

University of Maine FY 2018 Federal Legislative Priorities

Agriculture

Federal Base-Funded Support for Agriculture and Forestry Research <i>Support APLU recommended increase to base funding; contact Fred Servello and John Rebar</i>	USDA/NIFA
Forest Products Research <i>\$3.5 million to continue this legacy program; contact Steve Shaler</i>	USDA/ARS
New Potato Varieties <i>\$2.2 million to continue this national program; contact Greg Porter</i>	USDA/NIFA
Potato Pest Management <i>\$500,000 to continue this legacy program; contact James Dill</i>	USDA/NIFA
Adaptive Management of Native Berry Crop <i>\$2 million for this program supported by Maine blueberry growers; contact David Yarborough</i>	USDA/NIFA

Commerce, Justice, Science

Sustaining Highly Migratory Species in North Atlantic and Gulf of Mexico <i>\$400,000 for this initiative in partnership with Mot Marine Lab; contact Walter Golet</i>	Commerce/NOAA
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Defense

Rapid, Lightweight, Low-Logistics Infrastructure Construction <i>\$10.0 million to continue this research partnership with Corps of Engineers; contact Habib Dagher</i>	Army RDT&E
Jet Fuel from Forest Biomass <i>\$4.0 million to scale up production jet fuel from forest biomaterials; contact Hemant Pendse</i>	Defense Wide RDT&E
Advanced Materials and Structures for Expeditionary Soldier Support <i>\$5 million to continue this partnership with Natick Soldier Systems Center; contact Habib Dagher</i>	Army RDT&E
Composite Structures Research for Enhance Mobility <i>\$5.0 million for composites research on amphibious vehicles with Navatek; contact Habib Dagher</i>	Navy RDT&E
Pilot Manufacturing of Secure Hybrid Composite Containers <i>Support President's Budget Request; contact Habib Dagher</i>	Procurement, Defense Wide

Energy and Water

Maine Aqua Ventus I Offshore Wind Demonstration Project <i>\$40 million for offshore wind advanced technology demonstrations; contact Habib Dagher</i>	DoE/EERE
Additive Manufacturing of Bio-Based Composites <i>\$20.0 million for partnership with Oak Ridge National Lab; contact Habib Dagher</i>	DoE/EERE

Interior

Forest Ecosystem Services in Maine <i>\$440,000 for forest carbon inventory; contact Aaron Weiskittel</i>	Interior/USFS
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Labor HHS

Successful Aging for Independent Living <i>\$10 million for new national program focused on technology for aging; contact Len Kaye</i>	HHS/ACL
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Transportation-HUD

Hybrid Composite-Concrete Bridges <i>\$1.5 million to support new bridge system manufacturing in Maine; contact Habib Dagher</i>	DoT
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Hybrid Composite Structures Research for Enhanced Mobility

UM Signature Research Area: Advanced Materials for Energy and Infrastructure

Background and Need

The U.S. Navy requires a wide variety of specialized marine vehicles, such as amphibious personnel carriers, tracked ship-to-shore connectors, sleds, inflatable assault craft, and associated systems/components that require lightweight materials/structures to maximize speed, range and payload. Research into advanced and hybrid composites/structures is needed to help the U.S. Navy develop innovative technologies to enhance the mobility of future marine vehicles by reducing their weight. Example U.S. Navy projects which could significantly benefit from the use of advanced composites for enhanced mobility and/or structural weight reduction include:

UHAC



Since 2008, the Office of Naval Research (ONR) has been working with UMaine's industry partner, Navatek (with operations in Hawaii) to develop a well-deck-capable surface connector called the Ultra Heavy-lift Amphibious Connector (UHAC). Navatek has demonstrated a fully functional, half-scale prototype. The Singapore Ministry of Defence is co-funding this research program. UHAC can meet the Navy's and Marine

Corps' requirement for 20 knot target speed with the objective payload over a distance of 200 nm. The UHAC project is already funded at \$9.4 million over the next four years. In June 2016, Navatek was invited by ONR to submit a request to build a new ¼-scale UHAC vehicle. The vehicle may employ a variety of composite materials, including compression-molded carbon, filament wound carbon, and CRP/metallic combinations.

ACTUV



DARPA is developing the Anti-Submarine Warfare Continuous Trail Unmanned Vessel (ACTUV), an unmanned vessel optimized to robustly track quiet diesel electric submarines. Navatek received \$4.6 million from ONR to develop a towed-body autonomous deployment-retrieval system to interface with ACTUV. The system incorporates drop stitch composite panels.

ACV



Navatek has a pending \$1.4 million contract from NAVSEA to develop a drop-stitch ACV (Amphibious Combat Vehicle) ramp for the Navy's Expeditionary Fast Transport (EFT). The U.S. Marine Corps and Navatek are also exploring the use of drop-stitch inflatable panels for an ACV 1.0 High Speed Sled; and an ACV 1.0 Buoyancy Kit.

Navatek/University of Maine Composites S&T Project

The proposed S&T effort would focus on design, prototyping and testing of innovative composites and structures applicable to marine vehicles and associated structures. Examples include compression-molded carbon in combination with wound-carbon filaments for strength,

weight, and production advantages over metallic materials; and inflatable drop stitch panels in combination with hard structures. Research is required to more fully develop these materials. Initial focus would include:

1. Metallic-composite structures

Composites offer strength and weight advantages over conventional metallic structures, but are often more costly. Building structures that combine metal and composite can produce more cost effective structures that are lighter in weight. One idea is to combine compression molded carbon parts with carbon fabric layups that are attached to metal. Standard shapes can be quickly compression-molded with very little touch labor and the carbon fabric layups can customize their strength characteristics.

2. Compression-molded, long filament and short strand parts

Typically, compression-molded parts use short strands of carbon that are pressed and heated in a mold, producing parts quickly with relatively uniform material properties. However, structural properties are reduced relative to parts made with long fibers, as is the case with carbon fabric or filament winding. Combining long filament with short strands in a compression molding process could yield parts with tailored strength properties, while preserving the production advantage.

3. High strength, lightweight, flexible coatings for drop stitch fabric

Current coatings add approximately 90 oz./sq. yard to the drop stitch fabric. Lighter coating fabrics could be applied to the drop stitch fabric that could significantly reduce its weight, and simultaneously increase its flexibility. Increased flexibility will allow for smaller storage packages.

The discussion above refers to carbon composites, but applies equally to glass and carbon/glass composites.

FY '18 Funding Request

University of Maine and Navatek are seeking \$5 million in Congressional funding in FY 2018 to launch a collaborative research program to address the U.S. Navy's pressing need to enhance the mobility of future marine vehicles, while also reducing the structural weight of associated systems/components.

Requested Amount:	\$5 million increase to President's Budget Request
Project Title:	Hybrid Composite Structures Research for Enhanced Mobility
Appropriation Bill:	Defense
Account:	Navy RDT&E
Line Title:	Force Protection Applied Research
Program Element:	PE 0602123N
Line Number:	Line #5

University of Maine Contact

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