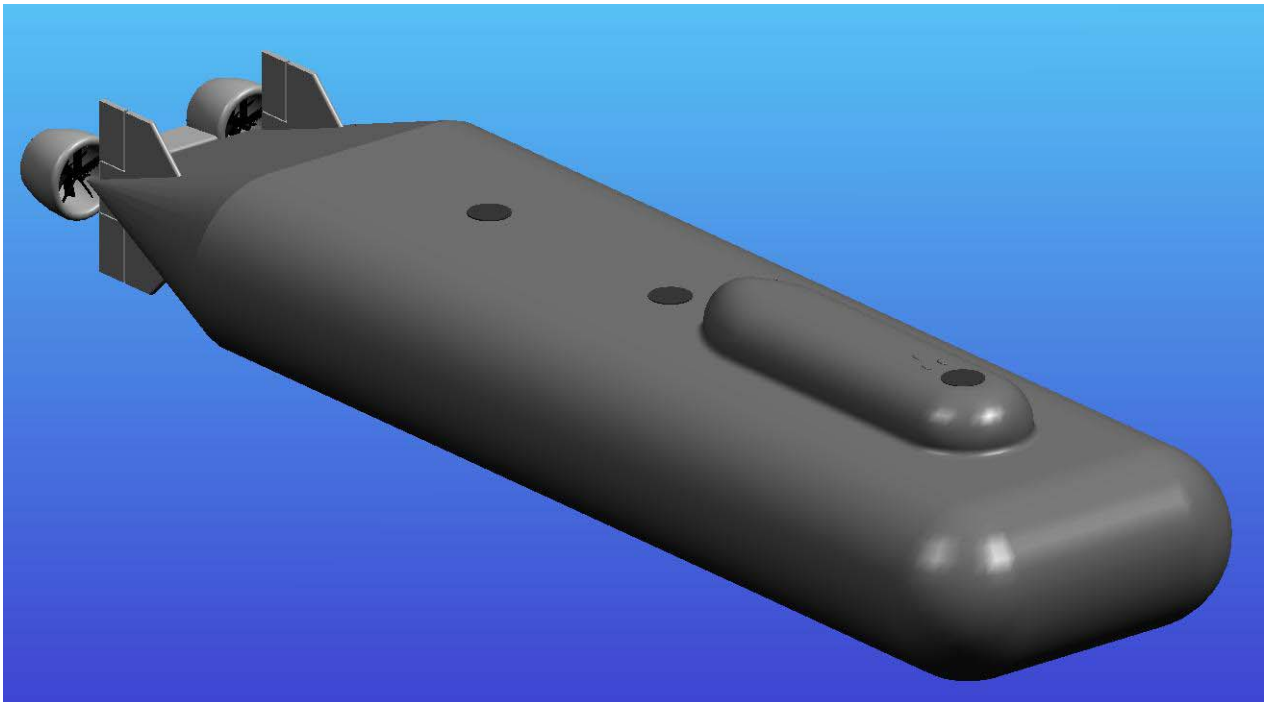


SSLW(X) Design Report

Littoral Warfare Submarine

VT Total Ship Systems Engineering Approach

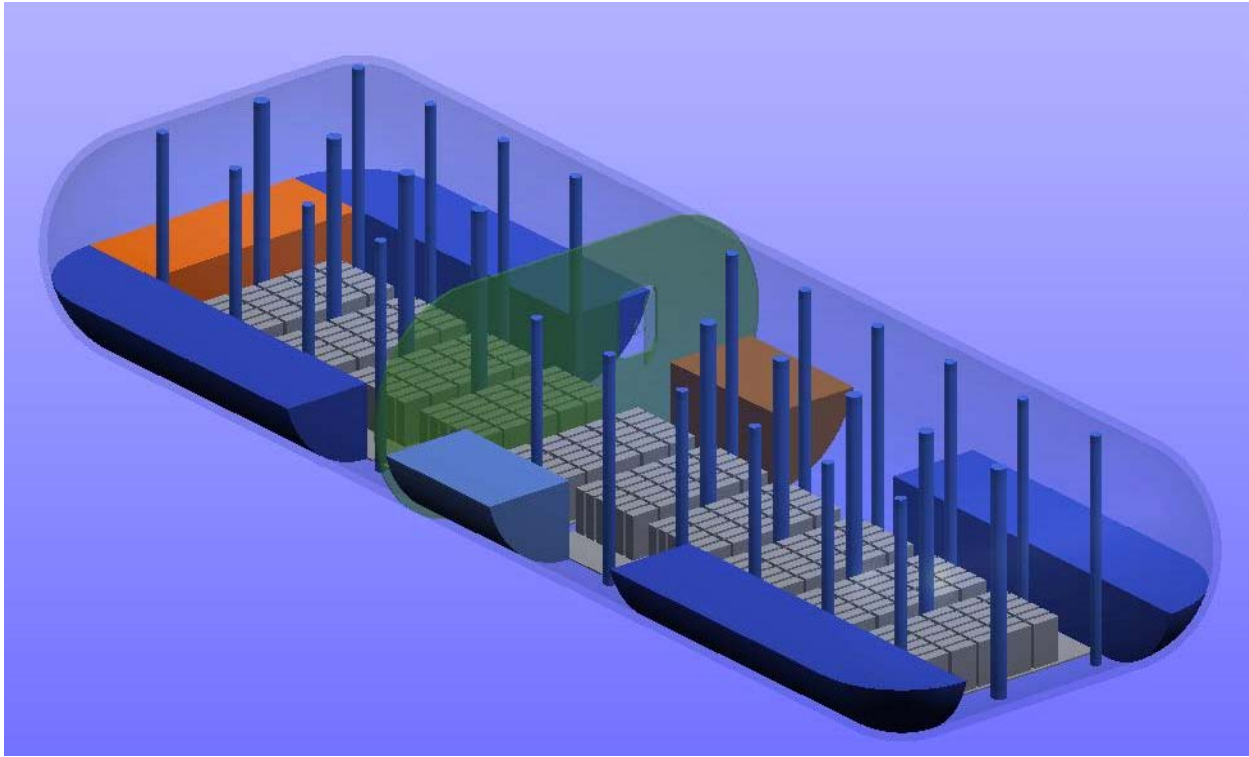


Ocean Engineering Design Project
AOE 4065/4066
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Virginia Tech Team 3

Justin Hlavin	_____	16528
Ronda Yon	_____	21621
Robert Boyle	_____	21622
Lucas Scruby	_____	21623

Executive Summary



This report describes the concept exploration and development of a Littoral Warfare submarine, SSLW(X). This design was completed in a two-semester ship design course at Virginia Tech.

SSLW(X) will perform the following missions:

1. Covert insertion, extraction, and support of Special Operation Forces teams.
2. Covert Intelligence, Surveillance and Reconnaissance (ISR).
3. Mother vessel support for multiple types of UUVs.

Requirements for this design are based on the SSLW(X) Mission Need Statement (MNS) and Acquisition Decision Memorandum (ADM).

The design must minimize life cycle cost through the application of new technology and minimum manning, and minimize personnel vulnerability in combat through automation, innovative concepts for minimum crew size and signature reduction. Performance requirements include a crush depth of 750 feet and a maximum speed of 12 knots. This requires a support vessel, surface or submarine, to carry SSLW(X) to its mission area. Concepts considered for the design include moderate to high-risk alternatives. The acquisition cost of SSLW(X) has a threshold value of \$600M and a goal value of \$300M.

The VT SSLW(X) baseline design meets mission, cost, and manning requirements. The hull form is elliptical to maximize interior volume for with a limited draft. A Proton Exchange Membrane Fuel Cell is used to provide integrated air-independent propulsion and ship service power with two Rim Driven Podded propulsors to propel the submarine at 10 knots with reduced acoustic signature and minimum manning. The submarine is outfitted with multiple MK-50 torpedoes to provide a limited self defense capability, and a large lock-out chamber to support Special Operations Forces.

LOA	114.5 ft
Beam	30.5 ft
Hull Depth	18 ft
Displacement	1032 tons
Cost	\$308M
Diving Depth	750 ft
Speed	12 kts
Range	500 nm
Endurance	60 Days
Electrical Power	1200 kW
SHp	1000 hp
Torpedoes	2 MK-50
Crew	12
SEALS	8