise "Ocean" 15-28 April 1970



1 15th: Helicopter cruiser Leningrad, Sverdlov cruiser, and three destroyers leave Mediterranean to simulate aircraft carrier task force.

2 Ten naval Bear D aircraft reconnoiter North Atlantic as far south as Gibraltar area.

3 17th: Two Bear Ds overfly northbound Leningrad group.

4 18th: Intelligence trawler takes up shadowing position. Bear D overflights continue.

5 20th: Three Long Range Aviation Bear bombers overfly Leningrad group, possibly acting as targets for the ships' air defenses or simulating ASM launches.

6 21st: Submarines shadow Leningrad group.

7 23rd: Two Krestas and three submarines simulate cruise missile strikes against the group. Bear Ds support strikes. Missile strikes by Badger aircraft follow.

8 24th: Some 115 aircraft leave Kola Peninsula in waves to take part in missile strikes against approaching naval forces.

9 25th: Leningrad and one destroyer join two Alligator LSTs and destroyer from the Baltic. This group continues north, simulating amphibious assault force.

10 26th: Another day marked by reconnaissance and missile strikes.

11 27th: Large group of destroyers and escorts with three Polnocny LSMs joins northbound assault force.

12 Osa coastal patrol ships join missile-launching defense. C class submarine possibly launches cruise missiles from underwater.

13 28th: Amphibious assault force establishes beachhead on Kola Peninsula

Operational Employment of Cruise Missiles

Soviet cruise missiles play an important role in defending the sea approaches to the USSR, countering Western aircraft carriers and other surface ships, and assisting Soviet antisubmarine warfare efforts.

Defense of the Sea Approaches

A naval surface force approaching the Soviet coast to launch a strike would have to bypass or defeat several echelons of Soviet naval forces armed with cruise missiles. Bear aircraft and diesel and nuclear cruise missile submarines form the first line of defense, which extends south of the Azores in the North Atlantic and into the Philippine Sea in the Pacific. Large surface combatants and Badger aircraft are employed closer to the USSR, but still far outside Soviet coastal waters; they form the second line of defense. Coastal patrol craft and diesel submarines form the last line of defense in front of shore-based installations. Cruise missiles are the main armament for all of the defending forces.

Exercise "Ocean," the largest multifleet exercise ever held by the Soviets, demonstrated how they intend to use their naval cruise missile force to defend the sea approaches to the USSR. The sequence of operations in Exercise "Ocean" is portrayed in the illustration on page 32. [redacted] simulated cruise missile launches were directed against one task group simulating a carrier force attacking the Soviet Union. Soviet strength in the defense of sea approaches lies in the number and variety of cruise missiles that can be brought to bear on an attacking naval force.

Antiship Capabilities for Open-Ocean Operations

Cruise missiles provide the Soviets with an antiship capability which they probably consider essential to support their expanding naval presence in the open seas. Most long-term deployments and large-scale exercises include cruise missile ships or submarines. Operational days at sea for submarines and major

surface ships increased from 3,370 days in 1965 to 19,100 days in 1970. Concomitant with this increase in open-ocean operations has been the 80-percent increase in the number of cruise missile launchers on Soviet ocean-going submarines and ships.

The increased deployment of cruise missiles in distant operations has occurred primarily in the Mediterranean Squadron, where the Soviets kept an average of about 50 naval units deployed during the first half of 1971. Ten to 12 were submarines--two of these were cruise missile submarines--usually E-II, J, or the newer C class. Some 15 to 20 were surface combatants, usually including a missile cruiser and six to eight destroyers, several of which were missile destroyers. The cruiser and destroyer force sometimes doubled in size during exercises, periods of tension in the Middle East, or while forces were being rotated in and out of the Mediterranean. The remaining units were auxiliaries.

The Mediterranean Squadron ships frequently conduct exercises against each other and against NATO ships. Occasionally, exercise targets are US carriers of the Sixth Fleet which are trailed by Soviet ships nearly all the time that they are in the eastern Mediterranean. In February 1971, for example, an exercise force consisting of a SAM-equipped Sverdlov cruiser, a Kynda class cruiser, two Kashin destroyers, a Kotlin destroyer, an unknown number of submarines including a C class, and a few small combatants and auxiliaries operated against the US aircraft carrier Forrestal. The Forrestal cut short the exercise by making a port call at Malta

similar Mediterranean exercises have also reflected simulated air-to-surface cruise missile attacks

Missile-equipped TU-16 Badger aircraft were deployed in early November 1971 to Aswan, Egypt, where air-to-surface missile crates have been

seen since the spring of 1970. The Soviet Navy probably will keep at least a squadron of about ten missile-carrying TU-16 aircraft in Egypt.

