



A Cold Warrior's Final Patrol: Russian Submarine K-77

By Christopher Carey

This past week (March 2010), the annual Hollywood *Academy Awards* event was held amidst all the splashy *hoopla-de-da* that characterises this recurrent self-celebration of *tinsel town's* best creative efforts. I don't normally pay much attention to all the fluff and attendant media fawning therein, but the Oscar awards ceremony this year was markedly different for the following reason: for the very first time in motion picture history a woman was awarded Oscars for *both* 'Best Director' and 'Best Film'. [What *didn't* happen, but perhaps should have, is a special award of 'Best Supporting Submarine' to the ex-Soviet *Juliett Class* boat that starred in another of Bigelow's earlier films (but more about that later).]

As anyone who follows film media knows, Hollywood has traditionally been a supreme bastion of entrenched male chauvinism and women, except on rare occasions (when raw talent has trumped gender associations), have typically been regarded at best as little more than intelligent sex-objects. Consequent with Kathryn Bigelow's commendable (and in my opinion, much deserved) double Oscar win, I personally sat up and took serious note of this attractive 59 year old woman's list of past cinematic accomplishments. I was amazed and surprised to learn that she had been the director of that unusual, but outstandingly quirky film 'Point Break' featuring a couple of California surfers who rob a bank (wearing masks of US presidents), but I was further fascinated to find she had also directed one of my favorite war films, a Harrison Ford 'Cold War' epic titled 'K-19: *The Widow Maker*' (based on an actual unfortunate Echo-2 Class Soviet nuclear missile submarine that sustained a near-meltdown of its nuclear pile while on war patrol).

Cut to April of 2007, at which time a Russian submarine sank to the bottom of the Providence River, while moored to a wharf in Rhode Island. Regrettably, it remained there for just over a full year while efforts were made to determine how to raise the 4,000 ton vessel from its watery resting place at Collier Point Park. The amazing story of how Soviet submarine K-77 came to its final end in the United States, after surviving 27 years of the 'Cold War' as a Soviet guided missile submarine followed by an additional 17 years out of active commission as a warship (serving as a museum display), and how it relates to the film 'K-19: *The Widow Maker*', constitutes a most interesting and surprising saga.

THE SOVIET 'PODNODVAYA LODKA RAKETNAYA KRYLATAYA' SUBMARINES

Soviet submarine K-77 began its life in a ship-builder's yard located in Nizhny Novgorod, Russia, the seventh *Juliett Class* boat built among its 16 *Juliett Class* sister subs between

1963 and 1968. While the name 'Juliett' is an arbitrary NATO imposed Cold War era identification assigned to K-77's class, its selection in this reference reflects a somewhat curious and unknown aspect of these boats in that they were the first submarine vessels designed principally by a (Russian) *woman* naval architect. Officially recorded in Russian naval archives as the 'Project 651' hull K-77 submarine, this *Cruise Missile Attack* type sub's keel was laid on January 31st of 1963. The boat was commissioned on 31 October 1965 and during its service carried an original war load of twenty-two regular torpedoes and four Soviet P-5 nuclear tipped cruise missiles stowed in special launch tubes built into its outer, upper hull structure.

The Juliett Class boats had been initially conceived as a post-war offensive addition to the Soviet Navy's weapons arsenal that would give the Soviet Union the ability to launch cruise missiles (with nuclear warheads) against the seaboard cities of the United States. The concept would later grow to embrace the use of more advanced cruise missiles against American aircraft carriers (so-called *super-carriers*), since the Soviets had no such vessels and American carriers (with their great strategic mobility and airpower assets) were viewed as a grave threat to the USSR in the event that the *cold war* suddenly turned hot.

The P-5 turbojet-propelled (albeit augmented by two solid-fuel rocket launch boosters) missile initially carried by the Juliett Class boats was a relatively short range weapon (300 miles) carrying a 2,000 pound nuclear payload at an altitude of from 600 to 1300 feet, but these were later replaced by upgraded P-6 and P-500 cruise missiles with extended range and capabilities. Although as originally conceived, the Soviet plan called for more than 75 of these conventionally powered (diesel and electric motor propulsion) missile carrying vessels to be built, that number was eventually trimmed down to a total of only 35, of which 16 were eventually built. Since a larger and more powerfully armed version of the type known as the Echo-2 Class (with nuclear powered propulsion and *eight* cruise missile launchers) were already being built, the advantages offered by nuclear propulsion for extended global operations seemed to offset a larger conventionally powered class. Considered to be an aesthetically attractive submarine design, the Juliett Class boats proved in service to be basically well engineered and operationally quite reliable, whereas their larger nuclear-powered sister class (Project 675, *Echo-2*) relatives were to demonstrate recurrent, severe design problems with their nuclear propulsion units in succeeding years, frequently developing many near catastrophic faults while underway and on patrol.

