Armidale Class

Outlook

- Unexpected increase in operational demands causing greater-than-scheduled sea time
- Hull cracking has occurred, resulting from extended duties in three ships
- Project SEA 1180 multirole ship proposed as Armidale replacement
- Improved and enlarged Armidale may be most cost-effective contender for this role

Orientation

Description. Patrol craft primarily tasked with offshore patrol and maritime policing.

Status. In service.

Total Produced. A total of 14 ships are in service.

Sponsor

Australian Department of Defence
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Canberra ACT 2600
Australia
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Pennant List

Ship	Builder	Ordered	Launch Date	Commission Date
83 *Armidale*	Austal Ships	10/2003	1/2005	6/2005
84 *Larrakia*	Austal Ships	10/2003	9/2005	2/2006
85 *Bathurst*	Austal Ships	10/2003	10/2005	2/2006
86 *Albany*	Austal Ships	10/2003	1/2006	7/2006
87 *Pirie*	Austal Ships	10/2003	2/2006	7/2006
88 *Maitland*	Austal Ships	10/2003	6/2006	9/2006
89 *Ararat*	Austal Ships	10/2003	6/2006	10/2006
90 *Broome*	Austal Ships	10/2003	9/2006	2/2007
91 *Bundaberg*	Austal Ships	10/2003	10/2006	2/2007
92 *Wollongong*	Austal Ships	10/2003	2/2007	7/2007
93 *Childers*	Austal Ships	10/2003	2/2007	5/2007
94 *Launceston*	Austal Ships	10/2003	5/2007	9/2007
95 *Glenelg*	Austal Ships	6/2006	8/2007	2/2008
96 *Marysborough*	Austal Ships	6/2006	10/2007	5/2008

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Mission. The vessels will be tasked with maritime policing of national waters, including the prevention of drug smuggling, piracy, and slave trading; resource protection; and other tasks associated with controlling territorial waters.

Price Range. The contract cost for these ships is $357.6 million for 12 hulls, yielding a unit cost of approximately $30 million each.

Contractors

Prime

Serco SpA	Via Sciadonna 24/26, Frascati, I-00044 Italy, Tel: + 39 06 9429 4213, Fax: + 39 06 941 9426, Email: gabbresc@serco.it, Prime
Austal Ships	http://www.austal.com, 100 Clarence Beach Rd, Henderson, Western Australia, Australia, Tel: + 61 9 8 9410 1111, Fax: + 61 8 9410 2564, Email: pubrel@austal.com, Lead Contractor

Subcontractor

BAE Systems Australia	http://www.baesystems.com, Taranaki Rd, Edinburgh Parks, Edinburgh, 5111 SA, Australia, Tel: + 61 8 8480 8888, Fax: + 61 8 8480 8800, Email: auswebinfo@baesystems.com.au (Prism ESM System)
Bainbridge International	8, Flanders Park, Hedge End, Southampton, SO30 2FZ Hampshire, United Kingdom (Flame Retardant Protection Systems)
Duramax Marine LLC	17990 Great Lakes Pkwy, Hiram, OH 44234 United States, Tel: + 1 (440) 834-5400, Fax: + 1 (440) 834-4950 (Shaft Sealing)
Filtronic Components Ltd	Airedale House, Acorn Park, Shipley, BD17 7SW Bradford, United Kingdom (RF Components)
Gresham Power Electronics Ltd	http://www.greshampower.com, Telford Rd, Salisbury, SP2 7PH Wiltshire, United Kingdom, Tel: + 44 01722 413060, Fax: + 44 01722 413034, Email: enquiries@greshampower.com (Power Handling Systems)
MTU Friedrichshafen GmbH	http://www.mtu-on-line.com, Maybachplatz 1, Postfach 2040, Friedrichshafen, 88040 Germany, Tel: + 49 7541 90 0, Fax: + 49 7541 90 5000, Email: info@mtu-on-line.com (Diesel Engine)
Rafael Advanced Defense Systems Ltd	http://www.rafael.co.il, PO Box 2250, Haifa, 31021 Israel, Tel: + 972 4 879 4717, Fax: + 972 4 879 4657, Email: customersupport@rafael.co.il (RCWS-30 Weapons Station)
Zodiac Aerospace	http://www.zodiacaerospace.com, 61 rue Pierre Curie BP 1, Plaisir, 78373 France, Tel: + 33 1 61 34 24 41, Fax: + 33 1 61 34 24 41 (Rigid Inflatable Boats)

