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Transfer of Soviet Antisubmarine Warfare Technology to Warsaw Pact Countries

AI Intelligence Assessment

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Transfer of Soviet Antisubmarine Warfare Technology to Warsaw Pact Countries [REDACTED]

An Intelligence Assessment

*Information available as of 1 August 1981
has been used in the preparation of this report.*

The author of this paper is [REDACTED], Office of Scientific and Weapons Research. Comments and queries are welcome and may be addressed to the Chief [REDACTED], OSWR, on 351-6922 [REDACTED].

This paper has been coordinated with the Office of Strategic Research and the National Intelligence Officers for Strategic Programs, for USSR-Eastern Europe, and for General Purpose Forces [REDACTED].

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Transfer of Soviet Antisubmarine Warfare Technology to Warsaw Pact Countries

Overview

The USSR is transferring antisubmarine warfare technology to the navies of the Warsaw Pact Alliance, including East Germany, Bulgaria, Poland, and Romania. None of these countries has an antisubmarine warfare mission beyond that of defending coastal areas against submarine incursions, and even this mission is made possible only by the acquisition of Soviet technology. Most of the Soviet equipment transferred so far to these countries is obsolescent or deteriorates in performance after delivery. Thus, these forces now do not represent a significant threat to US or NATO submarine operations.

East Germany has received most of the Soviet technology and the widest variety of weaponry. In 1978 East Germany received the relatively modern Soviet Koni-class frigates, Haze helicopters, and also current Soviet weaponry and electronics for the Balcom-4 frigate, a ship designed and built by the East Germans. This may indicate that similar Soviet transfers will be made in the future in an effort to bolster the antisubmarine warfare capabilities of Poland, Romania, and Bulgaria.

The Soviets apparently intend to optimize the Warsaw Pact countries' antisubmarine warfare capabilities for local waters. This is consistent with the wartime roles assigned to the non-Soviet Warsaw Pact navies—combat operations in the Baltic and Black Seas. All technology transferred thus far was originally designed by the Soviets for their own coastal defense. The weapons and sonars have extremely limited ranges and could not perform effectively in the open ocean. The surface ships and submarines that have been transferred are unable to perform on the high seas. Thus, the current threat to US and NATO submarine operations from non-Soviet Warsaw Pact navies in the open ocean is virtually nonexistent.

Warsaw Pact countries have not been involved in antisubmarine exercises with the Soviets outside of the Baltic and Black Seas, nor are these countries encouraged to conduct any significant research and development on antisubmarine warfare systems, either for themselves or for export.

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Preface

This paper delineates, describes, and assesses the antisubmarine warfare technologies obtained by the non-Soviet Warsaw Pact navies from the USSR. Judgments are made on the impact of this equipment upon the overall effectiveness of the Warsaw Pact navies. Although the scope of this study is limited, it represents a mandatory first step before the larger issues of worldwide naval technology transfer and the antisubmarine warfare capabilities of Warsaw Pact countries can be put into perspective. ■

Transfer of Soviet Antisubmarine Warfare Technology to Warsaw Pact Countries

Background

The Warsaw Pact Alliance (WP) was established in May 1955 with the signing of a Treaty of Friendship, Mutual Assistance, and Cooperation. The Warsaw Pact signers were the USSR, East Germany, Bulgaria, Czechoslovakia, Poland, Romania, Hungary, and Albania. (Albania withdrew from the Alliance in 1968.) From its inception to the late 1960s, the WP did not have an effective antisubmarine warfare (ASW) capability. Also, the Soviet ASW programs had not resulted in any significant developments.

The ASW technology that eventually was incorporated into the WP forces represented early Soviet developments. The first Soviet effort to develop an ASW capability was the construction of the Artillerist-class submarine chaser in the mid-1940s. Although this ship was not transferred to the Warsaw Pact, the Kronstadt-class submarine chasers and the Riga-class frigates that followed it were transferred. Beginning in the mid-1950s, the Soviets built slightly improved ships, such as the SO-1-class submarine chaser and the Poti-class patrol escort. The latter ships were selected for transfer to the WP countries. The Soviets built their Whiskey-class and Romeo-class diesel attack submarines also during the 1950s, and eight of these eventually were transferred to the WP countries.

The Soviets also began in the 1950s to develop ASW aircraft. Although many of the early Madge/BE-6 seaplanes were transferred to Communist China, none of these extended-range aircraft were ever sent to the WP countries. The most recent Soviet ASW helicopter is the Haze/Mi-14. The Haze probably will replace the Mi-4/Hound helicopter, which has been used in most of the WP countries.

Types of Technology Transferred

Data relating to quantity and types of Soviet platforms transferred to the WP are fairly reliable.

