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KIEV & KUZNETSOV

RUSSIAN AIRCRAFT CARRIERS

Barry Dean

CONCORD
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editor: James R. Hill

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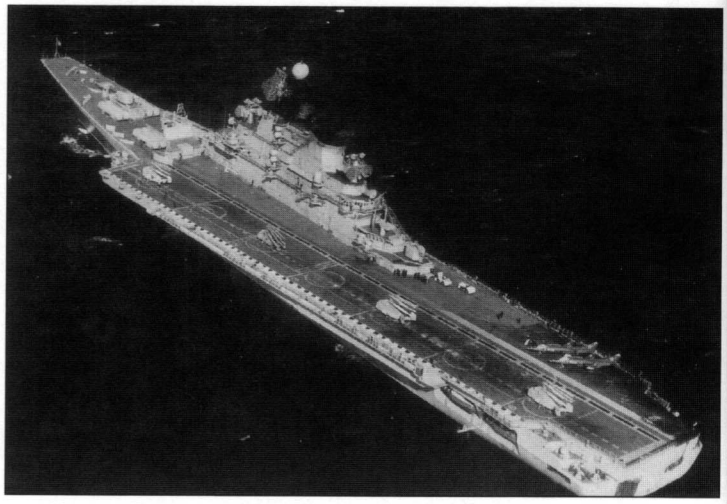
The ski-jump of the Admiral Kuznetsov is shown to advantage in this shot. It may have been intended to support the deployment of the Yak-141 Freestyle, as this aspect does not benefit aircraft without vectored thrust engines. (Sergey Skrynnikov)



Upper: Rear port quarter shot of the Kiev at anchor. Note the distinctive rust colour of the non-flying deck surfaces. The green colour of the 'operational' portions of the deck are due to fire proofing to protect it from Forger exhaust.

Lower: Three-quarter port shot of the Admiral Gorshkov showing the change to the bow at the waterline, the elimination of the port forward gun sponson and the obvious electronic changes.

INTRODUCTION

The Kiev class aircraft carriers, or AVIONESUSCHIY KREYSER (Aviation Cruiser) were the first Soviet full flight deck carriers to be built. Originally the Kiev was referred to as merely another cruiser. Although technically there are four Kiev class vessels, in fact a more realistic sub-division would be three Kiev's and an improved Kiev. Effective January 1991 the improved Kiev, the Baku, was renamed the Admiral Gorshkov.

All Kiev's have a full missile cruisers' fitting of anti-air, anti-ship and anti-submarine weapons, mostly mounted on the forward portion on the ship. Her bow mounts a large underwater bulb containing the sonar. Aft there is a variable depth sonar which is deployed through doors in the centreline of the stern. Boat storage is in the rear hull under the flight deck.

The flight deck is angled 4.5 degrees to port and is not fitted with catapults or arrester gear, unlike most other conventional carriers. There are two small elevators fitted, one alongside the island and one abaft the island. Additionally, there are three or four smaller weapons elevators in various positions on the flight deck. The deck was originally fitted with blast-resistant tile and measures 185 by 20 metres.

The Kiev mounts eight SS-N-12 Sandbox surface-to-surface cruise missiles in paired tubes, plus 16 reloads below decks which are raised through a centreline elevator. Sandbox has been in service since 1973 and is 10.8 metres long, has a wing span of 1.8 metres, weighs 4,800kg and has a top end speed of Mach 2.5. Although Sandbox has a maximum range of 300nm it is impossible to target further than line-of-sight from a surface vessel so a target designator is required for over-the-horizon operation. The on-board helicopters (either Hormone or Helix) provide this function and extend the range to over 100km.

The Kiev carries relatively few aircraft and was probably not intended to counter western carriers but to provide a Soviet presence abroad and to support Soviet land operations.

The Kiev, the first vessel of the class, was laid down in September 1970, launched in December 1972 and taken into service in May 1975. Her first operational deployment was to the Mediterranean in July 1976. Subsequently, she was based with the Northern Fleet in August 1976. Overhaul and upkeep is provided by the Nikolayev shipyard. Kiev displaces 36,000 tons and is fitted with Bull Horn bow-mounted sonar.

The Minsk, the second vessel, was laid down in December 1972, launched in May 1975 and taken into service in February 1978. She was deployed to the Pacific Fleet in 1979. Her first refit was undertaken in her home port of Vladivostok during 1981/82. The most noticeable differences with Kiev include: an extended port-side sponson, a rounded leading edge to the flight deck and a number of wind deflector plates fitted to the forward edge of the flight deck. Recent reports from the Russian television networks indicate that the Minsk is no longer a functional warship and is scheduled for decommissioning and scrapping.

The Novorossiysk, the third vessel, was laid down in October 1975, launched in December 1978 and taken into service in September 1982. She was deployed to the Pacific Fleet in 1983. The Novorossiysk is fitted with wind deflectors and the rounded deck edge but retains the original port-side sponson configuration. The SA-N-9 missiles have not yet been fitted so there are two empty platforms on the superstructure awaiting the installation of the Cross Sword guidance radar. On the deck blanking plates cover the circular doors where SA-N-9 will be fitted (six aft of the island and six forward to port). On the island, the Side Globe array has been replaced and Tin Man electro-optical devices replace the Tee Plinth. In the bow, Horse Jaw sonar replaces Bull Horn.

The last vessel in the class, the Admiral Gorshkov (ex-Baku), was laid down in 1978, launched in March 1982 and taken into service in June 1988. She was deployed to the Northern Fleet. The Admiral Gorshkov took 10 years to build and fit out, primarily due to the number of new weapon and electronic systems which are not found on her three older sisterships. These systems also account for the fact that she displaces 38,000 tons and draws more than the other three. There are a large number of differences between the Admiral Gorshkov and her predecessors which will be broken down into three sections.

(1) Exterior: the port side weapons sponson has been eliminated, the flight deck has been lengthened by five metres and a single movable air deflector has been fitted to improve the air flow over the deck. The deck edges have been rounded and the elimination of some rear deck weapon positions has resulted in an increase in the deck parking area.

(2) Weapons: SAMs: the long range missile (SA-N-3 Goblet) is not fitted but SA-N-9 is, 12 forward of the SS-N-12, six in a row on the port side of the flight deck and two rows of three to the starboard of the aft elevator.

Guns: the AK-630 six-

guns have been repositioned and increased in number and the two 76.2mm guns (one forward and one aft) have been replaced by two single 100mm guns, both forward.

ASW: no SUW-N-1 ASW rocket launcher or torpedo tubes are fitted and the two RBU-6000 ASW launchers have been replaced by RBU-12000.

SSMs: the 12 SS-N-12 Sandbox are fitted in one row of four paired launchers and one row of two paired launchers. The usual traversing reload skid is fitted, but there is no elevator to a reload magazine.

Electronics: Top Sail and Top Steer are replaced by Sky Watch fixed planar phased array radar. Some difficulties have been experienced in the day-to-day operation of this system. Plate Steer, a second 3-D radar, is mounted above the 9-metre high Cake Stand TACAN/air control radar. Low Ball SATCOM radomes are mounted fore and aft of Cake Stand, and Punch Bowl statellite data link radomes are mounted on either side of the island. The bow mounted sonar is Horse Jaw.

Following the completion of the Admiral Gorshkov in 1982 the Nikolayev shipyard started work on a new project. It was quickly seen that the new construction was not a new Kiev class vessel but something completely different for the Soviets, a full-size angle-deck carrier probably intended for STOL launches and arrested landings. As construction continued she acquired a name, the Leonid Brezhnev, but this only lasted while that Soviet leader remained 'in favour'. Following his death in November 1982 the vessel was renamed the Tbilisi. This name stuck until 1990 when she was formally completed and named the Admiral Kuznetsov. There are thought to be three vessels in the class now: the Kuznetsov, the Varyag and the modified Ulyanovsk.

The Admiral Kuznetsov was laid down in January 1983, launched in December 1985 and now serves in the North Fleet. She is 305 metres in length and displaces approx. 65,000 tons. Power is supplied by four steam turbines producing 200,000 horse power which allows a maximum speed of 30 knots. The Varyag was laid down in December 1985 and the Ulyanovsk in December 1988.

To date, the Forger has been the only fixed-wing aircraft to be found on Soviet aircraft carrying vessels. It appears that the Kuznetsov will change that . She could carry as many as 40 fixed/rotary wing aircraft, all apparently, below decks. Both MiG-29K Fulcrums and Su-27K Flankers have been seen on board in the company of Ka-27 Helix helicopters. Although she is equipped with arrester cables there is no steam-launch equipment, which may well limit her full-load launch capability. Problems with the steam-launch fitting may have contributed to the increase in deck size on the third of this class the Ulyanovsk.

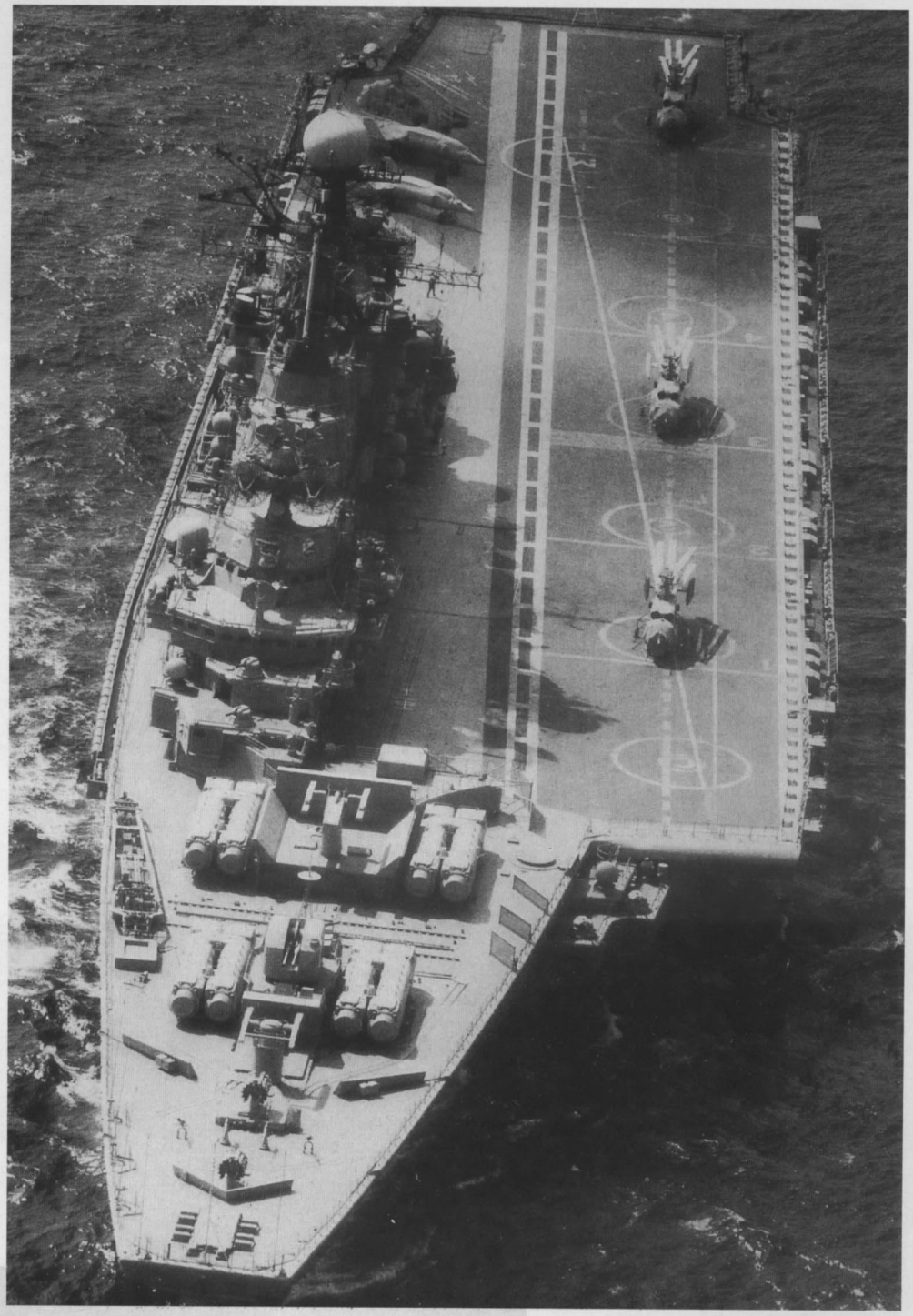
Weapon systems fitted represent both the latest in Russian technology and those well tried and tested. The defensive weapons are grouped in four positions, roughly at the corners of the main hull. There are eight SA-N-11 gun/missile positions and six AK-630 30mm close-in defence weapons. Oddly, there are no Bass Tilt radars to control the AK's, and no apparent space left on which to mount them, which would possibly indicate that they are slaved to the SA-N-11.

For short range anti-aircraft /anti-missile defence, there are four groups of six SA-N-9 missiles. These missiles are controlled by the Cross Sword radars and are thought to be a parallel development of the SA-15 land-based anti-aircraft missile system. Some sources suggest the fitting of vertical-launch SS-N-19 anti-ship cruise missiles on the fore deck, but imagery analysis does not support this contention. There are two RBU-12000 ASW rocket launchers mounted aft, which is not a 'usual' fitting for this type of weapon. This may indicate that RBU-12000 has an anti-torpedo application as well as anti-submarine.

Electronically speaking, the Kuznetsov closely resembles the Admiral Gorshkov. She is fitted with four Sky Watch 3-D multiple target track planar arrays, Top Plate 3-D radar (possibly back-up to Sky Watch), Cake Stand TACAN, Low Ball SATNAV, Cross Sword missile control, twin Strut Pair E-band air/surface surveillance radars and three Palm Frond navigation radars. Punch Bowl domes, usually associated with SS-N-12/19 missiles may, in this case, be related to the Kuznetsov's use as a fleet flagship.

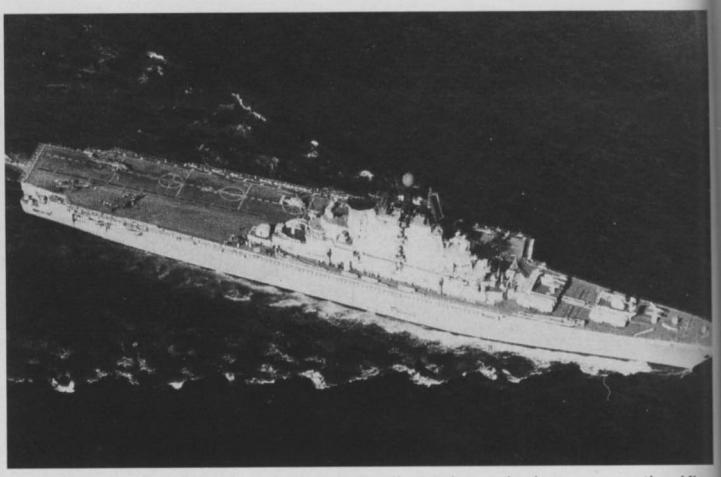
The downfall of the Soviet Union may well spell the end of Russian aircraft carriers as well. Of the three original Kuznetsov class hulls only the Kuznetsov is complete. Russian press reports indicate that the two remaining hulls have a very questionable future. The Russian government has, apparently, stopped paying for construction so their only future may well be the scrapyard. The press has also indicated that the future of one or more of the Kiev class vessels is also in serious doubt. It would appear that the requirement for expensive 'show-the-flag' vessels to support the superpower needs of the Soviet Union has apparently died with the union.

KIEV



Aerial view of the Kiev, the first aircraft
er in its class. The Kiev was laid down in
and first entered service in 1975, being
ed in the Northern Fleet. The Kiev is
gned to accommodate 12 Yak-36 Forger
ell as a variety of helicopters.

It's "business as usual" for the Kiev as one of its Helix helicopters rises from her flight deck. Much of the Kiev is in shadow in this photo, giving the vessel an almost silhouetted aspect. Her characteristic island superstructure can always be identified by the globe-like Top Knot radar atop the main mast.

