



Naval and Paramilitary Vessels



Expertise and Track Record






Tenix Defence Marine Division is a ship designer, systems integrator and builder based in the Asia Pacific region, developing naval and commercial vessels to meet the environmental and strategic requirements of the market.

Tenix delivers maritime solutions backed by extensive experience in designing, building and delivering over 200 naval, paramilitary and specialist vessels. Tenix is the major supplier to the Royal Australian Navy (RAN) and the Royal New Zealand Navy (RNZN) for guided missile frigates.

Tenix has designed and built 41 patrol boats for Australian and overseas clients since 1986, and currently manages the support of 22 of these vessels.

New Vessel Builds

Military/Paramilitary

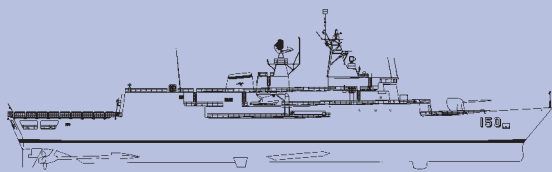
	Patrol Boats/Training Vessels	33
	Search & Rescue Vessels	8
	FFG Class Frigates	2
	ANZAC Class Frigates	10
	Landing Craft	2

Commercial

	Trawlers	146
	Tugs	16
	Others	26



FRIGATES



ANZAC Frigate

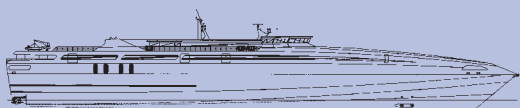
Tenix has delivered seven of the ten ANZAC Class ships to the RAN and RNZN under a contract won in 1989 for the design, construction and support of these guided missile frigates. The last of these vessels will be delivered in 2006. The ANZAC Class has been developed utilising an existing hull design, incorporating modified equipment and systems to meet or exceed the requirements of the RAN and RNZN. Most significantly, Tenix and its subcontractors have developed and integrated a completely new combat and communication system, vital for the ships to meet mission and performance requirements.



FFG-7 Guided Missile Frigates

Tenix built the last two of the six guided missile ADELAIDE Class Frigates currently in service with the RAN. HMAS MELBOURNE was commissioned in February 1992, and HMAS NEWCASTLE was commissioned in December 1993. Each FFG-7 is a long range escort ship able to undertake air defence, anti-submarine warfare, surveillance, interdiction and reconnaissance.

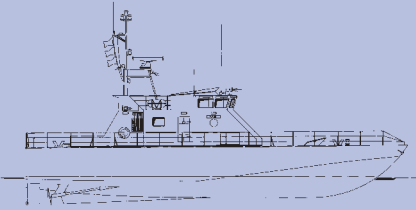
LITTORAL COMBAT VESSELS



80-metre to 130-metre Monohull

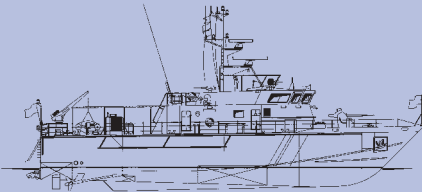
Tenix's design portfolio includes a range of steel hull with aluminium superstructure Littoral Combat Vessels. The vessels can travel at speeds of up to 40 knots. The vessels can be configured to carry up to 1200 troops and a mix of vehicle types.

PATROL VESSELS AND ATTACK CRAFT



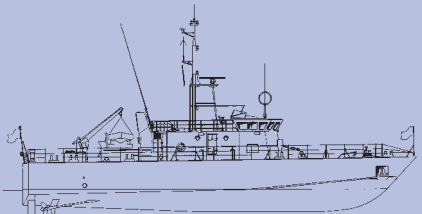
24-metre Patrol Boat

Tenix designed this high-speed craft for patrol, surveillance and inspection operations, military and police duties for coastal and inshore zones. It can also be used for pollution monitoring and crew training. The craft can be armed with light weapons and used to deter criminal activities such as drug smuggling and terrorism in estuarine, coastal and archipelagic areas of Economic Exclusion Zones (EEZ).



