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OPNAVINST 9010.318B

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OPNAV INSTRUCTION 9010.318B

From: Chief of Naval Operations

Subj: PROMULGATION OF THE T-ARS 50 CLASS SALVAGE SHIP, TOP  
LEVEL REQUIREMENTS

Ref: (a) OPNAVINST 9010.300A  
(b) MIL-STD-1399  
(c) NWP 14  
(d) NATO STANAG 1074

Encl: (1) Salvage Ship T-ARS 50 Class Top Level Requirements

1. Purpose. To reflect the Top Level Requirements (TLR) for the civilian mariner manned Auxiliary Rescue and Salvage (T-ARS) 50 Class ship.

2. Cancellation. OPNAVINST C9010.318A.

3. Discussion. Enclosure (1) has been revised in accordance with reference (a). Deputy Chief of Naval Operations (Fleet Readiness and Logistics) (CNO (N4)) is responsible for the content of this document and any required revisions/changes. Recommended changes should be submitted to the Director, Strategic Mobility and Combat Logistics (OPNAV (N42)).

4. Action. CNO (N4) is directed to ensure that the design and the Top Level Specifications (TLS) developed for the T-ARS 50 Class ship are fully supportive of the TLR promulgated in enclosure (1).

5. Records Management. Records created by this instruction, regardless of media and format, will be managed in accordance with Secretary of the Navy Manual 5210.1.

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SALVAGE SHIP  
T-ARS 50 CLASS  
TOP LEVEL REQUIREMENTS

Department of the Navy  
Deputy Chief of Naval Operations  
(Fleet Readiness and Logistics)

Enclosure (1)

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## SECTION 1

### OVERVIEW

This document specifies the TLR for the (T-ARS 50) SAFEGUARD Class salvage ship. This document includes the ship's mission, operational requirements, major configuration constraints, planned use, maintenance concept, supply support concept, manning limitations, minimal operational standards, cost limitations, and schedule constraints.

The objective of the T-ARS 50 Class program is to acquire and deliver to the fleet the initial programmed replacement for the aged ARS 38 Class salvage ships, which commenced retirement in Fiscal Year (FY) 1985. The design of the class and the T-ARS 50 mission tasks, characteristics, and constraints on the acquisition program are derived from this program objective.

1.1 Objectives and Scope. To accomplish the T-ARS 50 Class program objectives, the T-ARS 50 ship design and acquisition program is constrained to execution within the objectives, thresholds, and milestones documented in the ship's operational requirement. Thresholds shall not be breached without the specific approval of the Chief of Naval Operations.

1.2 Constraints. In addition to the Navy program constraints, there are additional thresholds established by the Office of the Secretary of Defense (OSD). However, execution of the T-ARS 50 Class acquisition program within the Navy program constraints will satisfy the OSD program constraints, which are addressed in the Navy Decision Coordinating Paper.

1.2.1 Program Costs. Sail away cost of the lead T-ARS 50 Class salvage ship is not to exceed \$100 million based on FY 1981 dollars.

1.2.2 Design-to-Cost Goals. The design-to-cost goal for the FY 1981 lead ship is \$97 million. The ceiling constraint is \$100 million. Non-government specifications and standards for material shall be used to the maximum extent possible.

1.3 Design Guidance. The hull shall be designed to American Bureau of Shipping rules and classified as a Class C ice

strengthened. The ship shall be designed to sustain basic design loads, and the particular loads which will be experienced in salvage and towing operations, including those local loads applied through handling and towing equipment. The design and installation of ship structure, appendages, systems, equipments, etc., that are subject to ship motion forces shall be compatible with minimum limits for ship motion per section 301 of reference (b).

1.3.1 Ship Manning. In the design and development of requirements, full consideration shall be given to reducing manpower costs by simplifying operation and maintenance.

1.3.1.1 Reliability and Maintainability Requirements. From the outset, planning will accord high priority to simplicity of design and to necessary contractual requirements to ensure a high degree of reliability and maintainability.

1.4 Summary of Major Ship Characteristics. This T-ARS 50 Class TLR has been prepared in accordance with reference (a). The TLR presents ship-system requirements for the ship and its propulsion, payload, maintenance, and support parameters. The TLR documents ship requirements as they are developed and refined throughout the design phases of the ship acquisition program. Upon approval of the T-ARS 50 Class TLR revision, serialized changes will promulgate any additional requirements or changes to existing requirements.

