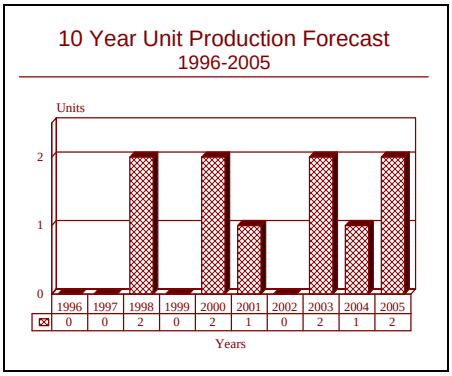
Project 1154 Neustrashimy Class - Archived 9/97

Outlook

- Construction greatly delayed by industrial problems
- Component supply network largely collapsed
- Original plan to build seven of class in doubt
- Exceptionally powerful surface combatant



Orientation

Description. Guardship (Storozhevoy Korabl or SKR) optimized for anti-submarine warfare (ASW) and anti-surface warfare (ASuW) operations.

Sponsor

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Contractors

Yantar Zavod 820
Kaliningrad
Kaliningrad Oblast
Russia

Licensee. No production licenses have been granted.

Status. Production and service.

Total Produced. Two ships are complete and running trials or are in service; two more are under construction. Forward construction planning calls for seven ships of this type.

Platform

Name	Builder	Keel Laid	Completed
Neustrashimy	Yantar Shipyard	April 1986	1991*
Yaroslav Mudryy	Yantar shipyard	May 1988	1992**
300 Let Rossiykomy Flotu	Yantar Shipyard	1989	10/1996
Nepokornyy	Yantar Shipyard	1990	1998

* in service January 1993
** still incomplete June 1996

Application. The Project 1154 design is classed as a Guardship (Storozhevoy Korabl or SKR), designed to provide ASW and ASuW capabilities in high-threat situations close to the Russian coastline and medium threat scenarios further afield.

Price Range. Quoted price for the export derivative of the Project 1154 design is US$375 million.

Technical Data

(All data taken from authoritative Russian sources. There are a number of significant differences from the estimated data published in other western reference books.)

Dimensions	**Metric**	**US**
Length:	129.63 m	425.2 ft
Beam:	15.6 m	51.1 ft
Draft:	8.35 m	27.3 ft
Displacement, standard:		3,590 tons
Displacement, full load:		4,200 tons

Characteristics	
Speed (max):	30 kts
Speed (cruise):	16 kts
Range:	3,000 nm at 18 kts; 700 nm at 30 kts
Crew (original):	22 officers, 88 mishmnanyii, 90 enlisted
Crew (current):	35 officers, 34 mishmnanyii, 141 enlisted

Armament	**Type**	**Quantity**
Guns:	AK-100 100 mm L70	1 (350 rounds)
	AK-630 30 mm	2 (4,000 rounds)
Missiles		
SSM:	P-100 Oniks	8
Anti-submarine:	100-RU Veder	8
SAM:	Kinzhal (9M330)	32
CIWS	Kortika launcher	2
	each has 2A38 30 mm guns	2
	and 9M311 SAM	8
Helicopter:	Ka-27 Helix	1
ASW RL:	1 RBU-6000	1

Electronics	**Type**	**Quantity**
Radar		
Air search:	MR-760 Fregat-MA	1
Surface search:	MR-212 Volga	2
Navigation:	MR-350 Privod-B	1
Fire Control:	Podberezovik	1
	Positiv-E	1
	MR-145 Lev	1
Electronic warfare		
ESM:	Start-M	2
ECM:	Krab-14	2
Decoy launchers:	RK-16	2
	RK-10	8
HF/DF	RPN-47-03	1
HF Intercept	Nikel-KM	1
Sonar:		
Low-Freq Hull	Zhvezda M-1	1
Low-Freq VDS	Zhvezda M-1	1
IFF:	Nikhrom	2
Gyrocompass:	MGL-50M Kurs-5	1
Echosounder:	NEL-5	1
Radiosextant:	ARL-50P	1