Comprehensive information on Contractors can be found in Forecast International's "International Contractors" series. For a detailed description, go to www.forecastinternational.com (see Products & Services/Governments & Industries) or call + 1 (203) 426-0800.

Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 22 Commerce Road, Newtown, CT 06470, USA; rich.pettibone@forecast1.com

Technical Data

	Metric	U.S.
Dimensions		
Length (overall)	56.8 m	184.6 ft
Beam	9.0 m	29.5 ft
Draft	3.0 m	10 ft
Displacement		270 tons
Complement		12

Armidale Class

	Metric	U.S.
Performance		
Sustained sea speed	46 km/h	25 kt
Range	5,556 km	3,000 nm @ 12 kt
	Type	**Quantity**
Armament		
Light guns	25mm Typhoon	1
	.50-caliber machine guns	2
Electronics		
Radar	Sperry Bridgemaster	1
ESM	Prism III	1
Electro-optical surveillance system	Rafael Toplite	1
Machinery		
Diesels	MTU 16V M70	2x 2,320 kW

Design Features. The Armidale class features a semi-displacement vee hull, with a Seastate active ride control system that incorporates hydraulic stabilizer fins and stern trim tabs. It is a stretched version of the 38-meter Bay-class patrol craft currently in service with Australian Customs. An unusual feature of the design is the provision of U.S. 115-volt, two-prong power outlets, a feature intended to allow the easy integration of U.S. standard equipment with the ships. In addition, 240V three-phase power outlets with RCD (residual current device) protection are fitted throughout the ship for all domestic and personal equipment.

The Armidale class is powered by two MTU 16V M70 2,320-kW diesels driving twin screws through ZF transmissions.

Operational Characteristics. A key factor in the Armidale design has been provision for the operation of two rigid inflatable sea boats. This reflects the increased aggressiveness of maritime criminals and their potential possession of weapons such as the RPG-7 that can inflict severe damage on patrol craft. The Rigid Inflatable Boats (RIB) permit the Armidales to stand off and carry out boarding and surveillance operations at considerable distance. The patrol boats are armed with a Rafael Typhoon quick-firing, 25mm cannon. This is in a stabilized mounting to enable accurate firing in rough water and at extended ranges.

The Armidale class is equipped with the BAE Systems PRISM III radar detection and identification system that was developed in Australia. The PRISM III system was also installed on the Huon class minehunters.

With a range of 3,000 nautical miles, the 14 boats would be able to spend more time at sea than the preceding smaller craft. At 57 meters, they are 14.8 meters longer than the Fremantle class and are able to accommodate 20 extra people in addition to the crew.

Rather than providing each patrol craft with its own crew, the Armidales are operated on a pool system under which a total of 21 crews man the 14 Armidale-class patrol boats. The patrol craft are divided into four divisions: Attack, Assail, Ardent, and Aware. Three of the divisions are assigned six crews for four ships, while the fourth has three crews for two ships. The original plan was that the 14 ships would be continually manned, with two out of three crews actively deployed while the third undergoes leave or training, or prepares to transfer into a ship (a change of crew can be accomplished in less than six hours). The original intention behind this personnel deployment scheme was to allow the ships to spend more time at sea without compromising crew leave or training requirements. However, the steadily increasing work load thrown upon the Armidale class and growing manpower problems within the Australian Navy had disrupted the smooth running of this scheme.

Personnel are posted to a crew for an expected duration of between 18 months and three years. Under the Armidale class multi-crewing regime, six crews rotate between four boats within a generic crew duty cycle comprising nine weeks assigned to a patrol boat, then four weeks unassigned for operational respite.