Naval operations elsewhere, although they have involved smaller forces than those in the Mediterranean, frequently involve cruise missile forces. For example, the Soviet naval visit to Cuba in May 1970 consisted of a Kresta armed with cruise missiles, a surface-to-air missile destroyer, a cruise missile nuclear submarine, two torpedo attack submarines, a submarine tender, and a naval supply ship. This naval force could hit surface ships up to 220 nm away with cruise missiles. The submarines or long-range Bear aircraft from either the USSR or a deployment base in Cuba could provide target information beyond the horizon for the surface-to-surface missile firings. The cruise missile submarines, patrolling at a distance from the main formation, would extend the strike range of the force. Some measure of protection from air attack would be provided by the surface-to-air missiles of the cruiser and destroyer.

Protection of Surface ASW Forces

The Soviets are arming some antisubmarine ships with cruise missiles to protect ASW task groups from surface threats that could disrupt their operations on the open sea. This use of cruise-missile-equipped forces will increase as the Soviets put more effort into antisubmarine warfare against ballistic missile submarines, one of their most pressing naval problems.

Exercise "Ocean" showed how the Soviets use ships armed with cruise missiles to protect an ASW task group. A major ASW portion of "Ocean" in the North Atlantic took place in the Norwegian Sea and involved an ASW task group of four Petya destroyer escorts and two Riga destroyers led by a Kresta cruiser.

Limitations

In addition to the disadvantages of the individual cruise missile systems previously discussed, there are other limitations in Soviet antiship capabilities. For example, the in-depth defense of Soviet coasts is complicated by the number of ships and aircraft that the Soviets use to do the job. Under combat conditions, the Soviets probably would experience command and control difficulties in coordinating the complex operations involved in the multiple-echelon defense of coastal areas.

The Soviet chief of naval communications, Vice Admiral G. G. Tolstolutskiy, in critiquing Exercise "Ocean" (*Naval Digest*, November 1970), stated that the reliability of operations was hindered by saturation and disruption of communications. He noted "inefficiencies in the control of the forces" even in exercise play where communications were not subject to combat interference. The Soviets are working to solve these problems mostly through improved means of communications, additional exercises at sea, and improved training for communications personnel.

A limitation applicable to all antiship capabilities is the heavy reliance the Soviets place on the intercept of electronic signals for ocean surveillance. The Soviets are attempting to overcome this problem by exercising against Soviet ships which simulate enemy forces and use strict control of electronic emissions.

Some Soviet cruise missile ships and submarines of the ocean-going force lose effectiveness when operating beyond the range of Soviet aircraft which provide over-the-horizon support in targeting cruise missiles. External targeting data are needed for the normal operation of most of the ocean-going cruise missile launchers.

Newer systems such as the SS-N-10 on the Kresta II and the SS-N-7 on the C class submarine may be capable of operating without outside assistance, but

they represent only one-fifth of the ocean-going force and their missile ranges are less than those of the systems they are superseding and complementing.

The variety of cruise missile weapons deployed complicates logistic support. At least seven different surface-to-surface cruise missiles are operational now. New weapons continue to be developed and introduced, yet the Soviet Navy seems reluctant to phase out the older systems. Soviet ships, because of their size and the numerous weapons and electronics on board, are believed to carry few spare parts and few weapons for refire. The underway replenishment capability for arms and equipment in the Soviet Navy is probably inadequate to compensate for the limited on-board logistics capabilities of Soviet ships.

Force of the Mid-Seventies

The number of cruise missile launchers on Soviet ships, submarines, and aircraft is expected to increase from the present level of about 1,460 to over 1,800 by mid-1975.

Important changes in the composition of the force will occur by mid-1975. Improved cruise missile systems--those introduced since the mid-Sixties--such as the SS-N-7 for the C class submarine are being deployed. These new systems comprised only about 5 percent of the total cruise missile launcher force in mid-1971 but will probably make up about 50 percent of the force by mid-1975.

At least two new cruise missile systems are expected to come into service by the mid-Seventies. The P class submarine has been in the Northern Fleet since the spring of 1971, although its missile may not be operational. Almost nothing is known about the missile for the P class, but it may be capable of hitting targets beyond the horizon, possibly after underwater launch.

Another new missile expected in the mid-Seventies is an air-to-surface missile for the Backfire swing-wing aircraft. The missile for the Backfire could be the AS-6, a modified AS-4, or the new missile which has been identified under development .

If the trends of the past decade are continued, new missiles are likely to have enhanced target acquisition capabilities and increased speed, and to be smaller. The trend toward smaller missiles is significant, as more missiles can be provided per missile carrier, thereby lessening logistic problems.

The cruise missile force in 1975 almost certainly will engage in an increasing number of long-range ocean-going operations, giving slightly less emphasis to defense of the sea approaches to the USSR. The ocean-going submarines and major surface ships will account for nearly all the numerical increase in the launcher force while coastal ships and aircraft are not expected to change significantly in number. The total number of submarine cruise missile launchers will probably increase from about 400 to about 550, and the number of launchers on major surface ships will triple--from about 80 to some 240.