Propulsion	**Type**	**Quantity**
Main engines:	COGAG	
Cruise turbines:	M-70	2x10,000 shp
Boost turbines:	M-90	2x27,500 shp
Screws:	Standard propellers	2
Electric supply	DG-600 diesel generators	2x1,500kW

Design Features. The hull form of the Project 1154 features a long forecastle, breaking only beneath the helicopter deck, some 20 m from the stern. It is a hull optimized for good seakeeping, with considerable sheer from just abaft midships and substantial flare at the bows. The bow profile is nearly straight and angled at some 55° to the vertical, a form necessitated by the very large sonar dome underneath. The bow also has reverse sheer in the foremost section to enable the bow gun to fire at low angles of elevation. This is a feature also found in recent Dutch and French warships.

The superstructure is laid out in two low, separate blocks linked by a single-level superstructure deck amidships. Unlike other recent Russian designs, there is no provision for bridge periscopes. The forward superstructure houses the navigation and command bridges and has a short lattice mast at its rear end. This carries the Podberezovik fire control radar for the Kinzhal missile system. The aft superstructure is built around the helicopter hangar for a single Ka-27 Helix helicopter. The mainmast is mounted on the forward end of this structure and carries the EW equipment and the Fregat-MA main search radar.

The *Neustrashimy* is designed with particular attention to reducing radar cross-section and infrared emissions. Conventionally, RCS is reduced by sloping the sides of each superstructure level; this has the major limitation of severely reducing internal space on the upper decks. The Russian design team has attempted to overcome this by designing the *Neustrashimy* with each deck level built with its sides in a < > shape with the lower components angled outward while the upper edges angle in to return to the same vertical line. This was intended to reduce RCS at an accepted cost in terms of structural strength and cost penalties. The funnels are shaped to reduce radar returns and are equipped with complex thermal baffles. The after stack is so low that it barely clears the hangar. This gives rise to questions about dispersing the heat plume from the gas turbines and suggests that the funnels contain comprehensive cooling equipment in addition to that already noted. These attempts to reduce operational indiscretion are partially nullified by the clumsy design of the midships lattice mainmast and the usual multitude of antennas, all of which will increase RCS.

In keeping with the role of the ship as an SKR, the *Neustrashimy* does not have extensive underway replenishment facilities for the transfer of liquid and solid stores. Living accommodation is much more cramped and Spartan than in most recent Russian designs. An interesting aspect of the accommodation is that the very high proportion of officers and Warrant Officers (mishmanyii) compared with the numbers of enlisted personnel in the original design has now been changed to proportions more aligned to those of Western navies. The original division reflected the complex equipment mounted on board and the inability of short-term conscript crews to operate such systems. The change in crew proportions may well reflect the accelerating shift of the Russian Navy to an all-volunteer force.

The operational concept of such ships is that they would be operating relatively close to the shoreline, certainly within the perimeters of the Russian Maritime Zones. Their deployments would therefore be short and they would operate under cover of land-based air. Oceanic deployments would be left to the Project 956 Sovremennyy and Project 1155 Udaloy class BPKs.

The radar suite includes a Fregat (NATO codename Top Plate) 3-D radar operating in the E/F band. This consists of two canted phased arrays used for air search. The Fregat complex also feeds situational data to the Second Captain. Fregat operates with a 30 kW peak power when pulse-compressed and has a 4 sec data rate. Maximum elevation is 55 degrees. Maximum range against an air target is 130 km. The associated Poima automatic data extraction computer can carry up to 20 target tracks. The two Kortika launchers are controlled by a Positiv-E radar. This is a navalized and radome-enclosed version of the target acquisition radar mounted on the rear of the turret of the Tungaska anti-aircraft tank. The suffix E in the designation is frequently reported as indicating either E-band operation or an export variant; in fact it stands for Esminets and indicates a version intended for destroyers. The Volga (Palm Frond) radar is used for navigation and surface search.