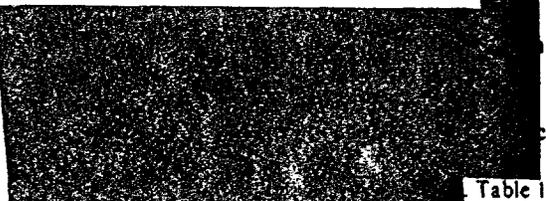


Table 1 lists the number of platforms that have been transferred to East Germany, Bulgaria, Poland, and Romania. Table 2 shows the performance characteristics of the platforms and lists some of their significant ASW sensors and weapons. The appendix describes in detail the ASW platforms, sensors, and weapons that have been transferred to one or more WP countries.

Surface Craft

East Germany. East Germany was among the early recipients of ASW surface craft from the Soviets. East Germany has received the largest number and variety of surface ships of any WP country. Included in the transfers were Rigas, SO-1s, Shershens, and Konis. The Mirkas were considered for transfer but were never delivered. The transfer of these surface ships has bolstered the East German capability to defend its coastal areas against submarine incursions.

In 1956 East Germany received four Riga-class frigates from the Soviets. In 1960 the Soviets modernized their Rigas by replacing the RBU-600 ASW rocket launcher with the modern RBU-1200 that has a longer range. We do not know whether the Rigas transferred to East Germany were modernized in the

Table 1

Transfers of ASW Craft From USSR to Warsaw Pact Countries

Class/Type	USSR: Year Constructed	East Germany		Bulgaria		Poland		Romania	
		Delivered	Total	Delivered	Total	Delivered	Total	Delivered	Total
Surface craft									
Kronstadt/submarine chaser	1950			1957	2	0	0	1956	3
Riga/frigate *	Mid-1950s	1956	4	1957-58	2	2			
SO-1/large patrol craft	Mid-1950s to late-1960s		12	1963	6	6			
			(16) *						
Kotlin/destroyer *	1958						1970	1	1
Poli/patrol escort	1961-68			1975	3	3		1964-67	3
Mirka/frigate	1963-66								
Sherashen/torpedo boat	1969-71	18	18	1969-78	6	6			
Koni/frigate *	1977-78	2	2						
Submarines									
Whiskey/diesel attack	1950			1958	2	0	1962	4	4
Romeo/diesel attack	1962			1972		2			
Aircraft *									
Hound/Mi-4B	1958								
Haze/Mi-14	1975								
		Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
		1980	9	1980	6	5	1981	6	6

* These ships are not primarily ASW craft but have sufficient ASW capability to be included.

† Number in parentheses also has been indicated in the literature.

‡ Some data indicate that plans were being made to replace Riga with Mirka in 1969. To date no Mirkas have been observed in the East German Navy.

§ Although not included, tenuous evidence indicates Ka-25A/Hor- none helicopters may be at Penemuende, East Germany.

This table is [redacted]

same way. No general modernization of the aging Rigas appears to have been attempted by the Soviets. We believe that the Rigas have been or will soon be completely removed from service in both East German and Soviet Navies. Only one remains in the East German Navy, although it may now have been deactivated or placed in reserve status. ■

East Germany received 12 to 16 SO-1-class large patrol craft in the mid-1950s. All of these ships have been phased out of service. The Soviets also are phasing out these aging vessels. ■

The 18 Shershen-class torpedo boats delivered to East Germany between 1969 and 1973 are still in active service. Although these boats function primarily in an antiship coastal defense role, they carry depth charges that can be used against enemy submarines. The Soviets stopped construction of the Shershens in the early 1970s. The Shershen has been exported in large numbers by the Soviets, and more may be taken out of the Soviet inventory for use in the WP navies. ■

The most recent delivery of Soviet surface craft to East Germany was two Koni-class frigates that were transferred in the late 1970s (see figure 1). The Koni is a useful addition to the East German naval forces, although its weapons and sensors are of early 1960 Soviet vintage. The Konis, built by the Soviets, showed only minimal improvement in performance over Rigas. Thus, the Soviets apparently decided to use them only for export. Thus far, the Soviets have built only four Koni frigates for export. ■

The transfer of the relatively modern Koni to East Germany in 1978-79 indicates that the Soviets were at least encouraging a modernization of the East German Navy. The Koni, while unsuitable for the Soviet Navy, appears to be a useful asset for East Germany. ■

Bulgaria. Bulgaria ranks second to East Germany in numbers of surface craft received from the Soviets. Included in the transferrals through 1978 were Kronstadts, Rigas, SO-1s, Potis, and Shershens. ■

* The remaining two were delivered to non-WP countries, Yugoslavia and Algeria, in 1980. ■