As was the case regarding many of both the US and Soviet submarine designs produced in the aftermath of the Second World War, the strong influence of late wartime German submarine research and development made itself apparent in new boats like the K-77. A comparison of the 3,174 ton displacement (surfaced) K-77 with wartime U-boats (such as those represented by the substantially advanced German Type XXI) clearly shows the lineage of their German-derived technology. This advanced technology came to serve both the Russian and American sides as part of the massive post-war recovery of German advanced research in weapons systems, and just as German aircraft breakthroughs formed the foundation of most US and Russian advances in aeronautical engineering, so did WWII German naval research significantly further the development of modern submarine fleets on both sides of the *Iron Curtain*.

The Juliett Class boats were fitted with (at the time) sophisticated weapons aiming and targeting radar systems that were intended for use in precisely guiding the P-5 missiles to their selected targets. Although the primary guidance system employed on board the Soviet cruise missiles was inertial, a massive (over 100 square feet) directional guidance radar antenna built into the forward part of the Juliette's sail (or *conning tower*), was used to send mid-course corrections to the missiles while in flight. Hidden behind a large hydrodynamically streamlined section of faired forward sail plating, the radar antenna was rotated 180 degrees from its 'stowed' facing aft just before launch—a process that took several minutes once the boat had surfaced. This radar guidance system was later down-linked to the Soviet *Kasatka* satellite communications network when more advanced

missiles came into use (P-6 and P-500), allowing more precise aiming and directional targeting uplinks to the launched missiles.

Although the first two Juliett Class boats had been constructed from special low-magnetic signature *austenitic steel*, a number of serious problems resulted from its use with the result that K-77's hull was fabricated from conventional steel. K-77's hull was further coated with a two-inch layer of sound deadening polymeric (specially profiled and formulated acoustic rubber) tiles that made the Juliett Class boats a somewhat formidable threat to US warships in the late 60s period. Despite a general tendency for Russian submarines of that era to be excessively noisy while submerged and therefore easily picked up on sonar, the Juliett Class vessels operated in markedly silent contrast to that otherwise norm for Soviet boats, and although the relatively short range of their missiles was a limiting factor, the offensive threat they posed could never be fully dismissed out of hand.

The primary vulnerability of the Juliett Class lay in the fact that the missiles had to be launched from the surface (at a maximum forward speed of about 4-5 knots). Since the total time required from surfacing to actual firing was in excess of 5 minutes, the threat posed by the Juliett Class boats was gradually downgraded by the West, as it was felt that in any genuine 'hot war' scenario, the boats would likely have been detected and destroyed by US defense forces before they could get off their first cruise missile salvo. This inherent vulnerability of the Juliett and Echo-2 subs was further enhanced by the fact that they had to remain on the surface for as long as 20 minutes *after* launch, so as to be able to radar-track and guide the deployed missiles. Under such circumstances, it would have been imperative that the Juliett and Echo-2 subs have an active air cover umbrella in the form of fighter planes for their effectiveness to be assured.

Although the improved Echo-2 nuclear powered boats were equally vulnerable in their missile launch cycle (despite possessing the advantage of nuclear propulsion), the Soviet Naval Command kept the newer Echo-2 boats operating globally while the slightly smaller and conventionally powered Julietts were redirected from former global strategic patrol duties (shadowing enemy carriers and lurking close-in to enemy coastal cities) to supportive duty with the Soviet Baltic Fleet.

In terms of their physical and operating specifications, the following technical facts associated with the Juliett Class boats are worth noting, at this point.

JULIETT CLASS SUBMARINE SPECIFICATIONS

Build Specs: Length = 300 feet. Beam = 33 feet. Displacement = 3,174 tons (without fuel) surfaced and 4,137 tons submerged, with an exceptionally large reserve buoyancy engineered into the double hull. The upper free-flooding outer hull was also unusually capacious and large enough to stow the four missiles within its structure.

Propulsion: Conventional diesel/electric, with two main D-43 type diesel engines providing 3500 HP each and two electric motors yielding 3000 HP each. An additional ultra-silent running capability was enabled through use of a special set of smaller electric engines, each with an output of 150 HP. 300 tons of conventional electrical storage batteries were used (initially silver/zinc, but later reverted to standard lead/acid), along with a 3000 HP dedicated 2D-42 diesel powered generator to charge them while running on the surface *or* submerged (a modern Soviet version of the German '*Schnorkel*' system was used by the Juliett Class boats while at sea, enabling them to operate submerged on diesel engines). Although helpful for avoiding detection, submerged diesel operation with the snorkel was a taxing, exhausting (no pun intended) undertaking and sailing on a Juliett Class boat was therefore far more arduous for crews than serving on the entirely self-contained and nuclear powered Echo-2 Class relatives.

Performance (speed/range): 17 knots surfaced, 18 submerged. Patrol endurance was about 90 days, with a crew complement of 64 (including 12 officers and 16 Petty Officers) and

range was generally about 9000 miles surfaced (at 8 knots) and about 810 miles submerged (at 3 knots).

