



SHIP TECHNICAL SPECIFICATION

SAR EGYPT

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Preamble

The ship technical specification describes the technical specifications of a Search And Rescue (SAR) type ship to be procured as part of the European Union contribution agreement in reference NDICI-GEO-NEAR/2022/437-699 and in destination to the Egyptian Navy.

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Table of Acronyms

▪ AISI	:	American Iron and Steel Institute
▪ ARPA	:	Automatic Radar Plotting Aid
▪ ASTM	:	American Society for Testing and Materials
▪ CCTV	:	Closed-Circuit TeleVision
▪ COLREG	:	Collision Regulations (international regulations)
▪ DIROPS	:	Director of Operations
▪ ECDIS	:	Electronic Chart DISplay and Information System
▪ EPIRB	:	Emergency Position Indicating Radio Beacon
▪ HF	:	High-Frequency
▪ GMDSS	:	Global Maritime Distress Safety System
▪ IACS	:	International Association of Classification Society
▪ ISO	:	International Organization for Standardization
▪ NATO	:	National Stock Number
▪ NMEA	:	National Marine Electronics Association
▪ SAR	:	Search And Rescue
▪ SART	:	Search and Rescue Radar Transponder
▪ EU	:	European Union
▪ SOLAS	:	Safety Of Life At Sea (international convention)
▪ VHF	:	Very High Frequency

1. Project description

The technical specification details the means and requirements necessary to strengthen the action of the Egyptian State at sea aimed at:

- The construction and delivery of SAR type ships, equipped with means of prevention and rescue and **already operated in at least one country to perform maritime search and rescue operations,**
- A training plan for the benefit of the crews and support teams of the workshops in order to carry out the preventive maintenance associated and linked to these equipped ships.

This modern and robust ship is designed to effectively guarantee the safety of the crew, the rescuers and that of people in distress and rescued at sea by covering aspects related to:

- Instinctive driving and the safe operation of the installations and in the event of damage, to ensure the management and maintenance of vital auxiliaries,
- The efficiency and availability of individual and collective safety equipment as well as the use of on-board rescue and emergency devices,
- The ergonomics of the crew's working environments, the organization of movement on board and the protections provided against falling overboard,
- Navigability and manoeuvrability in strong sea conditions,
- To the various missions devolved and detailed by the contractual requirement [EX-4]

The design must comply with regulatory standards for industrial construction and environment and must take into account certifications for uses related to the announced missions. It must not allow the boarding, storage or installation of lethal equipment.

The sentences noted [EX-XXX] correspond to contractual requirements. Compliance with these contractual requirements is mandatory. No derogation from these requirements is permitted.

[EX-1] In the event that a shipyard or a supplier can offer several types of ships corresponding to this specification, it is authorized to apply with several ships (one answer per ship type).

2. Applicable regulations

[EX-2] The ship must be subject to acceptance by a classification society approved by the IACS.

[EX-3] The applicable regulations are those chosen by the shipyard but must at least include international rules (COLREG, SOLAS, etc.), standardization regulations (ASTM) and specific to such a ship.

3. Tasks

The ship will mainly carry out SAR missions in the maritime navigation area in the Eastern Mediterranean and on the high seas (international waters).

[EX-4] The ship must be capable of carrying out the following missions under acceptable safety and operational performance conditions:

1. State actions at sea,
2. Surveillance of maritime activities and navigation,
3. Boat and shipwrecked search,
4. Man Overboard Recovery,
5. Towing of small tonnage boat,
6. Assistance and administration of first aid to shipwrecked people, protection of people,
7. Helicoptering day and night,
8. Firefighting of a small fire on a sinking boat,
9. Transfer at sea of people and equipment (coupled and depending on weather conditions),
10. Launching and recovery of swimmers on board.

4. Environmental conditions

[EX-5] The ship is intended to be operated by the Egyptian Navy in the Eastern Mediterranean Sea.

[EX-6] Due to her missions, the ship must be "all weather" rated, and must be able to sail in a sea state of more than 6 (six) which means it has no limitations for use.

[EX-7] The maximum navigation climatic conditions are set out for each season (summer, winter) and in temperate climates:

1. Sea water temperature (-1 meter),
2. Outside air temperature,
3. Relative humidity.

For information, the temperatures are as follows:

- Summer
 - Sea water temperature: ~32°C
 - Outside air temperature: ~40°C
 - Relative humidity: ~40%
- Winter
 - Sea water temperature: ~4°C
 - Outside air temperature: ~4°C
 - Relative humidity: ~60%

5. Features and performance

[EX-8] The ship must have the following characteristics and performance:

1. Minimum length: 17 meters,
2. Maximum length: 24 meters,
3. Minimum crew: 4 people,

4. Minimum number of castaways on board: 5 castaways,
5. Minimum number of castaways exceptionally¹ in rescue: 30 people,
6. Minimum radius of action: 200 nautical miles at service speed in sea state 2,
7. Towing capacity: greater than 4 tons,
8. Maximum speed at full load: over 20 knots.

