DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
WASHINGTON, DC 20350-2000

IN REPLY REFER TO
OPNAVINST 9010.330A
OP-03C
27 June 1986

OPNAV INSTRUCTION 9010.330A

From: Chief of Naval Operations

Subj: APPROVED TOP LEVEL REQUIREMENTS (TLR) FOR A TORPEDO TEST CRAFT (YTT)

Encl: (1) Torpedo Test Craft Top Level Requirements

1. Purpose. To issue the approved Top Level Requirements for the Torpedo Test Craft (enclosure (1)). This instruction is a complete revision and should be reviewed in its entirety.

2. Cancellation. OPNAVINST 9010.330

3. Applicability. This TLR is applicable to the YTT commencing with the FY-86 Shipbuilding and Conversion Program.

4. Changes. Changes to this TLR must be kept to a minimum. Therefore, any change which would result in a costly and time consuming impact on the ship's construction schedule must be fully justified. Proposed changes to the military characteristics of the ship should be submitted to the chairperson of the Ship Characteristics and Improvement Board for approval by the Chief of Naval Operations.

JAMES G. STORMS III
Assistant Deputy Chief of
Naval Operations (Surface Warfare)

Distribution:

SNDL A2A	(Department of the Navy Staff Offices) (NAVCOMPT, CNR, OPA, only)
A5	(Bureaus) (CHNAVPERS, only) (2)
21A	(Fleet Commanders in Chief and Detachment)
22A	(Fleet Commanders)
24D	(Surface Force Commanders)
26F3	(COMOPTEVFOR)
FF5	(NAVSAFECEN)
FF8	(Inspection and Survey Board)
FF18	(NAVTACSUPPACT)
FF42	(NAVPGSCOL)
FF44	(NAVWARCOL)
FJA1	(COMNAVMILPERSCOM)
FKA1C	(COMNAVFACENGCOM)
FKA1F	(COMNAVSUPSYSCOM)
FKA1G	(COMNAVSEASYSCOM)
FKQ3A	(NAVELEXCEN)

Distribution: (Con't)
OPs 090, 094, 095, 098, 01, 10, 02, 03, 03C, 32, 35, 37, 41, 44, 05, 06

Stocked:
CO, NAVPUBFORMCEN
5801 Tabor Ave.
Philadelphia, PA 19120-5099 (100 copies)

TOP LEVEL REQUIREMENTS
TORPEDO TEST CRAFT (YTT)
LIMITED OCEAN-GOING (COASTAL)

TOP LEVEL REQUIREMENTS OUTLINE

1. OVERVIEW

   1.1 Objectives and Scope
   1.2 Constraints
   1.3 Design Guidance
   1.4 Summary of Major Craft Characteristics

2. MISSION STATEMENT

3. TOTAL SHIP REQUIREMENTS AND CHARACTERISTICS

   3.1 Warfare Area Capabilities, Including C^3
   3.2 Detectability
   3.3 Survivability, Including Passive Protection
   3.4 Mobility
   3.5 Operating Environment
   3.6 Utilization and Operational Availability
   3.7 Logistic Support
   3.8 Manning and Habitability
   3.9 Flexibility for Change, Including Space and Weight Reservation
   3.10 Reliability and Maintainability
   3.11 Training

4. SUBSYSTEM REQUIREMENTS AND CHARACTERISTICS

   4.1 Structure
   4.2 Propulsion System
   4.3 Electric Plant
   4.4 Command and Surveillance
   4.5 Auxiliary Systems
   4.6 Outfit and Furnishings
   4.7 Armament
   4.8 Other

Appendix A - Ship Electronics Requirement Plan

TOP LEVEL REQUIREMENTS
TORPEDO TEST CRAFT (YTT)
LIMITED OCEAN-GOING (COASTAL)

1. OVERVIEW

1.1 Objectives and Scope

a. This document specifies the Top Level Requirements (TLR) for a Torpedo Test Craft (YTT), procurement of which is planned for beginning in FY 86. Included are the ship's mission, operational requirement, major configuration constraint, the plan for use, the maintenance concepts, the supply support concepts and minimum operational standards.

b. The objective of the YTT Ship Acquisition Program is to acquire the Torpedo Test Craft for the production acceptance testing, post overhaul proofing, and engineering evaluation of advanced and in-service undersea warfare weapons, vehicles, and systems.

c. The format of this TLR has been developed in accordance with the requirements of OPNAVINST 9010.300 (NOTAL). The TLR documents ship requirements as they are developed and refined throughout the design phase of a ship acquisition program. After this TLR is issued, serialized changes will be made to issue any further requirements.