The Navy defends this "multi-crewing model," saying it provides a 21-ship capability with just 14 vessels. It is, however, claimed to be unpopular with crews on the grounds that it prevents them from developing an attachment to the boats. On the other hand, the arrangement also delivers benefits: predictable respite periods; reduced duties in harbor; reduced leave liability; reduced training shortfalls; improved levels of individual readiness; and new opportunities for adventure training, vocational training, and familiarization with other Australian Defence Force (ADF) units such as NORFORCE.

Other reported crew complaints with the Armidales include a lack of storage space, inadequate lighting, and improperly secured anchors. The Australian Navy denies these problems, pointing out that living standards on board the Armidales are considerably better than those on the older Freemantle class and well above average for patrol craft as a generic type. The poor lighting complaint is due to a misunderstanding of the role of red lighting in compartments above the waterline, which ensures that white light does not affect the identification and aspect of a vessel at night. This requirement complies with the Convention on the International Regulations for Preventing Collisions at Sea (1972).

Overall, it would appear that the alleged problems with the Armidales are a mixture of teething problems normally experienced with a new class and the credulous reporting of the average seaman's deep suspicion of any change in the traditional way of doing things.

Armidale Class

Source: Australian Navy

Variants/Upgrades

Project SEA 1444. Australian designation for the Australian patrol boat replacement program.

Project SEA 1180. Australian designation for a multirole ship to replace the Armidale, Huon and oceanographic research and survey ships. This may well emerge as an improved Armidale class.

Program Review

Background. The history of this program dates back to a Malaysian Navy requirement for an offshore patrol vessel (OPV) to replace the 21 Kris-class patrol craft. The original Malaysian specification called for a 1,000-ton OPV capable of 20 knots and carrying a Lynx-sized helicopter in a telescopic hangar. In 1992, this specification was modified. Other navies strongly advised against a telescopic hangar because of its mechanical unreliability and excessive leakage. At the same time, the Malaysian Navy decided to increase the speed of the ship to 25 knots to better intercept ships engaged in illegal activities. These two design changes led to the target displacement being increased to 1,200 tons. This design was designated the NGPV (New Generation Patrol Vessel).

Armidale Class

Enter the Australians

Also during 1992, the Royal Australian Navy started a design project to develop a successor to its Fremantle class OPVs. As an interim measure, the Fremantle class was to be upgraded, extending the vessels' lives through 2004. The successor class was designated the offshore patrol craft (OPC) in anticipation of a design similar in size to the 42-meter, 200-ton Fremantle class. However, a study of the design tradeoffs led to the same conclusion as that reached by the Malaysian Navy – i.e., that a significantly larger craft would have much greater efficiency, and that its greater capital cost would be offset by a longer operational life and lower running expenses.

These considerations were reinforced by demands that the patrol areas covered by the OPCs be substantially extended, making a more seaworthy design essential. Thus, by the end of 1992, the Australian OPC looked very similar to the Malaysian OPV. This requirement was formalized under the designation Project Sea 1427. Late in 1995, the design was modified so that two packs of four anti-ship missiles could be installed.

Joint Program Formed

Accordingly, negotiations to establish a joint project were initiated in January 1993. At this point, the only significant difference between the design requirements lay in the Malaysian requirement for an embarked helicopter that the Royal Australian Navy did not regard as essential.

Once the joint program had been initiated, bids were received from no fewer than 35 potential suppliers. Both Malaysia and Australia required substantial local content, with local construction preferred. By August 1993, a list of 14 consortia had been prepared in Phase I of the project.

The finalists included the following companies: Danyard (with Kockums and Bath Iron Works); the German Naval Group, led by Blohm + Voss; Lürssen Werft; the Malaysian-German Consortium (Malaysia Shipyard & Engineering, Sabah Shipyard, and Bremer Vulkan); Transfield Defence Systems; and Vosper Thornycroft.