The electronic warfare suite on the *Neustrashimy* is a mixture of old and new systems. The most prominent installations are the two large Start-M (Wine Glass) ESM antennas. These are high-resolution systems intended to provide over-the-horizon-targeting (OTHT) information to the P-100 missiles. They are supplemented by two additional antennas designated Half Hat B by NATO. These are also ESM systems but may be intended to provide early warning of hostile radars and situational data to the Second Captain. The jammers are the well-known Krab-14 (Bell Squat A) noise jammers. The ships do not

appear to be equipped with the Krab-15 (Bell Squat B) deception jammer. The ship is equipped with two RK-16 82 mm 16-barrelled decoy launchers, firing TSP-60 chaff rounds and TST-60U flares, and eight RK-10 10-barrelled 120 mm decoy launchers firing SR-50 chaff rounds, SOM-50 IR flare/anti-laser aerosol rounds and SK-50 cartridges which dispense a mixture of chaff, flares and anti-laser smoke.

The sonar outfit is an integrated system designated Zhvezda M-1 which includes a new low-frequency bow mounted system, modeled on the US Navy SQS-53C. It has full digital beam-forming characteristics. The bow dome is, however, substantially longer than the US system, running back over a quarter of the ship's length. The rear part of this elongated dome contains two flank arrays. Presumably, the degree of separation is to provide triangulation. Interestingly, the inclusion of bow arrays into SQS-53 was an option considered by the US Navy around 1980 but was not taken up. The third component of the Zhvezda M-1 system is a low-frequency VDS housed in a stern shelter. These ships do NOT mount the Bull Nose/Steer Hide combination reported elsewhere. (The NATO code names Bull Nose and Steer Hide are now known to have been applied to a number of unrelated sonars). Unlike the US Navy, the Russian fleet apparently deploys VDS systems on its surface ships in preference to passive towed arrays.

Operational Characteristics. The major weapons system is the set of six torpedo catapults set amidships, angled out from the centerline at around 15°. These are fed from a central magazine which has a capacity of between 16 and 24 weapons. Weapons options include the following:

- The P-100 Oniks anti-ship missile. This is a folding-fin encapsulated version of the P-80 Zubr (SSN-22 Sunburn) missile used to arm the Project 956 Sovremennyy class destroyers. The P-100 was originally designed to arm the Project 671RTM class (NATO Codename Victor III) submarines and is fired from the 650 mm torpedo tubes fitted to those submarines. In the *Neustrashimy* installation, the encapsulated weapon is fired into the water from the torpedo catapults, dives to about 50 feet, stabilizes itself, then ignites to fire the missile. The P-100 missile itself has a range of approximately 130 km (250 km with mid-course correction), a speed of Mach 2.5 and a warhead of 320 kg. It uses Inverse Synthetic Aperture Radar (ISAR) homing. Contrary to many statements, neither the P-80 nor P-100 are the 3M-80 ramjet-powered anti-ship missile recently exhibited by the Raduga design bureau at a number of exhibitions; 3M80 arms the Project 1241.1 Tarantula III FAC-M and Project 956 destroyers offered for export, not the Project 956 destroyers or the Project 1154 frigates used by the Russian fleet.
- The 100-RU Veder torpedo-carrying anti-submarine missile (NATO codename SSN-16 Stallion). This is a torpedo-carrying analogue to the P-100 missile and operates in a similar manner. Its payload is the 53 cm AT-24 Orlan torpedo which it can carry to a range of 120 km. Again it was originally designed to be deployed from the Project 671RTM submarines where it could carry a nuclear depth charge as an alternative load (the depth charge version being named Vodopod). It is not known whether the nuclear depth-charge version of the 100-RU is carried on board the *Neustrashimy*. There is some reason for believing that the correct designation of this weapon is P-100RU.
- The 65-83 65 cm torpedo. This is a surface-launched derivative of the 65-76 torpedo used on the Project 671 and many other Russian submarine classes. This runs at 50 knots to a range of 50 km and carries a 1,000 kg warhead. A nuclear-tipped version exists but is not known to be deployed from surface ships.

Russian Navy sources state that the normal load-out is eight torpedoes, eight 100-RU torpedo-carrying missiles and eight P-100 anti-ship missiles, but this can be varied according to tactical requirements. Some Western sources now report that only a total of 22 weapons are carried; this may indicate that two nuclear-tipped weapons are no longer embarked and the facilities required for special weapons are no longer in use. Some Russian sources allege that the ships carried two nuclear tipped weapons in each of the anti-ship missile, anti-submarine missile and torpedo categories.