Bulgaria's first acquisitions of surface craft from the Soviets in 1957 were two Kronstadt-class submarine chasers. At about the same time, two Riga-class frigates also were delivered. In 1963 the Bulgarians received six SO-1s, and six Shershens were received from 1969 to 1978. The most recent delivery, starting in 1975, was that of three Poti-class patrol escorts. The Potis represented considerable improvements over the Kronstadts because of their greater range and speed; they also had newer sensors and armament. The effectiveness of the Poti, however, was hampered because of its limited ASW capability. In addition, the Poti was designed as a submarine chaser to operate in groups for optimum sonar performance. All of the surface craft delivered to Bulgaria are in active service. All of the Soviet ships delivered to Bulgaria, including the most modern, are characterized as aging and obsolescent. Nevertheless, these ships add materially to Bulgaria's capability to defend its sea lines of communication against submarines in the Black Sea. Overall defense of the Black Sea is further enhanced through regular combined Soviet-Bulgaria ASW exercises in the area. ■

Poland. Of all WP countries receiving surface craft from the Soviets, Poland has received the least. It has received Kottins and may have received Kronstadts. ■

In 1970 Poland received a modified Kotlin-class destroyer, sometimes referred to as the SAM-Kotlin because of its SA-N-1 installation. Although the modified Kotlin is not primarily intended for ASW, it does possess RBU-2500 ASW rocket launchers for use against enemy submarines. It is still active in the Polish Navy. Poland also may have received about nine Kronstadts from the Soviets. None of these is currently active in the Polish Navy. ■

The Poles participate occasionally in ASW exercises in the Baltic. Although the Poles contribute little to WP ASW effectiveness, this participation probably represents a Soviet desire to include Polish forces in more joint exercises, thus showing WP harmony. ■

Table 2

Description of Soviet ASW Technology Transferred to Warsaw Pact Countries

Class/Type	IOC	Physical Characteristics			Performance Characteristics				ASW Weapons	
		Length (m)	Beam (m)	Displacement (mt)	Speed (kn)			Endurance (nm) at Economy Speed		
					Standard	Full Load	Maximum Sustained			Maximum Speed
Surface craft Kronshtadt/submarine chaser	1948	52.2	6.5	Unk	336	19	12	850	1,400	Rocket launchers: 2 RBU-1200 2 RBU-900 (on some) 2 depth charge mortars (on some) 2 depth charge racks Mines capacity: 8
Riga frigate *	1952	91.0	10.2	1,396	1,510	28	13	550	2,000	Rocket launchers: 2 RBU-1200 1 MBU-600 (on one) 2 internal depth charge racks 1 double or triple 533-mm torpedo tube Mines capacity: 18-28
SO-1/large patrol craft	1957	42.0	6.0	190	215	26	7	372	1,920	Rocket launchers: 4 RBU-1200 1 depth charge mortar
Kotlia/destroyer *	1954	126.5	13.0	2,600	3,500	34	11	1,050	4,700	Rocket launchers: 2 RBU-2500 1 Quiet 533-mm torpedo tube
Post/patrol escort	1961	59.4	7.9	263	400	37	10	520	4,500	Rocket launchers: 2 RBU-6000 1 RBU-2500 (on export versions) 4 single 406-mm torpedo tubes

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Ship/Type	Year	Length (m)	Beam (m)	Displacement (t)	Speed (kts)	Range (nm)	Armament
Mirka I: Quint 406-mm torpedo tubes 4 RBU-6000	1963	82.4	9.2	1,000	10	500	4,800
Mirka II: 2 Quint 406-mm torpedo tubes 2 RBU-6000 rocket launchers Depth charge rack (internal)	1965	82.4	9.2	1,000	10	500	4,800
Sheraton/ torpedo boat	1959	34.7	6.7	145	18	460	1,000
Kom/ frigate	1976	97.0	12.8	1,600	27	14	1,800
Submarines							
Romco/diesel attack	1957	76.8	7.0	1,700	16 surface 12.5 sub-merged	Unk surface 12.5 sub-merged	Unk surface Unk submerged
Whiskey/diesel attack	1950	76.0	6.3	1,342	17 surface 13.5 sub-merged	2,860 surface 14.3 sub-merged	8,500 surface 14.1 submerged
Aircraft							
Hound/MI-4B	1953	16.8	21	7,800	115 maximum	250	Depth bombs
Haze/MI-14A	1975	Unk	21.29	12,000	147 maximum	222	Depth bombs; torpedoes

* Radars that have some capability against small, water-borne objects, such as masts or periscopes, were not considered in this study.
 * These ships are not primarily ASW craft, but they have sufficient ASW capability to be included.
 * On Soviet submarines.