[EX-9] The ship must have a covered reception area with the possibility of installing a stretcher or transport equipment for compact and secure casualties (attachment points) during transit.

[EX-10] The ship must have excellent manoeuvrability and optimized steering capability during rescue operations:

1. Navigation at very low speed,
2. Latency time and reactivity of the propulsion line,
3. Stabilization,
4. Roll reduced at low speed.

[EX-11] In an operation to transfer personnel or equipment at sea, the ship must be able to couple and moor autonomously to another ship.

6. Design

[EX-12] The metric system must be applied for her design.

6.1 Structure

[EX-13] All stainless steel bolts installed outdoors must be of AISI 316L or A4 category.

[EX-14] All the screws installed on board must be standardized and correspond to the ISO metric thread.

[EX-15] The engine room must be separated from the rest of the ship.

[EX-16] On the wheelhouse, the helmsman must have near 360-degree visibility on the horizon.

[EX-17] The ship must have a self-righting capability. That is to say, it must be able to return to its natural navigation position in the event of capsizing or overturning (full turn) without external human intervention.

¹ The term “exceptionally” means that comfort conditions may be degraded for this maximum number and/or that special regulation or operating provisions may apply.

- [EX-18] After a rollover, the crew must be able to resume a normal operating mode immediately and in full safety, without prior technical operation (repriming of fuel for example, ventilation, valves, exhaust, etc.).
- [EX-19] After capsizing, the ship must not require major checks, dockside inspections or repairs. In particular, it is accepted that suspended machines or machines benefiting from a wedging do not have to be readjusted and realigned.
- [EX-20] The colours and RAL of the exterior paintings of the ship (hull, deck and superstructure) as well as the identification number of the ship will be specified later. An indication of the European Funding must be shown on each side of the ship.
- [EX-21] The paints applied and their technical performance must be adapted to the navigation environment.
- [EX-22] The ship must include one toilet with an adapted sink. A second toilet with adapted sink would be accepted.
- [EX-23] Fuel tanks must be equipped with a water decanting system.
- [EX-24] The attachment and traction points must be subject to capacity marking. A plan of these means must be provided.

6.2 Operating redundancy

- [EX-25] The ship must be equipped with redundant operating systems. These redundant systems must have the same capacity and must guarantee the crew the conduct and operation of the ship in a lower operational mode. The installations and equipment with redundancy must be as follows:
1. Propulsion (including starter),
 2. Steering gear,
 3. Electrical generation,
 4. Fight against the fire,
 5. Bilge pumps,
 6. Power supply for vital and safety systems: on-board lighting, navigation lights, fog horn, fire and waterway detection, communication.
- [EX-26] The electrical installations must make possible to operate safety installations during a blackout.

6.3 Propulsion and electrical generation

- [EX-27] Each propulsion engine and its associated auxiliaries must be technically independent of the other engine.

- [EX-28] The propulsion engines must comply with the fuel type F76 type Marine Diesel.
- [EX-29] In the event of damage to a propulsion line, the shaft line must be mechanically braked.
- [EX-30] Depending on the type of propulsion, the propeller and thruster shafts must be equipped with a cable cutter.
- [EX-31] The operating time of the backed-up electrical network must be greater than 120 minutes.
- [EX-32] The ship's power supply at shore must accept a voltage of 380V for a frequency of 50Hz.
- [EX-33] The lighting network on board must be adapted according to the work areas and sufficient outside to carry out the defined operations ([EX-4]) at night and in complete safety for the crew.
- [EX-34] A shore power socket and an electrical safety installation must be installed to allow the ship to be connected to a shore power network. This connection must make it possible to ensure the electrical needs of the security installations, the recharging of the batteries as well as the operation of the "life on board" installations (direct or via a battery bank).