There is also a nuclear-tipped land attack version of the 100-RU missile designated RPK-6 Oniks. This is probably Vodopod with the nuclear depth charge fuzed for a surface burst. It is not known if the Project 1154 ever carried this weapon or, indeed, if RPK-6 remains in the inventory. In the Russian Navy, the RPK-6 was considered a strategic weapon, and may not, therefore, have been deployed on an essentially defensive ship

Since the *Neustrashimy* uses torpedo catapults rather than the more conventional torpedo tubes, it has the ability to fire 53 cm weapons as well as 65 cm types. The *Neustrashimy* has been observed firing the 90-RU (SSN-15 Starfish) torpedo-carrying missile and 53 cm torpedoes. This may reflect a shortage of the larger weapons or simply compatibility trials with the smaller, less effective systems.

The *Neustrashimy* carries a single Ka-27 Helix helicopter in a hangar at the stern. This is a deck-level structure with an up-and-over roller door, similar to those installed on Western ships. In sharp contrast to Western practice, the Ka-27 is not used as a weapons delivery platform for ASW operations. Instead, the helicopter is used for target

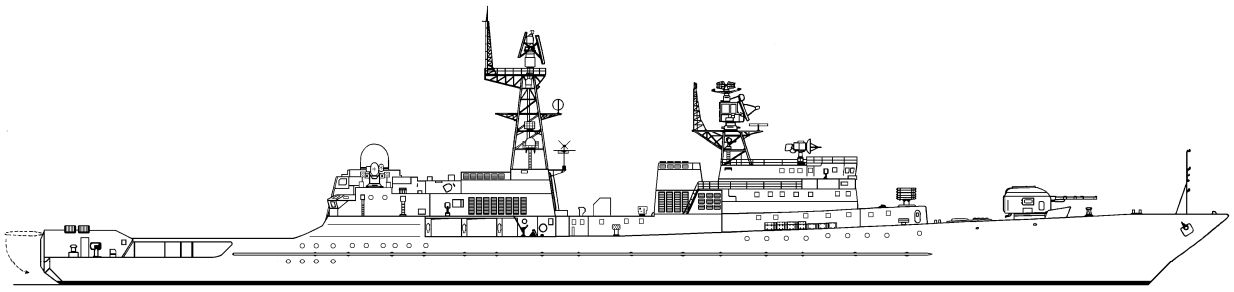
location and to refine the contacts made by the ship's sensor suite. Weapons delivery is undertaken by the 100-RU missiles, fired using data obtained from the helicopter. This mode of operation means that the Ka-27 can use the weight and volume consumed by weaponry on Western ASW helicopters to provide additional fuel and more efficient sensors. This mode of operation is only made possible by the excellent performance characteristics of the 100-RU missile.

The ship carries a primary gun armament of a single AK-100 100 mm L70 dual purpose gun. This is provided with 350 rounds of ammunition. Control is provided by an MR-145 Lev fire control complex which incorporates both a radar and an electro-optical adjunct. The gun is used primarily for low-intensity anti-surface missions, for example policing roles. It is backed up by two AK-630 30 mm gatling guns with 2,000 rounds of ammunition each. These do not appear to be provided with a fire control system and appear to operate under local control only. This suggests that their primary role is in arresting maritime criminals and taking them into custody.

Anti-aircraft defense is provided by the Kinzhal (NATO codename SAN-9) vertical launch missile system. Four individual rotary-launch silos are provided, each containing eight missiles for a total of 32 rounds. Rate of fire is one missile per silo every three seconds, and the guidance complex can direct a maximum of eight missiles divided between a total of four targets. Maximum engagement range is 12,000 m, with a minimum range of 1,500 m. The missiles have a speed of 3,050 kph and can engage targets at altitudes between 10 m and 6,000 m in altitude, traveling at speeds of up to 2,520 kph. The guidance computers automatically hand over any targets leaking through the Kinzhal screen to the Kortika CIWS.

