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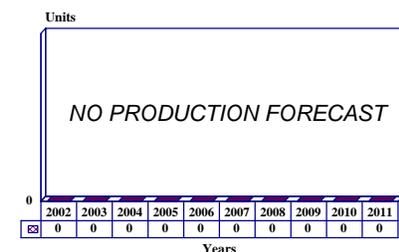
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um Al Maradim – Archived 04/2003

Outlook

- Design is response to Kuwaiti requirements after Gulf War
- Represents trade-off sacrificing firepower for situational awareness
- Additional construction unlikely
- Follow-on in Kuwait will be larger Offshore Missile Vessel
- No export potential at present

10 Year Unit Production Forecast
2002 - 2011



Orientation

Description. Fast attack craft – missile (FAC-M).

Sponsor. Kuwaiti Navy.

Contractors

DCN International (DCN)

Bureau Strategie
19-21 rue de Colonel Pierre Avia
F-75015 Paris
France
Tel: +33 1 41087171
Fax: +33 1 41080027
(Prime contractor, contract manager)

Alenia Difesa Otobreda Division

Via Valdilocchi 15
19136 La Spezia
Italy
Tel: +39 0187 581111
Fax: +39 0187 582669
E-mail: otobsales@col.it
(40 mm main gun)

Construction Mécanique de Normandie (CMN)

BP 10
F-50115 Cherbourg Naval
France
Tel: +33 2 33922020
(Systems integrator, hull construction)

Giat Industries

13 Route de la Minière
F-78034 Versailles cedex
France
Tel: +33 1 30 97 37 37
Fax: +33 1 30 97 39 00
Marketing Department
Tel: +33 1 30 97 39 91
Fax: +33 1 30 97 39 67
Web site: <http://www.giat-industries.fr>
(20 mm secondary gun)

Kamewa AB

Box 1010
68129 Kristinehamn
Sweden
Tel: +46 550 84000
Fax: +46 550 18190
Web site: <http://www.kamewagroup.com>
(Waterjet propulsion)

SAGEM, Defence and Security Division

61 rue Salvador Allende
92751 Nanterre Cedex
France
Tel: +33 1 40 70 63 63
Fax: +33 1 40 70 66 00
E-mail: jean-charles.pignot@sagem.com
Web site: <http://www.sagem.com>

(Passive IR seeker on SSMs)

Thales NCS France

7-9 rue des Mathurins
92221 Bagneux Cedex
France

Tel: +33 1 40 84 20 00

Fax: +33 1 40 84 11 59

Web site: <http://www.ncs-france.Thales.com/>

(Radar, combat systems, ESM)

CMN Support Services Ltd

Lowestoft

UK

(Logistics support)

Matra BAe Dynamics

London

UK

(Missiles, launchers)

Matra Defense

Courtaboeuf

France

(Optronic weapon director)

Sir Joseph Isherwood Ltd

Newcastle upon Tyne

UK

(Logistics support)

Licensees. No licenses for the construction of this class have been granted.

Status. In service.

Total Produced. Eight of this class have been built for Kuwait.

Pennant List

<u>Number & Name</u>	<u>Builder</u>	<u>Launch</u>	<u>Commissioning</u>
P-3711 <i>Um Al Maradim</i>	CMN Cherbourg	2/1997	8/1998
P-3713 <i>Ouha</i>	CMN Cherbourg	5/1997	8/1998
P-3715 <i>Failaka</i>	CMN Cherbourg	8/1997	12/1998
P-3717 <i>Maskan</i>	CMN Cherbourg	1/1998	12/1998
P-3719 <i>Al Ahmadi</i>	CMN Cherbourg	4/1998	5/1999
P-3721 <i>Al Fahaheel</i>	CMN Cherbourg	6/1998	5/1999
P-3723 <i>Al Yamook</i>	CMN Cherbourg	3/1999	4/2000
P-3725 <i>Garoh</i>	CMN Cherbourg	6/1999	5/2000

Mission. Coastal patrol and defense in the northern waters of the Arabian Gulf around Kuwait, including protection of the country's vital sea lanes.