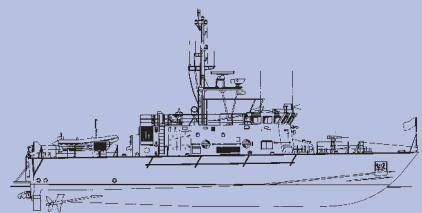
31-metre Patrol Boat

Tenix designed, built and delivered four of these Patrol Boats, a variant of the 31.5-metre Pacific Patrol Boat, to the Kuwait Coast Guard. The vessel is capable of extended range patrols in both coastal and offshore areas. To perform an interdiction role as well as a surveillance role, the craft can be armed with light weapons. Tenix also offers this hull as a fast crew boat for the offshore oil industry.



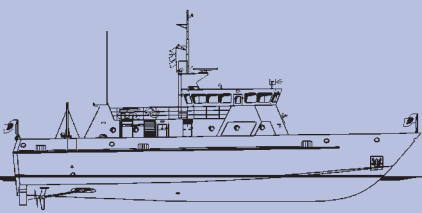
31.5-metre Pacific Patrol Boat

Tenix designed this robust 31.5-metre vessel specifically for operations in isolated areas. The vessel is extremely user friendly and has been built for operation by civilians. The vessel was produced as a surveillance craft for the Pacific Island Nations and Tenix Defence Marine Division has built 22 vessels under a contract with the Australian Government.



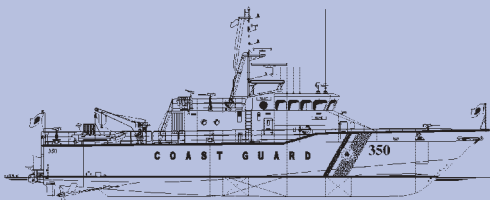
31.5-metre Police Patrol Boat

Tenix designed, built and delivered six of these vessels to the Hong Kong Water Police. The vessel is equipped with a comprehensive communications suite and a compact operations room for the co-ordination of aircraft and other assets in the execution of police and customs roles. It is also equipped with an electro-optic sight, navigation radar and three searchlights for surveillance and inspection at night. This variant of the Pacific Patrol Boat employs a third engine, driving a water jet for loiter and sprint purposes.



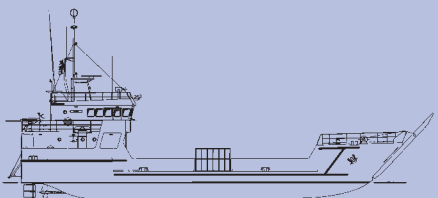
31.5-metre Navigation Training Vessel

Tenix designed, built and delivered the SEAHORSE MERCATOR, another variant of the 31.5-metre Pacific Patrol Boat, to the Australian Department of Defence, Defence Maritime Services in 1999 for use as a Navigation Training vessel for the RAN. This vessel used the same hull design as the Pacific Patrol Boat but the interior and superstructure were designed specifically for the vessel's training task.



35-metre Patrol Boat

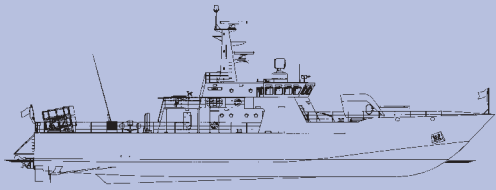
Tenix designed and built this extended and more capable version of the 31.5-metre Pacific Patrol Boat. The all aluminium vessel is intended for surveillance and interdiction patrols in coastal and restricted offshore zones. In December 2001, the Philippine Coast Guard placed an order with Tenix for the delivery of four 35-metre high-speed Search and Rescue Vessels with an option for 10 more as part of a larger follow-on order. The four vessels were delivered on time and on budget.



36.5-metre Landing Craft

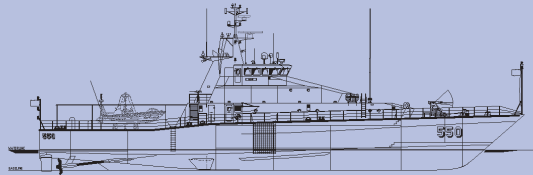
Tenix designed, built and delivered two of these vessels to the Royal Brunei Navy. This cost-effective landing craft is designed for marine transportation and logistic support duties in coastal waters. It carries a variety of liquid and deck loads including battle tanks, reconnaissance vehicles, artillery, trucks and combat troops. Logistic loadouts are also within the vessel's capability. Loading and unloading is via the main bow or a side door on each side.