Armament: Primary offensive weaponry included four P-5, P-6, or P-500 (SS-N-3 'Shaddock') turbojet powered, booster rocket-assist launched nuclear tipped cruise missiles with a range of about 300 miles. Secondary weaponry included six bow torpedo tubes and 4 stern tubes (loaded with anti-submarine torpedoes), with a total of 18 to 22 dual-purpose torpedoes (acoustic active/passive warheads).

Missile guidance system: Internally inertially directed and radar corrected, with later *Kasatka* satellite guidance capability added, using the 'Snoop Slab' or 'Snoop Tray' (both NATO designations) I-band radar to provide mid-flight course modification commands.

With eight integrated watertight main compartments and three floor levels within the inner pressure hull, the Juliett boats were strongly constructed and had a 'test depth' (generally considered their normal 'safe' diving depth) of approximately of 775 feet, a design depth of about 1200 feet, and an absolute crush depth of 1350 feet. It is noteworthy that of all 16 Juliett Class boats built and commissioned from 1963 through 1968, not one was lost in sea-going operations and all were eventually retired and decommissioned, the last one serving satisfactorily until 1994.

DEPLOYMENT AND OPERATIONAL SERVICE

Of the 16 Julietts, six boats were originally assigned to the Soviet Northern Fleet, while another six were assigned for use by the Baltic and Black Sea Fleets (to be split between them). Four boats were assigned to the Soviet Pacific Fleet (documentation notes that in 1987, the six Northern Fleet boats were reassigned to the Baltic Fleet).

The missiles carried by both Juliett and Echo-2 Classes deserve a bit of further description here, since they were of the early air-breathing cruise type weapon configuration that came into use prior to development of more powerful and precise sub-surface launched ballistic missiles. Both the United States and the Soviet Union developed air-breathing, submarine launched cruise missiles in the years immediately following the war and both nations based their systems on the German V-1 ramjet-powered winged missile developed in the last half of the war and used against English cities, along with the ballistic, rocket powered V-2 missile. In the USA, this took the form of the Loon (a V-1 clone), the Regulus I, and Regulus II missiles.

With a range of about 250 nautical miles, their original Soviet counterpart, the P-5 (SS-N-3c 'Pityorka', AKA 'Shaddock') was used on converted ('Long Bin') Whiskey Class (conventional diesel/electric), Juliett Class (also conventional), and Echo-2 Class (nuclear powered) Soviet submarines. They used a folded-wing configuration that allowed them to be stored within a clever tubular launcher that could be stowed within the outer, upper (non-pressurised) hull of a sub and fired after being erected to launch position. Similar in concept to a US *Regulus* missile, the P-5 missile used a turbojet air intake below the cylindrical main body of the missile and was configured with a clipped delta tail-plane, provided with two moving control surfaces, and incorporated twin 1750 pound solid rocket booster rockets that were discarded shortly after launch.

The P-5 missile was designed to fly at an altitude varying between three hundred and a thousand, three-hundred feet, reaching a cruising speed of about .9 Mach (just slightly above the speed of a modern commercial airliner, or about 600 mph). Capable of penetrating US coastal defense of the early 60s, the P-5 missile had a circular target error at full range of about 9000 feet, but made up for this rather flawed accuracy by virtue of its 2090 pound 'RDS-4' nuclear warhead. The Juliett Class's P-5 and succeeding P-6 missiles used the same basic procedure as the US Navy's submarine launched Regulus missile of surface launch, with loitering in a surfaced state being required to provide continuous tracking and course correction inputs to target.

The improved P-6 (SS-N-3a 'Progress', AKA 'Shaddock') missile had the same range as the earlier P-5, but achieved a slightly higher cruise speed of about 1.2 Mach en route to the target. As with its predecessor, the P-6 was vulnerable to both air-intercept by aircraft and ECM jamming. The P-500 (with 4K-80 nuclear warhead) series cruise missile, last to be used on the Juliett Class boats, was a dedicated anti-ship weapon, with much improved guidance, speed and electronics, and intended principally to take out US super-carriers.

Juliette Class boats were spotted in a number of places about the globe during their several decades of operation, from their initial deployment up through the 80s and early 90s. Frequently detected shadowing the US super carriers they were assigned to take out in the event of a hot war, Julietts put in regular appearances in the North Atlantic and Mediterranean oceans. A small flotilla of Julietts were also used as escorts for a Soviet guided missile frigate in the Tonkin Gulf at one point, which appeared in those waters as a reminder to the United States of the not-to-be-underestimated presence of Soviet naval might near Vietnam.

THE END OF THE COLD WAR AND DECOMMISSIONING

K-77, also known more popularly as *Juliett 484*, was initially assigned to duty with the Soviet Northern Fleet, operating on the shores of the Barents Sea near the Kola Peninsula. When the Soviet Union officially came to an end (with the establishment of the Russian Federation in 1990), K-77 was one of two ex-Soviet submarines of her class that were stationed in reserve status at the former Soviet Naval Base of *Liepaja* on the coast of Latvia, along with two boats of the diesel/electric *Foxtrot Class* and several other Russian naval surface vessels.