Price Range. Based on the 1995 contract value of US\$485 million for eight boats, the unit price is roughly

US\$60 million. However, this does not include the electronic warfare equipment, anti-ship missile systems and fire control radars or the anti-aircraft missiles. These would add an estimated extra \$10-15 million to the cost of each ship.

Technical Data

	<u>Metric</u>	<u>US</u>
Dimensions		
Length – Overall	42 m	137.8 ft
Waterline	37 m	121.4 ft
Beam	8.2 m	26.9 ft
Draft	1.9 m	6.2 ft
Displacement		
Full Load	222.2 tonnes	245 tons
Performance		
Top Speed	55+ kmph	30+ kt
Operating Range	2,500 km	1,350 nm at 14 kt
Maximum Range	4,250 km	2,300 nm
Crew	28-30 (5 officers)	

Armament	Type	Quantity
Main Gun	Otobreda Single Fast Forty A/L70	1
Secondary Gun	Giat Type 15A 20 mm	1
Machine-Guns	0.50 cal	2
SSM	Sea Skua SL	2x2
SAM	Matra Sadral (not fitted)	1x6
Electronics		
Radars		
Air-Surface Search	Thales Multi-Role 3D; G-band	1
Navigation	Litton Marine 20V90; I-band	1
Target Acquisition/Fire control for Sea Skua missiles	BAe Seaspray 3000 Mk 3; I/J-band	1
Electronic Warfare		
ESM	Thales DR 3000C or S1; intercept	1
Countermeasures Launchers	CSEE Dagaie (FFBNW)	1
Jammer (not fitted)	Dassault Salamandre	1
IFF	GEC-Marconi Hazeltine (AN/TPX-54(V) Mk XII?)	1
Command System	TAVITAC NT & Calisto	
Fire Control	CS Défense Najir Mk 2 optronic director	1
Datalink	Link 11	1
COMINT	Rohde & Schwartz/Siemens Link Y	
Countermeasures	Dagaie Mk 2 chaff launchers fitted-for only	2
Machinery		
Diesels	MTU 16V538TB93	2x3,000 shp (2x2,220 kW)
Auxiliary Engines	MTU BV 396	2
Propulsion	KaMeWa 90SII waterjets	2

Design Features. The Um Al Maradim class is a derivative of DCN's Combattante I class small fast attack craft. The special requirements of the Kuwaiti Navy have resulted in significant changes to the original design, including an enlarged hull and modified superstructure. The hull is made of steel, and the superstructure is aluminum. The deep-V hard chine hullform is optimized for operations in the restricted shallow-water conditions of the northern Arabian Gulf. The design of the craft has been carried out using the CATIA and CIRCE CAD software packages.

The vessel's main gun, an Otobreda 40 mm single mount, is installed forward of the superstructure. The Giat type M621 20 mm gun is mounted aft. There are two 12.7 mm general purpose machine-guns in the bridge wings.

The craft are armed with two twin launchers for the Matra BAe Dynamics Sea Skua anti-ship missiles, mounted on the fantail. Original plans were for the class to be equipped with the Sadral anti-aircraft missile launcher supplied by Matra BAe Dynamics. This fires the Mistral surface-to-air missile. The Simbad launcher was to have been installed aft of the radar mast. This plan has now been abandoned, and the missiles will not be installed.

The combat data system is the Tavitac, supplied by Thales. The vessel's optronic weapon director is the Najir Mark 2, supplied by Matra Defense.

The BAE Systems Seaspray fire control radar is mounted at the top of the main mast. Thales has supplied the MRR three-dimensional air and surface search radar, which operates in the E/F-band. The MRR radar is installed on the radar platform at the top

of the radar tower. The Racal I-band navigation radar is installed on the front of the radar tower. The attack boats are equipped with the Thales DR-3000S radar warning receiver, operating in D to K bands.

The vessels have provisions for decoy launchers and Sadral launchers for the firing of Mistral IR homing SAMs in order to expand their operational envelope to more robust aerial defense as well. The original plans included the Salamandre radar jammer developed by Thales, but this too has been abandoned. The ships can also be fitted with two Dagaie decoy launchers developed by Matra Defense. The propulsion system is based on two 2.94 MW diesel engines supplied by MTU with two waterjet systems developed by KaMeWa AB of Sweden.