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Figure 1 East German Koni-class frigate



Romania. Romania has approximately 100 nautical miles of coastline, which is flanked on the north by the Soviet Union and on the south by Bulgaria. Romania has a substantial number of coastal patrol craft for defending its economic zone of influence (very likely they will defend their sea lines of communications and the WP forces when they are in port). Delivery of Soviet ASW-related surface craft to Romania has been small in numbers and variety. Three Kronstadts were transferred in 1956 and are still in active service. Three Potis were the most recent acquisitions and were transferred in 1964-67. The Romanians may be reluctant to become closely tied to the WP by accepting Soviet-offered equipment.

Submarines

Only two Warsaw Pact countries—Bulgaria and Poland—have received submarines from the Soviet Union.

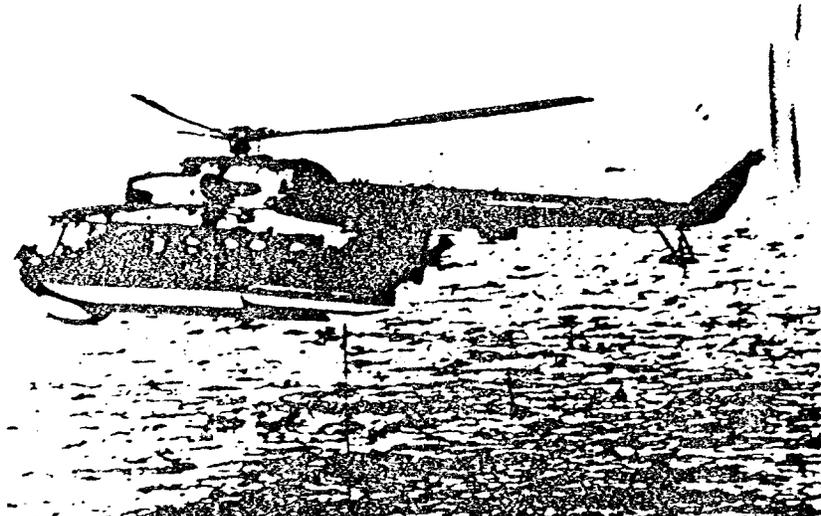
Bulgaria. In 1972 the Bulgarians received two Romeo-class diesel attack submarines (SSs), which replaced two aging Whiskey-class SSs transferred to Bulgaria about 15 years earlier. The Romeo-class submarines could provide defensive ASW barriers in wartime.

The acquisition of Soviet submarines strengthens Bulgaria's Navy and gives it a modest capability to conduct coastal operations against targets in the Black Sea. The two Whiskeys are retired. The two Romeos were built by the Soviets later than the Whiskeys but have similar propulsion systems. The Romeos have an improved hull form, better snorkeling, and quieter features than the Whiskey. The Bulgarian submarines, with their accompanying sensors and weapon systems, are too outmoded to add significantly to the ASW capability of the WP countries.

Poland. From 1962 to 1965 four Whiskeys, identical to those delivered to Bulgaria, were delivered to Poland. The Polish Navy is more balanced than its non-Soviet Warsaw Pact allies because it has the most submarines (four) and a larger naval air force. These four Whiskeys provide barrier defense for Poland's coastal waters. Poland probably gains much valuable experience in evasion tactics when it participates in the ASW exercises involving the WP countries. Nevertheless, Polish participation provides little enhancement to the ASW capability of the WP nations.

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Figure 2. East German Haze/
MI-14 ASW helicopter



Aircraft

Although the Soviets have exported fixed-wing ASW aircraft, none has been transferred to the WP. Many helicopters have been transferred to the WP, but it is not certain how many have an ASW role.

East Germany. East Germany is one of three WP countries to have received the Haze helicopter (see figure 2). Three were delivered in late 1979 or early 1980, and six were delivered in early 1981. The Haze is the best ASW helicopter in the WP inventory. It is the first in the WP forces to simultaneously have a dipping sonar, magnetic anomaly detector (MAD), and a radar. Some evidence indicates that the Haze also is instrumented with a relatively modern ASW data link designated Zenana.

Zenana is a very-high-frequency (130 to 135 megahertz—MHz) Soviet Navy interrogate/transpond data system. This system uses tonal transmissions between surface combatants and helicopters to direct the helicopters to the general area of underwater targets. Zenana almost certainly is used for helicopter station keeping; it may also have additional use in determining target data in conjunction with a shore-based control center that performs ASW analyses. In

early 1980 before the second delivery of the Haze, East German helicopter crews were observed participating in Soviet exercises using Zenana. In addition, reports indicate that an ASW data analysis center may be constructed near Stralsund, East Germany.

The developments in early 1980 indicate that the Soviets are bolstering the helicopter ASW capacity of East Germany and Poland, and they may increase the capability of Bulgaria.

