

Maritime Administration (MARAD) Research Plan

Part I: Fiscal Year 2017

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FY 2017 RD&T Program Funding Details

RD&T Program Name	FY 2017 Pres. Budget (\$000)	FY 2017 Basic	FY 2017 Applied	FY 2017 Development	FY 2017 Technology
META	\$3,000*		\$1,300*	\$300*	\$1,100*
Totals					

* Maritime Environmental and Technical Assistance (META) funding is a line item within MARAD's Operations and Training budget, and is provided pursuant to 46 USC 50307. META funding is used for R&D projects, however, META is not an "R&D program" as such. For FY2017, MARAD estimates that \$2.7M of the requested \$3.0M will be used for R&D projects. META funding and projects are being reported here to provide OST visibility of this program.

FY 2017 RD&T Program Budget Request by DOT Goal(s)

RD&T Program Name	FY 2017 Pres. Budget (\$000)	Safety	State of Good Repair	Economic Competitiveness	Quality of Life in Communities	Environmental Sustainability
META	\$3,000*					\$2,700*
Totals						

Program Description: Per 46 USC 50307, the META program authorizes the Secretary (delegated to MARAD) to "identify, study, evaluate, test, demonstrate or improve emerging marine technologies and practices that are likely to achieve environmental improvements by reducing air emissions, water emissions or other ship discharges, increasing fuel economy or the use of alternative fuels and alternative energy... and controlling aquatic invasive species." Projects undertaken in the META program are determined annually after

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careful review of the maritime industry's most significant environmental challenges, existing and future environmental compliance requirements, and recently completed and ongoing maritime environmental research, development and demonstration projects conducted by MARAD and other organizations worldwide. To preclude duplication of effort and ensure maximum synergy in the Federal family, MARAD coordinates each year's META plan with other agencies interested in maritime technology and environmental protection, in particular the U.S. Coast Guard (USCG), Environmental Protection Agency (EPA), U.S. Navy, National Oceanic and Atmospheric Administration (NOAA), the U.S. Army Corps of Engineers and the Department of Energy (DOE). In addition MARAD will continue to explore opportunities for collaboration with DOT modes such as FHWA, FAA, FRA, PHMSA, and ITS-JPO focusing on environmental research, green technology and commercial consensus standards to reduce the transportation environmental footprint, foster the application of alternative energy, and development of commercial consensus standards that lead to reduced environment impacts.

Program Objectives: The META Program supports MARAD's statutory mission to "foster, promote and develop the merchant maritime industry" (49 USC 109(a)), by enabling the industry to more effectively and economically comply with current and emergent regulatory requirements. MARAD works closely with industry to identify research needs, formulate research initiatives to address specific issues, and then transfer findings to the industry.

In a broader sense, META research activities are designed to enhance environmental stewardship, facilitate compliance and improve energy efficiency throughout the maritime transportation system, including ships, port operations and waterways.

Anticipated Program Activities:

1. Control of Aquatic Invasive Species. \$700,000

Continuing support for three ballast water management system test facilities that examine the effectiveness of shipboard ballast water treatment systems in meeting U.S. standards specified by USCG, and development of improved measures to control the spread of invasive species in hull fouling.

2. Reduced Air Emissions through Improved Control Technologies and the use of Lower Polluting Maritime Fuels. \$800,000

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Sponsor development and demonstration projects to address the ability of smaller, non-ocean going vessels such as inland tugs to use liquefied natural gas (LNG) as a marine fuel. Sponsor demonstration projects to ascertain the feasibility of using drop-in renewable biofuels from various feedstocks as marine fuel, determine biofuel long term effects on marine engines, and examine potential perishability of biofuel during long term storage. Sponsor demonstration projects to examine the effectiveness of certain types of exhaust gas treatment technology.

3. Alternative Energy Sources, Efficiency and Conservation \$1,200,000

Sponsor development and demonstration projects to ascertain the feasibility of using hydrogen fuel cells for powering refrigerated containers, providing auxiliary power for large vessels, and providing propulsion power for smaller vessels such as ferries and towboats. Explore the feasibility of using wind and solar power to augment vessel electrical power. Sponsor projects to encourage adoption of technologies and practices that lead to higher efficiency and lower polluting marine operations, examining technologies such as hybrid engines.

Expected Program Outcomes:

- 1) Improve the state of technology and standards for testing and evaluating the effectiveness of Ballast Water Management Technologies
- 2) Identify, demonstrate and evaluate technologies that reduce air emissions.
- 3) Advance alternative energy technologies and application to expand their use in the maritime industry

FY 2017 Collaboration Partners (Internal DOT)

Program Name	Name of Collaboration Partner(s) (Internal DOT)
META	OST-R, FHWA, FAA, PHMSA, and ITS-JPO, OST Climate Changes Center.