Operational Characteristics. The key functions of these boats include carrying out coastal defense operations and sea surveillance in Kuwait's EEZ (exclusive economic zone). The Kuwaiti Navy plans to have a total of 10 crews trained for the eight boats, utilizing a rotation system for the operation on a constant basis. The craft is operated by a crew of 24-28 (exact numbers vary according to source). The vessel is capable of a maximum speed of 30 knots. At an economical speed of 15 knots, the range is over 1,300 miles.

The MRR three-dimensional multimode radar can function in one of three operating modes: self-defense (maximum range 60 km); normal surveillance (optimized to detect low- and medium-altitude targets at up to 140 km distances); and long-range surveillance, which gives the vessel a maximum range of 180 kilometers in target surveillance capability. The Sea Skua SL lightweight surface-to-surface missiles can engage targets at up to 15 kilometer distances.

Target tracking, gunfire control, and EO surveillance are done by a Najir Mk 2 director by CS Defense. This allows fire control for two guns of different calibers and includes a line of sight stabilized mounting (two axis). The mast-mounted target acquisition radar provides tracking and semi-active illumination of the target. One of the Calisto multifunction consoles displays the track and target information as part of the overall command information center system.

The DR-3000S radar warning receiver system uses a combination of omnidirectional antennas and directional monopulse masthead antenna arrays to provide a directional accuracy of better than 1 degree for targeting. The system incorporates a very high speed instantaneous frequency measurement (IFM) system.



Um Al Maradim

Source: Kuwait Navy

Variants/Upgrades

Combattante I. The Um Al Maradim is an export configuration of the Combattante I class.

Combattante 1M. The Combattante 1M, which features a new combat system configuration with an unmanned aerial vehicle, incorporates a range of stealth characteristics which give the patrol craft an exceptionally low radar signature.

Combattante II. A design offered by CMN in 1967 representing an enlarged version of the original La Combattante FAC designed by Germany's Lürssen for construction by CMN in France. At 18 feet longer and about 20 tons heavier than the original Combattante (154.2 ft x 23 ft, or 47 m x 7 m, 234-265 tons), this version otherwise bore a very close resemblance to the German Type 148 design, resulting in suggestions of plagiarism. Greece ordered four, designated Combattante IIA, in mid-1969. Four more Combattante IIs were transferred from Germany in 1993. The hull sizes and propulsion are the same; the differences are in the electronics suites. The last two of this particular series were refitted to fire the Harpoon missiles during their midlife update in the mid-1980s.

Combattante IIB. Iran ordered 12 of the enlarged Combattante class FACs in 1974, the first nine of which were delivered by the 1979 Islamic Revolution. These boats had a length of 47 meters, with a beam of 7.1 meters and draft of 1.9 meters. Power comes from four MTU 16V538TB91 diesel engines, with a reported top speed of 36 knots. The electronics suite consists of one Decca 1226 and one Signaal WM-28 radar, DR-2000S ESM and Alligator jammer. About 10 boats are believed to remain in operation.

Combattante IID. The version operated by Malaysia (a.k.a. Combattante II 4AL, or the Perdana class) has the same hull dimensions as the Iranian boats, but the power comes from four MTU MB870 diesels. Also, the draft of these boats is listed as being twice as deep as those of others, at 3.9 meters (12.8 ft). The armament consists of two MM38 Exocet SSMs, and one 57 mm and one 40 mm Bofors anti-aircraft gun.

Combattante IIG. The boats operated by Libya are larger again, measuring 49 meters in length and 7.1 meters in width, with a displacement of 311 tons in full load. The armament consists of four Otomat SSMs, one OTO Melara DP gun, and one Otobreda 40 mm AA gun. Most of these boats are reported to be in non-operational condition today.

Combattante IIS. A modified version of the old Combattante II design has existed as well, modified into

an offshore patrol vessel configuration. As such, it was stripped of the missiles in its armament, being limited to the 76 mm gun, a 20 mm cannon and, two 12.7 mm machine-guns. No orders for this model have been reported.