PATROL VESSELS AND ATTACK CRAFT



46-metre Fast Attack Craft

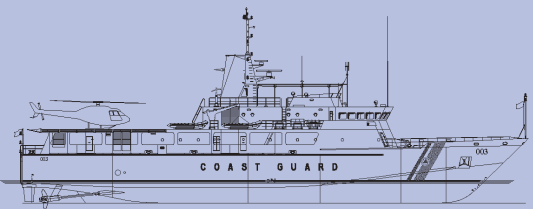
The Tenix designed 46-metre Fast Attack Craft is capable of extended offensive surveillance operations for customs and paramilitary duties in coastal and restricted offshore zones.



55-metre Patrol Boat

This new generation Tenix designed patrol vessel has been extensively tested at MARIN. The design has been optimised for the surveillance, interception, apprehension and escort of illegal vessels.

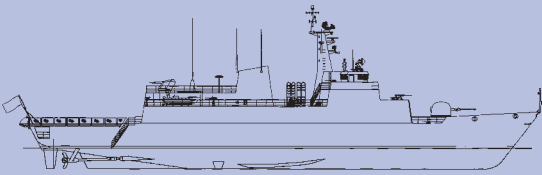
This specialist vessel is designed to Classification Standards for operation in tropical waters.



56-metre Search and Rescue Vessel

Tenix has designed, built and delivered four of these vessels to the Philippine Coast Guard for search and rescue duties in coastal and offshore zones.

This is a purpose built vessel capable of providing search and rescue operations in a variety of conditions and scenarios. It is designed with helicopter support facilities, an emergency medical facility and a recompression chamber.



80-metre Offshore Patrol Vessel

Tenix designed this vessel in conjunction with the Royal Australian Navy to meet the operational requirements of the region. The vessel has been optimised for long range patrol and surveillance roles. Seakeeping has been extensively tank tested by MARIN and the vessel is ideally suited to long arduous operations in the ASEAN region. The ship is designed for unrestricted operations in Sea State 5 conditions, including all weapons, sensors and intermediate sized helicopter operations.

Performance, Diversity, Quality

Tenix Defence Marine Division has constructed and delivered a range of vessels from 31-metres to 56-metres using a common design basis. Tenix's experience with successive designs, improved construction techniques, sea trials and support management has led to evolving design, build and support processes ensuring customer satisfaction.

Computer and scale model testing using acknowledged authorities such as the Marine Research Institute of the Netherlands (MARIN), Australian Maritime College (AMC) and Curtin University have supported the design process. Sea trials have confirmed modelling data for speed, seakeeping, passenger comfort, and noise and vibration levels.

All of Tenix's vessels are designed for ease of operation and maintenance, particularly in tropical conditions. The designs are practical and effective, while being tailored to the requirements of diverse customers. Constructed with steel hull and aluminium superstructure or all aluminium, using the latest welding techniques, the vessels have proven to be very robust in service. Propulsion configurations can be designed to meet customer requirements.

The vessels comply with Classification Society rules and embody the latest technological advances in design and materials.

Patrol Boats



56-Metre Search and Rescue Vessel

The Philippine Search and Rescue (SAR) Project is the latest success in the long history of Tenix patrol boat design, construction and export.

This purpose built Search and Rescue Vessel includes a helicopter flight deck, a stern launched rescue boat, reception facilities for up to 200 survivors including a recompression chamber and emergency medical facilities.

Four of these vessels have recently been delivered to the Philippines Coast Guard.

To meet the Philippine Coast Guard's operational requirements, the 56-metre SAR design includes the following innovative features:

- Helicopter capability – notably a flight deck and the stability to conduct flight operations in Sea State 3
- A large rescue boat that is launched and recovered through the vessel's stern
- Facilities for up to 200 survivors including a recompression chamber, modular bunk accommodation and an emergency medical facility
- Pollution control and firefighting systems.

Missions

- Search and rescue
- Marine environmental protection
- Maritime law enforcement
- Training.

Propulsion

The baseline propulsion configuration is two Caterpillar 3612 diesel engines driving two controllable pitch propellers.

