

Topic: N181-072

AVX Aircraft Company

Lightweight Gearbox for Air Cushion Vehicles

The gearbox is designed for the NAVSEA Ship-to-Shore Connector (SSC). The Lightweight Gearbox is designed utilizing advanced aerospace engineering and state-of-the-art materials. It will provide reliable gearbox operation over the thirty year life of the craft with no Time Between Overhaul (TBO) and minimal maintenance. A two-speed lift system gear train allows for fuel reduction and along with the lightweight design significantly reduces Operations and Sustainment costs. The AVX design has incorporated solutions to NAVSEA Lessons Learned from prior Landing Craft, Air Cushion (LCAC) and SSC Craft. The design team has brought previous design and sustainment knowledge from USMC V-22 and CH-53K drivetrain technology, where weight and reliability are critical, into the program to ensure success.

Technology Category Alignment:

Ground and Sea Platforms

Energy & Power Technologies

Materials & Manufacturing Processes

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SYSCOM: NAVSEA

Contract: N68335-19-C-0842



Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N68335-19-C-0842



Tech Talk: <https://www.youtube.com/watch?v=mLM1cRoB3GM>

Department of the Navy SBIR/STTR Transition Program

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NAVSEA #2020-0418

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Lightweight Gearbox for Air Cushion Vehicles
AVX Aircraft Company

WHO

SYSCOM: NAVSEA

Sponsoring Program: PMS 377 Amphibious Warfare-Ship-to-Shore Connector

Transition Target: Ship-to-Shore Connector (SSC)

TPOC:
(215) 897-8672

Other transition opportunities: Navy, Army, Air Force Lightweight Gearbox using Advanced Aerospace Technologies for multiple platforms

Notes: Image depicts the SSC highlighted by the Advanced Aerospace Engineering designed Lightweight Gearbox (LWGBX).

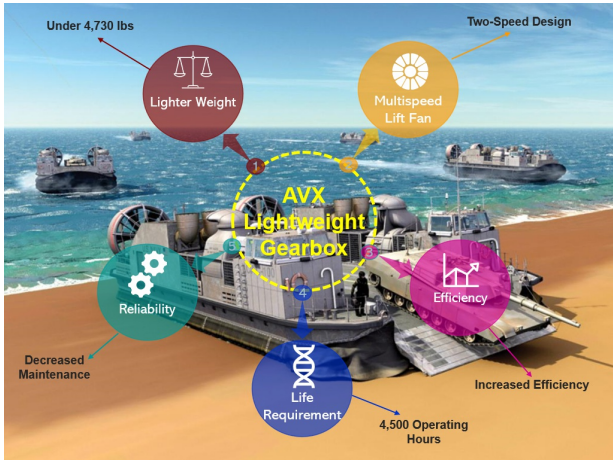


Image by AVX Aircraft approved by NAVSEA Office of Corporate Communications

WHAT

Operational Need and Improvement: The SSC is a replacement Air Cushion Vehicle for the Legacy Landing Craft Air Cushion (LCAC). The Lightweight AVX Advanced Aerospace Engineered Gearbox enables an increase in payload, reduction in fuel costs and a reduction in operational and sustainment costs over it's 30 year life.

Specifications Required: The Gearbox shall be designed for a minimum operating life of 4500 hours. The Port and Starboard gearboxes shall be functionally identical and interchangeable. Each Gearbox is powered by 2 turbine engines with maximum continuous power (MCP) of 4200KW at 15,000 RPM. The Gearbox drives a Propulsor Fan at 1257 RPM and a Lift Fan at 1715 RPM. Additional outputs drive the Craft Generator, a Hydraulic Pump and a Lubrication Oil Pump. Additionally, the Gearbox must comply with the SSC Design Specification that includes multiple requirements for sustained reliable operation in a harsh maritime environment.

Technology Developed: The AVX design incorporates a 2 speed (100%-85%) manually selected static shift for Lift Fan speed. Structurally efficient housing design with corrosion resistant material that reduces gear misalignment. Self contained lubrication system with oil-to-oil heat exchanger ensures gears can provide maintenance free 30 year life. Double locking proprietary design lock nuts eliminate locking wire, retaining rings, locking screws that have caused issues with loose hardware. Development of an innovative environmental barrier to protect carbon face seals.

Warfighter Value: This Lightweight efficient two-speed gearbox with a self contained lubrication system will significantly reduce Operations and Sustainment costs by reducing weight increasing payload, reducing fuel costs and maintenance man-hours.

WHEN

Contract Number: N68335-19-C-0842 Ending on: October 31, 2020

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Design Review with NAVSEA at Textron Marine.	N/A	Inspected SSC Craft with Textron/NAVSEA for System interface	3	January 2020
Preliminary Design Disclosure with NAVSEA/TPOC	N/A	TPOC Approved.	3	June 2020
Base program Final Report delivered.	N/A	TPOC Approved with comments.	3	June 2020
If Option exercised Critical Design Review	Med	TPOC/NAVSEA Approval.	4	December 2020
If Option exercised contract suppliers for prototype fabrication/test	High	Program moves to next phase.	5	March 2021

HOW

Projected Business Model: AVX is a horizontally integrated company developing Advanced Aerospace Engineering Systems. AVX creates the Subsystem and manages a skilled team of suppliers who manufacture the System under AVX direction.

Company Objectives: We anticipate the Navy SBIR/STTR Transition Program (STP) will facilitate connections with Government and Industry decision makers to select our Lightweight Gearbox for the SSC application. Our immediate goal is to earn the Phase II Option and Commercialization Readiness Program (CRP) funding. This would be closely followed by a Phase III Award to enable the program to commit to a Prototype unit build and test on the Prototype SSC.

Potential Commercial Applications: The AVX Advanced Aerospace Engineered Gearbox Design Criteria have applications for all rotary and fixed wing aircraft powered by Turbine Engines both Military and Commercail.

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