It was a time of great political, social, and economic turmoil for the new Russian state, as Russia suddenly found itself possessed of ponderously expensive and over-extended military forces, obsolete armament (much of it now outmoded by more recent advancements) and millions of unneeded military personnel that it had built up during the Cold War period. With the Cold War now officially ended, the newly emergent economic reality demanded extreme austerity from the Russian Republic, requiring many painful cuts and eventual reductions in both its military forces and surplus materiel.

Among the suddenly 'expendable' Russian defense items at the *Liepaja* base in Latvia were the two Juliette Class boats wharved at the former Soviet naval anchorage. These two boats were the K-77 (AKA: *Juliett 484*) and a sister boat, the K-24 (AKA: *Juliett 461*), which had been assigned to the Soviet Baltic Fleet. Although the Julietts were taken briefly out of service by the Soviet Navy in the early 80s, they had been placed back in service in 1985; two of the fleet ended up in reserve status, due to certain strategic arms limitations stipulations. The two *Liepaja* Julietts were eventually decommissioned in 1994.

With Latvia demanding immediate return of the *Liepaja* anchorage to their nation, the Russian Navy now faced a rather uncomfortable dilemma: how to dispose of some of their large number of submarines (both conventionally powered and nuclear), now that the base they were tied up at belonged to the Latvian Republic? It was a perplexing challenge, since the logistical considerations (particularly with reference to the nuclear powered subs, with their potentially hazardous propulsion plants) were as enormous as the economic ones. Meanwhile, the two Julietts simply sat at their dock, gathering rust. As may be easily recognised, disposing of nuclear submarines carries substantial risks due to their nuclear propulsion systems and the possibilities contained therein for dangerous and extremely hazardous contamination; conventionally powered submarines with their electric/diesel engines, on the other hand, are inherently less environmentally hazardous by an order of magnitude.

At this point, an unusual sequence of events occurred. A Finnish businessman named Jari Komulainen, who had been visiting *Liepaja* (Latvia), spotted the two Julietts at anchor and had a most unusual idea. Surely some of the two ex-Soviet subs could be made into fascinating 'Cold War' floating museums for the Finnish people and foreign visitors to

Helsinki to enjoy? Since Finland had been forbidden to build or operate submarines at the end of the war (due to their alliance with Nazi Germany), and mindful of Finland's earlier association with the *Vesikko* (a prototype for the World War Two German Type II Class submarine, built for Finland in 1933, now on permanent land-based display on Suomenlinna island in Helsinki Harbor as part of the Finnish Military Museum), Komulainen approached the commercial attaché at the Russian embassy in Helsinki and proposed that he be allowed to personally purchase one or two of the surplus Juliette Class boats for this purpose.

By a gratifying coincidence, the Russian attaché was a former submarine commander who had earlier helped Komulainen obtain one of the conventionally powered ex-Soviet Foxtrot Class boats (Project 641 submarine) in 1993. Quickly perceiving the novel value of such an arrangement, not to mention the convenience factor embodied in what amounted to a very clever way of disposing of two obsolete, surplus-to-need submarines for his government, he was agreeable to the proposal; eventually both the K-77 and her sister Juliette Class boat (the K-24) were acquired by Komulainen for use as public displays.

While the K-24 went initially to Copenhagen for dockside exhibition (and later to the German Maritime Museum at Peenemunde, where it remains on display today), K-77 was soon towed to Helsinki Harbor and installed at a wharf there, near the shipyards. Aside from the novelty of having a former undersea Russian warship open for inspection, the close interactions of Finland and Russia (more often extremely antagonistic than not over the past 100 years) had cultivated a further fascination among the Finns for this relic of the Cold War. By 1994, the ex-Soviet Foxtrot Class sub was gone and replaced by the K-77, which was pressed into initial use as an off-beat floating bar & restaurant. For this purpose, two large cuts had been made into the pressure hull, allowing a less restricted general access to the sub's interior (these large openings were secured by *dogged* doors, but they were not of the pressure-resistant, watertight variety, a fact would have later significance when K-77 sank at dockside in Rhode Island in 2007, as shall be seen). [Regrettably, the Project 641 Foxtrot Class boat that K-77 had replaced was shortly thereafter lost at sea while under tow to a future display venue in England.]

Originally known as K-77, the name '*Juliett U-484*' was acquired by the boat while she remained as a tourist attraction in Helsinki. According to Komulainen, the designation had been found inscribed on a plate uncovered within the craft's sail. The designation seems to have been one of a number of removable designations the K-77's crew used to display on the sail's exterior while on patrol so as to confuse and throw off NATO reconnaissance aircraft. Before long, the 'U' component in the name was dropped and she remained simply '*Juliett 484*'.

According to an October 2002 article by Sami Soininen in the *Helsingin Sanomat* newspaper, K-77 was not the source of inordinate profit for entrepreneur Komulainen that he may have originally envisioned, but it did remain at least *somewhat* profitable. The boat remained a singular draw for a wide range of people including native Finns as well as foreign visitors (who would first see the Juliette Class boat and then take a ferry to nearby Suomenlinna to view the famous *Vesikko* Type II U-boat precursor). Former submarine service officers of all nationalities were invariably attracted to K-77 and '*Juliette 484*' became quite a well-known aspect of Helsinki's many charming attractions.