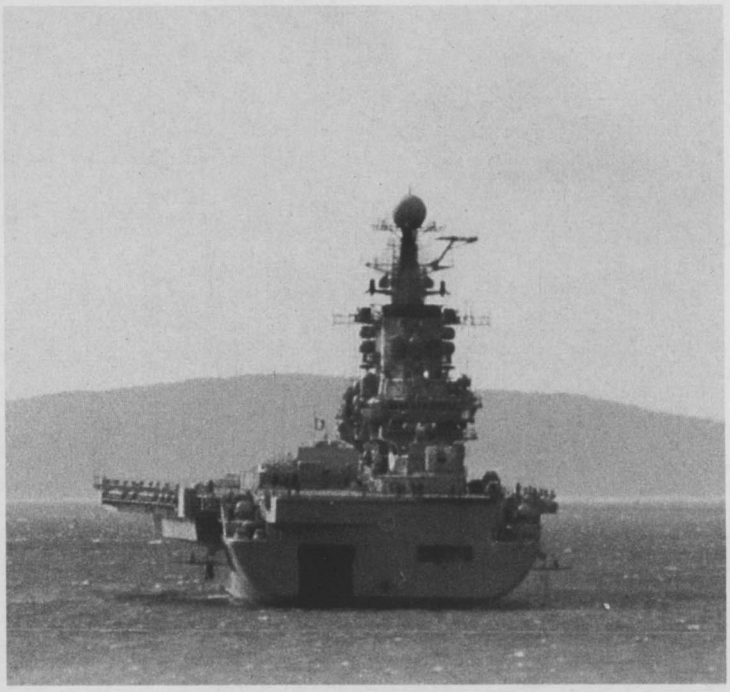


Creating a triangular wake as it slices through the waves, the Kiev displays a considerably weathered deck. This view provides a good view of the overall length of the Kiev, which measures 899 feet (275 meters).

The aircraft carrier Kiev sits at anchor here. The Kiev's prominent island rises high above some sailors, part of the vessel's complement of over 1200 crewmen, who are visible on the deck.

With her deck cleared of personnel, the Kiev displays graceful lines as she races through the waves. The Kiev's engines can crank up 200,000 hp(r worth of power to speed the vessel on its way.

An aerial view of the Kiev and its blackened decks. Helix aircraft are stationed in four of the seven launch positions on the deck. Note how little there is about the Kiev's paint scheme that helps it blend in with the surrounding blue water.



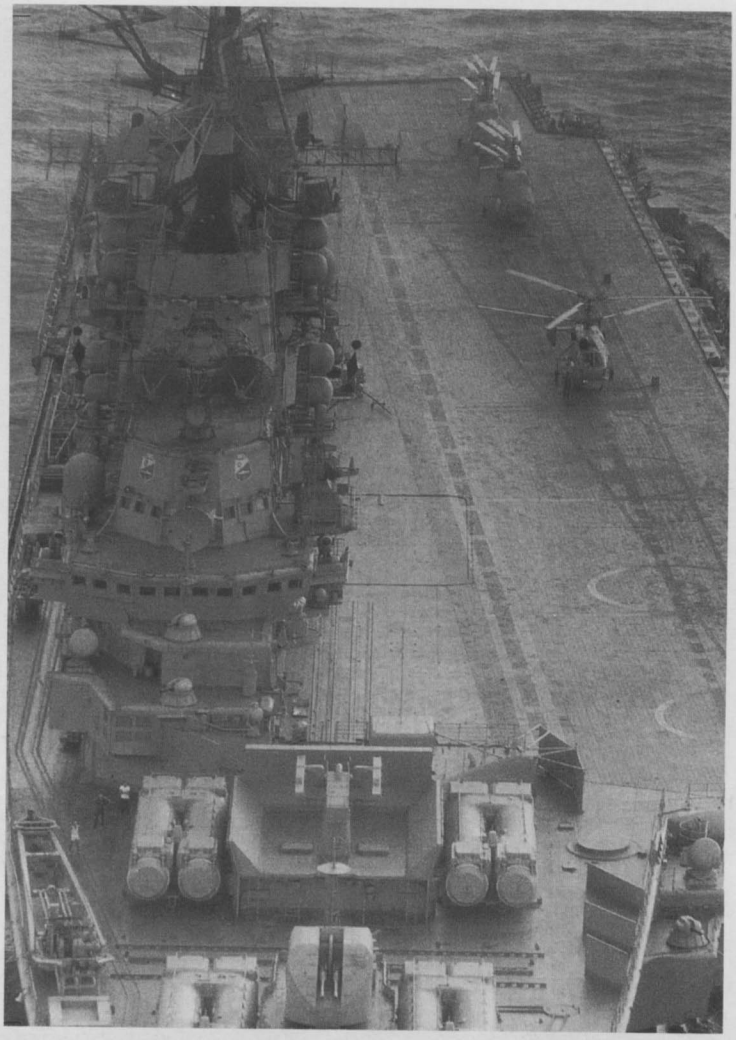
Positioned with its aft squarely toward the camera, the Kiev is seen from a waterline angle. Its width of about 155 feet (47.2 meters) is well displayed here. Note the array of antennae and radar attached to the Kiev's superstructure.

The Kiev with four Helix and two Forgers on her deck. Although many aircraft enthusiasts like to refer to the Forger as the Soviet Harrier, comparisons are not appropriate. Forger is at best an inefficient and ill-conceived aircraft, at worst more dangerous to her crew than to the enemy.

The Kiev 'clean' with no air
visible on deck. Weapon system
the bow (from bow aft) include: F
6000 (x2), SUW-N-1 launcher,
76.2mm gun mount sandwic
between two pairs of SS-N
Sandbox surface-to-surface cr
missiles, and SA-N-3 Goblet
launcher between another pai
Sandbox launchers.

The Kiev refueling from a Boris Chilikin class fleet replenishment vessel. The Boris Chilikin carries 13,500 tons of fuel and fresh water, 400 tons o
munitions and 800 tons provisions.

As crew members from the Kiev conduct exercises, a Ka-27 Helix hovers in the foreground, causing a considerable disturbance in the still ocean water. Note that one of the Kiev's SS-N-12 Sandbox launchers appears to be elevated.



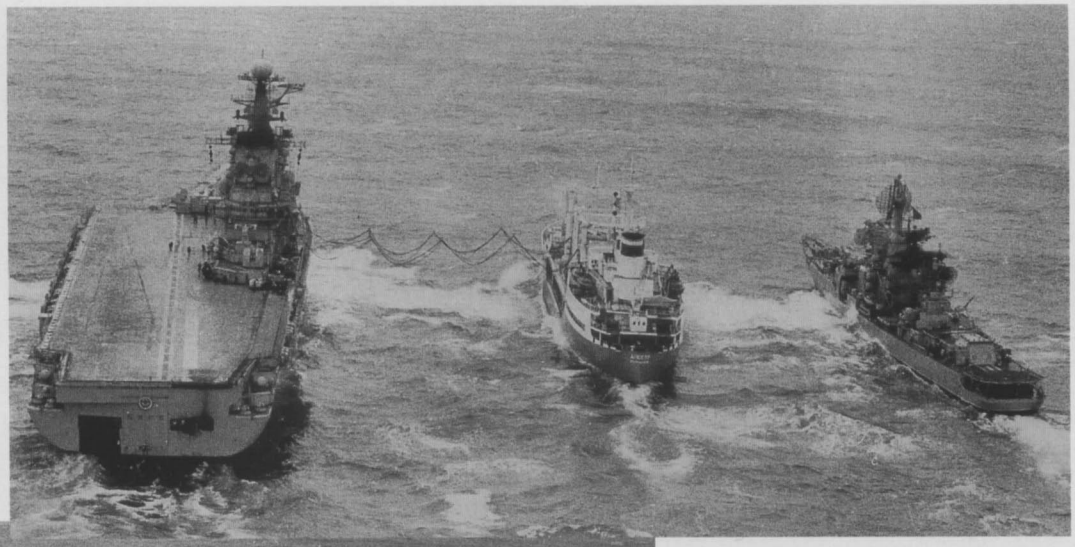
Three Helix on the flight deck being readied for flight. This view also clearly shows the AK-630 30mm six-barrel Gatling anti-aircraft guns (one in the lower right corner of the picture and the other two immediately behind the left pair of Sandbox missile launchers).

The Kiev with two Ka-27 Helix helicopters on the main deck in launch positions (but not ready to launch) and a Ka-25 aft of a pair of Forgers which have their wings folded. This shot shows the mass of electronic antennae found on all Soviet warships.

The Kiev showing its large island located on the starboard side. A comparison between Kiev class and U.S. carriers will show the absence of any deck launching or recovery equipment. Both the Helix and Forger are used in a VTOL mode only. The crewman walking forward of the Forger is just leaving the rear aircraft elevator.

Stern view of the Kiev underway with four Helix preparing to launch. The small dark rectangle to the right is the opening for the stern mooring lines.

What appears to be a kind of race between a trio of Russian ships is actually the Kiev replenishing its supplies at sea. Note the lines running between the cargo ship and the carrier. The vessel at the far right is a Kresta II guided missile destroyer.



Another view of the Kiev receiving supplies. This angle of the operation provides a good comparison of the sizes of the various ships involved. Both the cargo ship and the destroyer are only about two-thirds the size of the Kiev.

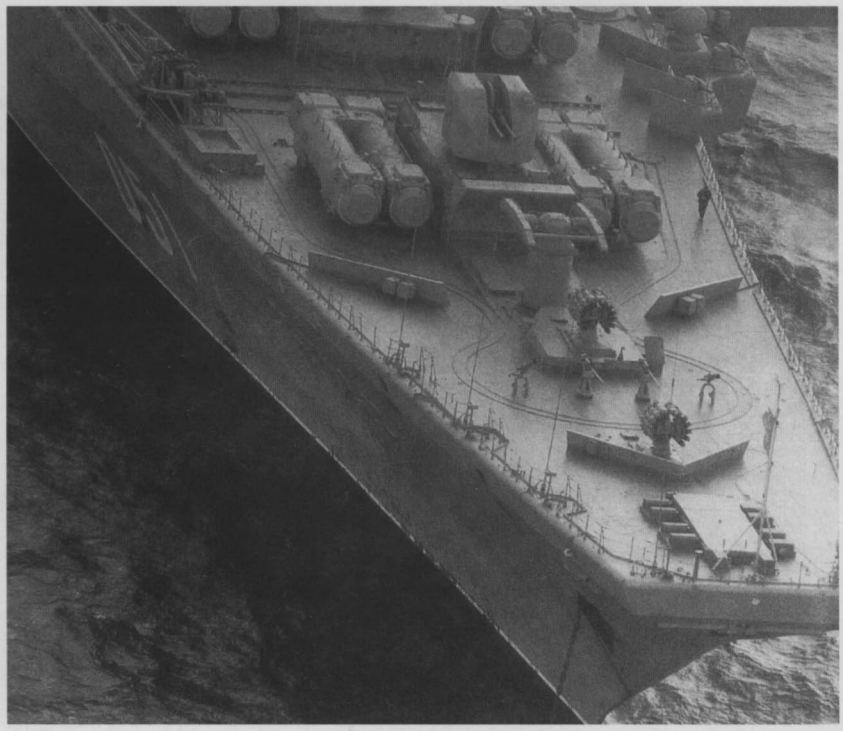
Close-up of the rear of the Kiev's island during at-sea replenishment. Judging by the number of personnel from the Kiev and the Kresta II guided missile destroyer who have come on deck (in apparently cold weather) to witness the event, entertainment for these men must be in short supply. No doubt it is good to see another ship with friendly faces aboard so far out at sea.

A very busy Kiev at sea with her rear crane erect, one of her launches in the water, her fire hoses in operation and a number of her crew in varying stages of trying-to-look-busy activity.

Overhead view of the flight deck area showing deck markings, Helix helicopters with rotors folded and the rear crane in the stowed position.

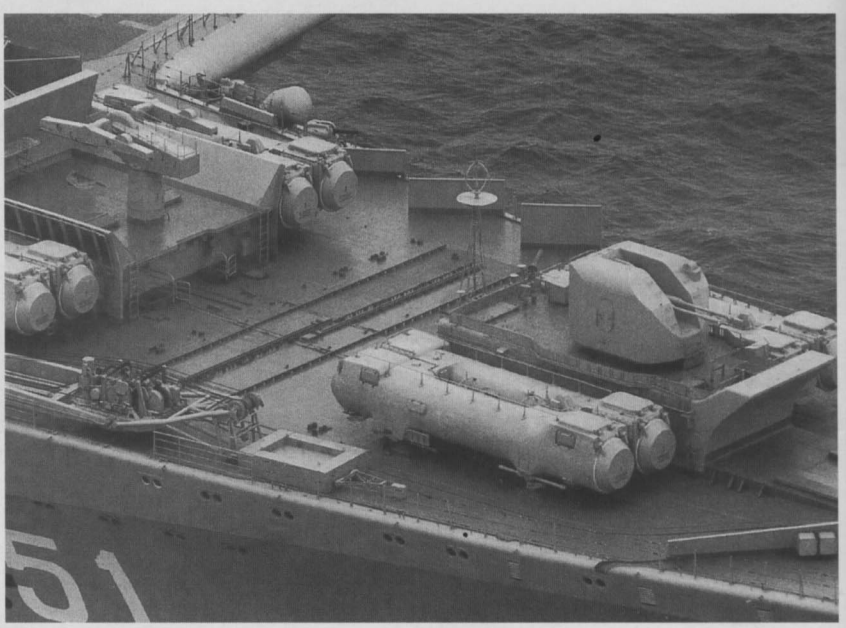
Kiev looking clean and fit with three Helix on deck along with a Ka-25 Hormone B and a pair of Forgers. Note that the Forgers are wrapped in canvas, not merely with their canopies covered as is more often seen. Note also the aspiring bird watchers aft of the island.

Close-up walk down the Kiev's starboard side showing both fore and aft crane in operation, the usual boys milling around in the guise of 'deck-swabbers' and a Goryn class rescue tug (SB-524) alongside.

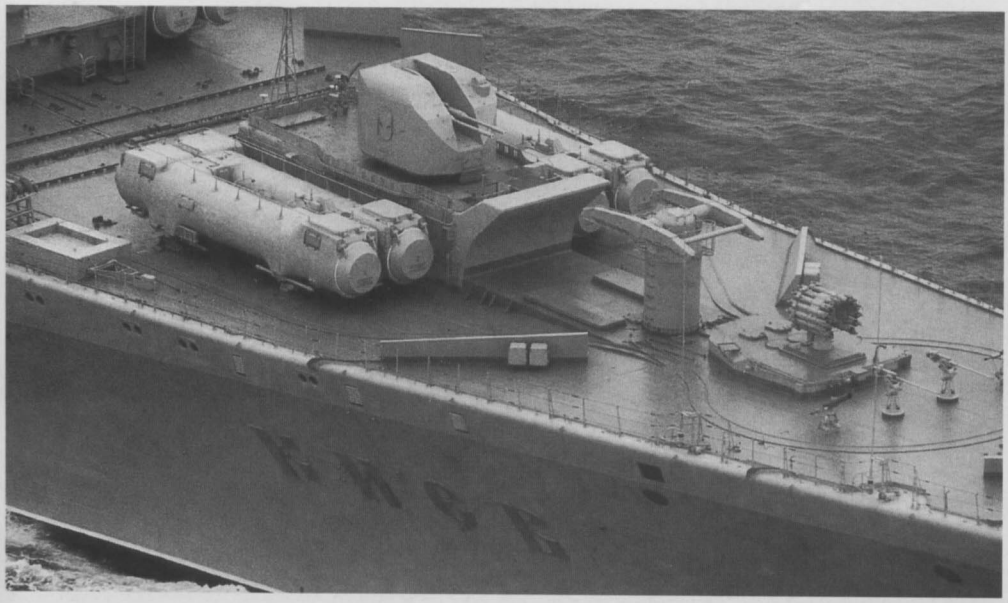


Close-up of Kiev's bow showing the Trap Door radar for SS-N-12 (in the retracted position), two RBU-6000 rocket launchers, SUW-N-1 missile launcher and twin 76.2mm guns between pairs of SS-N-12 Sandbox launchers. Also clearly visible are the tracks for the reloading dollys for the RBU-6000s.

This close-up shows three of the Kiev's prominent weapon systems. Sandwiched between SS-N-12 Sandbox cruise missile launchers (range of 300 nautical miles) are (to the right) twin 76.2mm guns and (to the left) twin SA-N-3 Goblet anti-aircraft missile launchers (maximum range 55km).