SECTION 2

MISSION STATEMENT

2.1 Mission. The primary mission of the T-ARS 50 Class salvage ship is to support advanced force operations, worldwide, in support of national policy. The ship will be employed to support projection of forces ashore through post-assault salvage operations in close proximity to the shore. The ship will be designed to perform combat salvage, lifting, emergency repair, and rescue towing of combatant or support ships which are damaged, stranded, scuttled, distressed, or abandoned at sea to repair yards or safe havens.

2.2 Primary Tasks. To carry out its assigned mission, the T-ARS 50 shall have the installed capability for performing the following tasks:

- a. Lifting submerged objects up to 150 deadweight tons.
- b. Offship firefighting.
- c. Rescue and open ocean towing with wire rope or synthetic fiber line.
- d. Air diving operations to a depth of 190 feet with recompression facility.
- e. Emergency underwater repair.
- f. Refloating stranded ships and other craft.
- g. Dewatering of sinking/sunken ships.
- h. Underwater salvage operations, independent of off-ship logistic support, on short notice.

2.3 Secondary Tasks. Secondary tasks will include the following:

- a. Perform limited patrol, surveillance, and reconnaissance functions.
- b. Perform search and surface rescue.

c. Collect hydrographic and oceanographic data (with load-out).

d. Exercise limited self defense against low-flying air penetration, small high speed combatants, magnetic mines, and biological warfare/chemical warfare agents.

e. Perform submarine rescue and intervention, and deliver emergency life support supplies to a distressed submarine.

SECTION 3

TOTAL SHIP REQUIREMENTS AND CHARACTERISTICS

3.1 Warfare Area Capabilities, Including Command, Control and Communications. The T-ARS 50 shall be designed to conduct operations in secondary mission areas of Anti-air (AAW) and Anti-surface Ship Warfare (ASUW). AAW and ASUW roles are self defensive. Combat system requirements are presented below.

3.1.1 Anti-air Warfare (AAW)

- a. AAW 6 - Detect, identify, and track air targets.
- b. AAW 6.2 - Recognize by sight, friendly and enemy aircraft which may be encountered in expected operating areas.
- c. AAW 6.5 - Detect, identify, and track air targets visually.

3.1.2 Anti-surface Ship (ASUW)

- a. ASUW 1 - Conduct ASUW operations.
- b. ASUW 1.6 - Engage surface ships with minor caliber (cal) gunfire.
- c. ASUW 4 - Detect, indentify, and track surface targets.
- d. ASUW 4.1 - Detect and track surface combatants with radar.
- e. ASUW 4.4 - Detect and track surface contacts visually.
- f. ASUW 4.7 - Identify surface contacts.
- g. ASUW 6 - Disengage or avoid attack.
- h. ASUW 6.2 - Employ evasive techniques.

3.1.3 Mine Warfare (MIW)

- a. MIW 6 - Conduct degaussing.

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- b. MIW 6.7 - Maintain magnetic signature limits.

#### 3.1.4 Mobility (MOB)

- a. MOB 1 - Steam to design capability.
- b. MOB 1.1 - Steam at full power.
- c. MOB 3 - Prevent and control damage.
- d. MOB 3.1 - Control fire, flooding, electrical, structural, and hull casualties.

3.2 Detectability. Not applicable.

3.3 Survivability, Including Passive Protection. Shock hardening is not required. Topside splinter protection is not required. Electromagnetic Pulse (EMP) radiation protection is required for two communication transceiver channels or equivalent. No other EMP protection is required except for what is inherent in the ship's structure or available in equipment normally provided.

3.4 Mobility. The T-ARS 50 Class shall have the following features:

- a. The ship shall be capable of conducting all normal piloting and conning tasks and of navigating and maneuvering in coastal waters. Maneuvering characteristics for open ocean and coastal operations shall be analyzed during Preliminary Design and described in the TLS. Within harbors and restricted waters the navigation system shall enable determination of position within 50 yards by electronic means and 200 yards by optical means.

- b. The ship shall be capable of mooring to a pier, buoy, or alongside another ship. It shall be capable, when moored, of holding position in 50 knot winds and 3 knot currents with sufficient fittings, capstans, and mooring lines arranged to ensure the ship's safety. When anchored in 40 fathoms of water over a sandy bottom, the ship must be capable of holding position in a 70 knot wind and a 4 knot current, from the bow.

c. The ship shall be capable of receiving munitions, provisions, stores, and fuel on either the port or starboard side by alongside method and fuel additionally by astern method while underway in moderate environment with the ship taking best heading. The refueling rate shall be 250 gallons per minute.

d. Life saving equipment (inflatable life rafts and life jackets) shall be sized based upon the sum of ship's accommodations plus temporary accommodations.

e. The ship shall have a range in the free route condition of 8,000 nautical miles at most economical speed and a sustained speed (at 80 percent power) of not less than 13.5 knots.

f. The ship shall have a draft of not more than 16 feet at full load displacement. A light load draft of not more than 13.5 feet shall be a design goal.

g. The ship shall be capable of continuous efficient operation (including towing) in a poor environment (Sea State 6) and of limited operation and capability of continuing mission (without returning to port) in a severe environment (Sea State 7).

h. The ship shall be capable of Level III, Class 4 operations of H1 helicopters and Level III, Class 5 operations of H3, H46, and H60 type helicopters.