Combattante III. An enlarged version of Combattante II, first bought by Greece in 1974. Six more were ordered in January 1977. Some of the ships were built locally in Greece. The length of the boats is 56.5 meters, with a beam of 8 meters and a draft of 2.1 meters. Power comes from four MTU diesels of type 20V538TB92 (17,060 shp), turning four controllable pitch propellers through four shafts.

The armament consists of four MM38 Exocet SSMs, two 76 mm OTO Melara DP guns, four Emerlec AA guns, and two heavyweight torpedo tubes in the aft, firing SST-4 wire-guided torpedoes. The electronics suite consists of the Decca 1226, Thales Triton and Thales Castor radars, the DR-2000S ESM system, and an Alligator jammer.

Combattante IIIB. The version operated by Nigeria is 56.2 meters long and has a beam of 7.6 meters, with a draft of 2.1 meters. Displacement is quoted as 385 tons standard and 430 tons in full load. Power comes from four MTU 16V956 TB92 diesels (17,700 shp), operating two shafts. The ships were bought in the late 1970s, and only two remain seaworthy. It is believed that the weapon systems are non-operational by now, having originally included four MM38 Exocets each.

Combattante IIIM. Qatar's three FACs of this type are slightly lighter in displacement, at 345 tons standard and 395 tons in full load. The four MTU 20V538 TB93 engines produce a total of 18,740 shp, on two shafts. These ships have eight Exocets each in addition to the 76 and 40 mm guns on board. The electronics suite is the same as on the IIIBs of Nigeria with the exception of more sophisticated countermeasures equipment.

Tunisia also operates three of this type, with all reportedly in need of a refit. Their total operating displacement is quoted as slightly higher than that of those in Qatar, at 425 tons. The engines are MTU 538 TB93s, which produce the same 18,740 shp.

Combattante IV. The latest version of the Combattante family of designs. It bears virtually no relationship to the earlier Combattantes, with an entirely different hull form and structural layout. The steel hull in this design is of hard-chine planing form, and is substantially deeper at the bows. The superstructure is made of composites for a lighter weight and reduced radar

cross-section. The mast is a carbon fiber tower structure; both the superstructure and the mast are shaped to provide enhanced stealth. No orders for this design have been reported thus far.

Combattante BR-65. An even larger version of the Combattante IVNG was announced at the 1992 Bourget Navale exhibition in France. The displacement had been raised to 820 tons, using all-steel construction. The armament was essentially the same as on the IVNG, with the addition of facilities for an attack helicopter on board. The lightweight Sadral missile system was replaced by Crotale.

Combattante BR-70. A 1,000-ton design with a total length of 215 feet and a top speed of 35+ knots was unveiled at the 1996 Euronaval show. Referred to as an ocean-capable patrol craft, this design, propelled by waterjets, implemented a superstructure intended to minimize the RCS. The power comes from three GE LM2500 gas turbines or four MTU diesels.

The primary anti-surface weapons include sea-skimming missiles such as the Harpoon or Exocet supplemented by a close-in weapon system (CIWS), a point defense missile system with 16 missiles,

long-range and short-range surface-to-surface missiles, as well as torpedoes and a medium-size helicopter. Two unmanned aerial vehicles are also offered in this ship.

One of the key features of this particular variant is its integrated combat system, which is intended to allow a 35-member crew to handle a range of surface and air warfare scenarios. The primary competitor is the Israeli Sa'ar 5 class, which features regional power projection capability, while the BR-70 is optimized for coastal operations.

P-37 BRL/P37-BRL/PB-37BRL. Alternative names for the Combattante I.

Tiger Class. This is the former German Type 148 FAC class operated by Chile and essentially very similar to the Combattante II type described above. This appears to be the design from which the Combattante II class emerged.

Type 148. The Lürssen-designed FAC which acted as the basis for the Combattante class.

Um Almaradim. Alternative spelling of the class name.

Program Review

Background. The Um Al Maradim class represents the first stage in Kuwait's naval rearmament after the losses suffered in Operation Desert Storm. In that war, Iraq captured one of Kuwait's two FPB 57 FACs and five of its six TNC 45 FACs. All six were subsequently sunk by air attacks during the Battle of the Bubiyan Channel in January 1991. Kuwait and France entered a bilateral defense accord in 1992 for the rebuilding of the country. Kuwait declared it would spend about US\$12 billion over the following 12 years to re-equip and modernize its naval capabilities.

