Virginia Tech
Aerospace & Ocean Engineering

Optimum Risk Tanker (ORT) Design Report

A Systematic Approach to a TAPS Tanker Design

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Contract Deliverables Requirements List (CDRL Key)

Requirement	Found in:	Page Number (Starts on)
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Technical approach used to satisfying owners requirements	Section 3.1	10
Technical risks	Section 4.11.1	81
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Speed / Power analysis	Section 4.3	30
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• Lines Drawings with Principle Appendages	Drawing 100-001	
• General Arrangements	Drawing 100-004	
• Crew and officer berthing	Figure 4.7.3.3	47
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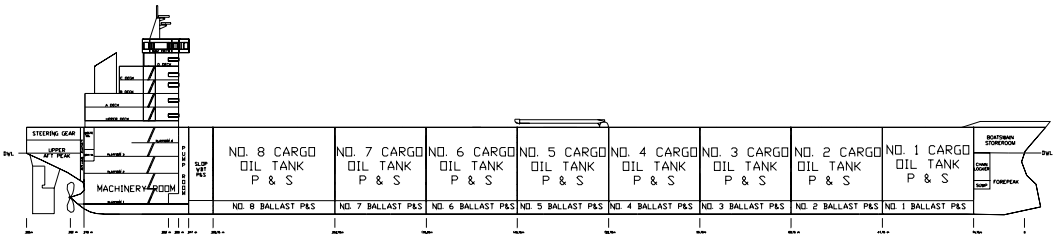
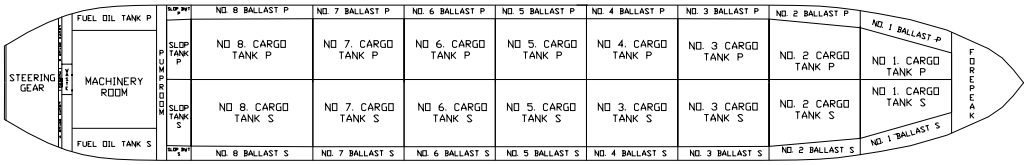
• Structural Midship Section	Drawing 100-002	

Executive Summary





Principle Characteristics

LWL	295 m	100% Cargo Capacity m^3	134354
Max Beam	45.7 m	Endurance speed	
Depth	25.8 m	Endurance Range	10,000 nmi
Draft	18 m	Sustained speed at 90% MCR	17 knots
Displacement m^3	189568	Number of Engines	1 @ 30560 HP
Lightship Weight	45780 DWT	Crew Size	26
C_B	0.756	Construction cost	$148 Million
C_P	0.752	Total Onwership Cost	$251 Million
C_X	0.994	Risk	0.0054 m^3

As techniques are developed to extract more oil from the Trans-Alaskan Pipeline System (TAPS) than originally anticipated, and the existing fleet of crude oil tankers plying this trade approach the end of their service life, a need is realized for replacements for this fleet. This paper proposes a state of the art replacement design for the TAPS trade. The replacement design must have a low probability of oil outflow, and incorporate high efficiency systems.

A low cost, low risk Very Large Crude Carrier (VLCC) design is presented. The design includes increased subdivision and double hull spacing over the existing fleet. This ship is designed for a full load capacity of 125,000 DWT to meet the Puget Sound limitations on deadweight tonnage.

This design represents the state of the art in minimum risk crude oil transportation. With double side and double bottom widths far in excess of the operational fleet, risk of oil outflow is drastically reduced over existing designs. Efforts have been made to provide maximum crew comfort in order to increase productivity. Corporate America has realized the importance of employee welfare, yet the maritime transportation industry has been slow to catch on. A high 90% MCR speed of 16.3 knots provides the owner/operator with flexibility to come to terms with the demands of port schedules and the North Pacific. This high transit speed is accompanied by increased fuel efficiency and seakeeping over traditional design.