



Navy ManTech Program

Composites Manufacturing Technology Center (CMTC)

Ryan Frankart, Director



NATIONAL SHIPBUILDING RESEARCH PROGRAM™
Taking Shipbuilding and Repair to the Next Level

NSRP All Panel Meeting
28 March 2023



Background

- Mission: Identify, develop and deploy advanced manufacturing technologies that will reduce the cost, time to build/repair and/or increase performance of Navy platforms.
- CMTC's Virtual COE Model: Deliver the best value to the Navy by:
 - *Teaming with industry experts and the best technology providers*
 - *Driving state of the art material solutions from the best available sources to implementation on target platforms*
 - *Bringing technology developments from labs/FNC/SBIR programs to the warfighter in as broad of a way as possible.*





Stakeholders, Partners & Results

CMTC Results

- Transition Rate of >75% (over 20+ years)
- Return on Investment > 9:1
- Over \$1.43B in Navy Cost Savings
- 16 Active Projects (14+ more in development)

Stakeholders



Platform OEMs

GENERAL DYNAMICS

Electric Boat

Bath Iron Works

A GENERAL DYNAMICS COMPANY



FINCANTIERI
MARINE GROUP



INGALLS
SHIPBUILDING
A Division of HII

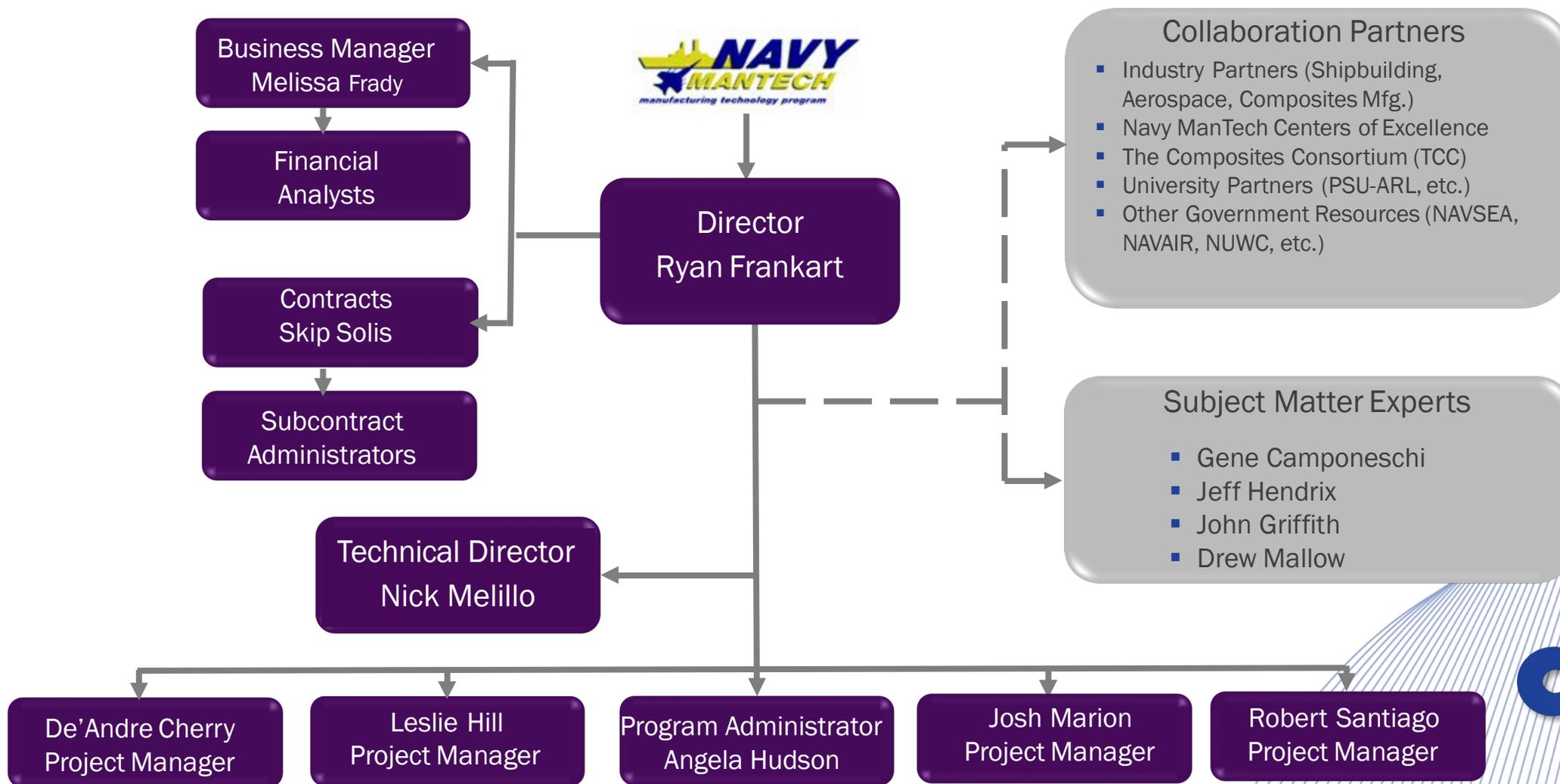
LOCKHEED MARTIN

NORTHROP GRUMMAN





Center Structure





CMTC Technology Areas

- Composites and Advanced Materials
 - Fiber-reinforced polymeric (organic) resin composites
 - Ceramic-matrix, metal-matrix, and carbon-carbon composites
 - Graphite, glass, and polymeric fibers as well as alternate reinforcements
 - Coating materials and treatments
 - Engineering plastics and similar materials
- Complex Structures and Design
 - Composite “internal” stiffening core materials such as foam, ceramic, balsa wood, polymeric or metallic honeycomb
 - Composite “external” stiffening concepts such as hat and blade stiffeners and methodologies to manufacture them
 - Materials for radomes and other electrical applications
 - Pourable filling, shaping, and fairing materials
 - Adhesives, adhesive bonding, and related technologies
- Testing and Inspection
 - Mechanical, physical, chemical, thermal, and/or electrical testing
 - Quality assurance/advanced non-destructive evaluation
 - Modeling and simulation, (i.e., cure modeling, finite element analysis, etc.)
- Processing and Automation
 - Process analytics
 - Robotic or automated processing of the above materials (i.e., drilling, machining, etc.)
 - Polymeric additive manufacturing technologies
 - Repair technologies
 - Sealant, coating, and filling materials technologies, including mixing, application, and removal
 - Engineering plastics and similar materials related processes (thermoforming, sanding/polishing, etc.)
 - Chemical technology and environmentally-safe practices for composite materials and manufacturing processes





False Deck

PEO	Shipyard Lead	Project Status	Cost Savings
Ships	HII – NNS, HII – Ingals, Bath Iron Works	Completed	\$7.1M Estimated Over 5 Years

Objective

The existing false deck panel system is expensive and time consuming to install and service. Multiple measurement and edge treatment steps are required to meet ships specifications.

Benefits

- Carried forward NSRP and ManTech project work to identify, refine and test a solution that will work for all surface ships.
- Applicable to multiple platforms
- Reduced fabrication and installation time/eliminate rework
- Demonstrated cost savings





Thermoplastics

PEO	Shipyard Lead	Project	Project Status	Cost Savings