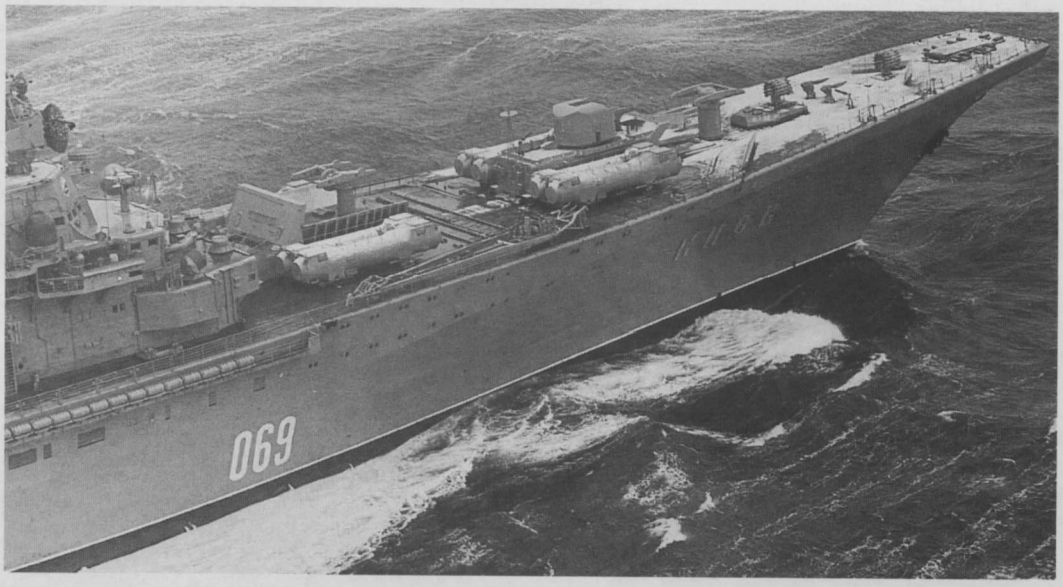


Close-up of the twin SA-N-3 Goblet launchers. Note the blast shields and the three vertical panels to the right of the photo which are wind baffles for the leading edge of the flight deck.



Forward of the 76.2mm gun is the twin SUW-N-1 launcher. This weapon is an unguided solid fuel rocket similar to the FROG-7 (Free Rocket Over Ground) used by the Soviet Army.

Anyone who has sailed in the North Atlantic knows of the harsh weather conditions in that ocean. In this photo, we see that snow is gathering on the bow of the Kiev as it traverses the frigid waters of that region, bearing witness to the cold weather experienced by the Kiev's crew on this mission.

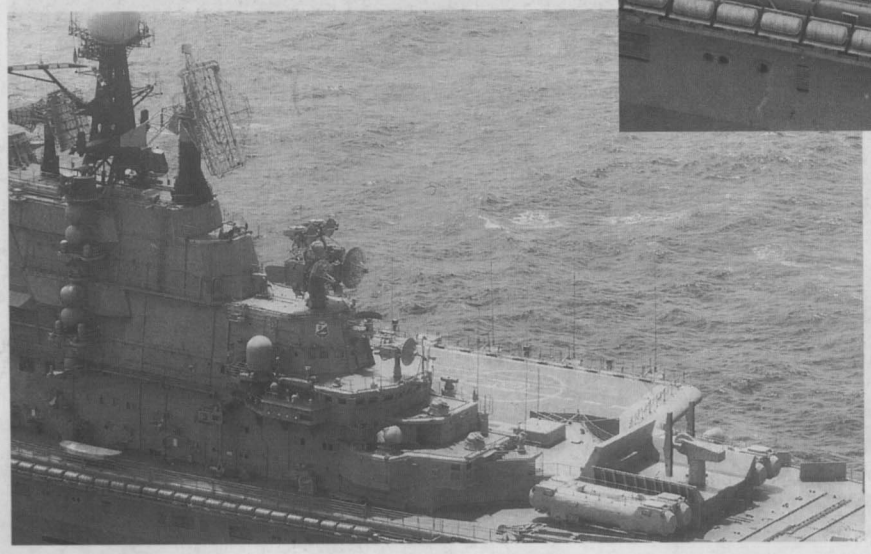


Forward of the RBU-6000 (a twelve-barreled rocket depth charge launcher) is the panel covering the Trap Door radar which is used for missile tracking and control for the SS-N-12 Sandbox.

Below the bow of the Kiev, a very ambitious crewman is about to undertake the paint job of the century! Note the side-mounted star and the winged anchor and star under the bow point. The crewman's position makes one wonder who he aggravated.....and how.

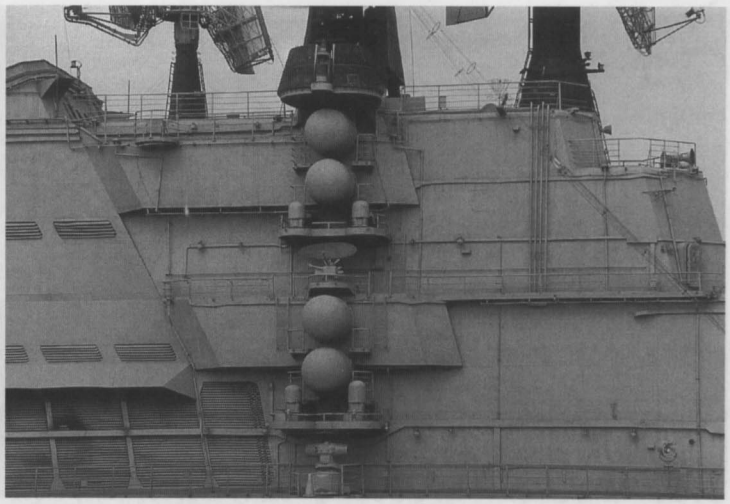
Starboard side amidships showing the Top Sail radar (in front of the mast) and Top Steer immediately behind it. One level down are the Head Light radars which are used in conjunction with the SA-N-3 Goblet SAM. The 'balls' in the centre of the island are Side Globe electronic warfare radomes.

Close-up of the AK-630 mounts with (to their right) the Bass Tilt fire control radar. Forward of the island are the SS-N-12 Sandbox cruise missile launchers, which are elevated when fired. These AK-630 close-in anti-aircraft and anti-cruise missile weapons fire up to 3,000 rounds a minute out to a maximum range of 8,250 feet (2500/metres).



Further forward on the starboard side showing the Top Knot TACAN radome atop the mast. Below the Head Light radar is Owl Screech which is used with the twin 76.2mm guns. Forward of that, on the next two levels down, are the AK-630 30mm Gatling guns.

Sliding back along the island you can see the Head Light radar, used as the fire control radar for the SA-N-3 Goblet missile. This radar operates on the F, G, H and D bands. Aft of that are the Side Globe electronic warfare (EW) radomes which are used for intercept/jamming.

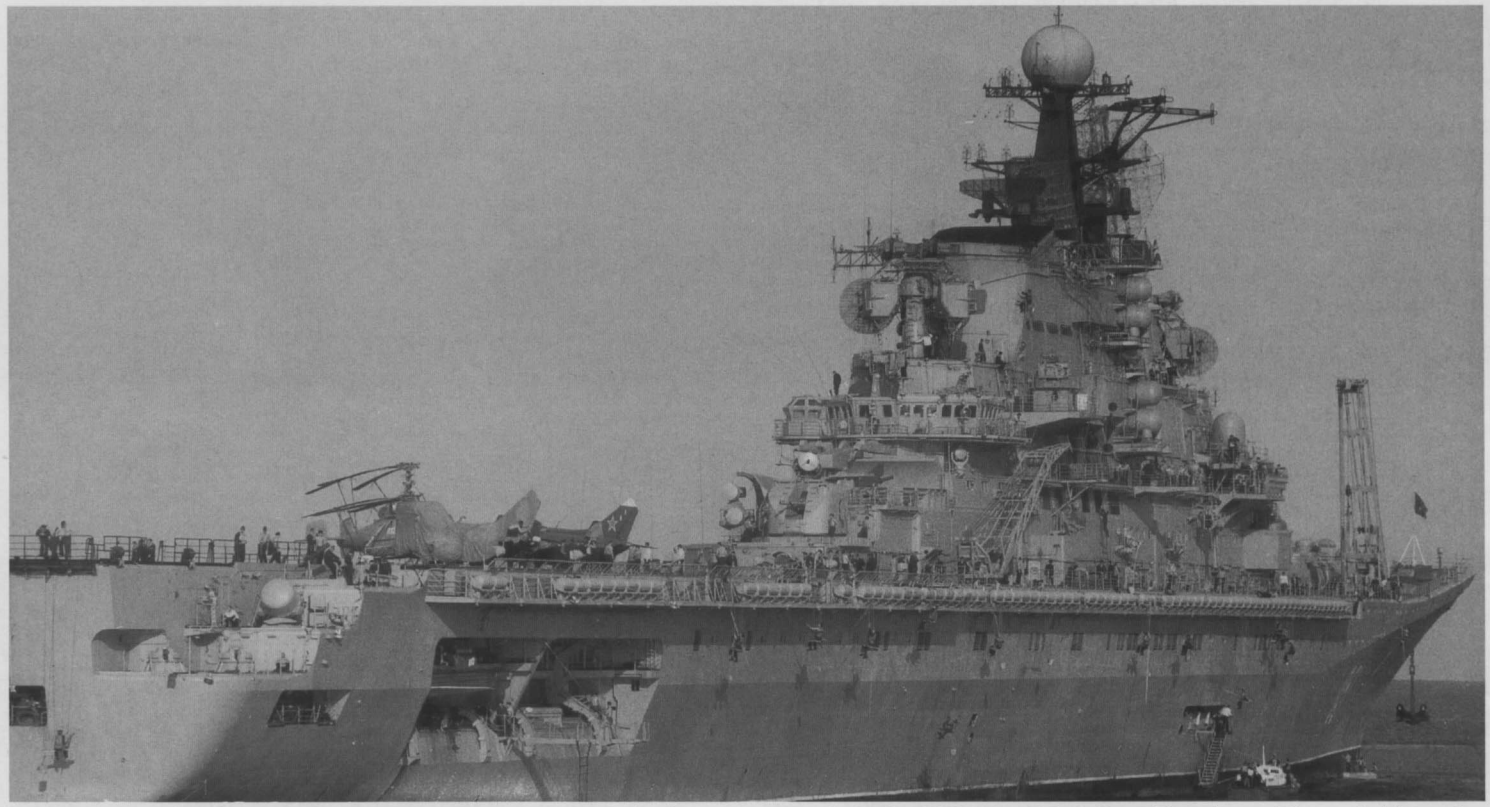


Climbing the radome ladder: (from bottom to top) Tee Plinth (electro-optical), two (horizontal) Bell Thump jammers, two (vertical) Side Globe EW radomes, two (horizontal) Bell Bash jammers, two more (vertical) Side Globes and, finally, Rum Tub ESM antennae.

Forward of the funnel is Top Steer, an S-band 3-D system used for air control. Even with the funnel rear and down one level is the Pop Group radar which is used to control the SA-N-4 Gecko SAM.

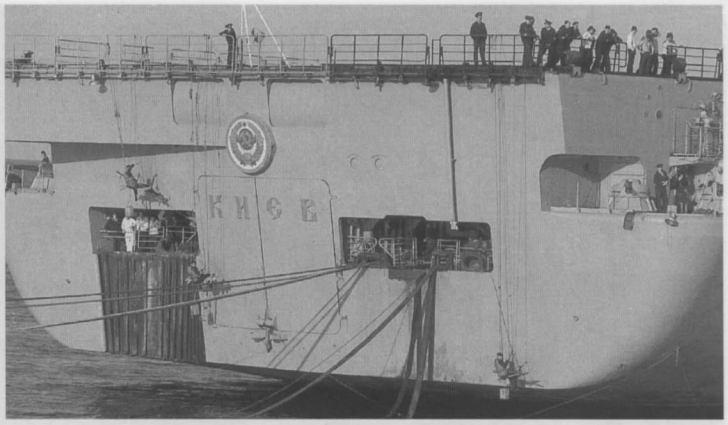
Rear of the island showing (from right to left) Head Light, Owl Screech and an SA-N-3 Goblet launcher. Goblet has a range of 34 miles (55km) and can intercept between 300 and 80,000ft. It also has an anti-ship capability.

The Kiev's island showing electronic and weapon systems. Immediately to the left of the "0" in "051" is a slightly darker toned panel which covers the torpedo launchers.

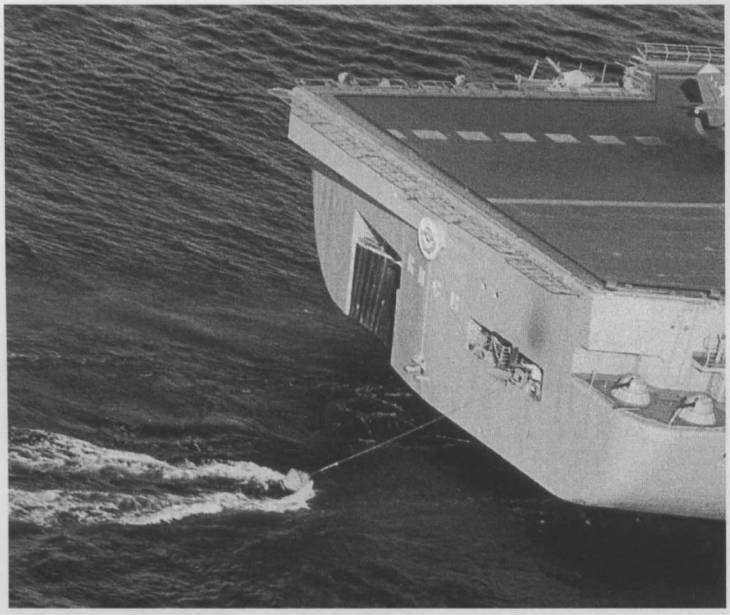


Interesting shot of the Kiev's starboard rear quarter showing (in the corner cut-out) a pair of AK-630 and their Bass Tilt radar and, forward of them, the (now empty) launch positions. Forward of the launch position, and extending to mid-island are would-be Soviet trapeze artists cleverly masquerading as painters.

Rear starboard quarter shot of the Kiev's island showing the very "busy" appearance of the on-board electronic fittings. This close-up makes it possible to see some of the whip antennae and other radar equipment that is normally less visible from a distance.



Stern view showing the AK-630 guns (both sides) as well as the doors (immediately under the Soviet emblem) which cover the Bull Horn variable depth sonar position. To the right are the stern mooring lines. Note the enthusiasm shown by the crew for 'clean-up day'.

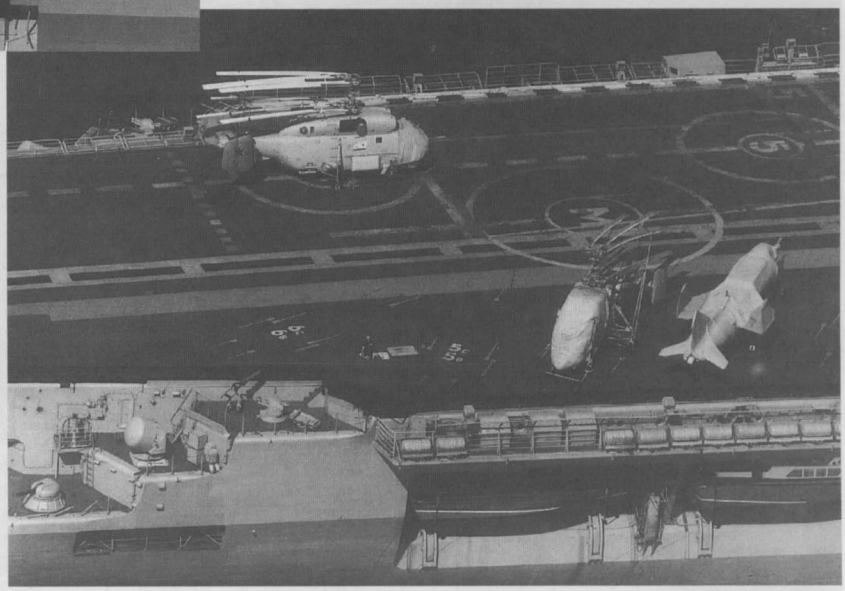


Creating whitecaps as the Kiev drags it through the ocean waves, the ship's Mare Tail towed variable depth sonar is shown as it is either being lowered or recovered. This sonar is also found on Moskva class vessels. A low frequency sonar is located on the bow as well.

This is a good clear view of the stern of the Kiev. Note the detail in the Soviet "hammer and sickle" emblem positioned above the Cyrillic vessel identification characters. Barely visible are two sailors standing behind the railings in the recesses of the stern who have been captured on film for posterity.

Aft island showing a non-camouflaged Helix with her rotors folded. The rear crane is folded and the SA-N-3 Goblet launchers are stowed. Note the SA-N-4 Gecko launchers which appear as a small circular plate on the starboard side next to the 76.2mm gun.

Flight deck details including a Helix helicopter on the flight deck and a Hormone and two Forgers to the starboard of the safety line. The Forgers are completely wrapped in tarping. The two ship's launches are mounted under the deck (bottom).



The Kiev's flight deck at the stern of the vessel. A Ka-27 Helix helicopter occupies launch position number "6" on the port side of the deck. At the bottom left corner of the picture is an AK-630 6-barrel Gatling gun and its fire control radar.

Starboard fore quarter showing the bulk of the weapon systems mounted there. The forward crane is erect, the starboard anchor is clear and there are ship's boats in the water.