The original designation for this program, P37-BRL or PB-37BRL, came from "Patrol Boat 37 meter, Blue Riband, Lengthened." This was a reference to the 67 meter Italian-made gas turbine vessel *Destriero*, also designed by DCN, which was built for breaking the speed record for nonstop crossing of the Atlantic in 1992. Originally this design was 37 meters in length, but was increased to 42 meters for the requirements of the Kuwaiti Navy.

The program progressed rather slowly, although the French announced in the third quarter of 1994 that the client had finally indicated its preference for the French solution over the rival bids from Germany's Lürssen Werft and Britain's Vosper Thornycroft.

Kuwait placed an order for eight boats of this type on March 27, 1995, in a government-to-government contract worth FRF2.4 billion (roughly US\$400 million) under Project Garoh. First steel was cut for the first two boats of the series on June 9, 1995. Since then, the plate cutting for the subsequent units has been on a six-month basis, one pair at a time.

The program suffered delays in its initial delivery schedule due to the changes made by the Kuwaiti Navy both before and after signing the contract. Disagreements and political clashes over the boat's surface-to-surface missile fit caused further delays in the delivery schedule.

The inability to make a decision about the surface-to-surface missile fit on these boats became a major sticking point. The missile contract was not part of the original order for the ships themselves, but was contracted separately. Long negotiations were carried out between the final bidders, which included France's Matra (Mistral Sadral SAM), Shorts Brothers of Ireland (Starburst), Aerospatiale Missiles of France (MM-15), and British Aerospace (Sea Skua SL). Norway's Kongsberg had also resubmitted its bid before the final decision was made. This was a last-ditch attempt to win the customer for its product, which the company claimed was better suited to the projected operating conditions of the ship. While the missile issue was still

open, some of the construction was slowed in anticipation of a decision on the missile choice. It was also suggested at the time that the first ships be delivered to the client without a missile system and be retrofitted only when at the destination.

The final decision came down to the Sea Skua and the MM-15. After much dispute and review by the Kuwaiti Parliament, the Sea Skua was selected in September 1997. The Kuwaiti Parliament had opposed the procurement of Sea Skua, claiming that the rival French MM-15 was less expensive and more effective. This impasse was eventually resolved by dissolving the Kuwaiti Parliament. The deciding factor in selecting Sea Skua was reported to be that the British missiles are installed on the rear deck using launch boxes, while the MM-15s would have necessitated cutting of steel on the side of the forward superstructure to allow installation of panniers. The first six ships will receive the Sea

Skuas as a retrofit once in Kuwait. The last two ships of the series were built in France with the Sea Skua systems already installed.

The first pair of the new class was delivered to the Kuwaiti Navy in August 1998, while the second pair followed four months later, in December. The third pair were completed in May 1999, but the last two hulls were delayed until May 2000 in order to install the long-awaited Sea Skua launchers. The first successful test-firing of a Kuwaiti Sea Skua was carried out in March 2000.

Units of the Um Al Maradim class saw action for the first time on October 24, 2001, when they intercepted five Iraqi fishing boats, apparently within Kuwaiti territorial waters, although details of the incident remain unclear. The action resulted in a written protest from the Iraqi Foreign Minister to UN Secretary-General Kofi Annan.

Funding

This program is funded by the Kuwait Ministry of Defense through the budget for the Navy.

Recent Contracts

<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
DCN	485	March 27, 1995 – Four-year contract for the delivery of eight patrol vessels (without weapon systems).
Otobreda	15.6	1995 – Eight Fast 40 gun mountings for the patrol vessels.
BAe (Matra BAe Dynamics)	72	March 1997 – A UK-Kuwait government-to-government contract for an unspecified number of Sea Skua SL missiles.
DCN	78	September 1997 – Installation, integration of the Sea Skua missile system in the overall weapon system.
Flagship Training/UK Royal Navy	20	November 1997 – Shared contract with the UK Royal Navy for training of 300 officers and ratings in language, logistics, computerized mgmt. systems.
CMN	N/A	January 1999 – Two-year contract by Matra BAe Dynamics for missile canisters (for Sea Skuas).

