Jawfish: Submarine-Launched Manned Submersible

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JAWFISH is an original naval vessel sponsored by U.S. Special Operations Command (USSOCOM); this year-long design project addresses the demand for a clandestine, dry-atmosphere, manned submersible which mates to a submarine host. Although the Advanced SEAL Delivery System once filled that role, critical setbacks to that program in 2008 resulted in an acute capability gap. As a smaller and lighter platform, JAWFISH constitutes a re-imagining of that design space.

The high-level technical requirements for JAWFISH constrained its design within the weight and space envelope of the Modernized Dry Deck Shelter (not to exceed 218,600 lbs and 506" in length). Using an Analytical Hierarchy Process with a scratch-built model to assess technical utility and cost, this design effort analyzed a total of 37,800 unique configurations in order to identify a Pareto frontier of optimal JAWFISH variants. This process evaluated the primary design variables of Crew Size, Cargo Space, Maximum Range, Loiter Time, Lock-in/Lock-Out Cycles, and Station-Keeping Ability, whose relative values were provided by manned submersible operators in the SEAL community. The primary technology tradeoff analyzed in this study was the means of station-keeping, expressed as an anchoring capability, a hovering capability using thrusters, or a combination of both.

From a pool of seven final JAWFISH variants, USSOCOM chose a vehicle with both anchoring and hovering with capacity for 10 crewmembers. This enabled final validation of the model by assessing JAWFISH trim and stability characteristics by means of an equilibrium polygon. Feedback from the sponsor indicates that this project was highly successful as a reference point for future manned submersible acquisition.

Principal Characteristics:

Length x Beam x Height	42' 2" x 8' x 9'	Max Op Depth	400 ft
Crew	8 divers/2 pilots	Max LIO Depth	190 ft
Cargo	40 ft^3	Max Speed	10 knots
Range	120 nm	Endurance Speed	5 knots
LIO Capability	Anchoring/Hovering	Energy Source	Li-ion, 621 kWh
Divers per LIO	5	Life-cycle Cost	$120.6 Million