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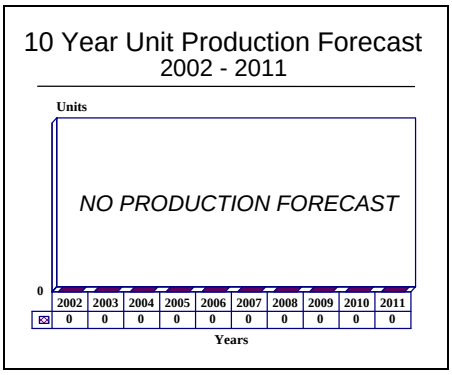
PC-1 Cyclone Class - Archived 3/2003

Outlook

- First of class transferred to US Coast Guard
- Six more due to decommission by end of 2003
- Status of remainder uncertain
- *Skjold* leased to evaluate technology for replacement class



Orientation

Description. Offshore patrol craft and special forces support ship.

Sponsor
US Special Operations Command (USSOCOM)
Navy Special Warfare Command (NAVSPEC-WARCOM)
Arlington, Virginia
USA

Contractors
Bollinger Shipyards Inc
8365 Hwy 308
South Lockport, Louisiana (LA) 70374
USA
Tel: +1 504 532 2554
Fax: +1 504 532 7225

Licensee. No production licenses have been granted.

Status. In production and service.

Total Produced. A total of 14 boats have been built.

Pennant List

Name	Builder	Launch Date	Commission Date
PC-1 *Cyclone**	Bollinger	2/1992	8/1993
PC-2 *Tempest*	Bollinger	4/1992	8/1993
PC-3 *Hurricane***	Bollinger	6/1992	10/1993
PC-4 *Monsoon*	Bollinger	10/1992	1/1994
PC-5 *Typhoon***	Bollinger	2/1993	2/1994
PC-6 *Sirocco***	Bollinger	5/1993	6/1994
PC-7 *Squall*	Bollinger	8/1993	7/1994
PC-8 *Zephyr*	Bollinger	12/1993	10/1994
PC-9 *Chinook***	Bollinger	2/1994	1/1995
PC-10 *Firebolt****	Bollinger	6/1994	6/1995
PC-11 *Whirlwind****	Bollinger	9/1994	71995
PC-12 *Thunderbolt*	Bollinger	12/1994	10/1995
PC-13 *Shamal*	Bollinger	3/1995	1/1996

Name	Builder	Launch Date	Commission Date
PC-14 *Tornado*	Bollinger	6/1999	6/2000

* Transferred to Coast Guard
** To decommission in 2002
*** To decommission in 2003

Mission. The primary assigned role of the Cyclone class is coastal patrol and interdiction, with a secondary mission of special warfare support and SEAL insertion. Key employment missions include forward presence, monitoring and detection operations, escort, non-combatant evacuation and foreign internal defense.

Price Range. The current unit price is between $23 and $29 million (depending on the extent of optional fitting on the ship), based on the 1997 order for the fourteenth ship. The unit price of the earlier ships, however, was only between $9 million and $11.5 million.

Technical Data

Note: The following data pertain only to the first 13 ships of the series. Please refer to the **Variants/Upgrades** section for data on PC-14 *Tornado.*

Specifications

	Metric	US
Dimensions		
Length	52 m	170.6 ft
Beam	7.6 m	24.9 ft
Draft	2.2 m	7.2 ft
Displacement		
Full Load	336.3 tonnes	334 tons
Light	289.9 tonnes	288 tons
Dead Weight	46.3 tonnes	46 tons
Performance		
Maximum Speed	65+ km/h	35+ kt
Cruise Speed	45 km/h	25 kt
Range	4,630 km at 22 km/h	2,500 nm at 12 kt
Acceleration	0-65 km/h in 100 seconds	0-35 kt in 100 seconds
Crew	4 officers and 24 enlisted men plus eight Marines or SEALs as required	