3.5 Operating Environment. The TLR environmental conditions are defined as weather, temperature and humidity, wind and sea, pollution, and vibration. The hull shall be designed to sufficient strength for arctic, intercoastal steaming in shoal water operations.

3.5.1 Weather Environment. Section 302 of reference (b) outlines the extreme weather factors applicable for T-ARS 50 design purposes.

3.6 Utilization and Operational Availability. The T-ARS 50 Class shall maintain a readiness condition to get underway as shown in table 3-1. Readiness to get underway for normal operation will cover availability of all systems including propulsion engines. Readiness for emergency (alerted) operation will include availability of not less than one propulsion engine

together with essential navigational and communications systems' functional capabilities, as well as required damage control capabilities. Utilization rates for operational use of the T-ARS 50 Class are assumed for design purposes and are described in the readiness conditions.

TABLE 3-1. READINESS

<u>Readiness Condition</u>	<u>Continental United States (CONUS) Operation</u>	<u>Wartime or Forward Deployment</u>
<u>In Port</u>		
Normal	24 hours	4 hours
Emergency	.25 hour	on signal
<u>Scheduled Upkeep</u>		
Normal	4 days	2 days
Emergency (Alerted)	24 hours	1 hour
<u>Intermediate Maintenance</u>		
Normal	4 days	4 days
Emergency (Alerted)	24 hours	24 hours

3.6.1 Readiness Conditions

3.6.1.1 Condition I - Battle Readiness. All personnel continuously alert. All possible operational systems manned and operating. No maintenance except as routinely associated with watch standing and urgent repairs. Maximum expected crew endurance is 24 continuous hours.

3.6.1.2 Condition III - Wartime Cruising Readiness. Operational systems manned and operating. All underway maintenance, support, and administrative functions performed. Eight hours rest per man per day. Maximum expected crew endurance is 60 continuous days.

3.6.1.3 Deployed (Extended Operations in a Distant Area). At sea, the ship shall conduct tactical exercises under the operational control of the fleet commander. T-ARS 50 visits to various ports of call shall be scheduled in addition to leave and upkeep periods. Typical conditions of readiness are discussed below.

3.6.1.3.1 Condition I - General Quarters.

Wartime conditions of readiness set during exercises simulating wartime conditions as directed by higher authority.

3.6.1.3.2 Condition III - Wartime Cruising.

Wartime conditions of readiness set during exercise periods requiring simulated combat conditions as directed by higher authority.

3.6.1.3.3 Condition IV - Cruising and Fleet Exercises. The ship will conduct normal underway watch standing and preventive and corrective maintenance while underway. Readiness Condition IV is subject to change to Condition III or Condition I (see Wartime At Sea) during fleet exercises or during patrol investigation of contacts as directed by fleet commanders. All mission-essential subsystems are on line and operational.

3.6.1.3.4 Condition V - In Port. The T-ARS 50 Class readiness condition while in port during deployed status is identical to CONUS in-port conditions except that an accelerated capability to get underway during leave and upkeep periods is required. Systems manned to the extent necessary for effective operation as dictated by existing situation. Watch stations assigned as required to provide adequate security. Personnel onboard able at all times to meet anticipated in-port emergencies and to perform in-port functions. Accomplishment of all required maintenance, support, and administrative functions expected. Maximum advantage taken of training opportunities. Subject to foregoing, crew provided maximum opportunity for rest, leave, and liberty.

3.6.1.4 Nondeployed (CONUS-Based Operations). T-ARS 50 operations and activities shall include leave; visits to other CONUS ports; and participation, either independently or with other fleet units, in underway training exercises and drills, competitive ship exercises, and fleet tactical exercises to provide operations training at the ship system level in the primary mission area of salvage and rescue. Preventive maintenance shall be performed during normal working hours. Corrective maintenance shall be performed as operationally required. Applicable conditions of readiness are discussed below.

3.6.1.4.1 Condition I - Battle Stations.

Wartime conditions for exercises.

3.6.1.4.2 Condition III - Wartime Cruising.

Wartime conditions of readiness set during exercise periods of wartime cruising.