During her years at Helsinki, there were a number of unusual inquiries by strange groups and individuals asking if the boat were for sale. One of these, we are told by journalist Soininen, was a cartel of Arabs from an unnamed Middle Eastern nation who seriously wanted to put the boat back into sea-going condition (for unknown purposes—one can only imagine). Another equally shadowy group turned out to be of Columbian (South America) nationality and although their offer to purchase the submarine was refused, American DEA agents later revealed that the Columbians were members of the infamous *Cali Cartel* who wanted a submarine for use in their drug-smuggling operations (despite their failure in obtaining this, or any other former military submarine, the Cali cartel today employs a number of much smaller, home-made submersible craft for this purpose).

Visual examination of K-77 close-up by American Naval authorities confirmed what had already been discovered back in the 1970s by US sonar experts, that concave sections of the Juliett Class boat's upper hull (designed to act as missile launch exhaust ducts) caused a distinctively singular sonar signature, thereby making identification of submerged Juliett Class boats a fairly simple matter for US anti-submarine forces of that era. This liability, combined with the unavoidable surface exposure required for launch and guidance of the *Shaddock* missiles, rendered the class technologically obsolete long before they were actually decommissioned. The surmise by US submarine warfare experts is that the Juliett Class boats, while essentially useless in the often shallow and rocky coastal operating areas of the Scandinavian nations (where only smaller, shallower draft submarines could operate with reasonable safety), would have been best employed in support of Soviet nuclear capabilities in the Baltic Sea. Despite that supposition, among the many paper documents found still on board the boat (surprisingly) when it was sold to Komulainen were several that suggested the boat had at some time been shadowing Norwegian *Kobben Class* submarines at some point in its operational history.

In 1997, which is when I was taking a tour of Finnish defense facilities as a guest of the Finnish Defense Minister, one of the side-excursions we made was to examine K-77. It was a very, very overcast day when we drove down to the harbor and I well recall seeing the darkened hull of this clearly Russian designed submarine looming out of the water at dockside like some sort of sinister sea-monster; it made quite an impression on me at the time. Flying from one of its periscopes was the blue, white and red Soviet Naval Ensign as we approached its berth and flying (inappropriately) from another was the Communist red hammer and sickle flag; we subsequently spent a good two hours going over the boat from stem to stern—an inspection I very much relished. Little did I dream I'd soon be seeing the same interior spaces once more in Hollywood director Kathryn Bigelow's film 'K-19: The Widow Maker' and not recognise them! I managed to shoot two rolls of film within K-77's interior and out on its deck, but to my everlasting regret left one of the exposed rolls sitting on a charting table in the control room!

K-77 COMES TO AMERICA AND BECOMES A HOLLYWOOD CELEBRITY

Shortly after my visit K-77's tenure as a museum display boat in Helsinki Harbor came to an end when Komulainen managed to lease the submarine to a Canadian promoter as a tourist destination in St. Petersburg, Florida. After an uneventful tow across the Atlantic, the boat arrived at St. Petersburg only to find that given the sub's fairly deep draft, its intended mooring site there was too shallow (the sub draws over about 27 feet at the stern). This necessitated moving it to a more distant location where tourist access was somewhat hampered. Due to lowered tourist visits, before long the Canadian promoter was forced to declare bankruptcy and after a brief effort to sell the submarine on eBay (with a price tag of a million US dollars), ownership of K-77 once more reverted to Komulainen. Wishing to get the aging submarine out of its harbor, where it was regarded as a possible hurricane hazard, Komulainen did not want to undergo the cost and difficulty of having the sub towed back across the Atlantic to Finland.

Fortunately, at this time *Intermedia Films*, in cooperation with the *National Geographic Foundation*, was about to undertake the filming of a movie to be titled 'K-19: The Widow maker'. Starring Harrison Ford and Liam Neeson and directed by now well known and Oscar winning director Kathryn Bigelow, the film was based on the story of a Soviet Hotel Class nuclear submarine (K-19) that experienced a catastrophic nuclear reactor meltdown while on its maiden voyage in 1961. Over 20 crew members died as a result of that incident and although the sub was eventually decontaminated and returned to service, it forever after acquired the nickname 'Hiroshima' among Soviet submarine crews. Word of the boat's availability had apparently reached the film's producers in Hollywood, subsequent to all the publicity arising from its attempted sale on eBay.

Intermedia therefore expressed an interest in acquiring temporary use of K-77 for its film and shortly after an agreed-upon one year rental of about \$200,000.00 had been paid, the

sub was towed up to Halifax, Nova Scotia, where some structural modification was undertaken on its hull (for the film). Per Soinen's account, K-77's hull was lengthened by some 25 feet and its superstructure was slightly modified to resemble a Hotel Class nuclear submarine. Interestingly, the involvement of the National Geographic group resulted in an insistence that absolute accuracy in depiction of a Hotel Class boat (which was a nuclear ballistic missile submarine) be maintained as much as possible...proof of the fact that the old technique of using underwater shots of a US Fleet Type submarine for ALL films about Russian submarines had long since come to an end (fortunately!).