	Type	Quantity
Armament		
Guns (alternative installations)	Mk 38 25 mm L87	1
	Mk 96 25 mm L87+40 mm Mk 19	1
Grenade Launcher	40 mm Mk 19	1
Machine Guns	0.5 in Browning M-2HB (Mk 33)	5
	7.62 mm M-60	2
Missiles – SAM	FIM-92 Stinger	6
Electronics		
Radar – Surface Search	RASCAR 3400C E/F-band	1
– Navigation	RASCAR 3400C I/J-band	1
EW – Radar Warner	APR-39	1
– Decoy Launcher	Mk 52 SRBOC	2
– Decoys	Wallop Super Barricade Mark 3	
Electro-optical		
Command and Control	Vision 2100 M Sperry Marine	1
Communications	USC-54(V) VICS	
	JMCIS	
Sonar	Wesmar high-frequency side-scan	1

	Type	Quantity
Propulsion		
Main Engines	Paxman Valenta 16RP2000 diesel	4x3,350 Shp
Propellers	Four shafts; fixed pitch	4

Design Features. The Cyclone class is derived from the 1970s' Vosper-Thornycroft 56-meter missile-armed fast attack craft, originally designed for Egypt as the Ramadan class. In the Cyclone class, the heavy suite of weapons and sensors has been deleted and a lattice mast amidships has been substituted for the original tower structure. This change probably represents a trade-off between the much lower radar cross-section of the tower mast in favor of the lower visible signature of the lattice. The dimensions and load-bearing capabilities of the mast appear unchanged.

The deep-draft hull has a round-bottom bilge and is capable of only moderate speeds compared to the competition, and the stealth characteristics of the hull and superstructure are relatively limited. This has been addressed in the design of the superstructure of PC-14, which has a decidedly more stealthy appearance than the other ships of the same series.

In spite of all the topside weight reductions, the Cyclone class sits noticeably deeper in the water than the Ramadan class does. The extensive areas of one-inch-thick appliqué armor over the superstructure explains this in part. The major cause of the weight gain is the adoption of much heavier construction standards for the hull. The original Vosper design featured very light hull construction in order to accommodate the perceived export market. These standards did not comply with US Navy requirements, and the hull was redesigned to satisfy much more robust criteria. This had the added effect of proofing the ships against small-arms fire, which is essential for their primary role. For all this armor, a substantial design margin has been retained for additional equipment.

The armament of the Cyclones has been drastically changed from the original configuration on the Ramadan class to suit the ships' different role. The US vessel is equipped with a Mk 38 25 mm cannon forward, a Mk 96 combined 25 mm cannon and 40 mm grenade launcher aft, two twin M-2.50 caliber machine guns in the bridge wings (one of which may be replaced by a Mk 19 40 mm grenade launcher), two 7.62 mm machine guns in the bridge wings, and one M-2.50 caliber machine aft. The armament is completed by a FIM-92 Stinger surface-to-air missile station with six rounds.

The sensor suite has also been drastically reduced from the original Ramadan design. The masthead position for a radar in the SPS-49(V) or Sea Giraffe 150 class is now occupied by the E/F-band antenna for the RASCAR 3400E radar. An I/J band antenna for the same radar is mounted lower down the mast. A new addition is a Marconi Vistar forward-looking infrared (FLIR) electro-optical surveillance system with a near-360 degree field of view.

In the summer of 1997, the Naval Surface Warfare Center in Crane, Indiana, was to evaluate technical proposals on multi-sensor night vision systems. The object was to replace the original, early 1980s' infrared and low-level light TV system with a multi-sensor system that will have at least as much capability, based on newer technology. A laser rangefinder may be added.

Also mounted on the mast is the receiver array for the APR-39 radar warning receiver. This equipment has not been well regarded, with crew complaints of poor reliability and interference from the ship's radar. It was reported that the original APR-39 could be used only if the ship's radar was not operating. This system has since been replaced by the USN-developed Privateer electronic support measures (ESM) system on the seventh ship and onward.

Internally, the ship is largely unchanged from the Ramadan, with four Paxman-Valenta diesels driving four fixed-pitch propellers. The engines are divided between two machinery rooms, with a sound-insulated machinery control space between them. The powerplant is said to be governed to a maximum speed of 35 knots for longer engine life, but the ship is probably capable of achieving at least 45 knots. The shaft line has been lowered from that in the original design with regard to shallow-water operations.