Ships	N/A	RSL Sunshields	Implemented	Approx. 8000 RMC Labor hours/year

Objective

Developed manufacturing approaches for thermoplastic composite corrosion resistant sunshields.

Benefits

- Maintain form, fit, and function of targeted applications
- Technology applicable to new acquisitions and retrofit
- Improved reliability, life-cycle duration and operational availability
- Significant reduction in RMC labor hours





Integrated Composites

PEO	Shipyard Lead	Project	Project Status	Cost Savings
Subs	GDEB	Plug & Play	Implementing	\$4M Over 5 Years

Objective

Design, manufacture and test a composite structure with integrated functional characteristics.

Benefits

- Maintain performance of component relative to the baseline
- Off-loaded secondary processes to the manufacturer
- Reduced overall cost of the component system
- Improved reliability, life-cycle duration and operational availability





Insulation Applications

PEO	Shipyard Lead	Projects	Project Status	Cost Savings
Ships Carriers	Bath Iron Works Ingalls Newport News	High Performance Insulating Materials / Thermal Insulating Coatings	On-Going	\$25M Estimated Over 5 years

Objective

Identify improvement opportunities in the application of insulating materials in piping applications. Review and evaluate newer insulation products on the market that could meet Navy requirements.

Approach

- Identify candidate applications and baseline materials/processes
- Conduct market research to identified latest generation of candidate materials that potentially meet requirements.
- Perform evaluations of candidate materials
- Define processes and procedures for selected materials.





Shipboard Adhesive Applications

PEO	Shipyard Lead	Project	Project Status	Cost Savings
Ships	Ingalls	Bonded Joiner Bulkheads	On-Going	TBD

Objective

Enable broad application of structural adhesives to replace welding on portions of joiner bulkhead systems.

Approach

- Define application/testing requirements
- Identify candidate materials
- Execute test plans and evaluate test results
- Conduct pilot demonstration on selected application
- Develop follow-on plan for remaining applications





Contact Information

Executive Director
Ryan Frankart
(864) 646-4529
ryan.frankart@ati.org

Technical Director
Nick Melillo
(843) 760-3580
nick.melillo@ati.org

Program Administrator
Angie Hudson
(864) 646-4515
angie.hudson@ati.org

<http://cmtc.ati.org/>



THE PROGRAM

CMTC is an Office of Naval Research (ONR) Center of Excellence. The program develops improved manufacturing processes for composite-based components and facilitates technology transfer to resolve manufacturing and repair issues identified and prioritized by the Navy's Program Executive Offices, other DoD services and industry.



THE ENTERPRISE

CMTC is a virtual enterprise connecting ONR, prime suppliers, university researchers, and small businesses. Industry and academia compete for projects individually or in partnerships. Project teams are assembled and dissolved as needed. This virtual center approach keeps costs low and ensures that ONR gets the best technology from the best sources.



HOW IT WORKS

CMTC issues calls for new project concepts on behalf of ONR. Any company or team of companies can submit project concepts. CMTC works with proposers to refine concepts and ensure alignment with DoD challenges. This process leads to formal technical and cost proposals. ONR evaluates proposals and selects sources. CMTC awards projects and work begins.