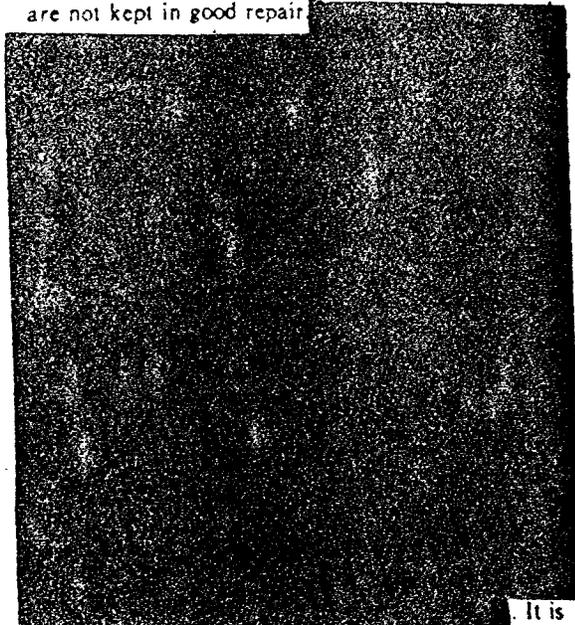
Bulgaria. Bulgaria has received six Haze helicopters from the Soviets. They have not been very active, and it is possible that one of the Haze helicopters in the Bulgarian Navy has crashed.

Poland. During May and June 1981, the Soviets delivered six Haze helicopters to Poland. Before delivery, Polish pilots underwent extensive training on these helicopters at Bryusterort in the Soviet Union. Delivery was made to the Polish air and sea reconnaissance base at Darlowo. If the same pattern of delivery of Haze helicopters to East Germany is followed,

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Sonars

We believe that, in most cases, the sonars transferred by the Soviets probably included those installed by the Soviets aboard their own ships. Many of these sonars are not kept in good repair.



It is possible, however, that MADs were on board the helicopters that have been transferred to East Germany.

Weapons

Many nonnuclear ASW weapons have been exported to the WP, including RBU rocket launchers and munitions, torpedoes, and mines. The exported weaponry is almost always less effective than that in the current Soviet inventory. Weapons effectiveness requires not only proper maintenance and practice, but also proper target location and fire control. The transferred sensors cannot perform the necessary target definition with sufficient accuracy or in a timely manner. Therefore, the weapons pose no threat to NATO submarines. Some of the weaponry actually may have been obsolete.

Table 3

Soviet ASW Weapons in the Warsaw Pact Inventory

Weapon	WP	East Germany	Bulgaria	Romania	Poland
Rocket Launchers					
RBU-900			X*	X	?
RBU-1200		X		X	
RBU-2500				X	X
RBU-6000		X	X	X	
Torpedoes*					
53-38	X				
53-39	X				
53-56	X				
SAET-50	X				
SET-53	X				
ET	X				
Mines					
MAG				Probably delivered	

* Delivered.

* Cannot determine which WP country.

This table [redacted]

Torpedoes. East Germany, Poland, Bulgaria, and Romania have received a number of Soviet torpedoes 53 centimeters (cm) in diameter. Included are the 53-XX antiship series (53-38, 53-39, 53-56), the antiship SAET-50, the Electriceskaya Torpeda (ET), and the antisubmarine SET-53. All except the 53-56 antiship torpedo appear to be obsolete in the Soviet inventory. These torpedoes are most likely proven, single-purpose systems, because the Soviets have avoided multipurpose types until recently. We cannot identify which WP country received which particular type torpedo (see table 3).

The newest torpedo delivered to the WP is the SET-40 antisubmarine torpedo for use aboard the East German, Baloom-4 frigate (figure 3). The Soviet version of this torpedo, which is 40 cm in diameter,

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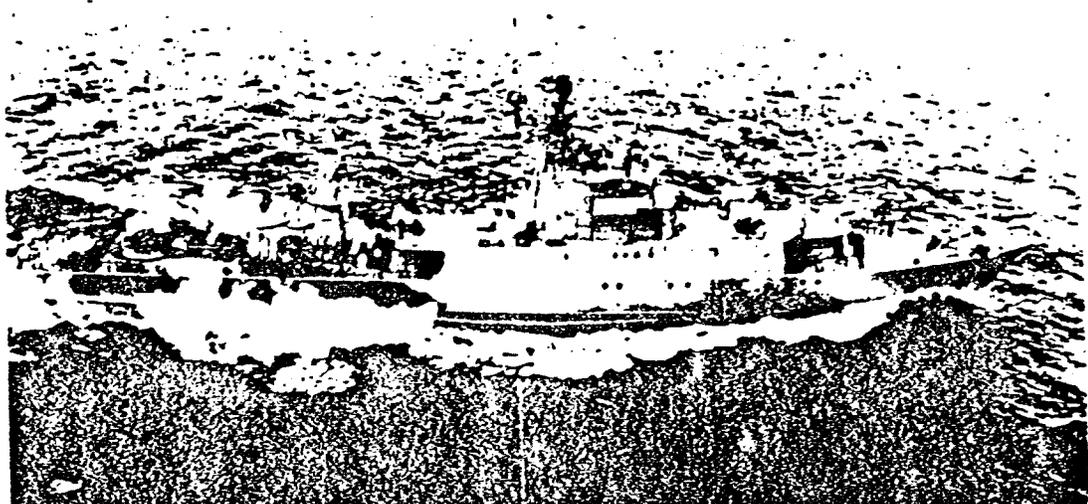