1.2 Constraints

a. A total of four ships are required with an Initial Operational Capability (IOC) of FY 89 for the first craft. A cost target of $22.0M/ $19.0M (Lead-FY 86/Follow-FY87) has been established.

b. The provisions of this TLR are to be regarded as specific requirements or constraints unless the direction is described as a goal with a stated range of flexibility for limited ocean-going (coastal) craft.

c. If the provisions of this TLR cannot be met, the Naval Sea Systems Command (NAVSEA) SYSCOM will so advise the Chief of Naval Operations (OP-32) in order to permit timely adjustments to the program or to this TLR.

1.3 Design Guidance. The YTTs are to comply with the applicable laws of the United States and the requirements of the regulatory bodies, American Bureau of Shipping (ABS), United States Coast Guard (USCG), unless specified otherwise herein. Compliance with the General Specifications for Ships of the U.S. Navy, NAVSHIPS Technical Manual, or other military requirements is not required except where necessary to meet requirements stated herein.

1.4 Summary of Major Craft Characteristics. Table 1 is a summary of approximate craft characteristics.

TABLE 1 - MAJOR CRAFT CHARACTERISTICS

Length, overall	180-220 FT
Maximum beam at waterline	35-42 FT
Draft, navigational	8 -12 FT
Displacement, full load	1000 - 2000 LT

2. MISSION STATEMENT

The mission of the YTT is to:

a. Serve as a platform for the production acceptance testing, post overhaul proofing, and engineering evaluation of advanced and in-service undersea warfare weapons, vehicles, and systems at the Naval Undersea Warfare Engineering Station in Keyport, Washington. Programs supported include MK 48 ADCAP, MK 50, MK 48 REBIT and MK 46 torpedoes, CAPTOR and SLMM mines, MOSS countermeasures, MK 30, MAST and ADMATT mobile targets and other weapons and systems.

b. Provide direct support for fleet operational training and undersea warfare combat system testing on existing test ranges.

c. Provide platform for launching and supporting vehicles capable of deep water bottom recovery. This includes the ability to make 3 and 4-point moors in 2,400 feet of water.

d. Provide platform for installing and maintaining underwater tracking range systems.

3. TOTAL SHIP REQUIREMENTS AND CHARACTERISTICS

3.1 Warfare Area Capabilities, Including C^3. Command, Control and Communications facilities shall be adequate for the support mission in Section 2. Features of command ship control facilities shall be per the Electronics Requirements Plan (Appendix A) and include:

a. Pilot House and bridge wings port and starboard. Port and starboard bridge wings will include gyro repeaters, rudder angle indicators and rpm indicators.

b. Manual steering control.

c. Visibility, from Pilot House forward and from bridge wings forward and aft for observation of working deck operations and docking, shall be provided.

d. A primary gyro.

e. A general ship's announcing system.

3.2 Detectability. Not applicable.

3.3 Survivability, Including Passive Protection

a. Intact and one compartment damage stability shall be per USCG criteria for survivability.

b. Degaussing is not required.

c. Collective Protective System is not required.

d. Use of flammable materials shall follow USCG standards and requirements specified herein. This translates to retention of existing furnishings and outfit unless conversion requires their rip out as part of the modification to the craft.

e. Electromagnetic Environmental Effects (E^3). All radiators and receptors of electromagnetic energy and related electronics on the YTT shall be designed and installed to ensure electromagnetic compatibility (EMC) and to avoid hazards to electromagnetic radiation to personnel (HERP) and fuels (HERF). Automated control systems shall not respond spuriously to electromagnetic interference (EMI) from radiating sources or to transients on power lines.

3.4 Mobility. A minimum sustained operational speed of 11 knots is required. The ships shall carry sufficient fuel for 1000 NM at the sustained speed, or a typical 12 day deployment, whichever is greater.

TYPICAL 12 DAY DEPLOYMENT

Speed (kts)	0	3	6	11
% of time	41	26	9	24

3.5 Operating Environment. The YTT shall operate as required on both inland waters and open ocean ranges in the Pacific Northwest. No operations in ice without icebreaker support are required.

