



ONR

Sea-Based Aviation National Naval Responsibility – Airframe Structures & Materials –

ONR Program Code 35

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At a Glance

What is it?

- Design, materials selection, fabrication, inspection and maintenance related to air-vehicle structures. Airframe materials and structures Science & Technology offers opportunities in durability, structural life, sustainment, ready-for-tasking effectiveness, and affordability. Most airframe technology challenges are not platform or design specific; they are fully represented in both current new-build and planned next-generation platform designs.

How does it work?

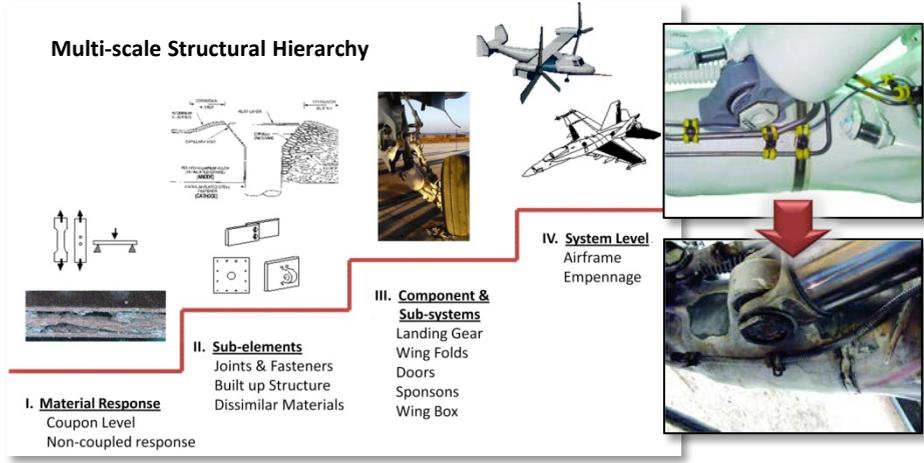
- Core investments include directed Basic and Applied Research funding, with proposals developed for Future Naval Capabilities and other advanced technology development options. Work is supported by Naval Aviation experts at the Naval Air Systems Command, Naval Air Warfare Center labs, and the Navy Research Lab. Close coordination with the Air Force Research Laboratory (AFRL), the Army Aviation Command, and the Defense Advanced Research Projects Agency (DARPA) helps to ensure that in addition to Navy and Marine Corps unique technology needs, the investments of other services and agencies are leveraged and integrated.

What will it accomplish?

- Advanced airframe technology will address the particular needs and environments of Navy and Marine Corps aviation in:
 - Understanding and predicting the impact of material property degradation
 - Developing advanced shipboard inspection, maintenance, and repair methods
 - Airframe structural life prognosis and sustainment
 - Integrated materials selection and design analysis, and
 - High-mechanical loads/light-weight structural requirements for shipboard launch/recovery.

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Naval Aviation is in the forefront of the Navy power projection mission, including our ability to successfully meet development, operational performance, readiness, and affordability requirements. There are additional needs for the knowledge, skills and expertise required to support the research, engineering, design, production, acquisition, and sustainment of Naval aircraft. ONR and NAVAIR are addressing these S&T needs in a fully integrated, collaborative approach between the science and technology, the engineering and sustainment, and the acquisition communities, as well as an optimum arrangement for successful, relevant, and efficient technology transitions. Sea-Based Aviation demands structural and materials requirements and challenges that are not the same as land-based aviation requirements. A robust program which sustains a focused aircraft S&T activity is critical to the health of naval aviation.

The ONR Sea-Based Aviation strategy will enable more robust aircraft design, reduce maintenance and sustainment impacts due to design decisions driven by weight or environmental factors, improve the fidelity of materials selection impact analysis and trade-off decisions, and enable reduced weight and/or increased range/payload without reducing durability. The SBA Structure and Material program consists of two thrusts – Advanced Airframes and Durable Aircraft. These two thrusts cover technical areas such as multi-material risk and reliability, integrated structural and material degradation design analysis, remaining life prediction, multi-scale fatigue and fracture prediction, optimized airframe materials selection, multi-functional materials research, advanced structural concepts development, and modeling complex load/degradation interactions.

Applied research programs are currently being initiated in the areas of advanced concepts, durable aircraft development, structural analytics and prognosis, advanced material design, composites and composite repair, and material coatings.

Research Challenges and Opportunities:

- Structural Failure Mode Characterization
- High-Loading/Light-Weight Structural Materials
- Advanced Structural Concepts
- Materials Degradation/Corrosion
- Structural Protection and Maintenance