Figure 3. East German Balcom-4 frigate [redacted]

has electric propulsion, a range of 9.6 kilometers (km) and a speed of over 27 knots (kn). It has an active and passive acoustic guidance system and explodes either on contact or by active acoustic influence signals. This is the first small torpedo that has been sent to East Germany for use on its ships [redacted]

WP countries [redacted]

Torpedoes such as the E-40-65A are believed to have been designed for smaller combatant operation. They have become popular within the Soviet submarine community because of their light weight and small size. They may find wider utility in the WP forces [redacted]

[redacted]

Mines. No data are available to determine the status of Soviet mine exports to the WP countries. Only one Soviet mine with ASW applications, called the MAG by the Soviets, is believed to have been exported to East Germany [redacted]

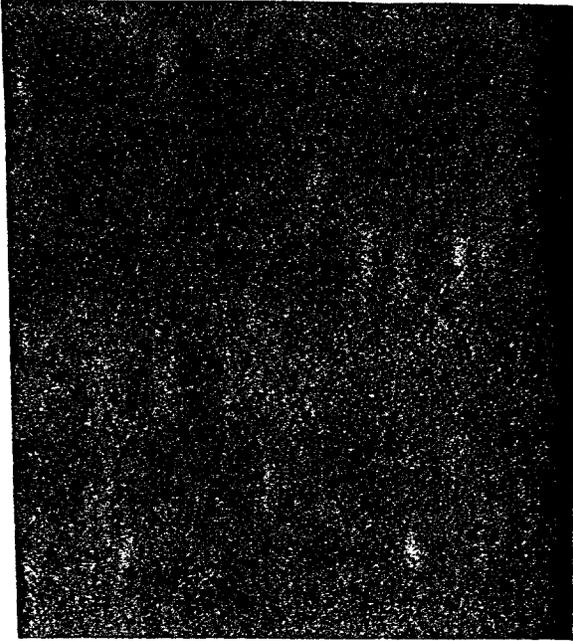
As currently structured, the WP navies pose virtually no threat to US and NATO forces [redacted]

Overall Effect of Transfers on WP and USSR Capabilities

[redacted]

The Soviets appear to be satisfied to keep the ASW capability of the WP countries at levels that are effective only in the shallow waters off the coast of the

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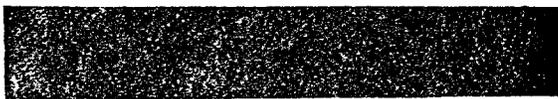


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Appendix

Description of Soviet ASW Technology Transferred

Surface Craft



Kronstadt class. This is a submarine chaser that appears to be an outgrowth of the World War II Artillerist-class, but it has a larger and improved hull design. The Soviets built about 230 of this class. None is in the Soviet inventory, but some are still in use in the WP countries.

Riga class. This frigate serves as an escort ship. Only 64 Rigas were built by the Soviets between 1952 and 1956. Rigas have been or soon will be removed from service in the Soviet and in the WP navies.

SO-1 class. This is a large patrol craft. The Soviets built about 150 SO-1s between the mid-1950s and late 1960s. They are still in service in the Soviet and WP navies.

SAM Kotlin class. This is a modified Soviet Kotlin-class destroyer having a surface-to-air missile (SAM) launcher (for an SA-N-1 GOA missile) in place of aft twin turrets. Nine SAM Kotlins were built by the Soviets and are still active. One has been transferred to Poland.

Poti class. This ship is a patrol escort that is designed as a submarine chaser and operates in groups to optimize sonar performance. It represents a considerable improvement over the Kronstadts but still lacks seaworthiness and effectiveness. Only 70 Potis were built by the Soviets, and six are still active in the WP navies.

Shersten class. The Shersten is primarily designed for an antiship role. It has some ASW capability by virtue of its weaponry. Nearly 100 units were built, and 58 units were transferred to Third World nations, including the WP. All appear to be in active status.

Koni class. This is a modern frigate that the Soviets have built for export except for one which is used for training in the Black Sea. Construction of an unknown number is under way; with the exception of one Koni, which will be used for training in the Black Sea, all of them appear to be for export. Four or five have been completed to date. The Koni has no torpedo tubes.