The Royal Australian Navy firmed up its acquisition plans in early 1997, stating that it would require a total of 12 and that the order would be placed in 1998-1999. The Malaysian Navy also confirmed that the first order would be for six hulls, followed by a further 21 ships, which would stretch the entire procurement over a period of at least 20 years.

In October 1997, the Malaysian Navy announced that it had selected the MEKO-A100 design offered by the German consortium. This announcement meant the end of the multinational procurement of this class, with the Royal Australian Navy (RAN) and Malaysia going ahead with their own programs. The Malaysian NGPV program is now covered as part of the report on the MEKO-A class frigates (see the "Destroyers and Frigates" section of this service).

Austral-Malaysian Program Splits

The Malaysian decision was quickly followed by a decision by the Australian Navy to indefinitely delay plans to build its OPVs in favor of a get-well program for the Collins class submarines, the modernization of the existing surface ships (FFG-7, ANZAC), and construction of the Huon class minehunter. Plans for building an indigenous OPV class were finally eliminated in the December 1997 document, "Australia's Strategic Policy." This review of the national defense policy led to the cancellation of the OPC project, as the expense could not be justified in light of other investment priorities. Oddly, the order for SH-2 Seasprite helicopters to operate from these ships was not canceled, apparently a bureaucratic oversight.

The plan to build a new class of replacement patrol craft was revived in November 1999 as a result of a steady growth in the number of refugees from Indonesia seeking entry into Australia and attempting to cross the Timor Sea on craft quite unsuitable for this purpose. This, added to the worrying level of piracy and other types of maritime crime in the area, threw renewed emphasis onto the patrol function. The existing Fremantle class was seen as being too small for this role, and the class was deteriorating rapidly as a result of heavy service. Accordingly, a new Australian patrol boat replacement program was instituted as Project SEA 1444.

Australians Go It Alone

The procurement process for SEA 1444 was delayed by another Australian Defence Review in 2000, which was highly supportive of the patrol boat replacement program. The Request for Tender (RFT) was issued in November 2001. The baseline specification envisioned a somewhat larger craft than the Fremantle, with a hull length ranging from 50 to 60 meters (the Fremantleclass was 42 m in length). The preferred gun was an M242 25mm Bushmaster backed up by two M2HB 12.7mm machine guns. The key part of the specification was that the class as a whole be able to provide 3,000 patrol days per year, with an additional surge capacity of 600 days per year. Required range was 3,000 nautical miles and the sustained speed was to be no less than 25 knots. The craft would be based in Darwin (Northern Territory) and Cairns (Queensland).

The Bidding List

By April 2002, eight bids had been received, from ADI, Tenix Defence, Babcock Defence Systems, Forgacs Shipyard, Austal/DMS, NQEA, Australian Submarine Consortium, and Singapore Technologies. In June 2002, the Australian Ministry of Defence selected three of these proposals for the final shortlist: the ADI proposal offering a version of the Danish Stanflex 300, the Tenix proposal featuring a variant of the patrol craft supplied to the Philippine Coast Guard, and the Austal / DMS bid that envisioned a stretched version of the 38-meter Bay-class patrol craft in service with the Australian Customs. In September 2002, a further step was taken when the Rafael Typhoon's stabilized mounting was selected for the 25mm cannon.

On November 29, 2002, Defence Minister Robert Hill announced that Australia's new patrol boats would be known as the Armidale class in honor of HMAS *Armidale*, a Bathurst class corvette with a crew of 149. She was sunk by enemy action on December 1, 1942, during operations off Betano, on the south coast of Timor, while acting as an escort vessel protecting Australian coastal and mainland convoys to New Guinea. The announcement confirmed that plans were for the first of the Royal Australian Navy's Armidale class replacement patrol boats to be delivered during the second half of 2004, consistent with the government's 2000 Defence White Paper commitments.