We are further told that due to restricted space inside K-77, major portions of the boat were removed and reconstructed in sound-stage sets on shore where filming could be more easily accomplished. An agreement signed by all parties involved in the film stipulated that when filming of the movie was finished, the boat would be returned to its original, pre-movie state. In order to assure this, over 1000 still photographs and a number of detailed drawings were undertaken prior to the modifications required.

After the year required for filming expired, the same problem as before presented itself once more: what to do with a very large, outsized and difficult to dock former Soviet submarine? Halifax port authorities were as anxious as their counterparts in St. Petersburg to see the huge 3174 ton submarine relocated to another site and the requirement for a fairly deep water berth for the boat proved again to be an effective deterrent for most potential buyers. Once again, K-77 faced the prospect of being an unwanted behemoth orphan in the storm and it was anyone's guess as to what the boat's fate might have been (sold for salvage as scrap?), had it not have been for a group in Rhode Island calling itself the *USS Saratoga Museum Foundation*.

USS SARATOGA FOUNDATION TO THE RESCUE

The USS Saratoga Foundation is based at the former US Naval Air Station at Quonset Point, RI, and its declared goal was to turn the facility into a theme-oriented naval park with the 56,000 Forrestal Class super-carrier as its principal focus. Interestingly, the Saratoga had been decommissioned in 1994, the same year that K-77 had been taken out of Soviet service, and the prospect of having a former Soviet super-carrier killer submarine to serve as a storied counterfoil to the mighty Saratoga was undeniably attractive to many. The idea that the Saratoga and other large American Forrestal Class aircraft carriers of its type had been the principal targets of Juliett Class subs was hard to resist and it almost seemed like a natural for the foundation to add K-77 to its park, for use as a Cold War era floating museum.

Owing to the fact that the Saratoga was still US Navy property and the fact that the foundation had not yet convinced the navy that its Quonset Point venue was the proper final resting place for the great carrier, the president of the Saratoga Foundation felt that having the K-77 on display would serve the additional purpose of acting as a powerful marketing incentive, furthering broad support for the Saratoga acquisition proposal. With a Board of Advisors comprised of a number of retired former US naval officers of elevated rank and with a large and enthusiastic volunteer base of former navy volunteers and general members (reportedly over 4000), it seemed as if there would be a substantial financial support base to draw upon for both K-77's and the Saratoga's acquisition. Negotiations were therefore initiated with Komulainen to acquire K-77 for this purpose and after an unspecified asking price was paid, the sub was once again towed by sea from Halifax to its new berth at Quonset Point. The new Saratoga Museum Foundation museum sub formally opened in 2002.

A careful search of the K-77's interior compartments after the boat had been handed over, revealed a further extensive cache of overlooked documents, photographs, radio messages, and maintenance reports (all in Russian, of course) that had apparently been left behind when the submarine was originally been sold to Komulainen in 1993. The most important finding from this unexpected trove of data was that K-77 was *indeed* K-77 and *not* K-81, as

has been erroneously claimed by several sources on the internet. As part of the initial work, the Saratoga Foundation also began efforts to get in touch with former Soviet Navy submariners who had sailed on K-77 and learned that the boat had patrolled in the Mediterranean Sea, been in coastal waters of West Africa and on patrol off the US Virgin islands. Of further interest was the information that once during her years of service, there had been a fire on board that had killed two of her crew. *Ghosts on the K-77? Perhaps.*

Given that the K-77 is an immense and ponderous vessel (one of the largest non-nuclear submarines ever built) drawing about 23 - 29 feet of water, finding a suitable berthing site for her posed special concerns. The boat was eventually tied up on the Providence River at Collier Point Park, a site adjacent to the former Quonset Point Naval Air Station. Although the river at that site has a sloping bank gradient, the boat was moored parallel to shore and far enough from the bank that this factor (the bank gradient) was felt to have been dealt with adequately as tides rose and fell. Thus, K-77 was finally opened to the public after a complete assay of it had been completed and necessary accommodations made to comply with public access and safety issues. For five years, subsequent to its formal opening in 2002, K-77 served as a fascinating focal point for the Saratoga Foundation's activities and functions, annually drawing a substantial number of interested visitors and providing further incentive for their Saratoga themed park concept to come to ultimate fruition. The large and enthusiastic group of former navy volunteers who support the Saratoga Foundation put in many hours of work on K-77 keeping her shipshape and presentable, no mean feat given the massive maintenance requirements of such a large vessel. It looked as if the benefits of having K-77 on display would continue to serve the Saratoga Foundation well in its efforts to secure final release of the Saratoga from the US Navy.