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How Program meets statutory requirements: The META Program was established by 46 U.S.C. 50307 and is executed by the Maritime Administration's Office of Environment. Since its formal establishment in 2012, the program has carried out cutting edge technology demonstrations, and various surveys and studies that inform decision making by regulatory agencies and maritime industry officials regarding development of environmental regulations and the means to comply with them.

Describe how public and stakeholder input have been utilized in the development of this research program: The META program is built on the premise of public-private partnerships and collaboration with Federal, state and local government, academia, maritime industry and non-governmental organizations. Many META projects provide for substantial cost sharing with other governmental, academic, and private industry partners. MARAD partners have included vessel operators, such as TOTE (a U.S. Flag ocean going vessel operator), AEP (an inland barge operator), Interlake Steamship and American Steamship Company (Great Lakes vessel operators), the Ship Operations Cooperative Program - a non-profit consortium that includes ship owners/operators, maritime educational entities, and maritime labor, and the Great Ship Initiative (a consortium of Great lakes maritime industry, academia, and Federal, state and local government from both U.S. and Canada). MARAD has also partnered with local entities such as Pittsburgh Clean Cities, California State Lands Commission, San Francisco Department of Environment, Puget Sound Air Quality Agency, Maryland Department of Transportation and multiple ports, and with numerous Federal agencies such as EPA, USCG, Department of Defense (DOD), DOE, NOAA, and U.S. Department of Agriculture (USDA).

MARAD works closely with industry to identify research needs, formulate research initiatives to address specific issues, and then transfer findings to the industry. For the most part, research is accomplished through contracts or cooperative agreement with industry partners and academia. In addition, MARAD staff have built strong relationships throughout the industry that position the agency to accomplish valuable Research, Development & Technology (RD&T) initiatives with exponentially beneficial paybacks from the resources applied.

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Part II: RD&T Projects (\$5.0M or greater) Fiscal Year 2017

NOT APPLICABLE - MARAD HAS NO PROJECTS OF \$5M OR GREATER

FY 2017 RD&T Project Funding Details

RD&T Project Name	FY 2017 Pres. Budget (\$000)	FY 2017 Basic	FY 2017 Applied	FY 2017 Development	FY 2017 Technology
Totals					

FY 2017 RD&T Project Budget Request by DOT Goal

RD&T Project Name	FY 2017 Pres. Budget (\$000)	Safety	State of Good Repair	Economic Competitiveness	Quality of Life in Communities	Environmental Sustainability
Totals						

Instructions for FY 2017 Project Budget Request by DOT Goal: Provide FY 2017 RD&T Project Name and RD&T portion of the President's Budget request by DOT Goal, as listed.

(Project Name)

(Funding Amount)

(\$000)

(Start and End Dates)

Project Description:

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Instructions for FY 2017 Project Descriptions: Provide description of at least a paragraph for each FY 2017 RD&T Project.

Project Objectives:

Instructions for FY 2017 Project Objectives: Provide descriptions of at least a paragraph for each FY 2017 RD&T Project.

Anticipated Project Activities:

Instructions for FY 2017 Anticipated Project Activities: Provide descriptions of at least a paragraph for each FY 2017 RD&T Project.

Expected Project Outcomes:

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Instructions for FY 2017 Expected Project Outcomes: Provide descriptions of at least a paragraph for each FY 2017 RD&T Project.

FY 2017 Collaboration Partners (Internal DOT)

Project Name	Name of Collaboration Partner(s) (Internal DOT)

Instructions for FY 2017 OA Collaboration Partners (Internal DOT): List all collaboration partners between your OA and other DOT OAs.

How will Project be evaluated?

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Part III: Fiscal Year 2018

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Program Description: The META Program for FY2018 is the same as described in Part I above.

Program Objectives: The META Program Objectives for FY2018 are the same as described in Part I above.

Anticipated Program Activities: During FY2018 the META program will focus on the same areas indicated in Part I above.

Expected Program Outcomes: The Expected Program Outcomes for FY2018 will be continued progress toward the objectives indicated in Part I above.

FY 2018 Collaboration Partners (Internal DOT)

Program Name	Name of Collaboration Partner(s) (Internal DOT)
META	In FY2018, MARAD will continue to collaborate with the internal DOT partners indicated in Part I above.

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How Program meets statutory requirements: In FY18, the META program will continue to meet statutory requirements as described in Part I above.

Describe how public and stakeholder input have been, or will be, utilized in the development of this research program: In FY2018, MARAD will continue to seek and use public and stakeholder input as indicated in Part I above.