6.4 Controls and commands

- [EX-35] All the control and alarm systems for the propulsion machinery and the electrical generation must be viewed and heard from the wheelhouse (nominal mode), and from the propulsion compartment (local mode).
- [EX-36] All the propulsion machinery and electrical generation control systems must be operated from the wheelhouse (nominal mode) and from the propulsion compartment (local mode).
- [EX-37] All signals and indications of operation of fixed installations and equipment must be visible on a control panel on the wheelhouse.
- [EX-38] The state of charge of the battery system must be monitored and the display of the values must be indicated on the wheelhouse. An insufficient charge and/or battery failure alert with an explicit signal for the crew must be set up.
- [EX-39] The volumes of fuel and fresh water must be specified in litres and the level indications must be indicated on the wheelhouse.
- [EX-40] Each compartment must be equipped with a suitable fire detector and its status must be signalled to the wheelhouse on a control panel.
- [EX-41] Each compartment below the waterline must be equipped with a flood detector and its status must be reported to the wheelhouse on a control panel.
- [EX-42] All the emergency stops for the installations and equipment, the controls for the fire-resistant ventilation valves, the controls for the fuel valves must be located on the wheelhouse.

6.5 Auxiliaries

- [EX-43] The ship's fire-fighting installation must take into account the different classes of possible fires on board and must have the appropriate means (fixed and mobile) to put them out.
- [EX-44] A fixed fire extinguishing installation must be installed in the engine room.
- [EX-45] A fixed automatic draining installation to fight against waterways must be installed.
- [EX-46] The ship must be equipped with an air conditioning system adapted to outside temperatures in summer and incorporates a heating system to adapt with the winter period. The average temperature inside the accommodation area must be $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ in summer period.
- [EX-47] The ventilation system of non-air-conditioned compartments must be sufficiently sized (power and flow rate) and efficient to adapt with excessive temperatures in summer.
- [EX-48] A fresh air ventilation system equipped with effective filtration must be installed to overcome sandstorms.
- [EX-49] The hull, if required, and any equipment subject to it, must be subject to corrosion protection.
- [EX-50] All fluid circuits must be equipped with isolation valves (upstream and downstream), identified by colour code and showing the direction of circulation.
- [EX-51] All seawater circuits must be protected from premature corrosion.

7. On-board installations and equipment

- [EX-52] The shipyard must install fixed and mobile installations and equipment on board in accordance with the SAR operations described in [EX-4].
- [EX-53] Each ship must be delivered with its SAR regulatory on-board installations and equipment, unless otherwise stated. The quantities must be considered as a minimum.

The list of regulatory equipment must be in conformity with SOLAS regulation and as a minimum:

- Radar reflector,
- Lifesaving Signals,
- Navigation lights,
- Compass,
- Maritime Radio (VHF and HF),
- International code flags,

- National flag (EGY),
- Quarantine Flag,
- Lifejackets,
- Life ring
- Life buoys,
- Life raft,
- Waterproof torch,
- Emergency signal / distress flare,
- Fire extinguisher system,
- First aid kit,
- Mooring and towing lines,
- Anchoring system,
- Lifelines,
- Charts (at least paper),
- Divider and protractor,
- Logbook and pilotbook,
- Emergency Position Indicating Radio Beacons,
- Boarding ladder or system
- GMDSS equipment.

[EX-54] The shipyard must set out the following main information of each installation and equipment :

1. The name of the supplier or equipment manufacturer,
2. Their number listed on board,
3. The main technical characteristics,
4. In addition, the main performances.

[EX-55] The ship must be equipped with one high-performance GPS, which must be connected to the navigation and use data network in line with the SAR operations described in [EX-4].

[EX-56] The ship must be equipped with one AIS (separate from the GPS), connectable to the NMEA navigation and usage data network in line with the SAR operations described in [EX-4].

[EX-57] The ship must be equipped with one magnetic compass.

[EX-58] The ship must be equipped with two-fixed VHF, in line with the SAR operations described in [EX-4].

[EX-59] The ship must be equipped with one fixed HF, for use in line with the SAR operations described in [EX-4] and capable of transmitting and receiving for a minimum range of 200 nautical miles.

[EX-60] The ship must be equipped with one radar with the following minimum characteristics:

1. Minimum range of 40 nautical miles,
2. ECDIS charting system,

3. Compatible with AIS,
4. Receiving satellite compass heading, GPS position, AIS tracks and track tracking.

A radar equipped with S Band and X band would be appreciated.