Search and Rescue Facilities

- 6.5-metre rigid inflatable fast rescue boat launched through a transom ramp
- Four crane launched 4.2-metre rigid inflatable boats
- Flight deck and helicopter support facilities
- Large enclosed survivors rescue area incorporating emergency berthing
- Medical facility
- Recompression chamber
- Pollution control equipment.

Main Dimensions and Characteristics

Length (overall)	56.0 metres
Beam	10.5 metres
Draught (extreme)	2.5 metres
Displacement (full load)	540 tonnes
Speed	24.5+ knots
Complement	38
Range at 24 knots	1000 nautical miles
Range at 15 knots	2000 nautical miles

"I have no hesitation in recommending Tenix as a contractor; a ship designer and constructor; and for the provision of through life support."

Captain Isidro Banaria PCG,
Project Director
Search and Rescue Project
Philippine Coast Guard.

80-metre Offshore Patrol Vessel

The 80-metre offshore patrol vessel has been designed specifically for naval operations and support in the region. This ship has been developed in conjunction with the Royal Australian Navy to meet the operational requirements of the region. It has been optimised for long range patrol and surveillance roles.

Its primary mission and functional capabilities are:

- Maritime surveillance, patrol and response tasks
- Protection of offshore resources and infrastructure
- EEZ patrol and surveillance
- Demonstration of national presence
- Participation in international exercises.

Secondary roles can include:

- Training
- Disaster relief including medical and emergency evacuation of personnel
- Search and rescue
- Collection of environmental data
- Pollution control.



Patrol Boats



31.5-metre Pacific Patrol Boat

This robust 31.5-metre vessel has been designed specifically for operations in isolated areas. The vessel is extremely user friendly and has been built for operation by civilians. An integral feature of the vessel is its simplicity of design which accommodates a wide variety of mission systems. The design was developed by Tenix, fully model tested at MARIN and modelling results were validated by sea trials.

The hull of the craft was developed from an operationally proven design using 250 grade mild steel with a marine grade aluminium superstructure which is easy to maintain and repair. To ensure optimal performance, Tenix manages the through life support and refits of these vessels.

The vessel was produced as a surveillance craft for 12 Pacific Island Nations and Tenix Defence Marine Division received an initial order in 1987 to build 22 under a contract with the Australian Government. These vessels, the last of which was delivered in 1997, have proved in-service to be excellent platforms within their operating environment.

Missions

- Surveillance and interdiction patrols
- Anti-piracy
- Search and rescue
- Fishery protection
- Crew training.

Main Dimensions and Characteristics

Length (overall)	31.5 metres
Beam	8.2 metres
Draught (extreme)	1.8 metres
Displacement (full load)	165 tonnes
Speed	20 knots
Complement	19 crew

Propulsion

The baseline propulsion configuration is two Caterpillar 3516 diesel engines driving two controllable pitch propellers.

Operational Characteristics

The patrol boat has exceptional endurance with a range of 2500 nautical miles at 12 knots but also has the ability to perform at high speeds while still retaining good seakeeping ability.



31-metre Patrol Boat

Four 31-metre variants of the Pacific Patrol Boat are in service with the Kuwait Coast Guard. This design variant used a slightly different hull to satisfy a customer requirement to operate at higher speeds.

Missions

- Surveillance patrolling
- Search and rescue
- Fishery protection.

Main Dimensions and Characteristics

Length (overall)	31.0 metres
Beam	6.5 metres
Draught (extreme)	1.8 metres
Displacement (full load)	120 tonnes
Speed	20 knots
Complement	11
Range at 20 knots	300 nautical miles

Propulsion

The baseline propulsion system comprises two MTU 16V 396 TB94 diesel engines driving two fixed pitch propellers, with loiter and sprint capabilities provided by a MTU 8V 183 TE62 diesel engine driving a steerable, reversible water-jet.

Operational Characteristics

The platform allows continuous visual watch, day and night, supported by radar and searchlights. Alternative systems can be provided to meet customer needs. Excellent seakeeping enables these vessels to operate without undue crew fatigue or interruption at full speed in up to Sea State 4.

The vessel has minimum roll amplitude at low speed or when stopped. This is an effective and desirable characteristic given its need to conduct investigations or rescues in a seaway, including deployment of the 5-metre inflatable boat. The robust steel hull allows the Patrol Boat to come alongside target vessels with minimum risk of damage.