In mid-1975, a little over half of the Navy's cruise missiles will be on coastal ships or medium-range aircraft, about one-third on submarines, and the remainder on major surface ships. The proportional distribution of missiles and carriers by fleet will probably not change significantly because their allocation appears to be based on fleet missions, which show no signs of changing before 1975.

Summary

The cruise missile has played a primary role in the expansion of the missions and operations of the Soviet Navy. In the early Fifties, the Soviet Navy was organized to protect the coasts of the USSR and to support the flanks of the Soviet army. By using the cruise missile the Navy has extended its defense perimeters to counter the Western carrier threat. In contrast to the early Sixties, Soviet warships now operate regularly far from the USSR's coasts.

Soviet naval cruise missiles have proved to be an accurate means of delivering large warheads at greater ranges than traditional naval guns. Only a few hits by conventionally armed cruise missiles would be needed to sink or put a large warship out of action. In recent years, the Soviets have traded off long range in some cruise missile designs for improved tactical characteristics such as submerged-launch capability for missiles on submarines, high-speed flight for air-to-surface missiles, and improvements in missile maneuverability or guidance.

Cruise missiles are integrally related to many of the missions and tactics of the Soviet Navy. Exercises for defense of the homeland illustrate annually the Soviet Navy's dependence on cruise missiles. These exercises show that a naval force approaching the USSR's coasts to launch a strike would have to bypass or defeat several echelons of Soviet naval forces armed with cruise missiles. Included in this echeloned defense are long-range aircraft, nuclear submarines, cruisers, destroyers, diesel submarines, and patrol craft.

The Soviets probably consider their cruise missiles to be an essential part of their expanding naval presence in the open seas. For example, they usually have in the Mediterranean a fleet of about 50 ships with about 10 to 12 submarines and 15 to 20 surface warships--including 1 to 3 cruise missile submarines, 1 missile cruiser, and 2 or 3 missile destroyers--which exercise against each other and at times simulate

attacks on NATO forces. These operations generally involve mock cruise missile strikes.

Cruise missiles will also protect ASW forces at sea as indicated by the Soviet Navy's construction programs and exercises. Ships armed with cruise missiles have been taking part in Soviet naval operations to develop tactics and strategy to be employed against submarines. The role of the missile-armed ships has been to act as command posts and to protect the ASW forces from the interference of other surface naval forces.

As the principal means of naval attack, Soviet cruise missiles have their shortcomings, however. For instance, most cruise missile submarines have to surface before they can fire their missiles. Command and control processes would present difficulties in coordinating the complex operations involved in multiechelon defense of the coast. Also, Soviet dependence on electronic intercept and direction findings for reconnaissance is a disadvantage in the face of opposing forces observing strict control of electronic emissions.

To date, the Soviet Navy has deployed at least seven classes--excluding variants--of surface-to-surface cruise missiles for submarines, patrol craft, and large surface ships. Those missiles which appeared in the late Fifties and early Sixties were designed around two basic concepts. They were either for long-range strike, so that the seagoing launch ship could launch a strike from outside the target's defenses; or for short-range strike from fast, maneuverable patrol craft. The new missiles deployed in the past few years have improved on these concepts by adding an over-the-horizon range to missiles on patrol craft and by giving greater tactical flexibility to the sea-going ships equipped with such missiles.

The four types of air-to-surface cruise missiles that have been deployed in Soviet naval aviation are all carried by the TU-16 Badger aircraft. An important increase in strike capability is being realized by the deployment of the new AS-6 missile. The AS-6 has

a top speed of Mach 3, which is about twice as fast as earlier naval air-to-surface missiles, and has a maximum range of 300 nm, which is more than double that of its best predecessor. Further increases in strike capabilities may be forthcoming in the mid-Seventies with the possible introduction of the swing-wing Backfire.

The Soviet naval cruise missile force has been oriented predominantly toward the defense of the sea approaches to coasts, but the ocean-going force is growing. Cruise missiles are distributed among the fleets in accordance with the main tasks of the individual fleets. Most of the cruise missile force is located in the Northern and Pacific fleets to assure better access to the open seas. Coastal patrol missile boats are deployed in accord with possible enemy attack routes. The Black Sea Fleet provides most of the surface ships used for Mediterranean deployments.

In addition, construction programs under way indicate that the use of cruise missiles on anti-submarine warfare ships to protect ASW task groups will increase.

The composition of the cruise missile force by mid-1975 probably will change significantly. By mid-1975, missiles introduced since 1965 will probably make up about 50 percent of the force compared with about 5 percent in mid-1971. Missile launchers on the ocean-going force of major surface ships and submarines probably will increase from about 500 in mid-1971 to about 800 by mid-1975.

Top Secret

[redacted]

Top Secret