In this particular photo of the Kiev, the numerous whip antennae at the bow of the ship have caught the sunlight and are highly visible. They usually remain in this upright position while the vessel is underway; they are lowered during aircraft takeoffs and missiles launches.

Aft starboard quarter with four Hormones on deck and a dark gray and green Forger parked. The colour in this shot is badly washed out cannot be used as accurate.

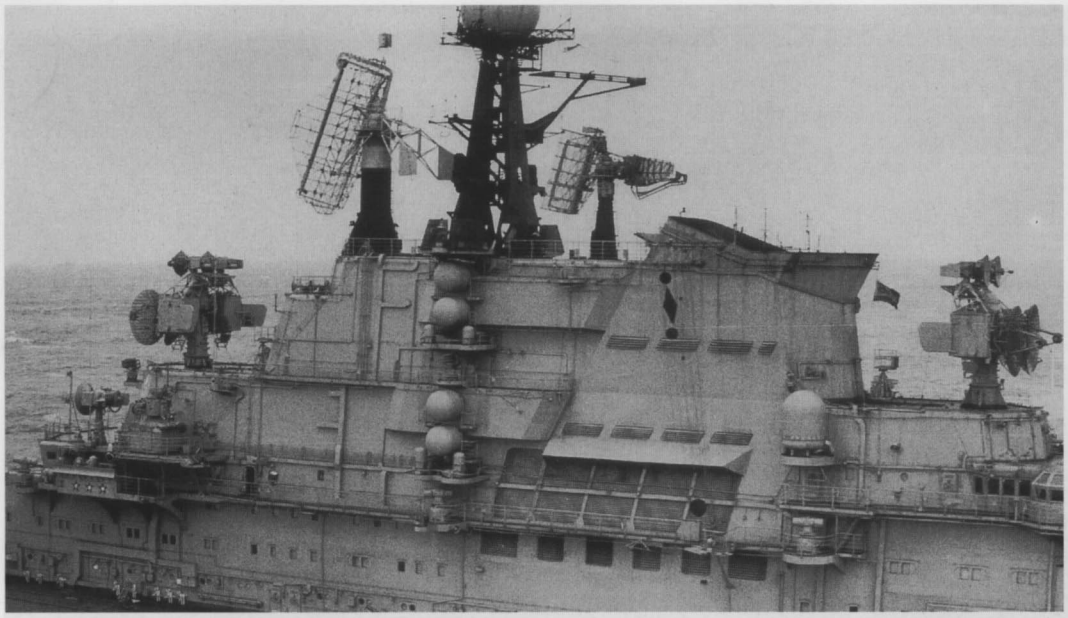
This port side fore quarter shot shows the detail of the weapon systems located there. Note the single-star flag fluttering on the bow, and the Kiev's name written in Cyrillic on the side of the bow.

The port side perspective of the weapon systems on the bow of the Kiev. While weapons such as the pair of 76.2mm guns and the SS-N-12 Sandbox launchers are more prominent, the smaller AK-630 30mm Gatling guns (at the bottom and upper right) are no less effective when called upon to perform their defensive roles.

Close-up of the foredeck detail including the twin AK-630 and their associated radars mounted forward of and below the flight deck. Note the size of the wind baffles (at left) in relation to the men standing next to them.

Except for the single sailor standing forward of the twin SA-N-3 Goblet launcher and the SS-N-12 Sandbox launching tubes that flank it, the Kiev appears void of humanity in this photo of the forward portion of the vessel's island.

A photographic stroll down the port side of the Kiev. All fixed wing aircraft and helicopters have been stowed below deck. Note how the small launches are stored in their respective spaces under the deck at the stern, and how they are launched by sliding them down the tracks.



Close-up of the port side of the Kiev's island. Running vertically down the side of the island (in line with the mast) are four of the eight Side Globe Electronic Support Measure/Electronic Countermeasure radomes.

A variety of work is being performed in this photo of the Kiev, some of it involving the use of the forward crane. Of particular interest in this shot is the way the SA-N-3 Goblet launcher has been pointed to the side.

A port side view of the rear of the Kiev's island. Sitting on the deck below the 76.2mm gun housing is the low-profile tractor used to haul aircraft from one part of the deck to another; it is referred to as a "mule" by Western aircraft carrier crew members.

The forward portion of the port side of the Kiev's island is a virtual mirror image of the starboard side. This shot provides a good close-up of the main mast and the Top Knot TACAN radome positioned on top.

Island port side rear with a Helix helicopter, in a most definite non-camouflage pattern, sitting on position three. Helix are replacing Hormone on most Soviet vessels and serve three uses: anti-submarine warfare, troop carrying and targeting for ship-borne weapon systems. They can carry depth charges and torpedoes.

Close-up view of the junction of the flight deck and the island superstructure. This is a good study of how the electronic warfare systems are configured onto the ship.

Bearing a red star on its square-cut tail fins, a Ka-27 Helix sits with rotors folded in launch position number "1" on the Kiev's flight deck. Up to 19 of these Anti-Submarine Warfare helicopters can be transported aboard the vessel.

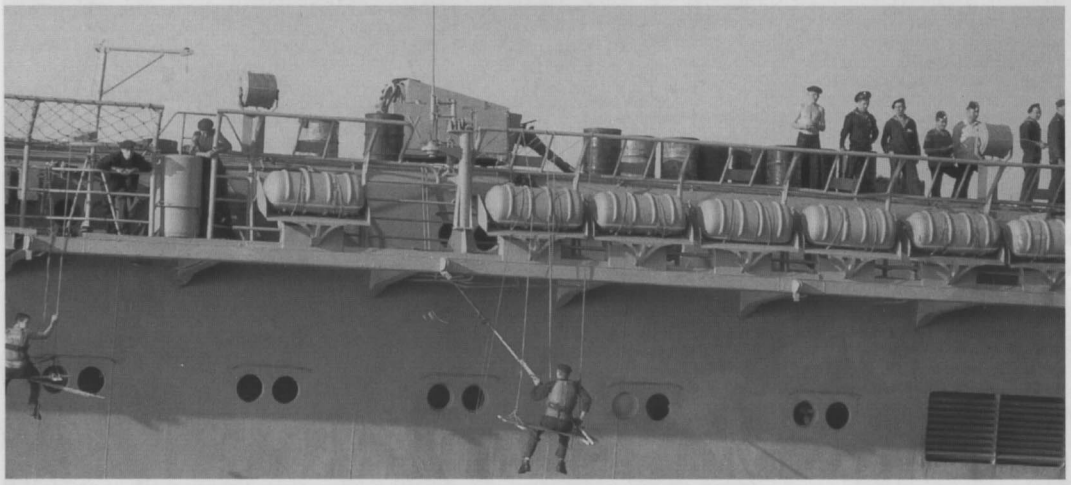
While some of the Kiev's deck crew members inspect an uncovered Ka-27 in launch position number "3" at left, other crewmen receive instruction by a superior standing next to the truck near the starboard side of the flight deck.

A good shot of a variety of flight deck detail. Aircraft displayed here are two canvas-covered Yak-36 Forger, a Ka-25 Hormone and a Ka-27 Helix. At the left of the photo (where the middle sailor is standing) is the clearly outlined rear aircraft elevator. Note how each launch position circle has received two identification numbers; the VTOL position is simply lettered "M".

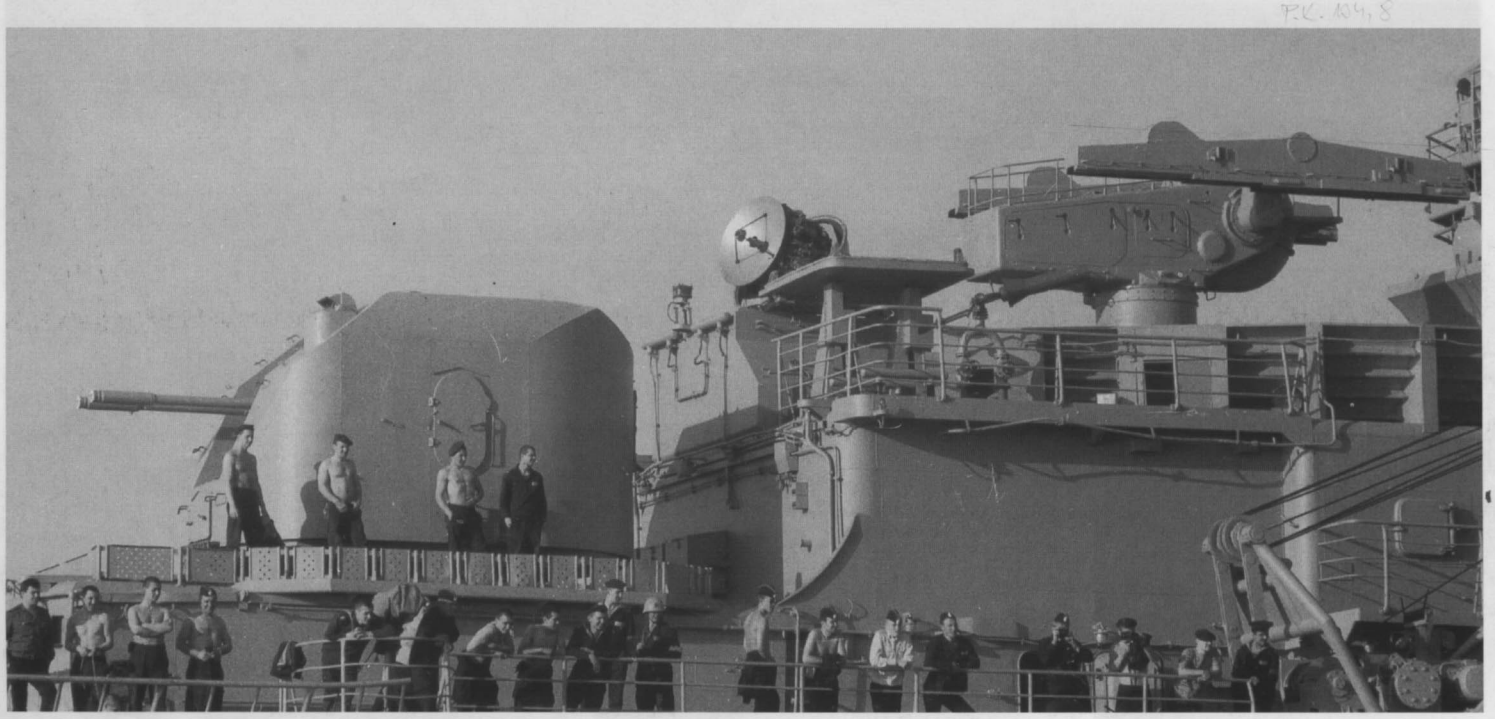
Details of the rear flight deck. The variety of painted markings on the deck are noteworthy. Also interesting is the railing fitted along the edge of the rear of the flight deck at the stern of the ship. It can be folded down to accommodate the activity of aircraft and then restored to an upright position.

Rear flight deck detail on a wet day. The Helix, although still in its canvas 'night-cap', has sets of rotor blades extended. In the rear are two Forgers and a Hormone helicopter.

A sunny day increases the amount of activity on and around the Kiev. The miniscule row boat in the water next to the mighty turbine-powered vessel seems better suited to a much earlier nautical era. Note the seagull atop the flagstaff at the stern of the ship.

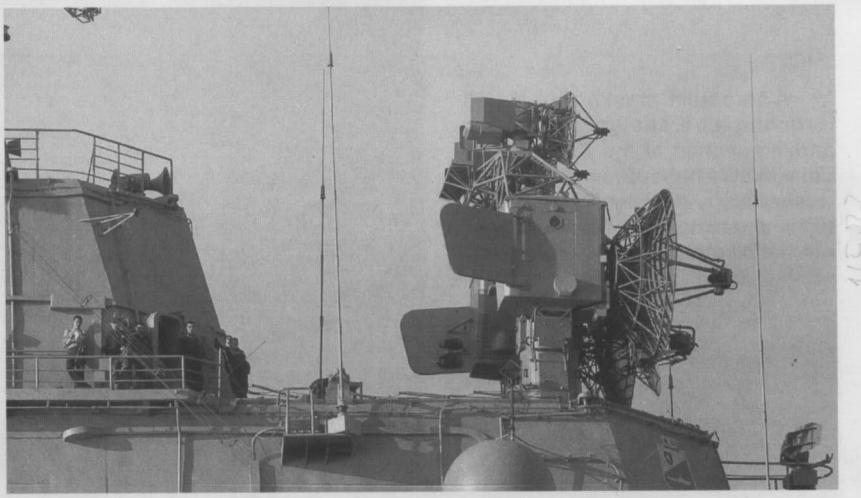


Under the critical eye of several of their fellow crew members, sailors of a clean-up squad hang from lines alongside the starboard side of the Kiev and try to perform their duty. Note the variety of dress among the sailors.

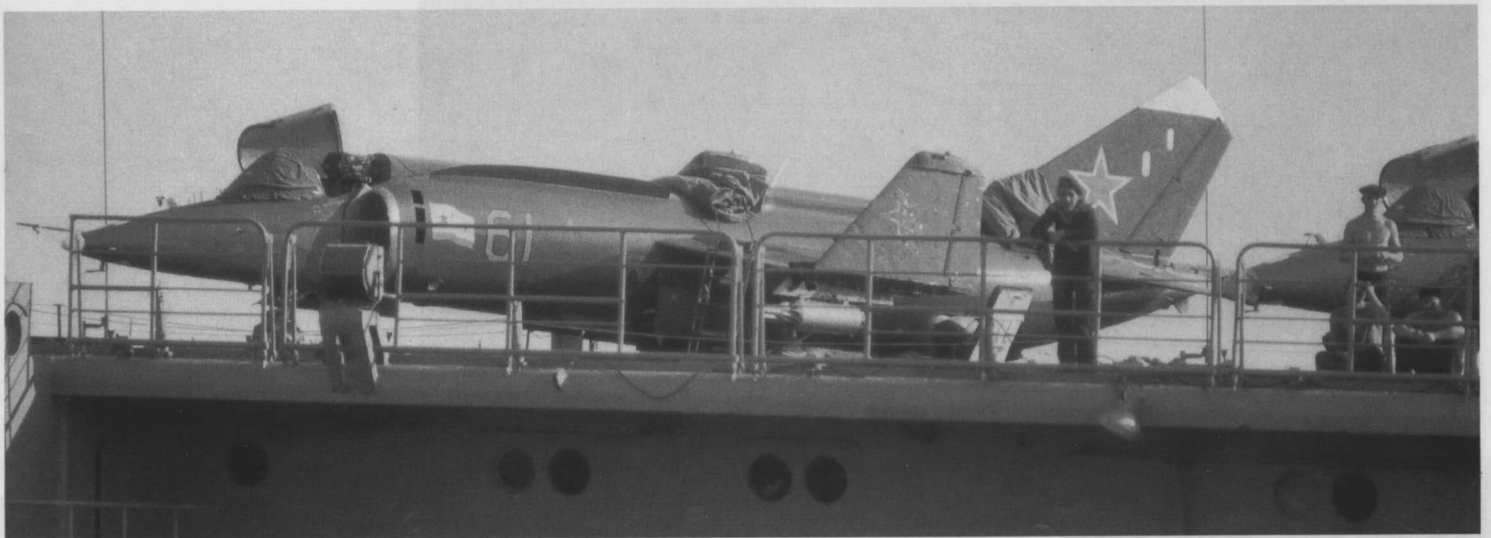


Close-up shot of the the rear 76.2mm gun and the SA-N-3 Goblet launcher. Note the series of short barriers that surrounds the turret of the gun where the four sailors are standing.

In this close-up view of the two rear starboard AK-630 30mm Gatling gun and their Bass Tilt radar, it is possible to see the six barrels of the rotating guns. The size of the guns and their turrets can be determined by comparing them to the sailor that is leaning against the one at right.