The CIWS system fitted is the Kortika (NATO codename CADS-1) combined gun/missile system. Two of these mounts are installed, one on each side of the helicopter hangar. Each is armed with a pair of 2A38 30 mm cannon (with a total of 30,000 rounds of ammunition for the four guns) and racks for eight 9M311 (NATO codename SAN-11) missiles. A total of 32 9M311 missiles are carried for the two systems. The four 2A38 guns have a barrel length of 119 calibers an aggregate rate of fire of 5,000 rounds per minute and an effective range of up to 3,000 m. The 9M311 missile has command-to-line-of sight guidance and a maximum range of 8,000 m. Two radar antennas are provided, code-named Hot Flash by NATO. One scans vertically to determine altitude, the other horizontally to give range and bearing. This arrangement, very common with Russian AAW radars, provides target tracking at 12,000 m. The system operates in the L-band (US V-band). There is no on-mount target acquisition radar; this function is provided by the Positiv-E radar.

The RBU-6000 ASW rocket launcher replaces the longer range and apparently more modern RBU-12000 seen on other Russian new construction. The launcher has 12 barrels of 250 mm for firing the rocket, which has a range of 6,000 m. Reversion to the shorter-range trainable rocket launcher reflects the introduction of the SV-3 guided depth bomb for the RBU-6000. This is effective down to a depth of 600 m and is guided by an active target acquisition sonar (pinger) which uses phase bearing to actuate tail fins. This bomb is claimed to have a kill probability 1.5 times greater than an unguided bomb in shallow water and four to eight times greater in deep water. For some reason, the SV-3 is not compatible with the long-range RBU-12000.



PROJECT 1157 NEUSTRASHIMY CLASS

Source: Forecast International

Variants/Upgrades

An export version of this design, Project 1154.1, was presented at the recent Abu Dhabi defense exhibition. This was virtually identical to the Russian Navy version but was claimed to have superior accommodation for the crew and more advanced computing capability. The export derivative of the Neustrashimy class carries the Klinok export version of the Kinzhal missile system. The CIWS is the Kashtan, a modified version of Kortika lacking the capability to launch 9M311 missiles. The Project 1154.1 is restricted to firing 53 cm torpedoes from its torpedo catapults. The anti-ship missiles are replaced by four quadruple launch mounts for Kh-35 Uran (Harpoonski) missiles.

Our sources in the Russian Navy have stated that the prolonged trials with the first of class have shown that the > shaped sides to the superstructure are ineffective in their primary role of reducing radar cross-section. Better results could be achieved by building the ships with conventional vertical superstructure sides and applying radar-absorbing materials. Accordingly, the third and subsequent ships of the class may be built to this revised design. This simplification will result in minor cost savings but substantial reductions in construction time.

Program Review

Background. The *Neustrashimy* design dates from the mid-1970s. At that time, the planned production of Project 1135 (NATO codename Krivak) class SKRs was reaching its end and attention turned to producing the next generation SKR. This was intended to be the definitive SKR design, rectifying the perceived limitations of the Project 1135. The Project 1135 SKR and its cousins, the Project 1134A (NATO codename Kresta II) and Project 1134B (NATO codename Kara) class BPK (Bolshoi Protivolodochny Korabl - large anti-submarine ships) had been interim designs, hastily redesigned from hulls designed as anti-ship missile platforms. As such, they were deficient in seakeeping, internal volume, and command control facilities. The Project 1135 design also lacked a shipboard helicopter. A new generation of designs was produced, optimized for their particular roles.

This new generation included the Project 956 Sovremennyy class (which took up the rocket cruiser role dropped when the Project 1134A ships were converted to BPKs), the Project 1155 Udaloy class (which followed on from the Project 1134B class) and the Project 1154 Neustrashimy class. In the case of the SKR design, the problem lay in combining the provision of a helicopter, stand-off anti-submarine missiles and a comprehensive sonar suite, along with the batteries of anti-ship missiles and air defenses required for the SKR role on a hull of reasonable size. This problem was solved when the P-100 anti-ship and 100-RU anti-submarine missiles were made available for surface ship use. These had been developed for the Project 671RTM submarines and were fired out of the 65 cm torpedo tubes on those submarines. The provision of such tubes on a surface ship were not considered practical and fixed torpedo catapults were substituted.