Contract Awarded

In August 2003, the Royal Australian Navy announced that shipbuilder Austal Ltd would design and construct the Royal Australian Navy's new Armidale-class patrol boats, in a deal worth AUD300 million. The announcement followed the signing of AUD553 million in contracts by the Australian government, Defence Maritime Services (DMS), and Austal Ships. Austal's part of the contract, worth $300 million, covers the creation of a fleet of 12 56-meter aluminum patrol boats at its Henderson yard in western Australia. DMS, a joint venture between Serco and P&O Maritime Services, will provide maintenance and support for the 15-year life of the boats.

Austal began construction of the Armidale class patrol boats in early 2004, with the first vessel scheduled to enter service in mid-2005 and the remaining vessels to be delivered to the Navy over a 42-month period. The program was shown to be running on schedule when, on January 22, 2005, the lead ship of the class was launched and formally christened. At that point, it was confirmed the vessel would start sea trials in May 2005. These took place on schedule, with two additional ships being launched in late 2005. Construction proceeded rapidly from that point, with the ships entering service in 2006 and 2007.

In June 2006, the Australian Navy placed an additional order for two extra ships of this class. Construction of these two ships proceeded with commendable speed, the first being commissioned late in 2007 and the last in February 2008.

This good news was offset by reports of problems with the fuel feed system on early members of the class. The system was being contaminated with sea water, damaging the pumps. The initial problems were rectified in a few weeks but then recurred later.

Reports Favorable

The Armidale class has an unusual distinction in that its procurement has been the subject of a favorable government audit report that concluded, "The contractual construct employed by the Defence Materiel Organization (DMO) is a sound approach that will encourage the contractor to deliver reliable, fully capable ships for use by the RAN. The DMO has sought to allocate significant risks associated with cost and meeting a delivery schedule to the contractor by rewarding timely delivery with a milestone payment regime, and discouraging schedule slippage by the capacity to invoke liquidated damages for delays against agreed ship delivery dates."

In a world where an external investigation of defense procurement programs usually results in a litany of missed opportunities and criticism of mistaken procedural steps, the audit of the Armidale class is a refreshing change. While some mistakes were noted, these tended to be fairly minor. The fact that only three recommendations were made, and these were to prevent the repetition of those mistakes, is a tribute to the sound management of the Armidale class program.

The last of the Armidale class patrol craft was commissioned in May 2008. At that point, the efforts of the Austal group shifted to locating export clients. One route to achieving this is the revival of an Australian program that donates offshore patrol craft to a variety of small Pacific nations. The Pacific Patrol Boat (PPB) program donated 22 31-meter patrol craft to 12 nations from 1987-1998. The patrol craft are used for a wide variety of activities, including fisheries enforcement, search and rescue, policing, border security, and disaster relief. Australia continues to support the operations of these vessels.

These relatively small craft will be reaching the end of their service lives in the 2017-2027 period, leading the

Australian government to consider whether to renew the program and build replacements. However, the problem is that although procurement of these craft is financed by Australia and their operations are subsidized, Australia doesn't meet all costs, with recipient nations expected to fund crewing and maintenance. This is a problem that has proved challenging. Australia encourages nations participating in the PPB to achieve 50 sea days a year, but the average was 36, mostly due to budget constraints and the high cost of diesel fuel.

Since construction of the Armidale class was completed there has been no overt interest in procuring the design from potential customers, and the Australian Navy shows no inclination to order additional ships. At this time, construction of the class appears to be at an end. This perception may, however, change given the heavy workload that has been absorbed by the Armidale class in recent years. This is primarily the result of a steady increase in the stream of boats carrying asylum-seekers to Australia.

The result of this development has been to extend the amount of time the Armidales spend at sea, with corresponding reductions in alongside time devoted to maintenance. This has also disrupted the original plans for the pool of crews supporting the Armidales to have a smooth cycle of sea duty, training and leave. However, the major effect of the increased time at sea has been the appearance of significant cracking in the patrol craft hulls. This was first noted in HMAS *Armidale* when large internal cracks were detected adjacent to her machinery spaces. These were so serious that *Armidale* was withdrawn from operations and is now limited to training while a remedial program is designed. Similar, though less serious, cracks have been detected in two other patrol craft of this class.