31.5-metre Police Patrol Boat

A high-speed version of the 31.5-metre Pacific Patrol Boat forms the basis of a series of six patrol vessels that have been supplied to the Hong Kong Water Police. This design variation used the same hull but a different trim wedge because of the high speed requirement, and employs a third engine, driving a water jet for loiter and sprint purposes.

The design was optimised for the boats primary mission and includes a comprehensive communications suite and an operations room for the coordination of other vessels and aircraft during law enforcement operations.

Missions

- Command, communications and surveillance for military, customs and police operations
- Search and rescue
- Fishery protection.

Main Dimensions and Characteristics

Length (overall)	33 metres
Beam	8.2 metres
Draught (extreme)	2.4 metres
Displacement (full load)	145 tonnes
Speed	24 knots
Complement	19
Range at 12 knots	1300 nautical miles

Propulsion

The baseline propulsion system comprises two Caterpillar 3516 Phase II diesel engines driving two fixed pitch propellers with loiter and sprint capabilities provided by a Caterpillar 3412 DITA diesel engine driving a steerable, reversible water-jet.

Operational Characteristics

The platform allows continuous watch, day and night, supported by radar, electro-optics, searchlights and radio direction finding. Excellent seakeeping enables these systems to be used without undue crew fatigue or interruption at full speed in up to Sea State 4. During the delivery voyage these vessels successfully transited through typhoon conditions.

The vessel has minimum roll amplitude at low speed or when stopped. This is an effective and desirable characteristic given its need to conduct investigations in a seaway, including deployment of the 5-metre inflatable boat. The robust steel hull allows the Police Patrol Boat to come alongside target vessels with minimum risk of damage.



55-metre Patrol Boat

Tenix has developed a 55-metre Patrol Boat to meet the particular needs of our clients. The design optimises powering, seakeeping and habitability and has been developed from the proven Philippines 56-metre SAR vessels.

The Tenix 55-metre Patrol Boat design has been proven in extensive model testing. The deep vee hull provides a stable platform and excellent seakeeping without the need for a complex ride control system. The hull size provides stability at low speed and safety in all sea conditions.

Crew accommodation is spacious and comfortable, and includes cabin style berthing with ensuite facilities for all ranks.

Experience gained from the design, construction and support of Tenix patrol boats, and other fleets operating under similar conditions, has been incorporated into the design to optimise vessel and personnel performance and minimise maintenance.

Main Dimensions and Characteristics

Steel hull, aluminium superstructure	
Length (overall)	55 metres
Complement	29 plus additional accommodation for 20

Propulsion

Two diesel, two shafts	
Maximum speed	25+ knots
Range at cruising speed	3000 nautical miles



35-metre Search and Rescue Vessel

The purpose designed, all aluminum, Search and Rescue Vessel has been built to undertake search and rescue activities, maritime law enforcement, marine environmental protection and maritime training. Four of these vessels have been designed and built by Tenix for use in the Philippine Coast Guard.

Main Dimensions and Characteristics:

Length (overall)	36.2 metres
Beam	7.3 metres
Draught	2.3 metres
Displacement	115 tonnes
Speed	24 knots
Complement	20
Range at 12 knots	2000 nautical miles

Attack Craft



46-metre Fast Attack Craft

The 46-metre Fast Attack Craft is capable of extended offensive surveillance operations. This design was tank tested at MARIN. This modelling confirmed design predictions and the suitability of the design for extrapolation to a range of vessel sizes.

Its primary roles include:

- Strike capability against surface targets
- EEZ patrol and surveillance
- Self defence from air attacks.

Secondary roles include:

- Anti-piracy
- Fishery protection
- Customs (drug and immigration enforcement)
- Pollution monitoring
- Search and rescue
- Crew training.

Landing Craft



36.5-metre Landing Craft

This cost-effective landing craft is designed for marine transportation and logistic support duties in coastal waters. It carries a variety of liquid and deck loads including battle tanks, reconnaissance vehicles, artillery, trucks and combat troops. The vessel can load from the main bow door or via port and starboard side doors. Two of these vessels have been delivered to the Royal Brunei Navy.