As the *Neustrashimy* design evolved, an increasing number of new and untried systems were incorporated. These included the new Zhvezda M-1 integrated bow sonar/flank array and a very advanced fully distributed and fully integrated command system. The latter was regarded as being essential in order to reduce manning requirements and thus the demands made on the design by the crew. Observation of Western attempts to develop such systems underlined the difficulties in bringing these advanced command systems into service. As an insurance policy against the failure of the advanced design, the Russian Navy prepared an upgraded version of the Project 1135, designated Project 1135P (NATO codename Krivak-III). This had its stern cleared and a helicopter hangar fitted, the AK-100 100 mm L70 gun was moved forward, and the 80-RU (NATO Codename SSN-14 Silex) missiles deleted. The latter system was replaced by 90-RU (NATO codename SSN-15 Starfish) missiles fired from the 53 cm torpedo tubes amidships. The 90-RU is an almost exact copy of the US Navy Subroc missile which was compromised in 1964.

As a result of difficulties with developing its subsystems, the Project 1154 design eventually dropped some five years behind schedule. The keel of the first ship of the new class was finally laid in April 1986. Due to the delays, a brigade of seven Project 1135P SKRs had been started as an interim, but these were taken over by the KGB while still under construction. They have now been returned to Russian Navy or Ukrainian Navy control.

The *Neustrashimy* was launched in mid-1988 and started running trials in December 1989. The ship finally entered full service in January 1993. An extended trial period is quite normal for the lead ship of a new class of this complexity and the economic crisis in Russia has probably stretched the schedule by restricting sea time. The second

of class was launched in May 1991 as the *Nepristupnyy* was still incomplete in February 1996. It was renamed the *Yaroslav Mudryy* in July 1995 as part of a Russian Navy policy of eliminating communist-inspired names in favor of those commemorating famous figures of Russian history. Two more ships of this class are under construction. During 1991 and 1992, construction on these hulls came to an almost complete halt but is now reported to have resumed, although at a relatively slow rate.

Following very extensive trials, the *Neustrashimy* was formally commissioned into the Russian Navy on January 24, 1993. As a matter of historical interest, the *Neustrashimy* was the first major Russian warship to be commissioned under the traditional Russian Cross of St. Andrew (as opposed to the communist hammer and sickle) and to receive a full blessing from the Russian Orthodox church since October 1917. The third and fourth members of the class are still building at a slow rate, reportedly due to the redesign of the superstructure referred to in the Variants and Upgrades section of this report. However, some very interesting photographs of the *300 Let Rossiyskomy Flotu* under construction revealed that the forward superstructure still retained the concertina form. These photographs also suggested that construction speed has continued to pick up during 1995.

There are some reports that the fifth of class was laid down in June 1994. This was contradicted by a Russian Government statement that no new major warships had been started in five years (presumably, this comment is restricted to surface ships).

During early 1995, Forecast International was provided with the official Russian Navy details of these ships. These corrected the estimates published earlier. The primary differences are that the ship is two knots slower than originally believed, sits some three meters deeper in the water (probably reflecting the much larger sonar dome than presumed in the West), is about 300 tons lighter and has substantially more installed power. This is an interesting series of discrepancies! We were also informed that the major problem in proceeding with the more rapid construction of these ships was that the factory supplying the gas turbines is situated in the Ukraine and neither a supply of engines nor spare parts can be guaranteed.

Funding

No funding information has been released.

Recent Contracts

No contractual information has been released.

Timetable

	1980s	Soviets decided to built a new SKR class
Apr	1986	First keel laid
May	1988	*Neustrashimy* launched
Dec	1989	*Neustrashimy* started sea trials
Jan	1993	First ship commissioned
Oct	1996	Second ship to commission
		Third ship to be launched

Worldwide Distribution

Russia. (2 built, 2 building, 3 projected).