One effect of the accelerated wear and tear on the Armidale class has been the acceleration of plan SEA 1180. This is intended to provide a common hull that will be used to replace the Armidale class patrol craft, the Huon class minehunters, and the existing oceanographic research ships. A class of up to 26 hulls is projected. The original concept was that these ships would use containerized modules to switch between the intended roles. In recent months, though, a study of the interchangeable module concept with input from the Danish and U.S. navies has led to doubts over the viability of this plan and a switch to designing three independent but related classes to fulfill this requirement. One proposal for the Armidale replacement is an extended version of the existing design, 80 meters in length and equipped with either a light helicopter or unmanned aerial vehicle (UAV).

Funding

The target cost for this program was set at AUD450 million ($266 million) for the construction of the class. This was somewhat exceeded.

Contracts/Orders & Options

Contractor	Award ($ millions)	Date/Description
Austal/DMS	553	Dec 2003 – Supply of 12 Armidale class patrol craft.
BAE Systems	N/A	Aug 2004 – Supply of 12 Prism III shipsets.
Austal/DMS	N/A	Jun 2006 – Supply of two Armidale patrol craft.

N/A = Not Available

Timetable

Month	Year	Major Development
	1991	Malaysian Navy starts OPV replacement study
	1992	Australian Navy starts OPC replacement study
Jan	1993	Agreement to merge programs
Aug	1993	Memorandum of Understanding signed
Early	1996	Canadian/Chilean bid based on the Mauritius Coast Guard vessel
Nov	1996	Bidders down to six, from 14, in Phase I prequalified proposals

Month	Year	Major Development
Feb	1997	Phase II technical, commercial proposals submitted for evaluation
Oct	1997	German consortium's design chosen by Malaysia
Oct	1997	Australia cancels OPC requirement
Nov	1999	Australian OPC requirement revived as Project SEA 1444
Nov	2001	Australian bids requested
Jun	2002	Shortlist prepared
	2003	Contract awarded to Austal Ships
May	2005	First craft delivered
May	2008	Last-of-class delivered

Worldwide Distribution/Inventories

Australia. 14 units in service.

Forecast Rationale

By any logical standard, there should be a healthy market for the Armidale class. This has, however, not emerged, despite the class being regarded as a generally excellent solution to the offshore patrol requirement. In fact, the real problem with the Armidale class is that they are too good. They were designed by professional naval architects for a professional navy and thus have benefited from a wealth of experience in the design and operation of patrol craft. This has translated into a highly effective design with admirable operational capabilities. Unfortunately for the prospects of additional sales, that translates into a unit cost a critical degree higher than that of the competition. Most navies regard the offshore patrol function as being very secondary to their primary duties and are only willing to invest the minimum possible resources in that role.

The Armidale class has also received some adverse criticism in recent months following the discovery of severe structural cracks in the lead ship of the class and less serious damage in two others. These are the direct result of the fleet of 14 craft being required to undertake much more extensive duties than originally contemplated. A repair program is being studied but no positive answers have yet emerged. The truth is that the harder ships are worked, the faster their hulls deteriorate and the shorter their operational lives will become.

This has added impetus to the SEA 1180 plan to design a replacement for the Armidale, Huon and survey ships. This was first formalized in the 2009 Defence White Paper but the recent construction of the Armidales and Huons made it of little urgency. This has now changed and the program is escalating in importance. Originally, an initial decision on this class was expected by 2015, with a final decision to be made in 2021. These dates have now been brought forward to 2013 and 2018, respectively.

An accelerated program of this type may well make an improved Armidale class the most practical alternative. For this "Armidale II," the hull would be stretched from 57 to 80 meters and a helicopter or UAV hangar would be installed. Other options being presented include down-sized versions of the two Littoral Combat Ship classes being built in the United States and a British alternative. However, if the urgency of SEA 1180 continues to escalate, a developed version of the Armidale class will be very attractive. This report will, therefore, be maintained while this proposal evolves into a more concrete form.

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