3.5.1 Temperature and Humidity. The YTT and its subsystems must have full capability within the ranges of temperature and humidity expected in the Pacific Northwest.

3.5.2 Wind and Sea Conditions. The craft must be able to fully perform the above missions safely and effectively in sea state 3. Heading must be maintained within 5 degrees in sea state 3 at weapon firing speeds under 3 knots regardless of wind and sea directions. Seaworthiness and maneuverability are required to support transits, underwater recovery, and range maintenance, including maintaining 4-point moors and hovering above tethered recovery vehicles at best heading, in sea state 5.

3.6 Utilization and Operational Availability

3.6.1 Availability. The YTT craft shall be ready to get underway on 48 hours notice.

3.6.2 Wartime and Peacetime Utilization. The mission of the YTT is the same in time of peace or war. Utilization guidance is provided by OPNAVINST 4780.6B.

3.7 Logistic Support

a. The YTT is to be primarily shore supported per OPNAVINST 4780.6B. Maintenance is limited to:

(1) Minor repair of above-water hull structure.

(2) Minor steering system repair.

(3) Minor propulsion, auxiliaries and electrical repairs.

b. The YTT shall have the capability for control of fire, flooding, and for maintaining security and damage control surveillance following USCG standards and the requirements specified herein.

c. No replenishment at sea capability is required.

d. Supply Support. Each YTT craft shall carry consumables for her own use as follows:

Dry Stores	12 days
Frozen	12 days
Chilled	12 days
Medical	15 days
Repair Parts	15 days

3.8 Manning and Habitability. The craft shall be designed for operation with the smallest possible crew. For new equipment or systems, design studies shall be conducted to optimize manning requirements.

3.8.1 Accommodations. YTT accommodations shall be per the following:

	Transients	CPO	Enlisted	Total
Civilian	9			9
Navy		4	27	31
TOTAL	9	4	27	40

3.8.2 Habitability Standards

a. Habitability standards shall be per OPNAVINST 9640.1 (NOTAL) or good commercial marine practice. Multiple crew living spaces shall be provided for flexibility in berthing females.

b. Airborne noise requirements of OPNAVINST 9640.1 (NOTAL) do not apply.

3.9 Flexibility for Change, Including Space and Weight Reservations. Service life allowance of five percent of full load displacement and .5 foot of KG shall be provided. Service life electrical allowance shall be 20 percent.

3.10 Reliability and Maintainability. The propulsion and electrical systems shall be designed to function continuously during the Typical 12 Day Deployment without sustaining a system failure that cannot be corrected at-sea or which degrades vital services. Overhaul/drydock cycles will be per OPNAVINST 4780.6B.

3.11 Training. Training, support and plans will be developed in accordance with OPNAVINST 1500.8.

a. Personnel Training. The following training will be provided to the crews of the craft:

(1) Familiarization training will be conducted for the nucleus crew personnel prior to each craft delivery. The training will include a general review of capabilities and limitations of all major shipboard systems and equipments.

(2) Equipment specific training will be provided for operator and maintenance personnel for unique equipment/systems.

(3) Factory training will be provided on equipment if existing Navy courses do not sufficiently address equipment features and capabilities.

4. SUBSYSTEM REQUIREMENTS AND CHARACTERISTICS

4.1 Structure. Structural design shall be done to American Bureau of Shipping Standards.

4.2 Propulsion System. The following specific capabilities and characteristics are required:

a. The craft shall have a propulsion plant capable of meeting the speed, endurance, reliability and maneuvering requirements specified herein and be supported and maintained by Navy operating personnel.

b. Economy of operation shall be considered during the design.

c. The machinery spaces will be designed for unmanned operation per American Bureau of Shipping and USCG requirements.

d. Halon 1301 and AFFF firefighting systems shall be provided.

4.3 Electric Plant. The electric plant shall be per USCG requirements with a service life electrical allowance of 20 percent.

4.4 Command and Surveillance. Command and surveillance equipment necessary for safe navigation will be provided.

4.5 Auxiliary Systems

a. The following specific capabilities and characteristics are required:

(1) Sufficient potable water capacity for a 12 day mission (based on 30 gallons per day, per military and civilian accommodation) is to be provided per United States Public Health Service requirements. Resupply of potable water will be available from shore facilities at the ranges.