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Q3	1994	Kuwaiti government declares intention to buy eight patrol boats from CMN
Apr	1995	Procurement contract signed
Jun	1995	Steel cut for the first two boats
Sep	1995	First boat moved to outfitting hall
Dec	1995	Steel cut for the second pair of boats
Jan	1996	Keel section fabrication begins for third boat
Spring	1996	Kongsberg submits unsolicited bid for Penguin Mk 2 missiles
Jun	1996	Steel cut for the third pair
Feb	1997	Launching of the first-of-class
Apr	1997	Arrival of first crew at Cherbourg for training
May	1997	First boat begins sea trials
Early	1998	Handover of first two boats to Kuwaiti Navy (while still in France)
Jun	1998	First boats arrive in Kuwait; sixth boat launched at CMN
Jul	1998	Official acceptance of the first pair
Dec	1998	Second pair commissioned by the Kuwaiti Navy
Jun	1999	Eighth boat launched
May	2000	Last units entered service in Kuwait

Worldwide Distribution

Kuwait (8)

Forecast Rationale

Kuwait's Um Al Maradim class owes its existence to the disastrous situation facing the Kuwaiti Navy after the Second Gulf War. Six of the eight FAC-M on strength before the war had been sunk and most of the smaller craft had been stolen and/or destroyed by the Iraqis. There was an immediate and pressing need to re-establish a naval force that could control local waters, have adequate firepower to confront Iraqi incursions, be small enough to operate close inshore, and be affordable in light of the many other demands upon Kuwaiti resources. As the design resulting from this difficult requirement, the eight Um Al Maradim class craft are adequate for coastal and inshore work and fulfilled the short-term needs of the Kuwaiti Navy well. The recent disagreement with Iraqi fishing vessels shows that they are already hard at work on their intended duties. Kuwait is likely to turn its attention to the Offshore Missile Vessel, a long-standing requirement for a frigate-sized combatant. This has been on hold for about five years while more urgent priorities are satisfied.

The Um Al Maradim also demonstrates the salutary effect of real-life combat experience over theoretical posturing. Having seen firsthand how helpless the traditional FAC-M was in the face of air attack, the

Kuwaiti Navy appears to have set out to build a more balanced design within the weight and size limits imposed upon them. This resulted in a decision to severely restrict the firepower of these ships (a single 40 mm gun in place of the more usual 57 or 76 mm, four short-range light anti-ship missiles in place of the normal battery of four or eight long-range heavy weapons) in favor of a more adequate sensor fit and the installation of a fully integrated command system. In short, theoretical firepower is traded off to gain superior ability to use real firepower.

The questions now turn on whether the decisions made by the Kuwaiti Navy will be justified. Are the shorter-range weapons installed on the Um Al Maradim tied to a better and more comprehensive sensor system really capable of confronting other Gulf region surface vessels, with their 57 mm main guns and longer-range SSMS? If indeed this is the case and the realistic engagement range (as determined by target acquisition) is similar for both types of ship, then the Kuwaiti gamble will have paid off. Neither the Um Al Maradim nor its larger opponents have any sort of damage resistance capability, and the first hits will be decisive. In these conditions, better situational awareness is more important than overkill in missile range and striking

power. The calculation on numbers of missiles carried is more ruthless; four missiles are adequate because in the type of short-range knife fight envisaged, neither the Um Al Maradim nor its larger opponent is likely to survive long enough to launch more.

The Um Al Maradim remains a specialized design that is intended to meet unique requirements. The primary class of construction for smaller navies today is the light frigate, an 85- to 110-meter craft displacing between

1,200 and 1,800 tons. It is indeed striking how quickly the FAC-M has become totally eclipsed as a result of real combat experience with this type of craft. It is quite safe to say that, except for a few dedicated enthusiasts and a small handful of navies that face highly unusual geopolitical circumstances, nobody takes the FAC-M seriously anymore. However, on those rare occasions where a requirement for small combat craft does exist, the Um Al Maradim is likely to be the pattern followed.

Ten-Year Outlook

No additional construction is forecast.

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