- [EX-61] The ship must be equipped with one depth sounder.
- [EX-62] The ship must be equipped with one wind and weather network and must be connected to the navigation data network.
- [EX-63] The ship must be equipped with one NMEA-type navigation data distribution network that allows all the equipment to communicate with each other.
- [EX-64] The ship must be equipped with one CCTV network in the propulsion compartment and the rear deck.
- [EX-65] The ship must be equipped with one indoor broadcasting network.
- [EX-66] The ship must be equipped with one external broadcasting network.
- [EX-67] The ship must be equipped with one siren and horn suitable for SAR operations.
- [EX-68] The ship must be equipped with one flashing light (SAR regulated) visible at 360° on the horizon.
- [EX-69] The ship must be equipped with two fixed searchlights (one on each side).
- [EX-70] The ship must be equipped with one manual thermal camera in order to be able to find extra heat in an electrical box.
- [EX-71] The ship must be equipped with one FLIR M364 infrared camera or equivalent equipment with the minimum characteristics of the FLIR camera.
- [EX-72] The ship must be equipped with two pairs of marine navigation binoculars (x10 magnification, 200h of autonomy, 90 of luminosity, weight under 1 kg) for the captain and helmsman.
- [EX-73] The ship must be equipped with one set of regulatory flags.
- [EX-74] The ship must be equipped with four waterproof long-range portable VHF.
- [EX-75] The ship must be equipped with one set of lifebuoys.
- [EX-76] The ship must be equipped with one EPIRB-type disaster location radio beacon compliant with the GMDSS service.
- [EX-77] The ship must be equipped with one search and rescue radar transponder type SART compliant with the GMDSS service.

- [EX-78] For rescue operations, the ship must be equipped with the following sets:
1. One set of mobile fire equipment to put out a small fire on a sinking boat,
 2. One set of drying equipment to carry out a sinking boat,
 3. One set of health assistance and first aid medical equipment,
 4. One set of regulatory distress equipment for navigation,
 5. One "Jason Cradle" type system for the recovery of castaways at sea.
- [EX-79] The mooring line (anchor and chains) must be installed and must fit to the size of the ship.
- [EX-80] A polyamide emergency mooring line must be installed on board.
- [EX-81] One set of manoeuvring equipment (hawsers, fenders, hooks, etc.) must be provided.
- [EX-82] The ship must be equipped with one autopilot system which must be connected to the navigation and use data network

8. Documentation

- [EX-83] The supplier must provide the "non-proprietary" and "as built" documentation for all on-board installations and equipment, the ship's drawings must include a "General Arrangement", the installation plans and the supply network diagrams. A list of all documentation must be provided.
- [EX-84] This documentation in paper and computer version must have an English version. It must allow the crew to start up the installations (user documentation) and the maintenance shop personnel to maintain them (maintenance documentation). Lists of user documentation and maintenance documentation must be provided.
- [EX-85] One set of user documentation must be installed on board each ship.
- [EX-86] Three sets of user documentation and three sets of maintenance documentation in paper and computer format must be delivered separately and for the attention of the logistics and industrial maintenance organizations on the Egyptian site.

9. Training

- [EX-87] The shipyard must carried out in Egypt the training in English of the crews to the handling of the ship and the 1st level maintenance (crew level). This training must be done during a single session for the benefit of the first crew.
- [EX-88] The shipyard must provide the training in English for workshop support teams in 2nd level maintenance (workshop level) of the ship's main installations. This training must be done in a single session. If the training is not held in Egypt, all the expense must be borne by the shipyard.

10. Maintenance

- [EX-89] One full maintenance plan, one software to link the maintenances tasks with associated spare parts must be supplied.
- [EX-90] For each ship delivered, the supplier must supply one set of preventive maintenance parts covering a calendar period of 3 years and 2,500 hours of operation.
- [EX-91] The packaging of spare parts must be transport standard.
- [EX-92] The format and the nomenclature of the spare parts labelling must be standardized in the proprietary format with its P/N as well as in the NATO National Stock Number format.
- [EX-93] If the maintenance requires it, one set of specific tools must be provided in order to carry out this maintenance. This set must be detailed.
- [EX-94] The shipyard must supply a set of emergency spare parts identified by OEM with at least:
1. One propulsion line set (propeller for each side if different, propulsion shaft line...),
 2. One propulsion engine and transmission set,
 3. One electrical generation set (engine and power generation),
 4. One bilge pump set.
- [EX-95] If the frame of the hull needs it, one set of specific equipment for beaching the ship (side stands, cradle adapted to the hull, etc.) must be provided. This set must be detailed.
- [EX-96] One power supply cable with a minimum length of 20 meters and equipped with shore connection sockets must be provided. This set must be detailed.

11. Guarantee

- [EX-97] The ship must be guaranteed for 12 months from the final acceptance on site. This guarantee must be given without restriction and within the framework of normal use and support of a SAR ship. The general conditions of the guarantee must be detailed.