Mirka class. This frigate was built between 1963 and 1966 and consists of two basic types designated I and II. The two types have different ASW armament. Type I has one quint 406-millimeter (mm) torpedo tube cluster and four RBU-6000 rocket launchers; type II has two quint 406-mm torpedo tube clusters, two RBU-6000 rocket launchers, and an internal depth charge rack.

The Mirkas apparently were an interim-class frigate designed to fill the need that was to be filled by the Petya class.

Submarines

Whiskey class. The Soviets built about 236 Whiskey submarines with design features based on the World War II German-type XXI submarine. Many variants exist, including missile carriers and radar pickets.

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having a folding antenna on the sail. In wartime, it can perform useful roles in defensive barriers, including minelaying operations. ■

Romeo class. The Romeo-class submarine has a propulsion system similar to that of the Whiskey. The hull form of the Romeo represents an improvement over the Whiskey, and the larger snorkel induction on the Romeo permits snorkeling on two engines rather than one as on the Whiskey. Shrouds surrounding the propulsion screws on the Romeo provide some propeller quieting. The Romeo can carry about 20 mines in place of its torpedoes. Wartime roles for this submarine would include defensive ASW barriers. ■

Aircraft

Many helicopters have been transferred to the WP, some of which have an ASW role. ■

Hound/Mi-4B. The Hound is a four-blade, single rotor, medium-size helicopter used in large numbers as a transport in many different types of Soviet aviation units. The Hound B is used in a land-based ASW role in Soviet naval aviation. ■

■ The Soviet Union and WP countries are replacing the aging Hound B with the newer Haze A helicopters. ■

Haze/Mi-14A. The Haze A is an amphibious variant of the Hip/Mi-8 helicopter. Haze A is designed primarily for an ASW role. It is superior in speed, payload, range, and sensors when compared to the Hound and Hormone. The Haze A has a large chin radome, a weapons bay, dipping sonar, and MAD gear. The Haze A is designed primarily for land-based operations, but it can make emergency water landings. ■

Sensors

The sensors aboard the Soviet surface ships and submarines transferred to some WP countries are probably identical to those on similar Soviet platforms at the time of transfer. ■

Acoustics

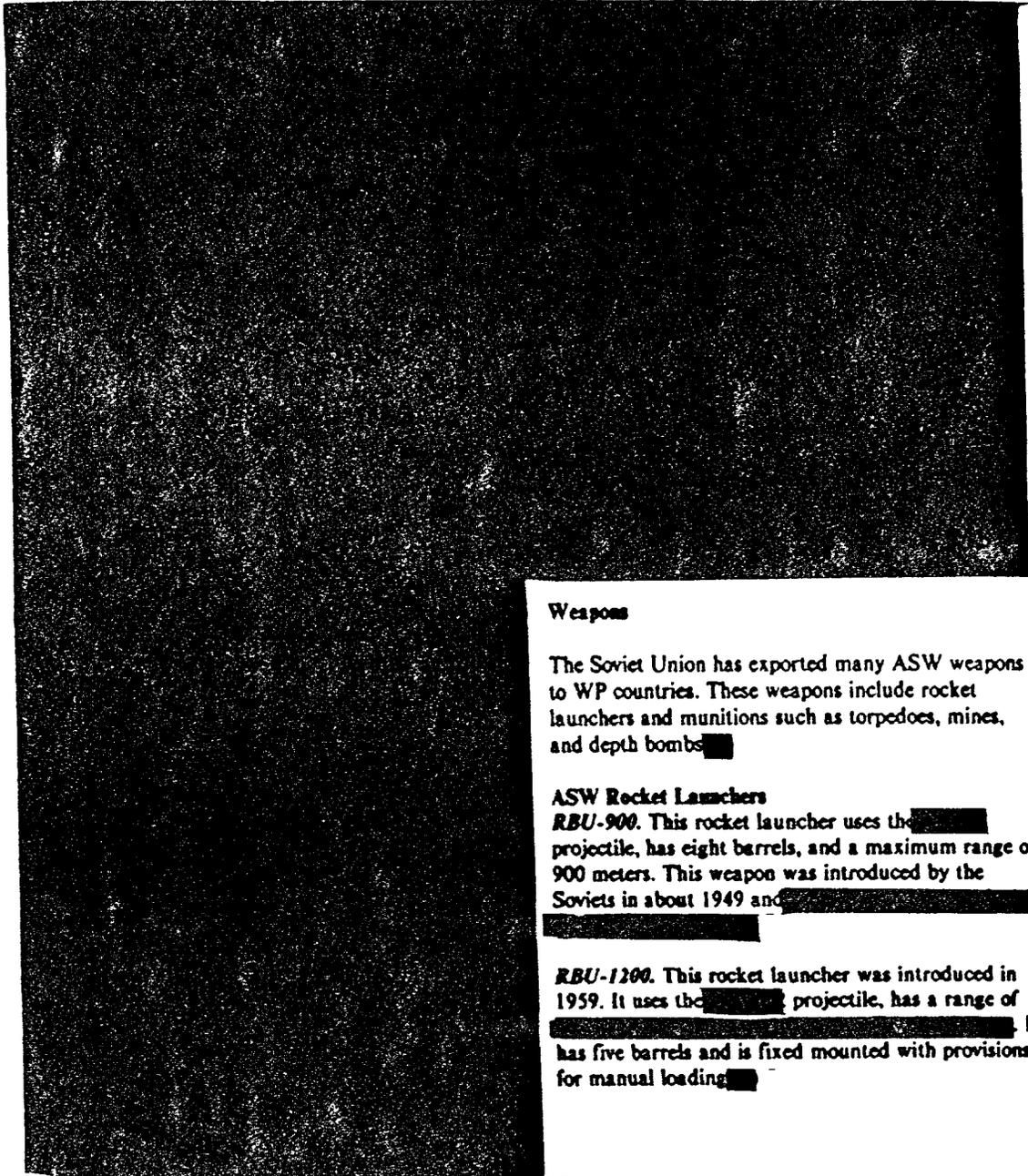
The sonars aboard the Soviet craft transferred to some WP countries represent Soviet developments in the 1950s and 1960s and are used mainly for coastal defense. ■