3.6.1.4.3 Condition IV - Peacetime

Cruising. Operational systems normally manned to the extent necessary for safe and effective ship control, propulsion, and security. Accomplishment of all underway maintenance, support, and administrative functions expected. Maximum advantage taken of training opportunities. Expected endurance will not be manning constrained.

3.6.1.4.4 Condition V - In-Port. Watch

standers and duty section personnel manning control stations as required by senior officer present afloat instructions to meet emergency situations, carry out in-port routines, and to meet required operational commitments.

3.6.1.4.5 Special Operations. In addition

to the principle conditions of manning readiness (Conditions I and III), there is a special condition peculiar to salvage and rescue ships, namely salvage operations, i.e., diving, salvage, and towing. The nature of this condition requires specialized manning by personnel qualified in salvage operations in addition to the rating qualifications required by the principal conditions.

3.6.2 Reliability, Maintainability, and Availability. The design goal is 0.95, and the threshold requirement is 0.75 probability of successful mission accomplishment (probability of being available and reliable) for the 60-day wartime deployment of table 3-1. Availability is measured for the 60 day wartime deployment and reliability is measured for the maximum Condition I period of 24 hours. Success is defined as performance of all tasks even if certain of these are completed at a degraded level of accomplishment. Failure is defined as the failure of any mission critical function for which repair cannot be accomplished within an appropriate allowable downtime. The T-ARS 50 logistic support strategy, resources, and maintenance repair policies shall be structured to satisfy this objective.

The ship systems shall be designed to meet the following system Mean Time Before Failure (MTBF) and Mean Time To Repair (MTTR) standards as shown in table 3-2:

TABLE 3-2. SYSTEM STANDARDS

Ship Systems	Design Goal		Threshold	
	MTBF	MTTR	MTBF	MTTR
Propulsion	Mission Duration*	1.4	450	7
Electrical	13,000	1.2	3,000	6
Auxiliary	18,000	5.0	4,000	25
Deck	6,500	0.5	1,500	2
Surveillance	3,000	0.2	700	1
Navigation	6,500	1.2	1,500	6
Exterior Communications	1,000	0.5	250	2

\* 100% reliable

3.7 Logistic Support. The logistic support concept of the T-ARS 50 Class is to provide sufficient repair parts, equipage, and consumables to a level and depth that will enable the ship to fulfill its assigned missions. Range and depth of repair parts will be determined for 90 days endurance.

3.7.1 Specific Logistic Support Requirements. The design requirements below govern the development of logistic support for the T-ARS 50.

a. Current ship experience shall be utilized to achieve the highest practical degree of topside maintainability for the T-ARS 50.

b. Underway replenishment facilities aboard the T-ARS 50 will include Connected Replenishment (CONREP) and Vertical Replenishment (VERTREP) capabilities with their ancillary stores and provisions handling systems. CONREP systems and equipment and rigging shall be in general accordance with reference (c).

c. Equipment introduced into the T-ARS 50 design shall be procured using the criteria and objectives of approval for service use policies, with support provided through the Navy supply system.

3.8 Manning. The T-ARS 50 manning goal is established as 10 percent above the base level. The base level is 87 personnel, including up to 25 percent women, and is defined and shown in table 3-3 as follows:

TABLE 3-3. MANNING

	<u>Manning</u>
Crew	26
Military Detachment (Radio)	<u>4</u>
Crew Total	30
Mobile Diving Salvage Unit (MDSU)	
Augment (Condition IV)	17
MDSU Additional (Condition III)	<u>31</u>
	48

3.9 Flexibility for Change, Including Space and Weight Reservations

a. For new and nonstandard hull, mechanical and electrical equipment, modular design, and construction shall be achieved to the greatest practicable extent.

b. The design of the T-ARS 50 shall seek optimum accessibility to mission-essential equipment.

c. Ship accesses and arrangements shall be such that ship systems equipment can be removed and replaced with minimum removal of ship structure and other equipment or systems.

d. Sufficient clear deck (2,500 square feet minimum) and hold space aft to support salvage operations and diving operations of supplemental load-out equipment.

e. Limited mobile salvage operations to 300 feet deep. Diving system will require use of load-out equipment.

f. Suitable shop and storage facilities to enable the ship to effect damage and salvage repair of other ships, to maintain its own equipment and systems, and to service supplemental loaded out equipment and systems.

g. Sufficient clear deck and hold space to simultaneously support submarine rescue operations with the Submarine Rescue Chamber (SRC) Fly-away System and the Assessment/Underwater Work System (AUWS) of the Submarine Rescue Diving and Recompression System (SRDRS).

h. Sufficient boom capacity to operationally deploy/recover the SRC and the AUWS Atmospheric Diving System 2000.