MAN PROPOSES, NATURE DISPOSES: THE SAD END OF K-77

Sadly, nature had other ideas and intervened adversely in this plan of the Saratoga Foundation, when Rhode Island was inundated by an unusually severe "*Nor'easter*" storm in April of 2007. In that storm, one of the worst on record, Juliett 484 was swamped by its stern and shortly thereafter sank at its mooring site. Although a formal accident investigation report has yet to be released detailing the *exact* sequence of events that led to this loss, the following events appear to have been primary contributors.

On April 17th, 2007, the storm responsible for K-77's loss had created massive and unusually strong tidal surges in the Providence River. The situation was further complicated by the closing of a special hurricane barrier further up the river and a shift in wind direction to the East (most unusual, per the usually prevailing conditions). When the barrier in question was closed, discharge of redirected water took place in the area very near the sub's stern, creating further abnormally large hydrodynamic surges. This combination of factors apparently resulted in the bow of the sub being pushed inward toward the shore and the stern being pushed further out into the river. When the tide dropped that day, the sub's bow was left aground, while the stern section fell disproportionately. Due to the fact that access openings allowing entrance to the aft torpedo room had been cut into the pressure hull (when the boat was originally in Finland) and fitted with hatches that were weather tight but not pressure/water tight, water began to enter the sub and gradually filled the aft interior compartment spaces of the pressure hull.

Although at that point the urgency of the need to enter the sub and secure internal watertight doors was clearly recognized, local health and safety officials prevented museum volunteers from entering the sub in its semi-flooded state, and there is little question that the storm was so severe such actions would have been quite hazardous. Sadly, the predictable result was that within 30 hours the entire vessel had filled from stern to bow. The boat sank to the bottom of the river where it was moored (water about 35 feet in depth) and given the depth of the river at that point this left only the periscope masts above water. The severity of the storm initially kept anyone from being able to do anything further at the onset of the emergency, but an underwater survey of the sunken sub done after the

storm had subsided showed it resting on the river bottom at a 50 degree list to port, a posture resulting from dislodged river mud beneath its keel that held the boat there.

Although the Foundation held a one million dollar insurance policy on the boat, its provisions stipulated that only half of that amount was eligible for operations involving salvage. Acutely aware of the fact that the longer the sub remained in its sunken exposed status in the river, the less the chances of its being able to be successfully raised and restored, effort nevertheless continued to raise the boat as soon as weather and safety considerations permitted. Months passed, but eventually a cooperative US Army and Navy team effort was able to raise K-77. By the time it was finally brought back to the surface, K-77 had laid on the bottom for just over a full year (15 months) and once the water had finally been pumped out, it quickly became apparent that the damage and exposure was far more extensive than anyone had anticipated. Given the excessive expense that a full restoration effort would have required, the Foundation most reluctantly decided that there was no economically reasonable option to pursue other than to dispose of the boat for its scrap salvage value.

Thus, the boat's remains were sold to the nearby Rhode Island Recycled Metals Corporation (ship breakers) and that company subsequently relocated it to their site not far from the Collier Point Park area. Generously, the agreement reached by RIRM Inc. with the museum contained provisions that would make certain components from K-77 available to the Foundation for various purposes directly associated with fund-raising. It is expected that items like K-77's periscopes, torpedo tube doors, missile firing control station, some engine assemblies, and smaller items (like controls and gauges) will serve as saleable artifacts that would help raise money for the Foundation, since these items would have obvious historical value both to museums and collectors. In this manner, despite the sad loss of the entire boat as a complete and historic museum piece itself, at least *parts* of K-77 will survive in private and museum collections. K-77's legacy shall therefore continue in part, and memory of her historic role in the Cold War era will not fade away entirely with her loss.

Despite history's having now consigned K-77 to the scrap heap of modern memory, you may still view Oscar winning director Kathryn Bigelow's movie, *K-19: the Widowmaker* (on DVD) and remind yourself that the scenes depicting the Hollywood 'K-19' are actually of K-77. In this manner, although disguised for the movie K-77 manages to live on in cinematic perpetuity as a final, fitting tribute to her memory. In no small way, both the story of K-77 and Bigelow's movie serve as a further memorial to the thousands of Russian naval officers and seamen who went to sea in the Soviet submarine fleets during the Cold War period.

[Note: Now that 'Julieta 484' has been lost, her sister ship K-24 (Julieta 461) on permanent display at the German Maritime Museum at Peenemunde is the only remaining example of the Julieta Class Soviet submarine left in the entire world. More detailed information on K-24 may be found at the German Maritime Museum's website, given at the end of this article below, and a selection of images of both boats also follows.]