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Weapons

The Soviet Union has exported many ASW weapons to WP countries. These weapons include rocket launchers and munitions such as torpedoes, mines, and depth bombs.

ASW Rocket Launchers

RBU-900. This rocket launcher uses the [redacted] projectile, has eight barrels, and a maximum range of 900 meters. This weapon was introduced by the Soviets in about 1949 and [redacted].

RBU-1200. This rocket launcher was introduced in 1959. It uses the [redacted] projectile, has a range of [redacted]. It has five barrels and is fixed mounted with provisions for manual loading.

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RBU-2500. This launcher has 16 barrels, a range of 2,800 meters, and was introduced by the Soviets in 1958. It is a fully trainable launcher and uses the RGB-25 rocket. It typically is associated with the 15- to 23-kHz sonar (Titan/Vychedga) [REDACTED]

RBU-6000. The RBU-6000 has 12 barrels and was introduced in 1961. It is fully trainable, automatically loaded [REDACTED]

[REDACTED] Its maximum range is 6,000 meters. [REDACTED]

Torpedoes

Data on torpedoes that were transferred are insufficient for us to identify the specific torpedoes or the WP country receiving them. [REDACTED]

53-XX Series. The 53-XX series torpedo was standard Soviet weaponry in the late 1930s and early 1940s. These 53-cm-diameter torpedoes use air stream propulsion and gyro guidance. They have speeds ranging from 45 to 51 kn and ranges of about 4,000 meters. They explode on impact and are primarily antiship weapons. The 53-38, 53-39, and 53-56 torpedoes have been sent to WP countries. The 53-38 is now obsolete. [REDACTED]

SAET-50. This was the first Soviet acoustic homing torpedo; it became operational during the 1950s. It is 53 cm in diameter, has an electric propulsion system, a speed of 23 kn, and a range of 8,000 meters. The SAET-50 has gyro/acoustic guidance control, explodes either on impact or by magnetic influence, and is an antiship weapon. [REDACTED]

SET-53. This weapon, which represented a blend of World War II-German technology and indigenous Soviet underwater sensor technology, was first used operationally in 1960. This 53-cm-diameter torpedo has electric propulsion, a speed of 23 kn, and a range of 8,000 meters. It is an antisubmarine weapon. It has gyro/acoustic guidance and explodes on impact or by magnetic influence. Noise and stability problems with initial versions of the SET-53 led to many modifications. The SET-53 is not believed to be in the Soviet stockpile, but early variants are believed to be in the WP navies. [REDACTED]

ET. The ET designation is derived from its name *Elektricheskaya Torpeda*, and it is the basic design for all Soviet electric torpedoes to date. It is 53 cm in diameter, has a speed of 29 kn, a range of 5,000 meters, and explodes on impact. [REDACTED]

Mines

A number of Soviet naval mines have been transferred to the WP. Available data indicate that only one mine type with an ASW utility may have been exported. [REDACTED]

MAG. This mine was first introduced by the Soviets in 1940. It is a moored type that is detonated by contact through a galvanic-action antenna and, in some cases, by chemical horn. It is launched by surface ships and operates in water depths of 460 meters or less. [REDACTED]

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