Orion's Force Class Ship

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Abstract *— The United States Navy (hereinafter referred to as Navy) submitted a request for proposals (RFP) for a new class of surface ships titled Force Class Ship. Orion Industries submitted a proposal for their design which they have titled Orion Force Class Ship. In Orion's proposal they have detailed how their proposed design provides all the capabilities categorized as "NEEDED" by the Navy in the RFP, as well as how their design contains the capabilities listed as "LIKES" that they have deemed provide the most value and lethality to their design. Orion's design provides all the expected technical features from a deep water surface ship and exceeds by providing all but one of the "LIKES" the Navy defined in the RFP.*

Key Terms *— Contract, "LIKES" Capabilities, "NEEDED" Capabilities, United States Navy RFP*

INTRODUCTION

In response to a congressional inquiry into the current operational capabilities of the Navy it was determined that the Navy needs to increase from 308 vessels in 2014 to 355 in the next 30 years [1]. As part of this inquiry it was determined that the major surface ship force protection gap falls in the large, multi-mission, surface combatants as shown on Table 1.

Table 1
2016 Navy Nation Needs [1]

Type / Class	2014 FSA	2016 NNN
Ballistic Missile Submarines[1]	12	12
Aircraft Carriers[2]	11	12
Attack Submarines	48	66
Guided Missile Submarines[3]	0	0
Large, Multi-Mission, Surface Combatants	88	104
Small, Multi-Role, Surface Combatants	52	52
Amphibious Warfare Ships	34	38
Combat Logistics Force	29	32
Command and Support	34	39
Total	**308**	**355**

Understanding the capability gaps assessed by congress, the Navy produced an RFP for a new class of ship they have called Force Class Ship. The Navy intends to award the contract to the best value proposal for the design and build of the first 10 ships. In the RFP the Navy provided two categories of capabilities that they are looking for in the Force Class ships. The first category being the "NEEDED" capabilities which are the non-negotiable capabilities, meaning these are a must; and the second category being the "LIKES" capabilities which are nice to have but not technically needed to be the winning proposal.

In response to the Navy RFP, Orion Industries has decided to develop a proposal for their take at designing a Force Class Ship which they have called Orion's Force Class Ship. Orion Industries design will contain all the capabilities that the Navy has deemed as "NEEDED" and the "LIKES" they have determined provide the most value based on a trade-off analysis. This report contains the capabilities provided by Orion's Force Class Ship and proves how Orion's design provides the best value design for the Navy.

UNDERSTANDING THE NAVY RFP

In order for Orion Industries to develop and submit a proposal for the Force Class Ship, the Navy RFP capability categories are to be defined and understood.

"NEEDED" Capabilities

The first category of capabilities is the most important category which is the "NEEDED" capabilities. These categories are considered a must, meaning the Navy will not award the winning contract to a design that does not contain all the "NEEDED" capabilities. Table 2 provides a breakdown of the "NEEDED" capabilities.

Table 2
"NEEDED" Capabilities

Functional Area		Capabilities
General/Operational	Speed	20 knots transit, 30 knots accelerate
	Manning Capacity	150 Sailors
	Area of Operation	Deep water
Structural	Operating Life	35 Years
Propulsion	Range (without refueling)	500 nautical miles
Auxiliary	Firefighting	Spaces need to be compartmentalize so that fire does not transmit between spaces
	Ventilation	Ventilation and air conditioning needs to be supplied to sailor's quarters at 75 degrees F in the cooling season and 55 degrees in the heating season
	Galley	Food, potable water and sanitation services is to be provided to the crew
	Entertainment	Five lounge and recreation areas need to be provided in the ship. Each lounge area needs to provide the capacity of 15 sailors at a time
Electrical	Power	The entire ship needs to be provided with electrical and back electrical services. Back up electrical services need last for 3 hours
Communication	Within the ship and outside	Capability to communicate with other ships in the squadron, land and satellite communications
Weapons	Defense	Air, land and underwater defense
	Attack	Air and land attack

"LIKES" Capabilities

The second capabilities that the Navy defined in the RFP was the "LIKES". These capabilities are nice to have but are not required to win the contract. Table 3 provides a breakdown of the "LIKES" provided in the Navy RFP.