LINKS

The Saratoga Foundation (JULIETTA 484/K-77 Russian Submarine Museum)
<http://www.julieta484.org/julieta/index.html>

The German Maritime Museum at Peenemunde (JULIETTA 461/K-24 Russian Submarine Museum)
<http://www.u-461.de/>

Kathryn Bigelow directed movie: *K-19, The Widowmaker* (1988)
<http://www.nationalgeographic.com/k19/>

IMAGES OF SOVIET JULIETT CLASS SUBMARINES (K-77/Juliett 484 & K-24/Juliett 461)



(Above: A view of the German Maritime Museum's K-24/Juliett 461 boat)



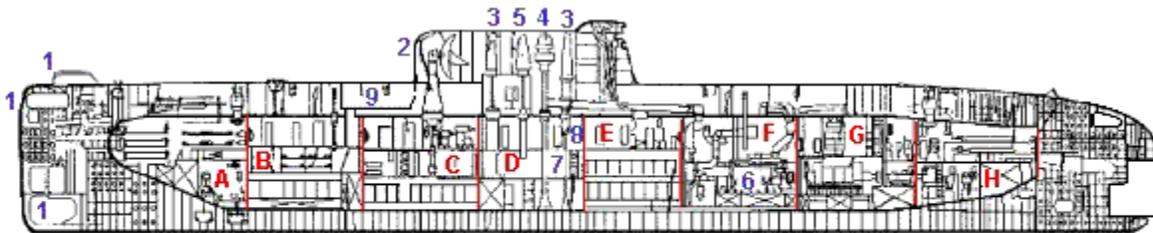
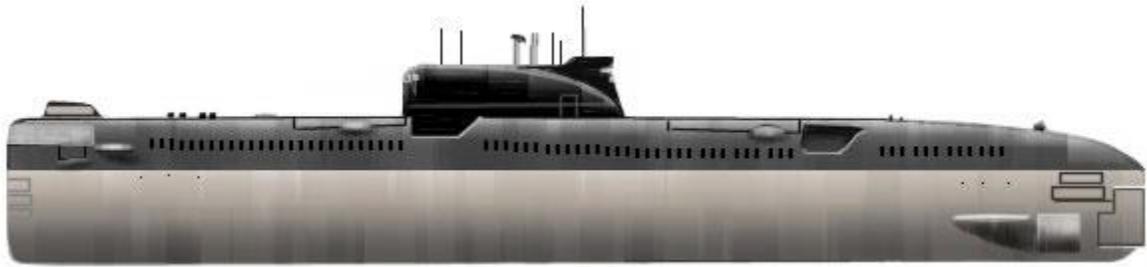
(Above: a Juliett Class sub underway in the 70s, image snapped by US recon aircraft)



(Above: K-77/Juliett 484 moored at Collier Point Park in Rhode Island, USA)



(Above: a view of Germany's Juliett 461, showing off missile guidance radar quite clearly)



- | | | |
|------------------------------|-------------------------|----------------------|
| 1 - Sonars | 4 - Snorkel | 7 - Radio Room |
| 2 - Missile Guidance Station | 5 - Retractable Antenna | 8 - Radar Room |
| 3 - Periscopes | 6 - Main Diesel Engine | 9 - Missile Launcher |

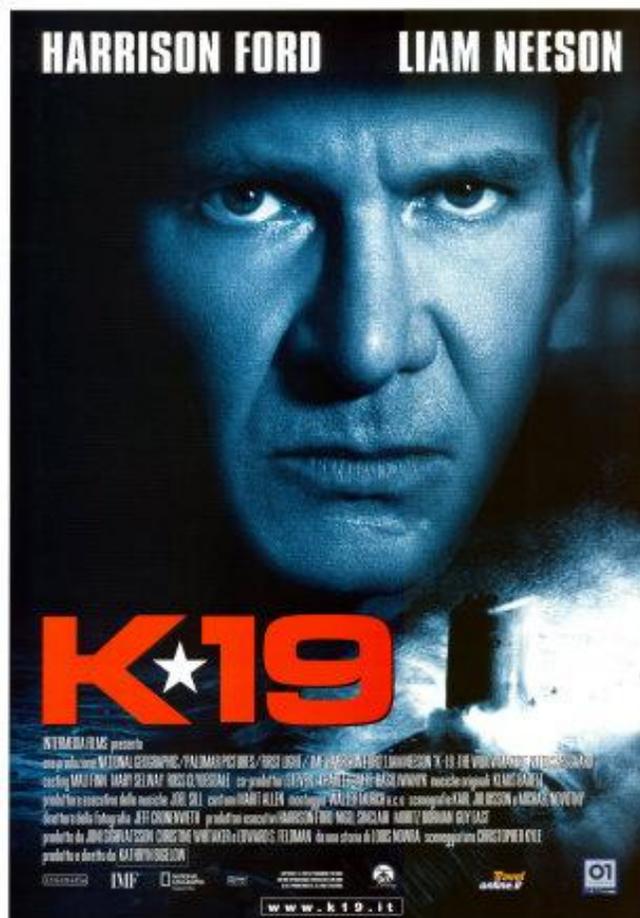
(Above: external and internal views of the Juliett Class submarine)



(Above: K-77 after being raised from 15 months submerged in the river)



(Above: Afloat again and on her last voyage up-river to the ship breakers yard)



(Above: Movie marquee poster from Kathryn Bigelow's *K-11: The Widowmaker*)