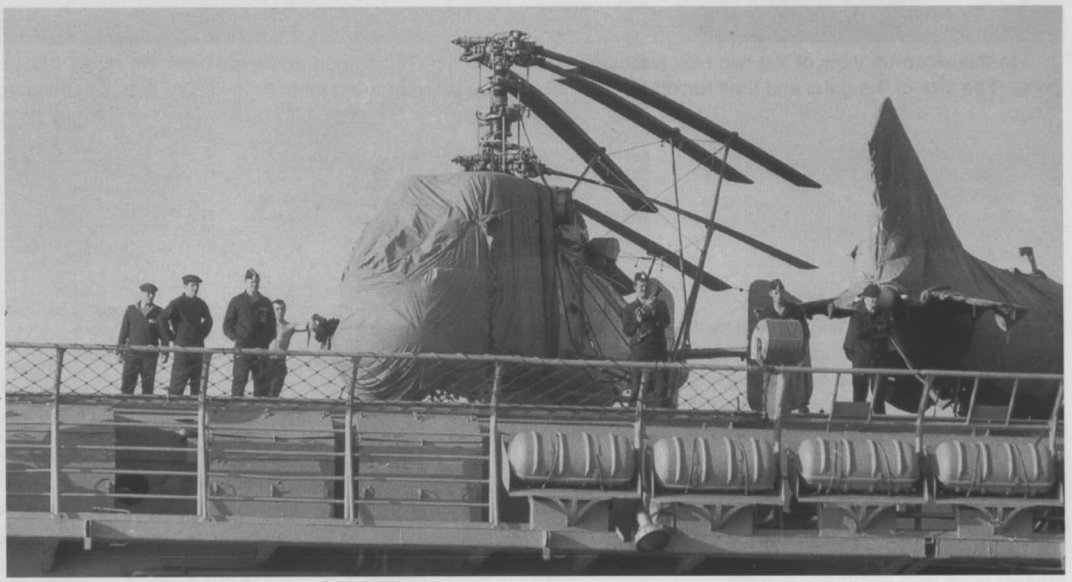


Head Light, the fire control radar for the SA-N-3 Goblet missile. The larger dishes provide tracking signals and the smaller ones give command signals.



A Yak-36 Forger. This aircraft appears to be painted in the one-colour dark blue scheme. Forger is a fighter-bomber but is limited to about 2,200lbs (1,000kg) of ordnance. It is powered by three engines: two for lift and one for thrust.

Veiled beneath a protective tarp, a Yak-36 Forger awaits its call to duty. This Forger is well suited for a carrier with a deck that is unsuited for conventional STOL operations. Its vectored-thrust turbojet and two lift jets provide it with the capacity for vertical takeoff.



A tarpaulin masks this Ka-25 Hormone as it sits unused on the parking section of the Kiev's deck. This ASW helicopter is usually recognized by the "Big Bulge" search radar under its nose, the outline of which is discernable here.

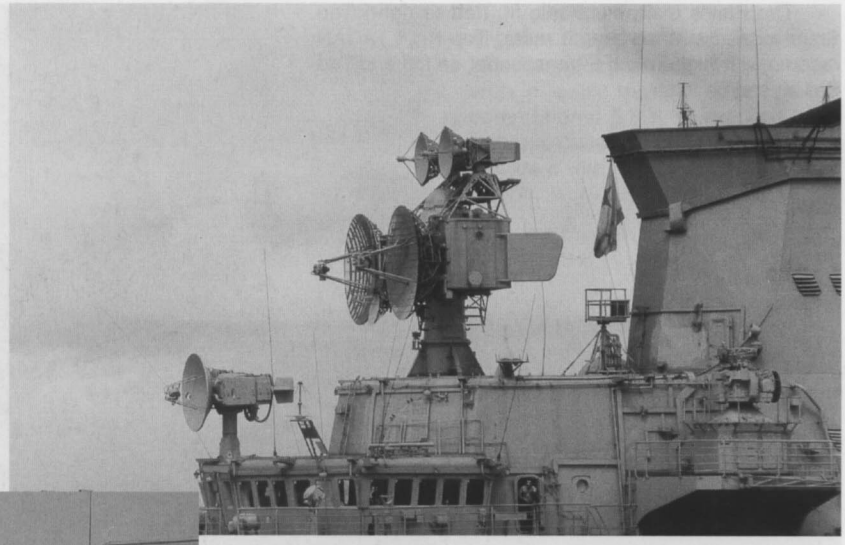
This photo shows some of the fire control radars located on the Kiev's island. At left is the Head Light system; in the center is one of two Pop Group systems. Of the Kiev class vessels, only the Kiev itself and the Minsk are equipped with Pop Group radar.

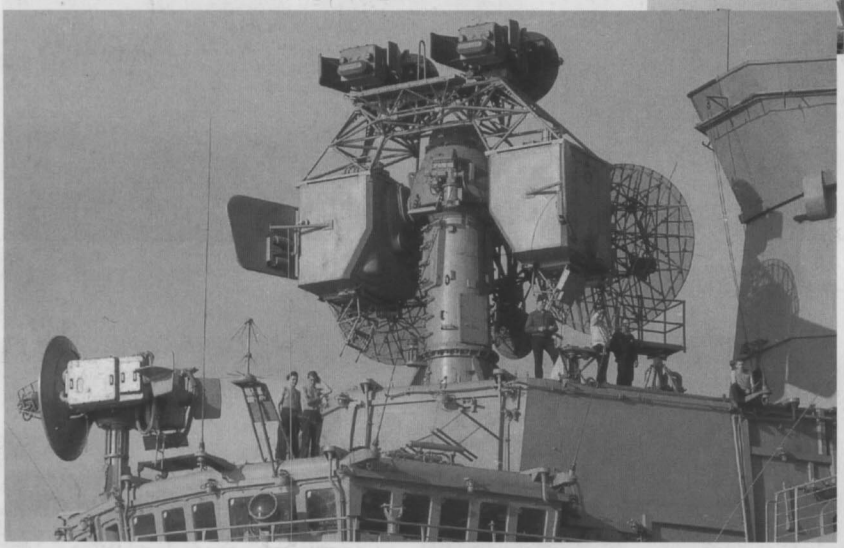
The Kiev's main electronic fit: (left to right) Top Steer air and surface search radar, Top Knot TACAN radome with High Pole IFF transponder on top and Top Sail air search radar.

The Top Steer radar commands the center of attention in this photo. A portion of the Top Knot radar is visible atop the main mast at right. Note the "bird cage" appearance of some of the smaller equipment.

Close-up detail of the main mast shows the ball-shaped Top Knot TACAN radar. The Top Sail radar system, which can be seen at right, is employed in air search.

The Kiev's rear weapon control radar systems are seen here. The smaller is the Owl Screech radar (lower left) for the 76.2mm guns and the larger is the Head Light radar (center) for the SA-N-3 Goblet missiles.





Another close-up view of the Head Light and Owl Screech fire control radar systems. Head Light is for the SA-N-3 Goblet missiles; Owl Screech is for the 76.2mm gun.

MINSK

The second of the Kiev class carriers, the Minsk, at speed. The Minsk has a number of changes not seen on the Kiev. The port forward gun mount (supporting two AK-630 and their Bass Tilt radar) is extended, the flight deck leading edge is rounded and the wind deflection panels abaft of the SS-N-12 are of a different configuration. The Minsk operates in the Pacific Fleet out of Vladivostok.

A walk up the starboard side of Kiev showing the relatively clean stern and the heavy grouping of weapon systems on the bow. Just to the left of the number "051" is the door covering the 533mm torpedo launchers.

Forward port view of the Admiral Gorshkov. Differences in this section include: replacement of the RBU-6000 with the RBU-12000, replacement of the SUW-N-1 position with flush mounted SA-N-9 SAM, increased SS-N-12 complement, and two 100mm single gun mounts.

The Admiral Gorshkov's center section showing (from the top) Plate Steer radar, Cake Stand radar (resembling a large tub!), Low Ball SATCOM radomes (fore and aft of the main mast) and a flat Sky Watch 3-D planar phased array radar plate (immediately beneath the foremost Low Ball radome).

Rear island and deck view of the Admiral Gorshkov. The 76.2mm gun, the SA-N-3 launcher, the flush mounted SA-N-4 launcher and all their associated electronic fittings are not here; the only weapon system to be found is the vertical launchers of the SA-N-9 and its Cross Sword radar.

Forward weapon positions of the Admiral Gorshkov. Note the absence of the weapon sponson, the single wind deflector and the Hormone helicopter. Each of the 100mm gun barrel caps has a little red star on it. Note also that the leading edge of the flight deck has been extended and is rounded.

A distant view of the first true Russian aircraft carrier, the Admiral Kuznetsov (originally Leonid Brezhnev, then Tbilisi). Navalized Su-27K, along with other Russian ship-based aircraft such as the Su-25T and the MiG-29K, undergo flight tests from its deck. (Sergey Skrynnikov)

Fore deck of the Admiral Kuznetsov showing the SA-N-11 with canvas weather covers, SA-N-9 missile silo covers, 20-metre crane and island details. The Cross Sword radars are visible on either side of the Sky Watch array.

The Admiral Kuznetsov has nine helicopter circles and a single 14m circle aft for VTOL operations. There are two take-off positions for fix-wing fighters with a 105m run, and a single position for the longer 195m take-off run. (Sergey Skrynnikov)

Debriefing of the Su-27K pilot on board the Admiral Kuznetsov. The navalized Flanker features a strengthened landing gear, tail-hook, in-flight refuelling probe, a navigation system for maritime operations, and folding wing arrangement. Although the Su-27K is intended primarily as a fighter, it has been modified to use in the naval strike role, capable to carry anti-ship missiles. (Sergey Skrynnikov)

With its pilots strapped into their cockpits, this Su-25T taxies past the Kuznetsov's massive island superstructure. Clearly visible is the camouflage scheme of the aircraft. (Sergey Skrynnikov)

NOVOROSSIYSK

Novorossiysk at anchor wearing the side number "028". It is the third of the Kiev class vessels. Side numbers are frequently changed, but on a four vessel class like Kiev the changes have much less impact than on a class with 15 or 20.

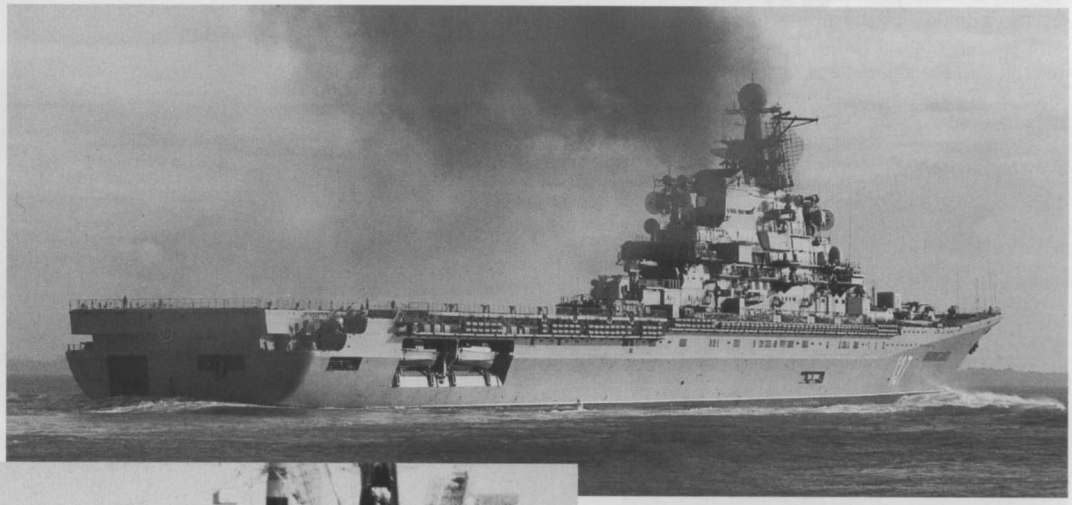
White clouds of smoke pour from the Novorossiysk's funnel as she pulls out of her berth. The ship's eight boilers, along with four turbine engines, can take this Kiev class vessel up to a speed of 32 knots.

Novorossiysk at sea, now wearing the side number "137". She is accompanied by a Sovremenniy class guided missile destroyer. The difference in both shape and size of the port forward AK-630 mount (immediately to the rear of the '137') is readily apparent.

The Novorossiysk at her best, quietly at anchor with most of her complement of Kamov Helix helicopters on deck. The Novorossiysk and the Minsk are the only aircraft carriers in the Pacific Fleet. If the Russian press is correct, there may soon be one or two fewer.

The Novorossiysk from the stern port quarter showing the VDS doors, the port-side boat launchers and a deck-full of happy sailors. Also visible are the four stern-mounted AK-630 ADMG's and the Helix helicopters on deck, some with their rotor blades folded back and secured.

The Novorossiysk from the starboard-side stern. In this view the stern mooring port, boat launchers (one empty) and the collapsible life rafts are all visible. The Helix helicopters are not as small as normally thought, as is evident by a comparison with the crew members standing next to them.

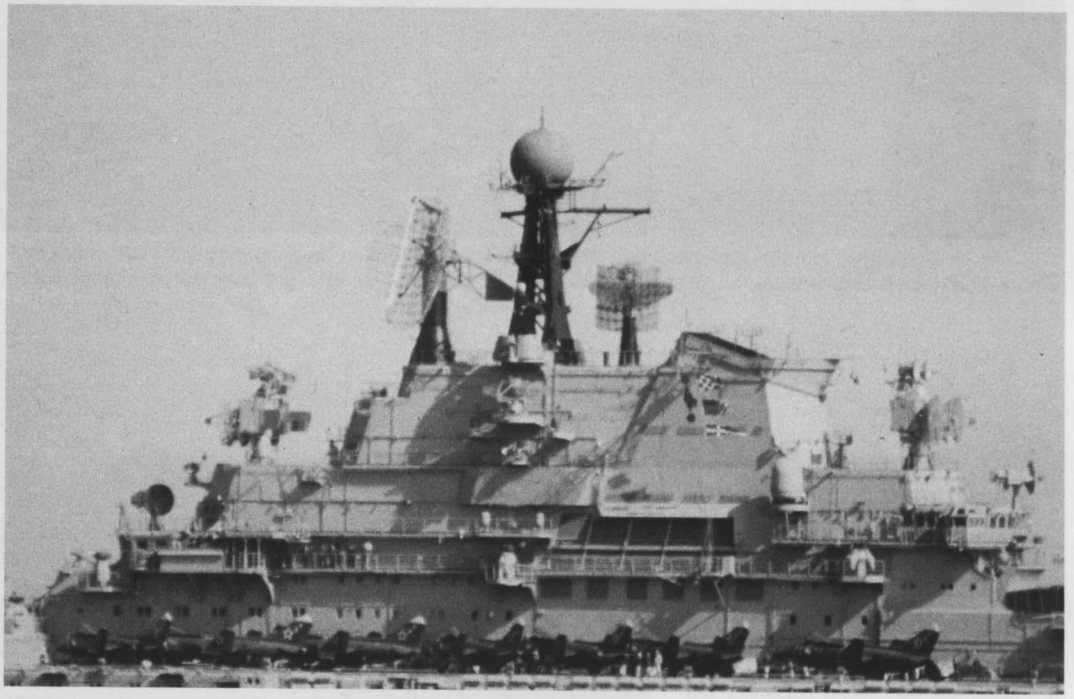


This profile view of the Novorossiysk shows the vessel's physical similarity to the Kiev. Though the ships are in the same class, there are a number of striking dissimilarities in the way the vessels are equipped.

The Novorossiysk aircraft carrier was assigned to the Pacific Fleet in 1983. Here its gray-painted hull underlines the forward portion of the towering white island. Half a dozen colorful Yak-36 Forger, with Soviet stars painted on their tails, are visible on its flight deck.

No aircraft are to be seen on the flight deck of the Novorossiysk in this photo of the vessel's stern. The comparison in size between the vessel and the several crewmen strolling on its deck illustrates the immensity of the aircraft carrier.

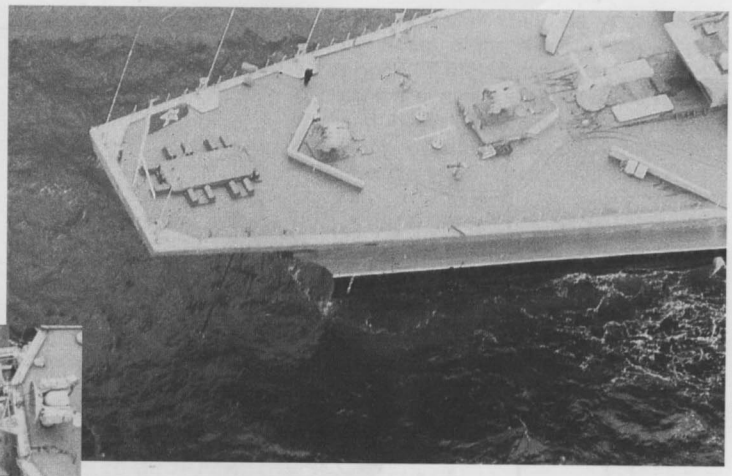
This is a good study of the main portion of the Novorossiysk's island. Its bulk is made even more impressive by the addition of the numerous fire and aircraft control radar. The Forger aircraft and the signal flags add a bit of color to the vessel's drab nautical paint scheme.