Forecast Rationale

The *Neustrashimy* is not a frigate; it is a SKR or guardship. The use of Western warship classifications to describe Russian designs which have totally different operational rationales has always been a major barrier to proper analysis of these ships. For this reason Forecast International is now making a point of using the Russian designations for their ships and equipment wherever these are available. The SKR is intended to patrol coastal and territorial zone waters on relatively short-duration cruises. In peacetime, the primary role has been maritime policing with the prevention of smuggling and illegal entry and exit as priorities. In wartime, the major role is to provide

shallow-water ASW and defense against enemy surface ships. An additional role, formulated in the mid-1950s, is to provide advance warning of air attack, alerting the air defense network. In effect, the SKR is a combination of frigate and OPV.

In this environment, the complex, heavily armed and highly sophisticated (and, therefore, also very expensive) Project 1154 SKR can be seen as a response to the evolution of the US Maritime Strategy. If the US Navy had pressed home its attacks on the North Cape and in the Greenland Sea, the Northern Fleet SKRs would have faced a continuous sequence of skilled and effective attacks by surface, submarine, and air units. The requirements of the operational environment and tactical roles demanded a front-rank ship and the Project 1154s filled the bill perfectly.

This projected environment was rendered obsolete by the collapse of the Soviet Union. The much less expensive Project 1135P SKRs are perfectly adequate to meet the existing Russian requirements. However, continued construction of the Project 1154 is likely to continue, partly to increase the acceptability of the ship and its systems on the export market and partly to maintain the ability to build ships of the latest standards. The 1993 Russian 10-year naval plan stated that the Project 956, Project 1135P and Project 1154 class ships would be the only major surface combatants to be built for the Russian Navy during that period.

Superficially, the Project 1154 will be very attractive to many navies. It has adequate, if not excessive, AAW capability with its Klinok/Kinzhal system being about equivalent to Sea Sparrow. The combination of a digital beam-formed low-frequency bow/flank sonar and VDS with a helicopter (to finalize contacts) and the 100-RU missile to deliver torpedoes to that contact make it a formidable ASW ship for the green water environment. If the P-100 Oniks missile is made available, only the Kh-35 Uran (Harpoonski) has been made available to date, the ASuW capability of these ships will be unequaled, since the Mach 2.5 missile with its highly sophisticated homing system has no Western equivalent in service or even planned.

The design has been offered to the UAE in response to its frigate requirement, to Turkey, India and China. It failed to be shortlisted in the first two cases while China has opted for the long-range ASuW-oriented Project 956. The problem is that technical support for the ships cannot be guaranteed, and experience with Russian equipment has shown that maintenance requirements are high if severe performance shortfalls are to be avoided. This perception is limiting sales of Russian goods and may well severely restrict the export potential of the Project 1154. However, the results of the recent Russian elections may partially resolve some of these doubts. The main Achilles heel would appear to be the reliability and power output of the gas turbines. These doubts are reinforced by the difficulties inherent in getting the gas turbines and spares from the Ukraine, Now, if these were to be replaced by LM-2500 or Spey turbines, the story may be very different. This is an option being seriously examined by the Russian Navy.

The following forecast is based on the completion of the planned brigade of seven ships. We believe that the need to preserve the ability to build front-line ships and to keep the nucleus of the shipbuilding workforce intact will ensure that the program is completed, but the rate of construction is likely to be very slow. A major effort to export ships of this design is probable; potential customers do not seem common. We are projecting two or three export sales of Project 1154 ships. India is a likely candidate to reinforce the existing fleet. China is another possibility. The development of a version with Western gas turbines and with its helicopter replaced by a Western weapons-carrying equivalent (which would take over the ASW role and enable the ship to carry 24 of the deadly P-100 missiles) would greatly increase the prospects of exports.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

			High Confidence Level				Good Confidence Level				Speculative		
Designation	Application	thru 95	96	97	98	99	00	01	02	03	04	05	Total 96-05
PROJECT 1154	FF (VARIOUS)	0	0	0	1	0	1	1	0	1	1	1	6
PROJECT 1154	SKR (RUSSIA)	2	0	0	1	0	1	0	0	1	0	1	4
Total Production		2	0	0	2	0	2	1	0	2	1	2	10