Table 3
"LIKES" Capabilities

Functional Area		Capabilities
General/Operational	Manning Capacity	150 Sailors + **50 additional sailors**
Propulsion	Range (without refueling)	500 + **1000 nautical miles**
Auxiliary	Modify as required	
Weapons	Provide space and weight reservation for 24 cells of vertical launch system (VLS)	
	Provide space, weight and energy reservation for laser gun	
	Provide space, weight and energy reservation for rail gun	
Electronic Warfare and Decoys	AN/SLQ-32(V)2 Electronic warfare System	
	AN/SLW-25 Nixie Torpedo Countermeasures	

Having defined the "NEEDED" and "LIKES" capabilities the Navy provided in the RFP, Orion Industries determined their approach to provide the proposal for the Orion's Force Class Ship.

ORION'S APPROACH

Orion Industries has been a government contractor for years and has provided services to the US Government such as engineering and administrative services. In preparation of the proposal, Orion has ensured to understand and analyze the expectations of preparing and submitting a government proposal, even though Orion has prepared proposals for the engineering and administrative services it has provided, it has never developed a proposal for the design and built of a ship, therefore the company has provided employees with specialized training by providing the guidelines and expectations for developing a government proposal as a refresher [2]. Additional measures taken by Orion for the preparation of the RFP is studying current Navy ships and assessing the capabilities provided by the ships currently in the

Navy fleet [3]-[4]. This information will be used as a baseline for the development of the capabilities the Navy has stated are "NEEDED" and the achievable "LIKES" that Orion is able to provide. Orion is able to do this because the Navy requested the capabilities but did not provide the means as to how the capabilities will be achieved. This falls completely on the agency developing the proposal.

How to win the Navy Contract

In an effort to ensure that the Orion design contained all the "NEEDED" and optimized the "LIKES" provided in the RFP, a systematic approach was taken at developing a solution. This approach entailed starting from the basics, such as defining the Orion Force Class Ship Team, to performing an in-depth analysis, such as the trade-off analysis performed to determine the "LIKES" that could be provided.

- Defining the Team: After getting the refresher in providing proposals and understanding the current capabilities of the Navy Fleet, the Orion Force Class Ship Team (hereinafter referred to as Team) first needed to ensure that the Team was properly staffed and divided to assess the functional areas of the proposal. At the time this meant performing a high level analysis of the "NEEDED" capabilities and determining which functional areas would require the most attention, hence the most capable staffing. Looking at Table 2, it can clearly be seen that a weighted average of the capabilities can be performed to determine how to properly staff the Team. Figure 1 details the weighted average of the capabilities detailed in the RFP and it can clearly be seen that the brunt of the work falls on the auxiliary division. This is the section of the Team that had to be staffed most robustly.

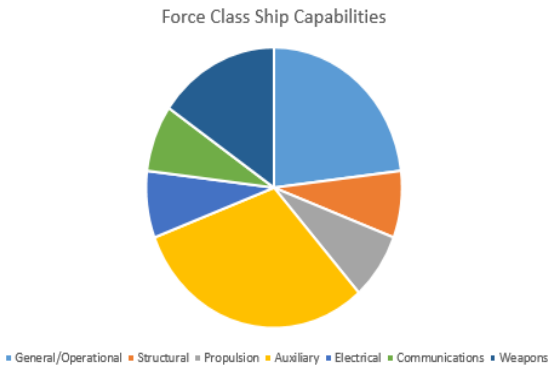

Figure 1
Force Class Ship Capabilities Weighted Average

- Providing the "NEEDED" Capabilities: Orion's approach to provide the "NEEDED" capabilities was to utilize Navy approved design and standards in as many systems as possible. In doing so proving that the Orion's Force Class Ship is a trusted design from its inception. Orion's design will not pursue new technology development in order to eliminate the inherent risk that comes from unknown new technologies and its implementations. Table 4 contains how Orion will be providing the "NEEDED" capabilities only. The "NEEDED" capabilities that where modified as part of the "LIKES" capability were intentionally left out and will be covered in Table 5.