3.10 Training. A personnel qualifications standards program will be used for assigned personnel in accordance with applicable Office of the Chief of Naval Operations direction. Unit level training and higher will be in accordance with type commander direction.

## SECTION 4

### SUBSYSTEM REQUIREMENTS AND CHARACTERISTICS

4.1 Structure. The T-ARS 50 Class shall be designed using a displacement-monohull configuration. Provisions shall be made for damage control and engineering casualty control. The T-ARS 50 Class and its installed systems shall be designed to operate as required on any navigable ocean of the world and to perform its assigned mission under a wide range of environmental conditions.

4.2 Propulsion System. The propulsion plant shall be diesel engine prime movers driving two shafts, each with a controllable, reversible pitch propeller in Kort nozzle via reduction gears.

4.3 Electrical Plant. The ship service electrical system shall be capable of sustaining the full electrical load of the ship while simultaneously supplying at least 50 kilowatts to another ship or facility. The generating capacity shall be sufficient to maintain the maximum functional load (excluding bow thrusters) during operations with one generator inoperable. The ship shall be capable of providing off-ship electrical power at both sides of the ship. In lieu of a separate emergency generator, the ship service electrical system shall be capable of sustaining the ship systems vital loads through use of redundant, separately fueled, sufficiently separated, ship service power generation and distribution systems. These systems will have properly designed load sharing to provide normal and alternative sources of power to vital loads.

4.4 Command and Surveillance. The command and surveillance suite shall be compatible with existing and projected fleet and advanced force operations' navigation and communication systems with which it may interface, to the extent that the necessary capabilities of the T-ARS 50 command and surveillance suite shall permit.

#### 4.5 Auxiliary Systems

4.5.1 Distilling System. The distilling system capacity shall be sized in accordance with the latest habitability standards, and shall be capable, under rationed conditions, of

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providing for the drinking water and medical care needs of the crew and supplemental crew. In addition, the T-ARS will be engaged in extended operations in areas of contaminated waters where operation of the distilling plant from sea water will be curtailed. Accordingly, a storage capacity of not less than 30,000 gallons of fresh water shall be provided. Fresh water requirements associated with diver wash-down shall be accommodated by fixed tankage.

4.6 Outfit and Furnishings. A basic crew accommodations suite including berthing, messing, recreation, sanitary, and provisions and storage spaces, complete with necessary functional and habitability equipment, fittings, and furnishings, shall be provided for the ship's crew. In designing the accommodations, allowance shall be made for a complement which may include 25 percent of the enlisted personnel being women, as well as one woman officer. In addition, the design should include a 10 percent accommodation margin to provide for the following contingencies.

a. Supplemental manning occasioned by the loading-out of supplemental equipment and systems.

b. Future manning growth due to the probable long life of the ship and the addition of supplemental or new equipment and systems.

c. Consideration is to be given to the provision of medical facilities to enable the ship to cope with medical needs occasioned by diving operations and the possibility that personnel rescued from ships undergoing salvage may need medical attention.

4.7 Armament. The T-ARS 50 class will be capable of storing 20,000 rounds of .50 cal and will include stowage areas for salvage blasting charges and detonators, and pyrotechnic equipment.

4.8 Other

<u>Quantity</u>	<u>DESCRIPTION</u>
<u>INFRARED FACILITIES</u>	
One	Fixed beacon, unmodulated (large)
<u>RADAR FACILITIES</u>	
One	Surface search radar
One	Short range navigational radar (with collision avoidance system)
One	Identification Friend/Foe transponder
<u>SONAR FACILITIES</u>	
One	Echo sounder
One	Underwater telephone system, complying with reference (d)
<u>NAVIGATIONAL FACILITIES</u>	
One	Satellite navigation position fixing system
One	Dead reckoning tracer
One	Dead reckoning analyzer indicator
<u>RADIAC FACILITIES</u>	
One	Shipboard monitoring system
<u>REMOTE STATION FACILITIES</u>	
<u>Pilot House</u>	
One	Control and monitoring of two plain/cipher voice channels
One	Control and monitoring of bridge-to-bridge radio
One	Standard radar display

Chart Room

One Reception of one continuous wave channel  
One Control of Echo Sounder

Helicopter Control Station (VERTREP)

One Control and monitoring of one plain/cipher  
voice channel  
One Radio frequency selector

Bridge Wings

One Control and monitoring of one voice channel  
each wing (Port and Starboard (P&S)).  
One Control and monitoring of one bridge-to-  
bridge radio each wing (P&S)