The design is constructed of all welded mild steel construction to international classification society standards and complies with NATO standards and safety and stability requirements. Comfortable air-conditioned accommodation and recreation facilities are provided for a ships complement of 12 and the design incorporates modern navigation and communication systems.

A typical weapon fit comprises two 20mm cannons and two 12.7mm machine guns, and the vessel is equipped to transfer fuel, water and stores to other vessels at sea. Logistic loadouts are also within the vessels capability. The design can be readily adapted for a variety of non-military logistic roles including emergency disaster relief operations.

Its primary mission and functional capabilities include:

- Vehicle transportation and landing
- Troop transportation and landing
- Logistic support
- At sea replenishment for small combatants.

Secondary roles can include crew training and disaster relief operations.

ANZAC Frigates



The ANZAC Ship Project is a collaborative project between the Australian and New Zealand Governments for the development and construction of 10 new ANZAC Class guided missile frigates - eight for the RAN and two for the RNZN.

Tenix won the ANZAC Ship Project contract in 1989. The 17-year, fixed price contract is currently worth approximately \$A6 billion. It is the largest and most successful Defence contract ever awarded in Australia. Tenix's management of the contract has earned it international recognition and a number of prestigious engineering and quality awards.

The ANZAC Class ship is a versatile surface combatant designed to the particular needs of the Royal Australian and New Zealand Navies. The frigates can operate effectively in climatic and oceanographic conditions ranging from tropical to sub-Antarctic.

The ANZAC Class is derived from the MEKO® 200 platform design. The design has been enhanced and modified by Tenix to meet the specific regional and strategic requirements of the RAN and RNZN. Tenix has also undertaken detail design of the ANZAC Class frigates including the integration of the combat system and the incorporation of high levels of locally sourced equipment.

Principal Characteristics

Length (overall)	118.0 metres
Beam (extreme)	14.8 metres
Displacement (full load)	3600 tonnes
Speed	>27 knots
Range at 18 knots	>6000 nautical miles
Complement	164 officers and sailors

FFG-7 Guided Missile Frigates



Tenix built the last two of the six guided missile "Adelaide" Class frigates currently in service with the RAN, HMAS MELBOURNE and HMAS NEWCASTLE.

Each FFG-7 is a long range escort ship able to undertake air defence, anti-submarine warfare, surveillance, interdiction and reconnaissance. They are the first RAN ships with gas turbine powered main propulsion.

Ship design, combined with a modern repair by replacement policy, has allowed both a reduced complement and a high availability for sea. The FFG can be underway from cold in less than 30 minutes. In addition, two forward mounted, retractable auxiliary propulsion units provide a secondary means of propulsion plus excellent manoeuvrability in confined waters.

Principal Characteristics

Length	138 metres
Beam	14.3 metres
Displacement	4100 tonnes
Speed	>30 knots
Complement	210 officers and sailors



Tenix Defence Pty Ltd

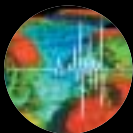
Tenix Defence is a world-class project, product and services organisation serving defence markets in Australia, New Zealand, the South Pacific and South-East Asia. The only Australian-owned major defence prime contractor, Tenix Defence provides complete systems solutions on naval, airborne and land platforms.

Tenix Defence is organised in four divisions: Aerospace, Electronic Systems, Land and Marine.



Aerospace Division

- Designs, integrates and installs aircraft systems
- Undertakes modifications, upgrade and support of military aircraft



Electronic Systems Division

- Delivers systems and technology solutions in C4I, surveillance and reconnaissance, electronic warfare, simulation, and information and computer security
- Supplies hydrographic services through the manufacture and operation of laser airborne depth sounding systems by Tenix LADS Corporation



Land Division

- Designs, manufactures, modifies, maintains, upgrades and repairs military vehicles
- Provides integrated logistic support and through life support to all major in-service ADF vehicles in Australia, and garrison services to the Albury-Wodonga Military Area



Marine Division

- Designs, builds, maintains and refits naval, para-military and commercial vessels; provides comprehensive maritime support; utilises particular skills in naval systems design and integration
- With Australia's largest shiplift, undertakes ship repair and dry-docking for commercial and naval operators
- Manages the ANZAC Ship Project delivering two frigates to the RNZN and eight to the RAN

For further information, visit our website at

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For innovative solutions