The only two major internal differences from the Ramadan class are the replacement of the missile control room in the original design by a command information center (CIC) and the inclusion of SEAL (Sea Air Land) team accommodation aft of the engine room. The CIC is a luxury on a ship this size and it may be replaced by a dedicated electronics intelligence (ELINT) room in due course. The mast is large enough to hold the required arrays. The ships are fitted with comfortable mess decks and accommodation spaces. A well-equipped galley is provided for the crew. The SEAL accommodation is placed aft of the engine room so that the SEAL team has direct access to a swimmer disembarkation platform on the stern.

Operational Characteristics. The primary mission of the Cyclone class PCs has been designated as coastal patrol and interdiction surveillance, as part of broader littoral warfare operations. The secondary mission is the performance of Naval Special Warfare operational missions, including long-range SEAL insertion and extraction, intelligence collection, swimmer operations, operational deception, and littoral support. The boats are particularly suited for fast response to emergency situations and expeditionary warfare.

The Cyclones appear to be a very good platform for some of the functions performed overseas, such as participating in foreign naval exercises. They are not overly conspicuous and thus do not overwhelm the host country, as could larger warships. They also appear to be highly functional for SEAL platoons and other SOF elements as relatively fast-moving support bases having better accessibility than larger ships such as frigates and destroyers.

The boats have a slow-speed loiter capability, making them suitable for extended periods of stay outside the coastal lines in shallow waters. Two SEAL raiding craft and one RIB are carried on board. Each craft is able to carry either an eight-person SEAL team or a SEAL delivery vehicle (SDV). Alternatively, a nine-person Coast Guard special law-enforcement detachment can be carried. Swimmers can be launched and recovered by using the recessed platform in the stern on vessels No. 1-13; the last of the series has a special ramp for operating RIBs. This ramp is now being fitted to PC-2, PC-8 and PC-13.

The specific role of the Cyclones is unclear to many even inside the Navy. The mission of these boats is flexible and yet seems inappropriate to the original intention of supporting SEAL operations. In addition, the Cyclones lack a supporting constituency within the Navy and have tended to be orphans looking for gainful employment.

The weaponry on board – albeit relatively light duty with regard to the ship's size – provides devastating short-range firepower, commensurate to the ship's primary interdiction role. Plans to install Hellfire missiles in order to provide a longer-range punch have been abandoned.

In recent years, the Navy has shared many of its Cyclone class operations with the Coast Guard, providing the ships for drug interdiction and patrol operations in the Caribbean and Mediterranean. Cooperation with Coast Guard will probably be extended. The Navy, meanwhile, appears to be shifting away from the use of these ships as platforms for the insertion of SEAL teams and toward more patrolling functions while keeping them an integral part of the littoral warfare strategy.

Variants/Upgrades

The Cyclone class is a disarmed and drastically modified Vosper-Thornycroft 56 meter FAC-M. The second group of six ships (from PC-7 onward) have the USN-developed Privateer ESM system in place of the APR-39E. In June 1995, the Navy began replacing the existing Mk 38 25 mm gun mounts with the Mk 96 mounting which co-locates a 25 mm cannon and a 40 mm grenade launcher on a stabilized mounting. The Navy has replaced the aft Mk 38 with a Mk 96 on all the PC class ships but abandoned plans to replace the forward mount.

The modified ESM system fitted to the second group of six craft was meant to be retrofitted to the first six. Photographs of the ships indicate this has been done. In addition, a new decoy launching system has been introduced to replace the existing launchers on the older boats. The ML Aviation SuperBarricade system (designated Barricade Mark 4 for this application) has been the leading candidate all along by a very wide margin.

In May 1999 the Navy announced plans to evaluate the Barricade, starting in late 2000, in the Chesapeake Bay area on board "small Navy and Special Operations Command vessels." The aim is to fit all 14 Cyclones with the system, and later expand their installation to include up to 200 other vessels.