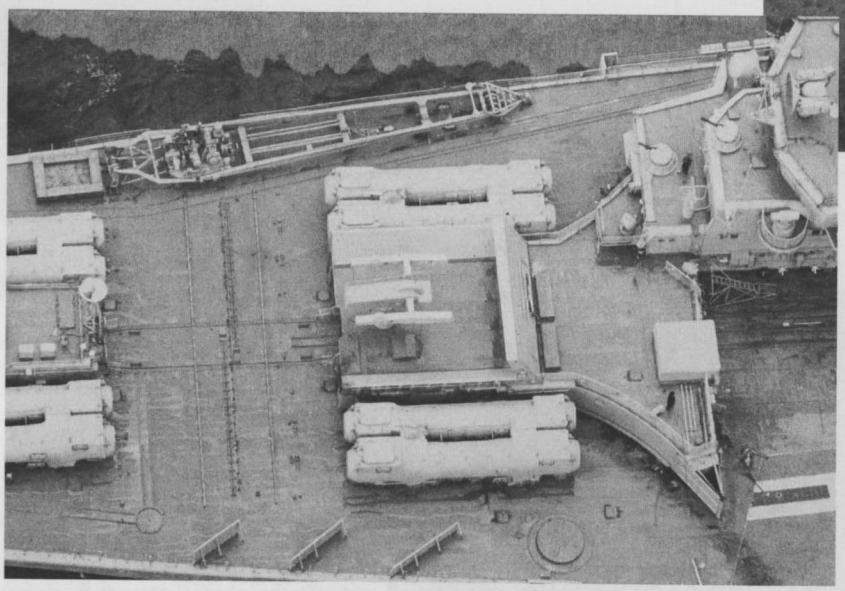


A Yak-36 Forger hovers in the air prior to landing on the Novorossiysk's flight deck. Unlike aircraft carriers in the Western navies, the Russian Kiev class carriers are not fitted with arresting cables to help slow the landing of their aircraft. The takeoff and landing of the Forger is usually vertical.

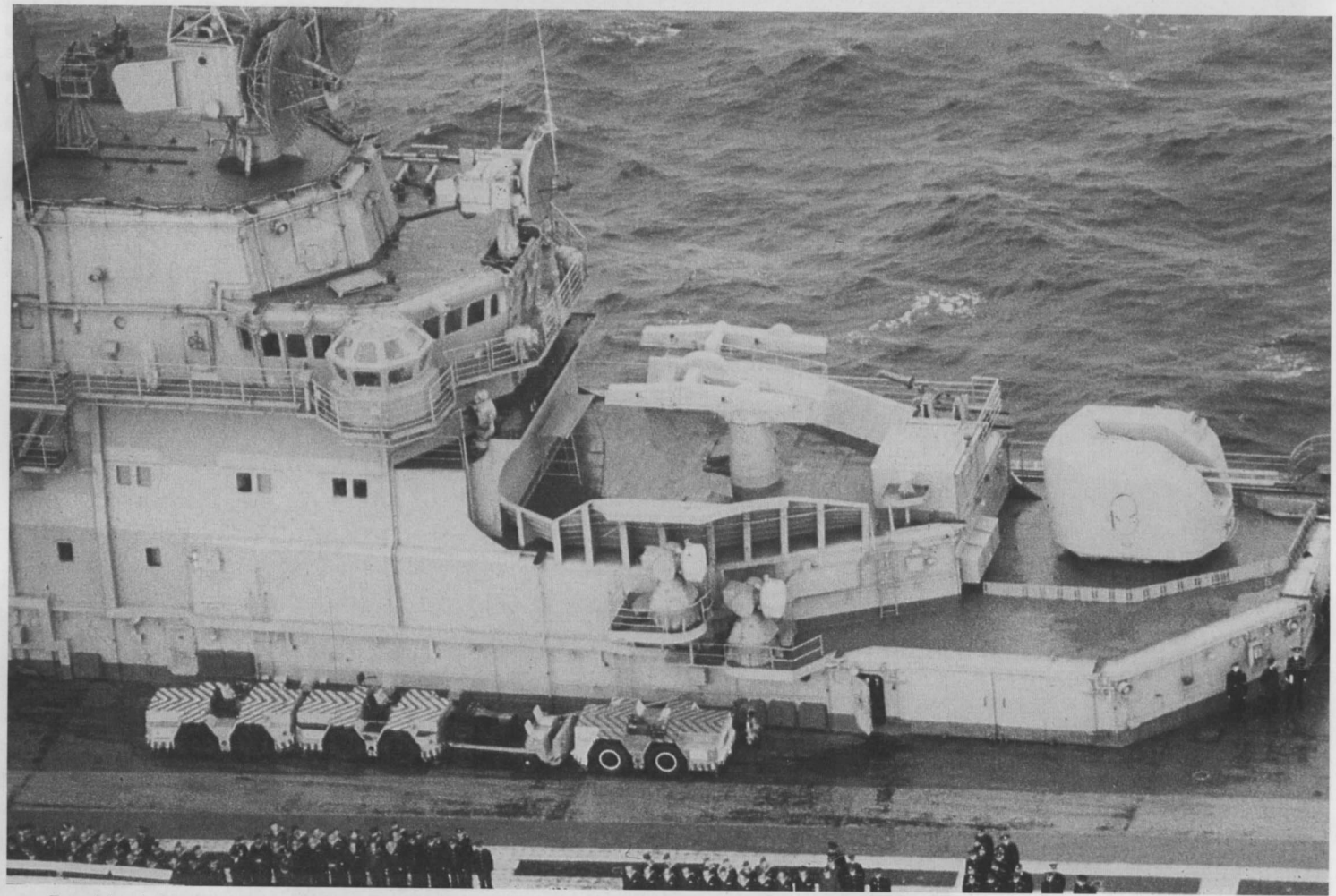
This view clearly shows the different shape of the Novorossiysk's gun mount, and is a very good clue as to vessel's identification. One should not, however, discount the presence of the lengthy plate!

Novorossiysk's forecastle housing (L to R) flagpole, Trap Door radar, RBU-6000 ASW rocket launcher, two saluting guns, a second RBU-6000 and the forward SUW-N-1 ASW missile launcher.





Novorossiysk's foredeck showing eight SS-N-12 launchers, the SA-N-3 launch rails, and two AK-630 Gatling guns.



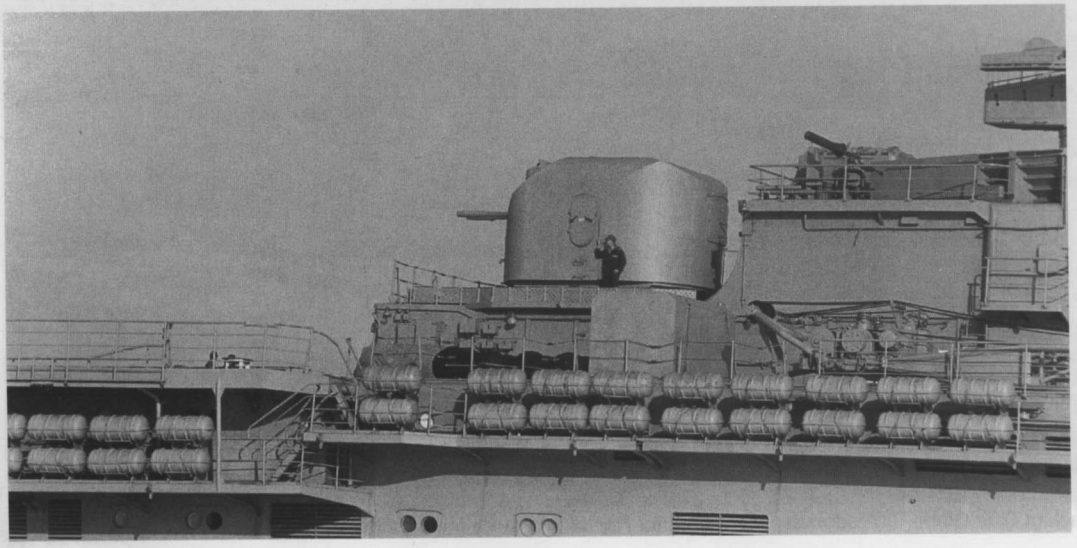
Rear island view centering on the SA-N-3 launcher and the twin 76.2mm guns. Port of the island are the motorized vehicles used to tow aircraft from/to the elevators.

The Novorossiysk's island showing another difference with Kiev - the lack of Side Globe EW balls. In addition, as there are no SA-N-4 Gecko launchers (which would appear as a small circular plate on the starboard side next to the 76.2mm gun, right where the Gaz-66 truck is parked), there is no Pop Group radar mounted below and forward of the Head Light radar. (See earlier Kiev shots for comparison). Note that the aft aircraft elevator is lowered.

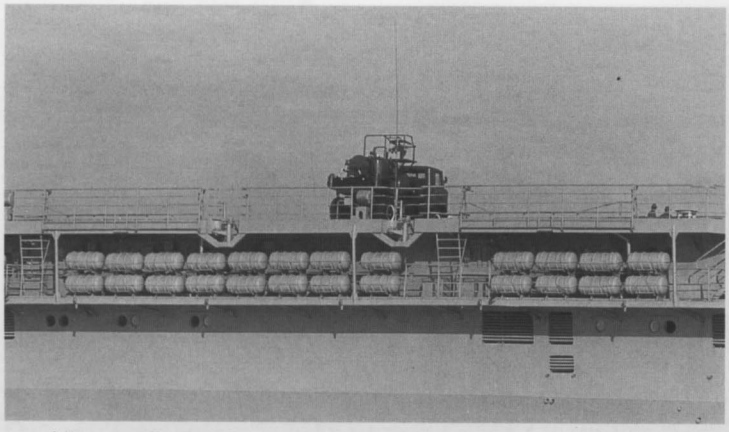
Forward section of the island showing the lack of Side Globe EW radomes. The mount for Pop Group radar (not fitted) is on the extreme left centre.

A view of Novorossiysk's forward island showing her electronic set. Seen here are (L to R) Head Light radar (fire control for the SA-N-3), Top Sail (3-D Air Search), Top Knot radar (TACAN) and Top Steer (3-D Air Search).

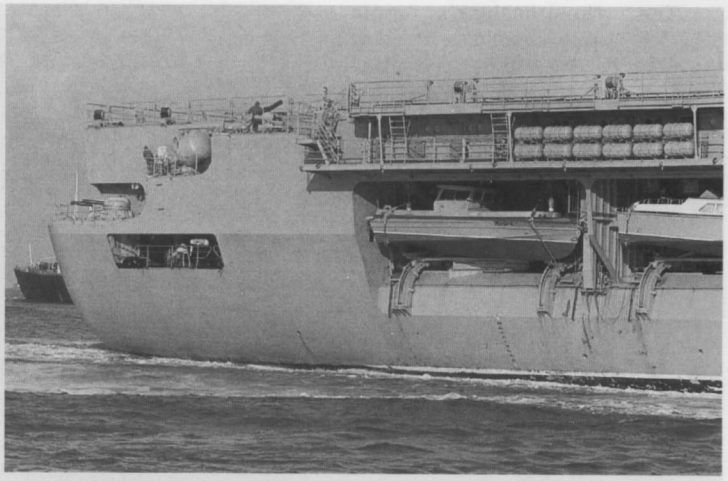
On the foredeck of the Novorossiysk sit the same forward weapon mounts as seen on the Kiev. The recessed middle section of the 7.62mm gun's turret where the barrels protrude is shown to advantage here.



Rear gun mount. Immediately to the left of the gun would normally be found the recessed SA-N-4 launchers. However, the Novorossiysk is to be fitted with six SA-N-9 launchers abaft the island.



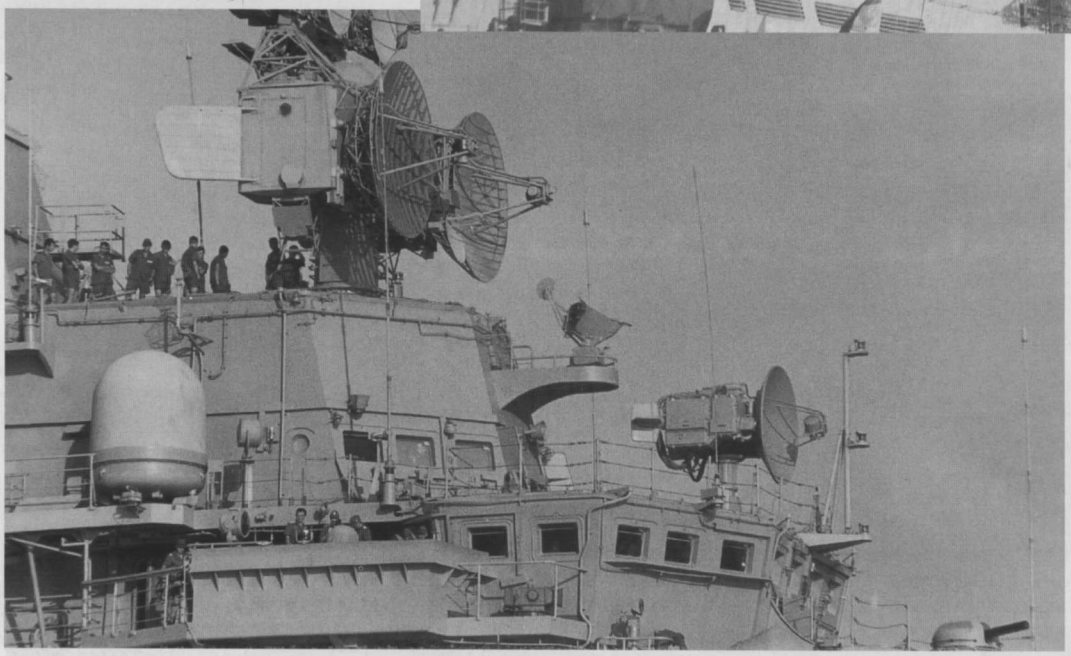
Like on all aircraft carriers, a variety of vehicles are required to maintain the smooth operation of the ship. Deck tractors are used for towing aircraft, and fire fighting/rescue vehicles insure the safety of the ship's crew and aircraft personnel. Shown here is a modified Gaz-66 two-ton truck.



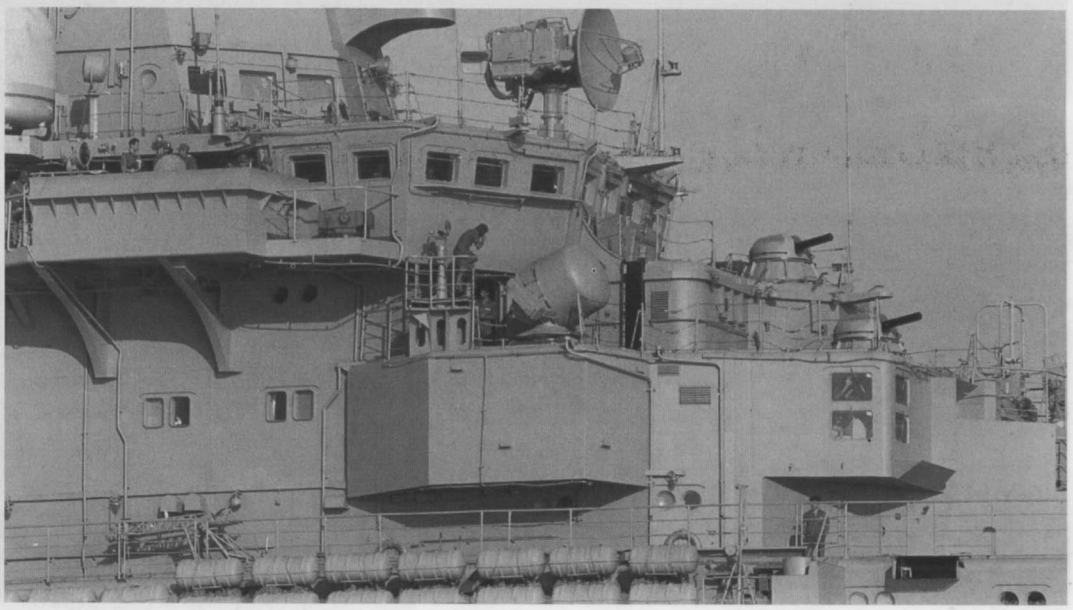
This close-up shot of the Novorossiysk's aft starboard further shows the similarity of that ship to the Kiev. Note the manner in which the small launches of both ships are stored.

Comparison of the sterns of the Kiev and the Novorossiysk from the starboard quarter vantage point. The Kiev's deck is loaded with aircraft and vehicles, and its aft elevator is open. Note the life raft cannister storage areas on the Novorossiysk just below the edge of the deck.

The Novorossiysk's main electronic fit is featured here, including the Top Sail radar (right), Top Knot (TACAN) aircraft control radar with High Pole IFF (center) and the Top Steer equipment (left).