Table 4
Orion's Design for "NEEDED" Capabilities

Functional Area	**Orion's Design**
Speed	Four LM 2500+ gas turbine
Manning Capacity	Navy approved berths will be used in the design
Area of Operation	Ship size: 32 ft. draft, 515 ft. length
Operating Life	Made of Steel
Within the ship and outside	Navy approved standards will be utilized for the design of the system.
Weapons for Defense	Short range air and land: 47 mm gun Long range air and land: SeaRAM anti-ship missile defense system Aegis Ballistic Missile Defense System Underwater: Unmanned underwater will be used to survey and defend the ship Tomahawk missiles Mark 32 torpedoes
Weapons for Attack	Air - tomahawk missiles Air and land - harpoon missiles

- Providing the "LIKES" Capabilities: A trade-off analysis was performed by the Team and they analyzed which of the seven "LIKES" that the Navy provided in the RFP would provide the most value to the Orion Force Class ship. The Team analyzed current capabilities of Navy ships and current threats in the World and it was determined that all "LIKES capabilities except one really provide a great value for the Orion Force Class ship while improving lethality which is something the Navy is always looking to improve, in laymen's terms, Orion determined which capabilities provided the most bang for your buck while at the same time not requiring the need to excessively modify the needed capabilities. Table 5 provides the "LIKES" the Orion Force Class Ship will contain and how they will be provided. Table 5 also details how the Auxiliary systems capabilities will be provided including the "LIKES".

Table 5
Orion's Design for "LIKES" Capabilities

Functional Area	Orion's Design
Propulsion Range	Tanks will be sized for 1500 nautical miles of fuel
Auxiliary/Firefighting	The system will be designed and sized to include the higher demand required due to the "LIKES". The following Navy approved systems will be used: Aqueous film forming foam Water mist Sea water
Auxiliary/Ventilation	The system will be designed and sized to include the higher demand required due to the "LIKES"
Auxiliary/Galley	This auxiliary section was not affected due to the "LIKES" capabilities
Auxiliary/Entertainment	This auxiliary section was not affected due to the "LIKES" capabilities
Power	The system will be designed and sized to include the higher demand required due to the "LIKES"
Weapons for Defense/Attack	These affect the ventilation, power and firefighting "NEEDED" capabilities
Electronic Warfare and Decoys	These set of "LIKES" affect the ventilation, power and firefighting "NEEDED" capabilities

- How the "LIKES" changed the Orion Force Class Ship: Having originally sized the ship for the "NEEDED" capabilities only, a thorough assessment had to be done to ensure that the "LIKES" that the Team decided to pursue did not require a full redesign or the ship. After the analysis was complete it was determined that the ship was properly sized from the beginning to allow room for the growth associated with incorporating the "LIKES". The Orion Force Class Ship remains at the same size detailed in Table 4.

Maintenance

The Navy stated that the maintenance capabilities of the Force Class ship fall completely on the developing contractors but must strictly adhere to the Joint Fleet Maintenance Manual (JFMM) [5]. Orion will provide preventative, routine and emergency maintenance procedure developed in accordance with the JFMM and will be clearly detailed in the proposal sent to the Navy.

CONCLUSION

It is understood that winning a contract such as the Navy's Force Class ship would be an extremely lucrative venture for any Government contractor and therefore Orion Industries expects this competition to be full of excellent proposals. However, understanding this Orion truly believes that the Orion Force Class Ship provides the Navy with the best value proposal by providing all the "NEEDED" capabilities and all but one of the "LIKES" capabilities. Orion is providing these capabilities using tried and proven Navy technologies while keeping a ship size that can clearly operate in squadrons all throughout the world. Orion's design provides all the expected technical features from a deep water surface ship and exceeds by providing all but one of the "LIKES" the Navy defined in the RFP. Orion's design provides, tried, tested and approved Navy technology therefore reducing the risk of unknown complications; making this the best value design.

REFERENCES

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