Coast Guard Use. On June 24, 1998, the Navy approved an option to transfer part of the Cyclone fleet to the Coast Guard in an effort to cut costs and address urgent needs in US coastal law enforcement and interdiction capability. However, in mid-2000 it was reported that this decision had been reversed and that all 14 craft would remain with the US Navy.

One craft, the USS *Thunderbolt*, was evaluated by the Coast Guard from March 2 to July 17, 1998, off Miami. The *Thunderbolt* was still painted in its blue-gray Navy livery while posting Coast Guard markings on the sides when it began the 20-week trials.

PC-14 *Tornado*. The last boat of the series, USS *Tornado*, has a slightly larger hull, at 179 feet in length and with a 25 foot beam, and its maximum navigational draft is also greater – to 9 feet. The boat's light displacement is quoted as 352 tons, versus the others' 288 tons. Full load displacement, however, is up to 387 tons, from 334 tons.

PC-14 is significantly different from the others in its exterior appearance. Besides being longer and heavier, its superstructure has been built to minimize radar cross section. These changes in size and weight are presumably indicative of the upgraded systems used on this particular boat, while an effort seems to have been made to reduce the topside weight, probably for better weight distribution. The boat also has a new Integrated Navigation System and C^2 System (see below), which will be backfitted on the earlier boats as well.

PC-14 appears to have become a test platform for experimental new concepts in littoral warfare. There is reason to believe that she may incorporate more experimental technology than has been admitted. This speculation primarily resulting from her high unit cost.

System Upgrades. The electronic sensor and weapons control equipment on the ships is being modernized during the course of operation. The latest boat, the PC-14, will be fitted with a multisensor FLIR system for target detection, recognition and identification. This will be in lieu of the early 1980s' infrared and low-level light TV system, providing much more accurate imaging capability. It is believed that the same system will be retrofitted on the other boats as well, providing funds are available.

The Integrated Navigation System and C^2 System were also scheduled for upgrading in the summer of 1997. Sperry Marine was contracted to fit the boats with Pentium 200 processor computers as well as various electronic interfaces and navigation/chart software, in addition to receiving a "J-release" of Sperry's proprietary Voyage Management System.

Besides the boat's electronic systems, physical components are being upgraded as well, including the stabilizers and steering gear for the new PC-14. The original designer, Vosper-Thornycroft, has already delivered a complete fit of stabilizers, powerpacks and controllers for the other 13 boats as part of an upgrade. At this point, all of the retrofits and upgrades on these boats have been back-burnered until the Navy decides whether it will keep the remaining PC-14s in inventory.

Program Review

Background. The PC-1 Cyclone class coastal patrol boat was formerly known as the Special Warfare Craft, Medium (SWCM), and as the PBM Sea Viking. This class vessel was developed to replace the aging fleet of small patrol craft used to support US Navy Sea Air Land (SEAL) special warfare units. The Navy had about 19 boats devoted to this task, most of which were acquired in 1973. By the early 1990s, the useful lives of these boats had practically ended.

In the early 1980s, the Navy initiated two programs aimed at developing new fast attack craft/coastal patrol boats. The PCM program was to replace the PB series boats which had been used for the transport of SEAL team members and other missions of the Special Boat Units. The SWCM program was aimed at developing a new class coastal patrol boat with improved tactical mobility, heavier firepower, greater endurance, and improved seakeeping qualities compared with earlier patrol craft types.

In October 1982, the Navy issued a Request for Proposals relating to the proposed new fast attack craft. The service received 13 proposals from the following firms or teams of firms: Boeing Aerospace, Bertram Marine, Designers and Planners/RE Director, Designers and Planners/Equitable, Intermarine, Marinette Marine/Vosper Hovercraft, Modutech Marine, Fairey Allday/Peterson, RMI Incorporated (previously known as Rohr Marine Incorporated), Superior Engineering, Tacoma Boatbuilding, Swiftship/Advanced Marine Enterprises, and Uniflite. The Navy allotted $15 million in developmental funding for long-lead funding for the lead ship of the PBM class. The Navy chose four firms – Boeing Aerospace, Swiftship, Uniflite and RMI – for further development work before selecting a prime contractor.