(2) A clean ballast system will be provided to maintain draft and trim within the required limits. Dirty ballast will not be necessary in any loading condition.

b. The YTT shall be capable of limiting the pollution emanating from the craft. A shipboard sewage system, including transfer systems and marine sanitation devices shall be installed. Oily waste holding tanks shall be provided. The shore side connection fitting of discharge hoses from both sewage and other systems shall be compatible with berthing pier connections at expected discharge points.

c. Recovery and Diving Support Systems. Adequate deck space, stability, and support (including deck cranes and winches) are required to accommodate and launch two recovery systems - one Submerged Object Recovery Device (SORD) type and one Cable Controlled Underwater Recovery Vehicle/Tethered Remotely Operated Vehicle (CURV/TROV) type.

d. Battery power is required to operate the fire control, control consoles, selected lighting, navigation and communications equipment during weapons testing.

e. The ship shall be equipped with two anchors in accordance with ABS requirements. These anchors are separate from the anchors required for the 4-point moor mission in Section 2.

f. The craft shall be capable of providing man overboard rescue capability.

4.6 Outfit and Furnishings. Not applicable.

4.7 Armament. Not applicable.

4.8 Other.

a. Torpedo Stowage. Stowage capacity for 14 heavyweight and 6 lightweight torpedoes must be provided adjacent to the respective tubes. Test torpedoes contain no warheads. Flooding and firefighting systems will be provided to contain fuel spills or fires in torpedo stowage areas. The heavyweight torpedo stowage area must be long enough to accommodate extended length (274 inches) developmental and test versions of various torpedoes and other underwater vehicles and systems.

b. Underwater Torpedo Tubes. Two tubes are required to support salvo test fittings of torpedoes and rapid sequential target/torpedo firings, and to provide system redundancy. The tubes must be of sufficient length to support extended-length (274 inches) developmental and test versions of various torpedoes and other underwater vehicles and systems. Depth of the tubes from the water surface to their tops must be at least 8 feet and the tubes must be depressed 3-4 degrees to avoid inadvertent weapon broachings, as indicated by past experience with shallow weapon firings. As required ballast tanks will be provided to obtain a minimum depth of 8 feet over the tubes.

c. Surface Torpedo Tubes. One standard triple tube mount (e.g. MK 32) is required, at sufficient height above the waterline to approximate fleet installations as described in NAVSEA Technical Manual SW395-AC-MME-010.

APPENDIX A
SHIP ELECTRONICS REQUIREMENTS PLAN

1. TRANSMITTING/TRANSCEIVING FACILITIES

a.	3	225 - 400 mHz	A3, F4	Transceiver
b.	6	115 - 152 mHz	A3	Transceiver
c.	1	156 - 162 mHz	F3	Transceiver

2. SECURE FACILITIES

a.	7	"R"	Wideband Secure Voice (TSEC/KY-58)
b.	2		Secure Data Units (TSEC/KG-84)

3. EXTERNAL COMMUNICATIONS REMOTE FACILITIES

a.	Bridge	One station access to any selected voice channel. Simultaneous monitoring of any selected voice channel. Control of three UHF/VHF transceivers, access monitoring and control of VHF Bridge to Bridge transceiver.
b.	Bridgewings	Access and monitoring of VHF Bridge to Bridge Transceiver. Selectable monitoring of any selected voice channel.
c.	Recovery Control	Two station access to all voice channels. Simultaneous monitoring of any selected voice channel.

d. Craftsmaster Stateroom One station monitoring of any selected voice channel.

e. Communications Center Control and monitoring of two voice channels.

4. SPECIAL FEATURES

a. 1 Frequency standard with remote outputs in combined workshop.
b. 1 Emergency Position Indicating Radio Beacon (EPIRB)
c. 1 Lifeboat Radio
d. 1 Automatic Alarm (500 KHz) for Communications Center Communication Security System
e. 1 Communication Security System (CSS)
f. 1 Manual Voice Security system (MVSS)
g. 1 Signal Distribution System -- A 25 pair data cable from a distribution frame in the communications center to each of the following: Fire Control, Combined Workshop, Recovery, Torpedo Hold, and Bridge.
h. All communication systems to be on an Uninterruptable Power Supply (UPS).
i. 1 Portable UHF/VHF Transceiver

5. INFRARED FACILITIES - None.

6. NAVIGATION FACILITIES

1 Navigation Radar (W/Collision Avoidance System (CAS))
1 Depth Sounder

7. Countermeasures - None.