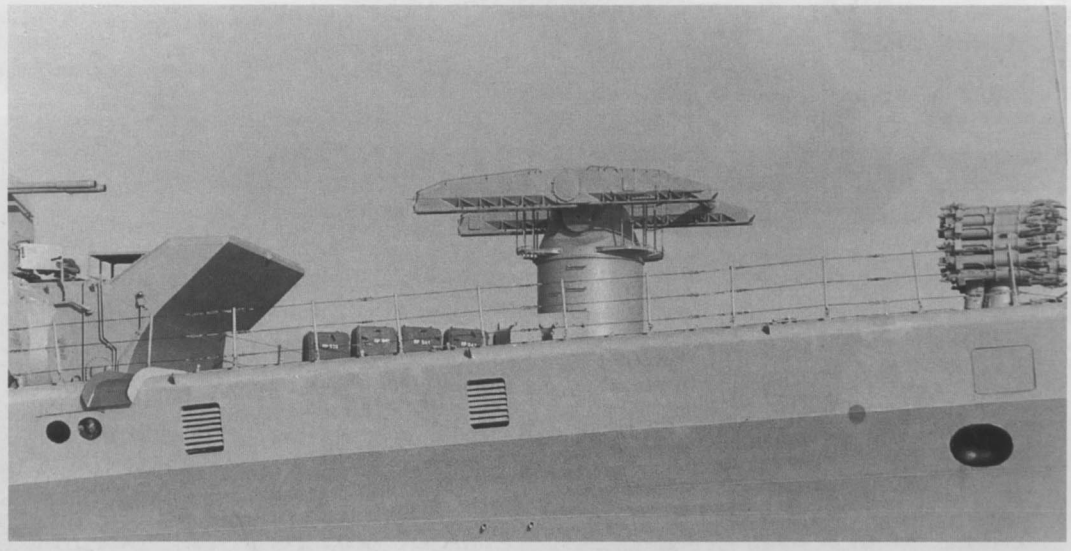


The forward island of the Novorossiysk is configured like the Kiev. The Head Light, Owl Screech, Bass Tilt fire control radar and an AK-630 30mm Gatling gun are visible in this shot.

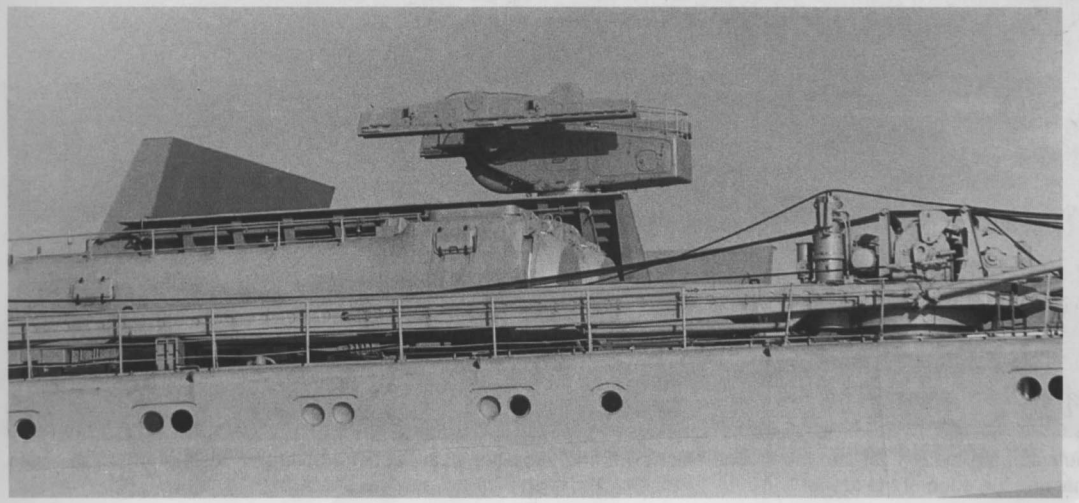


Fire control radar and two AK-630 are the focal point of this view of the forward portion of the Novorossiysk's island superstructure. Note how the many windows provide the officers in the bridge area with an excellent view of the ship's deck and the surrounding ocean.

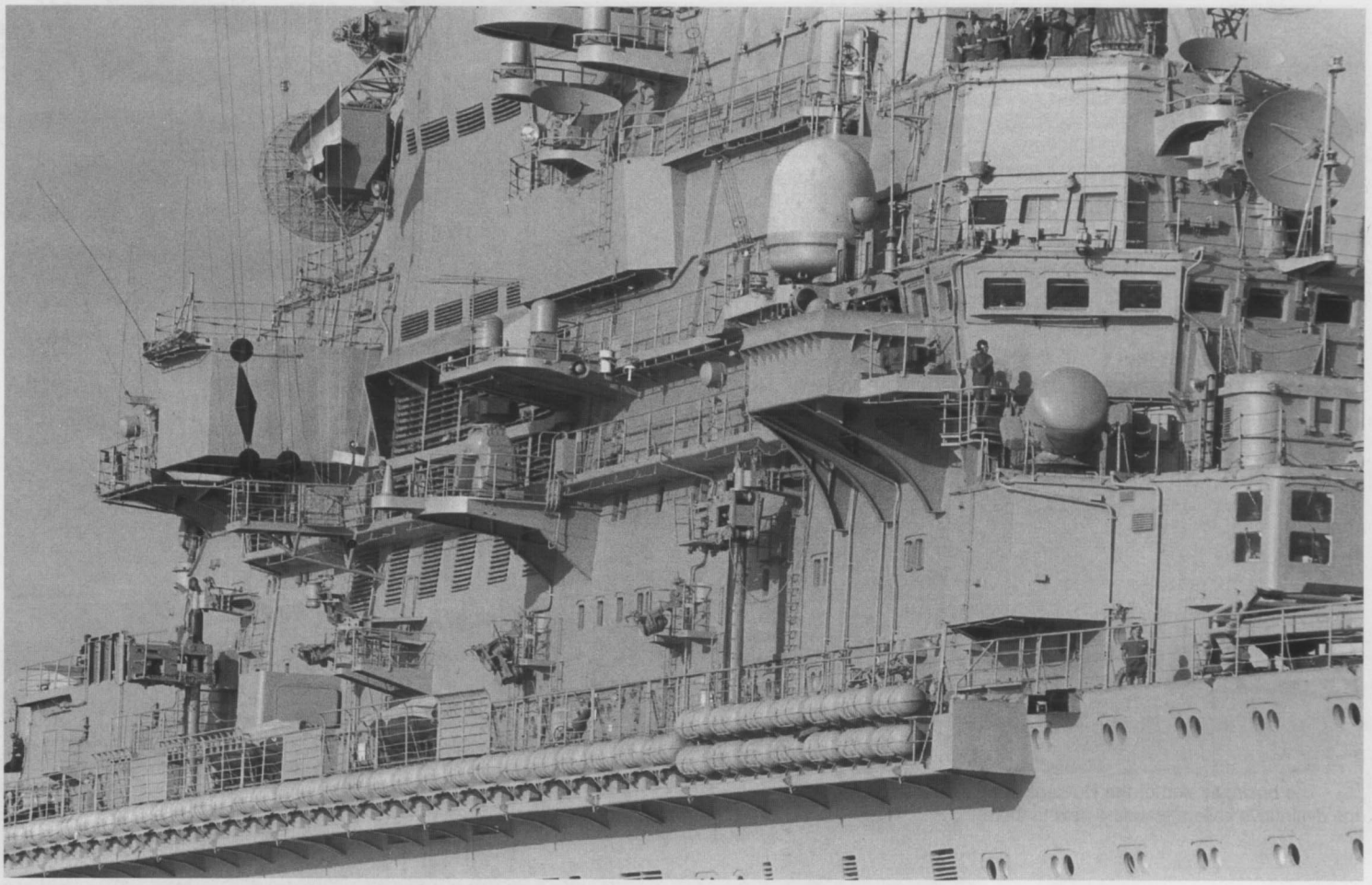
The business end of the Novorossiysk. The size of the SS-N-12 surface-to-surface missile launchers is best appreciated by comparing their mass to the diminutive sailors standing next to them.



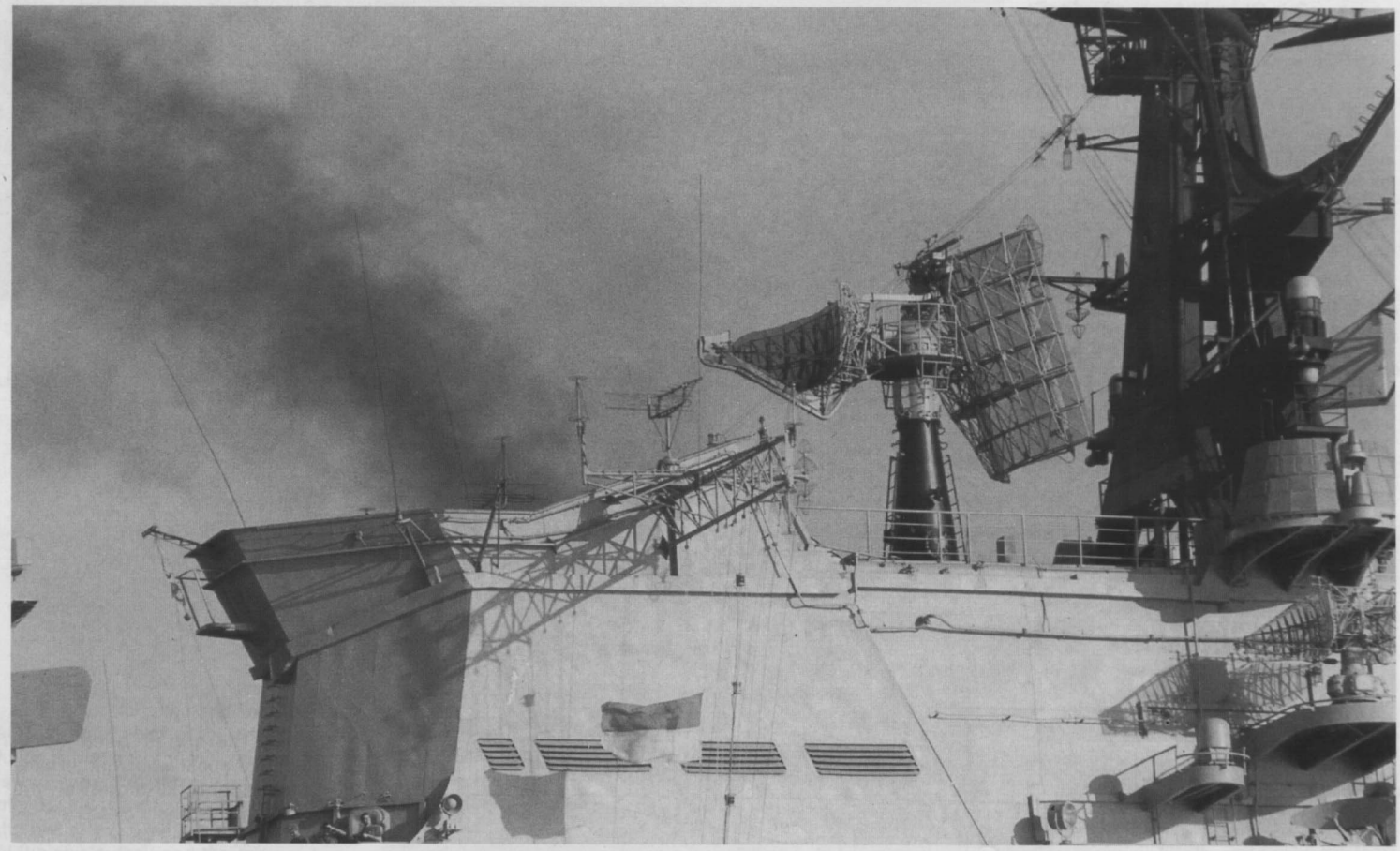
More of the Novorossiysk's arsenal of weapons. From left to right they are: the 76.2mm gun mount, angled blast deflector, an SUW-N-1 ASW missile launcher, and an RBU-6000 ASW rocket launcher.



While there has been some disagreement about what kind of anti-aircraft weaponry is carried on the Novorossiysk, this photo clearly shows a launcher for SA-N-3 Goblet surface-to-air missiles. Some SS-N-12 missile launchers are displayed as well.



Close-up of the starboard side of the Novorossiysk's island. Note the amount of detail that goes unnoticed when the ship is viewed from a distance. Let's see a model builder try to scratchbuild that in 1/700 scale!



The Top Steer radar assembly sits between the main mast and the smoke-belching funnel atop the island superstructure of the Novorossiysk. Note the whip antennae and other equipment that ring the edge of the funnel.

ADMIRAL GORSHKOV

The Admiral Gorshkov (formerly the Baku, as the Cyrillic name on the hull reads) sitting at anchor. The difference in the superstructure between the other Kiev class vessels and this one is apparent by the briefest study of the electronic equipment with which it is equipped.

The Admiral Gorshkov and a Sovremenniy class destroyer taking on fuel from a Boris Chilikin class fleet replenishment vessel. The Sovremenniy is an anti-ship vessel which has adequate anti-air, but minimal ASW, capability.

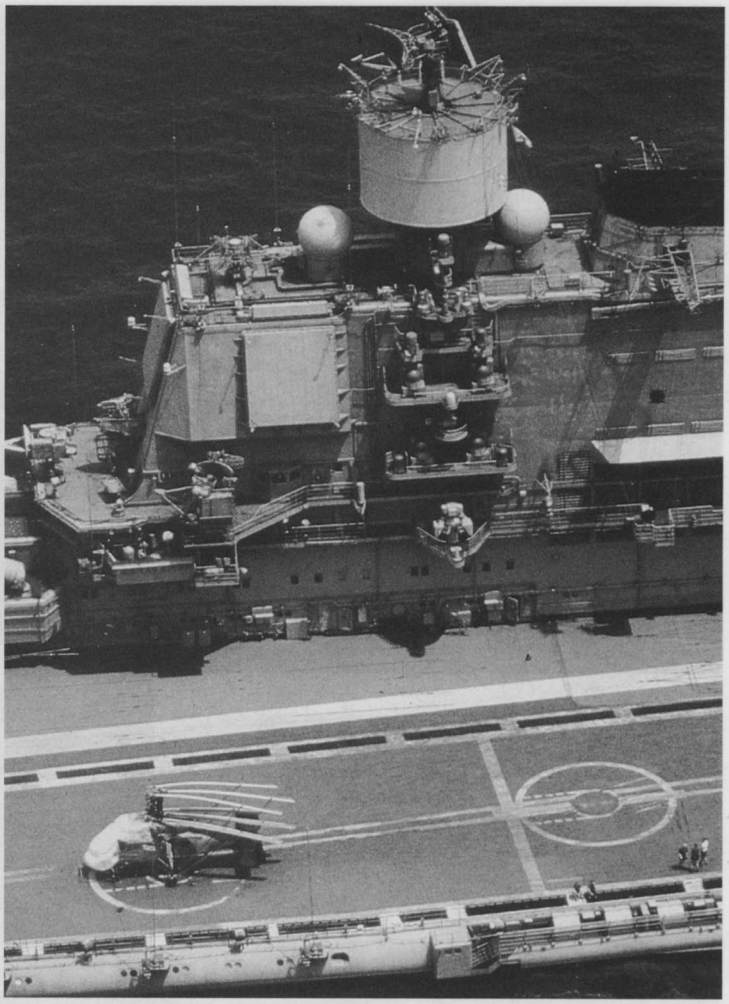
An excellent aerial view of the Admiral Gorshkov at sea. While most of the island superstructure is painted a neutral gray, the white Cake Stand radar and Low Ball satellite navigation equipment stand out as they reflect the sun's light.

Port and starboard side view of the Admiral Gorshkov (formerly the Baku) at speed. Several differences with the first three of the Kiev class become immediately apparent, especially with regards to weapons and electronics.

This shot clearly shows the new array of the SS-N-12 launchers, the new guns and the absence of the port bow gun sponson. There is also only a single wind deflector forward of the flight deck.

Weapon systems on the bow: Trap Door radar (retracted), two RBU-12000 ASW launchers, twelve flush-mounted vertical launch SA-N-9 launchers, four pairs of SS-N-12 launchers, two more pairs of SS-N-12 launchers, two 100mm guns and the re-configured AK-630 guns (now four) mounted in tandem pairs.

The two single 100mm gun mounts and four of the SS-N-12 Sandbox missile launchers located on the foredeck of the Admiral Gorshkov comprise the main subject of this photo of number "103". Also clearly shown is the extended leading edge of the flight deck.



Slicing the length of the Admiral Gorshkov's deck is a bright orange-yellow safety line that separates the parking area from the operations deck and the helicopter launching positions.

The electronic systems and radar array are well displayed in this photograph of the Admiral Gorshkov's island. Modelers should note the red-brown color of the walkway decking around the island.