In July 1984, the Navy awarded RMI a $7 million contract for the final design of the PBM. The contract included an option for the construction of the lead vessel of the class. The service was to procure an additional 19 vessels through 1990 under the terms of the contract. These craft were to be based in two 10-boat squadrons, one on the East Coast and the other on the West Coast. The RMI entry into the competition was a SWATH vessel similar to the SES-100A test craft. On November 2, 1984, a US$4.3 million contract (N0002483-C-2182) was awarded to RMI for the construction of the lead craft of the new PBM series. In order to further test the hull configuration, RMI was to launch a demonstrator, the SD 60.

The program, however, ran into problems soon after its initiation. Most of the US Navy's Special Warfare programs are covert and not subjected to full congressional scrutiny. Furthermore, the program suffered from a conflict in the intended missions, reflected also in the craft's designation PBM. The Navy wanted it to fulfill the missions of interdiction and coastal patrol, while also being capable of handling covert SEAL team insertion operations. The two

missions had differing requirements, and a vessel optimized for one role generally suffers in others. This became evident in 1985 and '86, as the Sea Viking design went through numerous changes and modifications, causing the vessel's displacement to increase by over 20 tons. These problems, combined with a series of financial problems at RMI, led to the firm's bankruptcy under Chapter 11 in 1986, and work on the first vessel eventually ceased.

The Navy seized the uncompleted hull of the first PBM on January 7, 1987. Congress subsequently instructed the Navy to complete the unfinished product. It also voted to appropriate $19 million for the second ship in the Fiscal Year 1987 budget. In 1986, the Pentagon's inspector general charged the Navy with forging signatures on a major document relating to the PBM program and then attempting to cover up the action. In early 1987, the Navy began a study to determine the future of the PBM program. Unconfirmed reports indicated that the report was to recommend the PBM be optimized for the SEAL delivery mission, implying a smaller vessel than the existing PBM. Also, the service expected a vessel with lower radar and infrared signatures than those on the PBM design.

The Navy restructured the PBM program in early 1987, dropping the PBM designation and referring to the program as SWCM. This work was terminated in July 1987. The Navy then considered various options for revising the Special Warfare Craft program. The modified plan called for the original lead ship not to be completed, one ship to be funded in FY87, a second in FY89, and eight vessels per year in Fiscal '91 and '92. When Congress passed the Fiscal Year 1989 budget, it gave the Navy an unrequested $100 million for construction of patrol boats for Special Operations Forces. The Navy was required to use these funds for the SWCM program; a total of 16 vessels were to be procured.

The program was again restructured, and redesignated PBC (Patrol Boat, Coastal) until June 1991 when it was redesignated PCF (Patrol Craft, Fast). The first eight vessels were authorized for procurement in Fiscal Year 1990, and the order was placed August 3, 1990. Five additional hulls were ordered in 1991. The three remaining boats of the originally projected class of 16 were canceled when it was discovered that the Cyclone was too large and unwieldy to perform the inshore roles for which it initially had been designed.

The class began entering service in late 1993. Although the US Navy did not request any additional ships of this class, National Security Committee member Bob Livingston (R-La.) later sought and won funding in the House of Representatives for building the PC-14. An order for the fourteenth unit of the series was placed in July 1997. Its price tag is substantially higher ($23 million, and with all options exercised, up to $30 million) than that of the original 13 boats ($9-11 million each), partly because of the more modern electronic systems on board. Some of the systems being installed on the PC-14 will be retrofitted in time on the other boats as well, but that process is expected to be drawn out over a number of years since funding will not be immediately forthcoming. Reports are also emerging that the superstructure of the fourteenth boat is, in fact, quite different from that of the others, having more stealthy characteristics. The boat is also longer, at 179 feet, with the inclusion of a ramp for launch and recovery of SOF vessels (RIBs) on the stern while under way. The PC-14 is armed with two Mk 38 25 mm cannon, two 40 mm Mk 19 grenade launchers, two M-2.5 inch machine guns, and the Stinger air defense missile post.