This aft island view shows two Sky Watch panels. Compare the clean look of this vessel with the other Kiev vessels. The SA-N-9 launchers can just be seen at the bottom of the picture directly under the figures. The helicopters are a Helix and a Hormone.

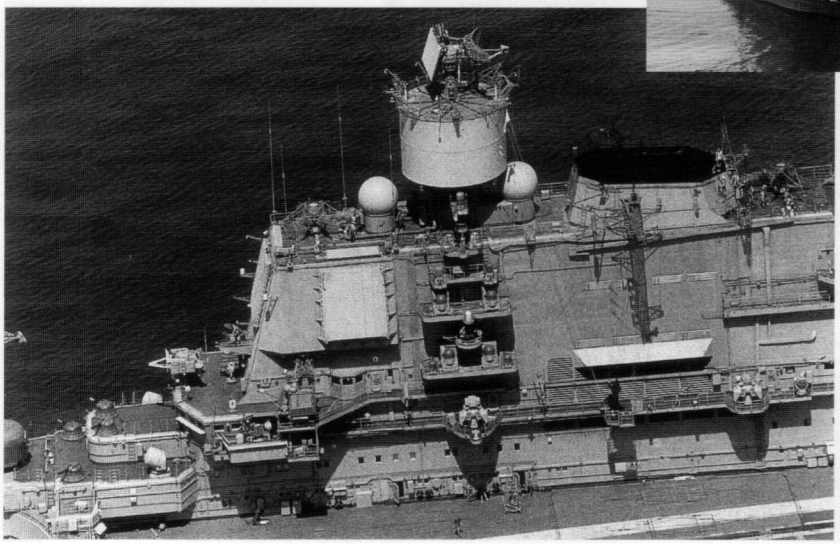
The Admiral Gorshkov at anchor. While the weapon systems on the first three vessels in the Kiev class were positioned on the bow and the stern, they are located primarily on the bow of the Admiral Gorshkov. Note the forward crane in operation and the crowd of people milling about by the Ka-25 Hormone helicopter.

Overall shot of the Admiral Gorshkov's stern showing the increased deck area aft of the island provided by the removal of the gun turret and SAM launcher.

Two RBU-12000 launchers and the flush-mounted SA-N-9 launchers. The SBU-12000 has only 10 barrels, but is larger than the RBU-6000. The SA-N-9 launchers are visible between the SS-N-12 launchers and the rear RBU-12000.

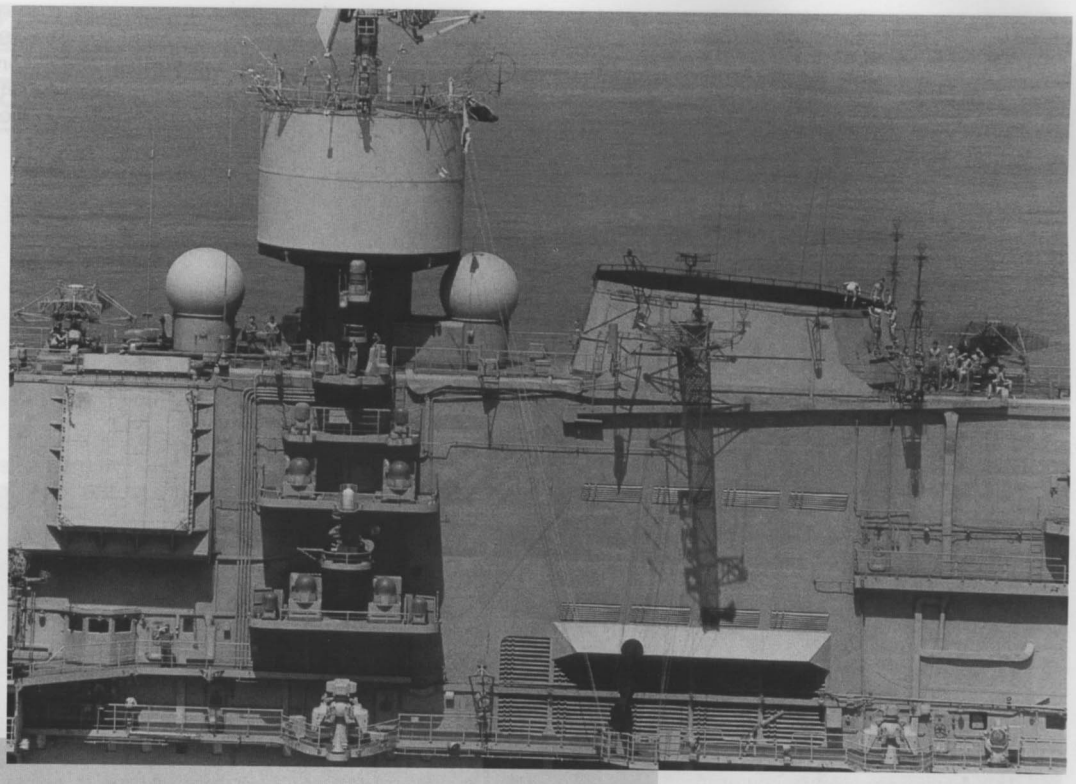
A Ka-27 Helix ASW helicopter sits secured to the deck in the aircraft parking area at the stern of the Admiral Gorshkov. This picture shows the repositioned aft aircraft elevator and some of the SA-N-9 vertical missile silos (both at the left where the lone figure is walking).

One of the Admiral Gorshkov's ammunition elevators is being put to use here. Note that the stern of the vessel bears the Cyrillic characters of the name "Baku" (the ship's former appellation), visible just between the stern's two shadowed openings.



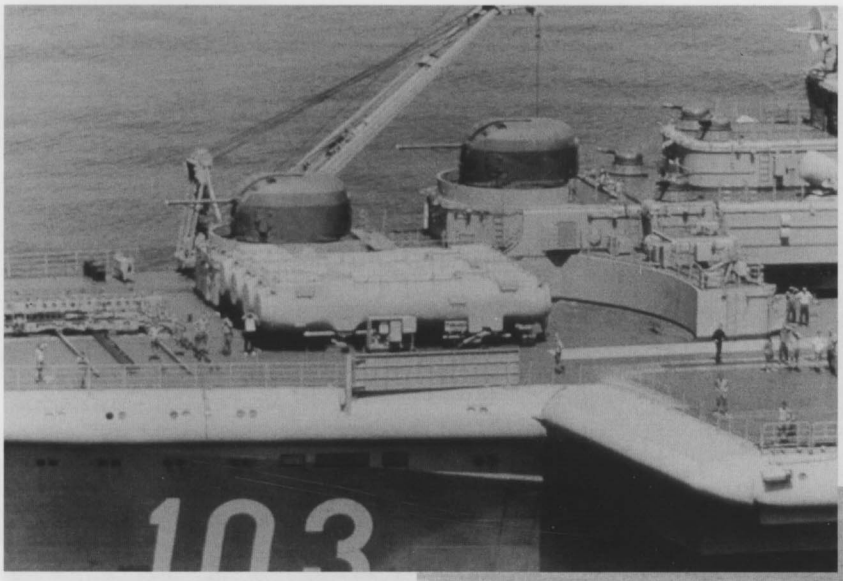
This forward island view shows, left to right, the 100mm gun, two pairs of AK-630, Bass Tilt radars, Kite Screech radar (for 100mm guns), two Sky Watch panels, two Low Ball pods and the Cake Stand TACAN/air control radar.

Close-up of the electronic systems on the Admiral Gorshkov's island, in particular the two Low Ball pods and the Cake Stand radar. It is unlikely that the human activity aft of the funnel has anything to do with sacrificing a virgin to appease the 'volcano'.



Another close-up view of the island electronics. It is this rotund 27-foot (9-meter) tall Cake Stand radar array that makes the Admiral Gorshkov so easy to recognize next to the other three Kiev class vessels. The radar assembly to the right of the Low Ball pods is the Strut Pair air/surface search radar.

Close-up of the AK-630 mounted on the Admiral Gorshkov. There are six 30mm barrels on this close-in defence system which can fire 3,000 rounds a minute to a range of about 1,800 feet (600m). They are similar to the Phalanx system.



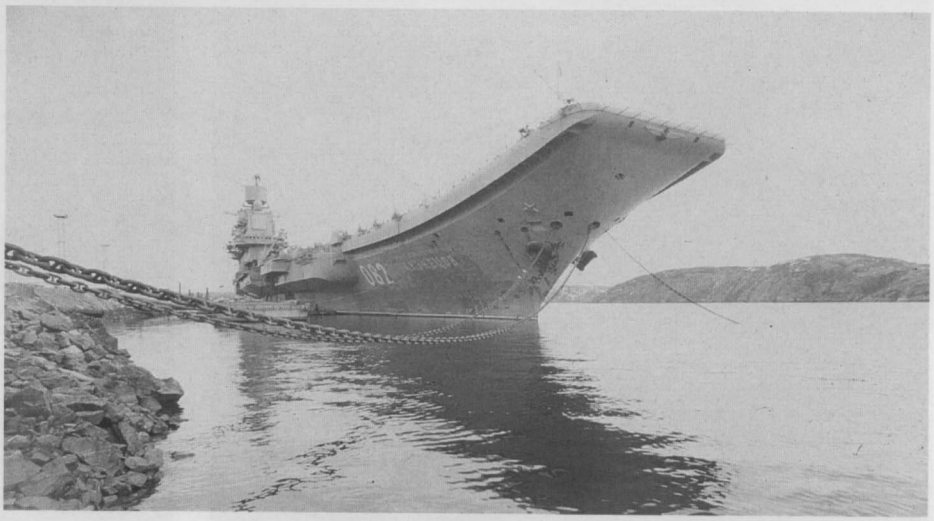
Close-up of SS-N-12 Sandbox launchers and two 100mm gun mounts. The 100mm gun has a range of about 9 miles (15,000m) and is controlled by Kite Screech radar. SS-N-12 is an advanced version of the SS-N-3 Shaddock which uses the Trap Door radar, recessed in the forecastle on the Kiev class ships.

The Admiral Gorshkov's bow with her very impressive missile battery. The SS-N-12 has no reload capability, unlike the three earlier vessels which have eight missiles and eight reloads.

Here the Admiral Gorshkov churns the sea into froth as it speeds through the water on maneuvers. Note the many crew members on deck taking in some fresh air. Given the myriad of weapons on the bow of the carrier, it almost appears that the men have been gathered at the stern to counterbalance the weight.

ADMIRAL KUZNETSOV CLASS

ADMIRAL KUZNETSOV



Lack of funds keeps the first true Russian aircraft carrier laid up in port. Being a part of the CIS (Commonwealth of Independent States) Northern Fleet, the Admiral Kuznetsov is based at Severomorsk. (Pavel Gerasimov)

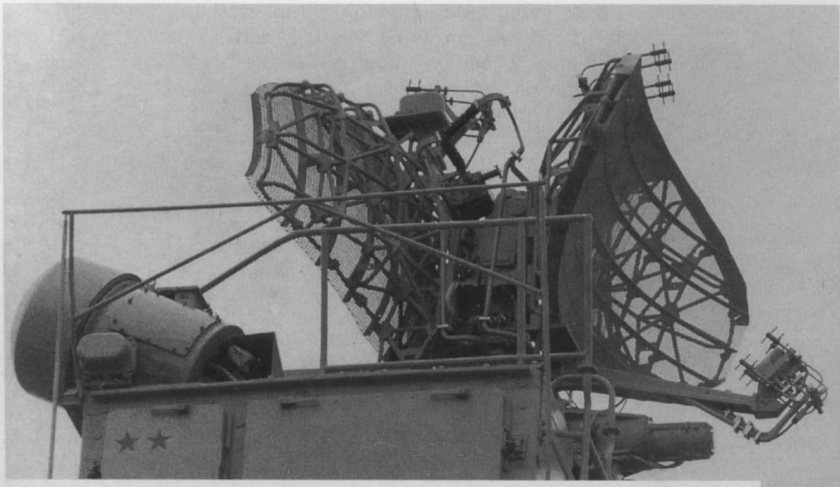
The Admiral of the Fleet Kuznetsov from the port side. Compared to the Kiev, her deck is clear and uncluttered. The island is also clear and considerably smaller. The fore and aft weapon stations are easily seen, as are the inflatable life rafts along the edge of the deck.

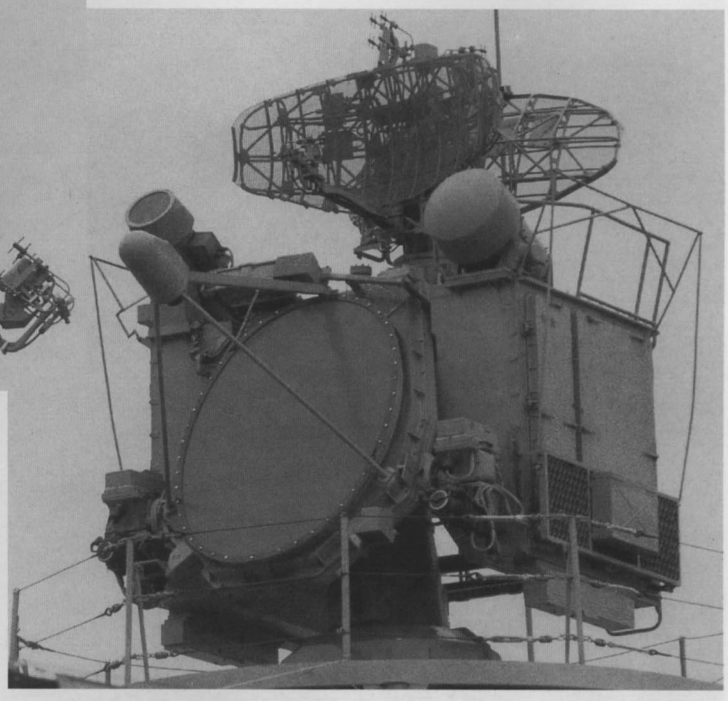
Stern view showing the ski-jump fore deck and the electronic fit on the Kuznetsov's island. Note the stern does not have a VDS door. The function of the two vertical 'posts' is unknown.

This view of the Admiral Kuznetsov from directly ahead shows the two forward weapon areas and some of the detail on the island. The flight deck, which measures 999 ft x 229.7 ft (304.5m x 70m), is well displayed here.

Stern area of the Kuznetsov's deck and rear weapon positions. To the rear of the two SA-N-11 mounts is the RBU-12000. To the front are the SA-N-9 missile silos. Half way along the deck are two AK-630 close-in defence weapons.

Flight deck aft of the island showing a Helix, the SA-N-9 silo and electronic fit on the island. The Cross Sword fire control radar is clearly visible.





Cross Sword radar, used for fire control of the SA-N-9 SAM, as seen on the Admiral Gorshkov and the Admiral-of-the-Fleet Kuznetsov. This radar represents the latest in Russian technology and did not have an easy birth. Numerous problem areas delayed its introduction, and it is still not known if it will perform as intended.

Overall view of the starboard side of the island. Topping the mast are the Plate Steer array atop the Cake Stand. The Big Ball SATCOM domes and the Sky Watch phased array are also shown.

Close-up of the stern of the Kuznetsov. The small size of the island is apparent in this view. Weapon systems seen on the port side stern are: AK-630, RBU-12000 and two SA-N-11.

Unlike its busy Western counterparts, the Admiral Kuznetsov's deck is mostly used as giant parade ground for Russian seamen rather than for carrier landing operations. Note the Sky Watch planar phased array and the Cross Sword radars. (Pavel Gerasimov)

The initial candidates for the Kuznetsov's air group were the Su-27K Flanker, the MiG-29K Fulcrum, the Su-25T Frogfoot, and the Ka-27 Helix. The fixed-wing aircraft were all modified for carrier operations, with tail-hooks, folding wings, strengthened landing gear, in-flight refuelling probe and other modifications optimized for naval service. It now appears that the MiG-29K has been abandoned and that the Yak-141 Freestyle is a likely candidate. (Sergey Skrynnikov)

This Su-27K Flanker is waiting for take-off clearance before it begins its mission over the Black Sea. The fold-down launch restrainers permit the engines to develop maximum thrust prior to launch. This aircraft is armed with AA-11 Archers for self-defence and medium range air-to-air AA-10 Alamos. (Sergey Skrynnikov)

Here a navalized Su-27K Flanker shoots airborne by means of a main deck's 12 degree ski-jump. The afterburner acceleration gives the aircraft an added boost. (Sergey Skrynnikov)

Jet blast deflector shields are raised behind a Su-25T Frogfoot while it runs up its engines. The engine exhausts are deflected by these shields measuring 8m by 4m. The presence of such shields are essential for the safety of the flight deck crew. (Sergey Skrynnikov)

Having completed a training flight over the waters of the Black Sea, a Su-25T makes its final approach over the deck of the Admiral Kuznetsov. (Sergey Skrynnikov)

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