The US Special Operations Command (SOCOM) said in the summer of 1998 that it would reduce the Cyclone fleet from 13 to seven due to budget constraints. The boats now in service have been deployed with the US European Command (EUCOM) forces in the Mediterranean in support of the Sixth Fleet and off the West African coast, and also in the Baltic to train with foreign navies and their respective special forces. One or two Cyclones are also in operation in the Persian Gulf as part of the Navy contingency enforcing the shipping restrictions imposed on Iraq.

EUCOM has requested that four boats be permanently homeported in Rota, Spain, to provide continuous presence in the European theater and support Special Operations Forces there. The US Naval Air Station in Rota is said to have the resources to absorb the necessary increase in infrastructure. The move would only require an investment of about $3.5 million for building a dock and other support facilities.

The money saved from the reductions of the PC force of the Navy was to be used for the support of critical force structure requirements. Those would presumably include outfitting the Navy's Trident-missile-capable nuclear submarines with an advanced SEAL delivery system for special forces.

In recent years, the Cyclone class boats have been assisting the Coast Guard and operating in drug interdiction roles. An arrangement to lend PC-1 class boats to the Coast Guard was being worked out between the two services in the spring of 1998, with a decision memorandum issued in June of that year. The same year saw a 20-week evaluation period involving the PC-12 *Thunderbolt*, in 1998. The Coast Guard agreed to bear the cost of maintaining the *Thunderbolt* during

this demonstration/evaluation period. Funding for operating the craft – up to seven of them – in the Coast Guard was contained in that service's FY00 budget. However, by late 2000, the US Navy was reported to be going cold on the idea of transferring any of the PC class to the Coast Guard, preferring to keep the craft as US Navy assets.

The last of the class, the PC-14 *Tornado*, was commissioned on June 24, 2000. The first of the PC class, the PC-1 USS *Cyclone* was transferred to the US Coast Guard at that time.

In mid-2001, it was announced that the US Navy would be decommissioning three of the Cyclone class, the PC-3 (USS *Hurricane*), the PC-5 (USS *Typhoon*) and PC-6 (USS *Sirocco*) in 2002 after which the craft would be available for transfer to the Coast Guard if required. Two additional craft, the PC-10 (USS *Firebolt*) and PC-11 (USS *Whirlwind*) would be decommissoned in 2003. It is reported that additional decommissionings may take place in 2004/2005.

Early in 2001, the US Navy leased the Norwegian fast attack craft *Skjold* for a year to evaluate her performance as a special forces support and coastal interdiction craft as a follow-on to the PC class.

Funding

The ships are manned by the Navy's Special Warfare Command (NAVSPECWARCOM) but are purchased by, and considered assets of, US Special Operations Command (USSOCOM). Consequently, the funding of these boats is more complicated than that of standard Navy ships though it still falls under the Department of the Navy's budget. Furthermore, most of the spare parts and logistics for these boats are procured outside the Navy's supply system, resulting in higher maintenance costs.

In October 1982, the Navy allotted $15 million in developmental funding for long-lead funding for the lead ship of the PBM class. Initial funding for the program was made available in the FY84 defense budget. In calendar year 1984, funding was arranged for the construction of a lead ship of an intended series. However, after the program shakeout in 1987, the plan was modified. Under the revised plan, the original lead ship was not to be completed, but one ship was to be funded in Fiscal Year 1987, a second in FY89, and eight vessels per year in FY91 and '92.

When Congress passed the FY89 budget, it gave the Navy an unrequested $100 million for construction of patrol boats for Special Operations Forces. The Navy was required to use these funds for the SWCM program; a total of 16 vessels were to be procured. Eight boats (contract value US$91.3 million) were ordered in 1990, with the second batch of five valued at US$48.7 million in 1991. The last three were canceled.

Meanwhile, in FY1996-98, research and development funds were allocated to upgrade the self-defense capabilities of the Cyclone class ships. The FY97 defense bill included an allotment of $6 million in response to the identified need to perform an upgrade in one of four different configurations. However, due to the shortage of the funding, it is likely that only the PC-14 will be upgraded as proposed by a 1997 DoD study, while the operators of other units will need to justify their funding needs on the basis of subsequent performance of the PC-14.

Recent Contracts

Contractor	Award ($ millions)	Date/Description
RMI Inc	7.0	July 1984 – Final design of the PBM, including an option for the construction of the lead vessel of the class.
RMI Inc	4.3	November 2, 1984 – Construction of lead craft of the new PBM series. (N00024-83-C-2182)
Bollinger Machine Shop & Shipyard Inc	91.3	August 3, 1990 – Construction of eight patrol boats, completed by April 1993. (N00024-90-C-2293)
Bollinger Machine Shop & Shipyard Inc	48.7	July 1991 – Option for construction of five additional ships, completed by October 1994. (N00024-90-C-2293)
BBN Systems & Technologies	0.57	January 1997 – Active noise control systems for Cyclones.

Contractor	Award ($ millions)	Date/Description
Raytheon E-Systems	11	March 1997 – Integrated C^4I systems for all Cyclones.
Sperry Marine	N/A	June 1997 – Upgrading of navigation, C^2 systems.
Bollinger Shipyards Inc (BSI)	23.2	July 1997 – Construction of the fourteenth ship of the series. Value of contract with all options: up to $29.5 million.
Bollinger Shipyards Lockport	5.1	October 5, 1999 – Retrofit of three boats with a new stern launch and recovery system, with an option for a fourth boat.

Timetable

Month	Year	Major Development
Oct	1982	Initial Request for Proposals issued
FY	1984	Initial funding granted for the program
	1984	Lead ship funded
	1986	RMI declares bankruptcy
Jan	1987	Navy seizes unfinished PBM hull
	1987-90	Program reorganized
Aug	1990	Contract awarded for eight PC boats
Jul	1991	Contract for another five boats
Nov	1995	PC-13 delivered
Jul	1997	Order placed for one more ship
Jun	1998	Approval for transfer of seven boats to Coast Guard
Summer	1999	PC-14 launched
Jun	2000	Delivery of PC-14 to USN
	2000	PC-1 transferred to Coast Guard

Worldwide Distribution

US. 13 boats in service with US Navy, one with US Coast Guard.

Forecast Rationale

It now appears certain that the PC-1 Cyclone class will have only a short career in the US Navy. Ten years after the first-of-class was commissioned, the process of decommissioning the patrol craft will be well under way. Already, the lead ship of the class has been transferred to the US Coast Guard and it seems probable that the six craft scheduled to decommission in 2002 and 2003 will go the same way. This means that, by the end of next year, seven of the 14 PCs will have left the US Navy.

There are more decommissionings probable for 2004 and 2005, and there is a very good chance that this will eliminate the class from the US Navy force structure. On the other hand, the Coast Guard reservations about the suitability of the Cyclones for its requirements appear to have been resolved and it is at least possible that all 14 will be wearing the USCG paint scheme by the end of 2005. Although lightly armed by Navy standards, the Cyclones are more heavily armed than the equivalent Coast Guard craft. Since a growing portion of the USCG mission will be to defend and protect ports, coastal shipping and other vulnerable areas from terrorist attack, the powerful close-range firepower of the Cyclones may prove a timely addition to the USCG cutter force.

The lease of the Norwegian Navy Skjold fast attack craft in order to determine its feasibility for the coastal interdiction is the final seal on the possibility of additional production of the Cyclone class or its derivatives. If there really is a useful role in the US Navy for this type of ship, then that role would be better filled by adopting the technologies pioneered by the *Skjold*. However, if these are a limited and minor part of the overall responsibilities of the Fleet (which seems more likely), it becomes highly questionable that the costs of a follow-on for the PCs can be justified given

the demands of the War on Terrorism. Either way, it would appear that the Cyclone class program has now ended. This report will be archived next year.

Ten-Year Outlook

No new production of this series is projected, only modernization and upgrades of the onboard systems. The forecast chart is therefore omitted.

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