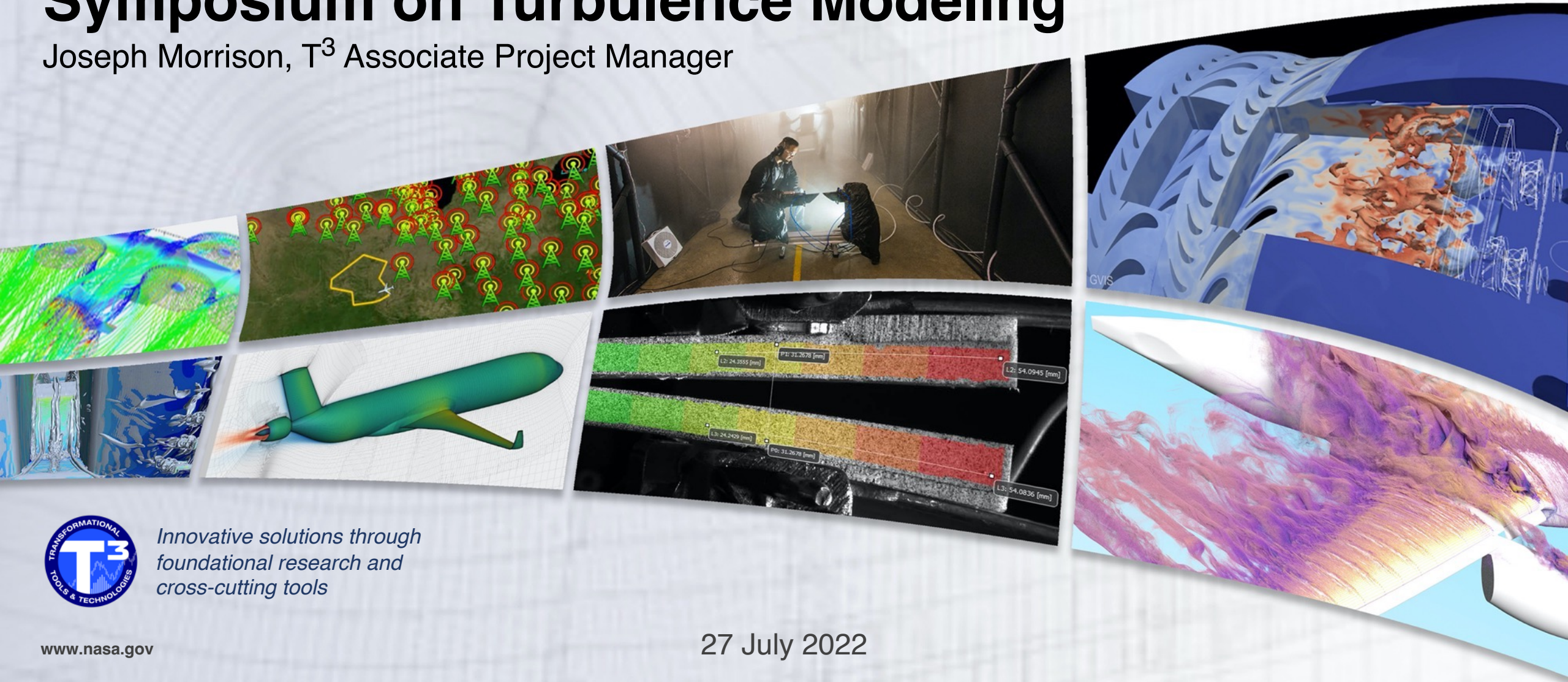
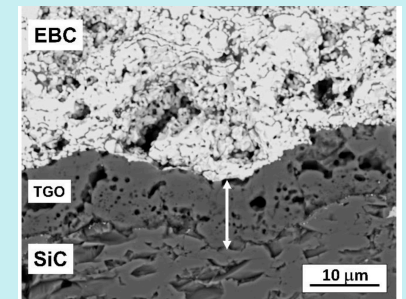
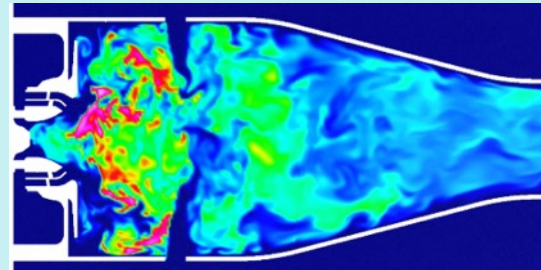
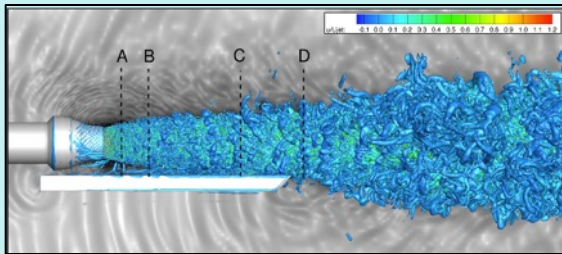


Joseph Morrison, T³ Associate Project Manager



Enables fast, efficient design and analysis of advanced aviation systems from first principles and supports exploratory research with breakthrough potential

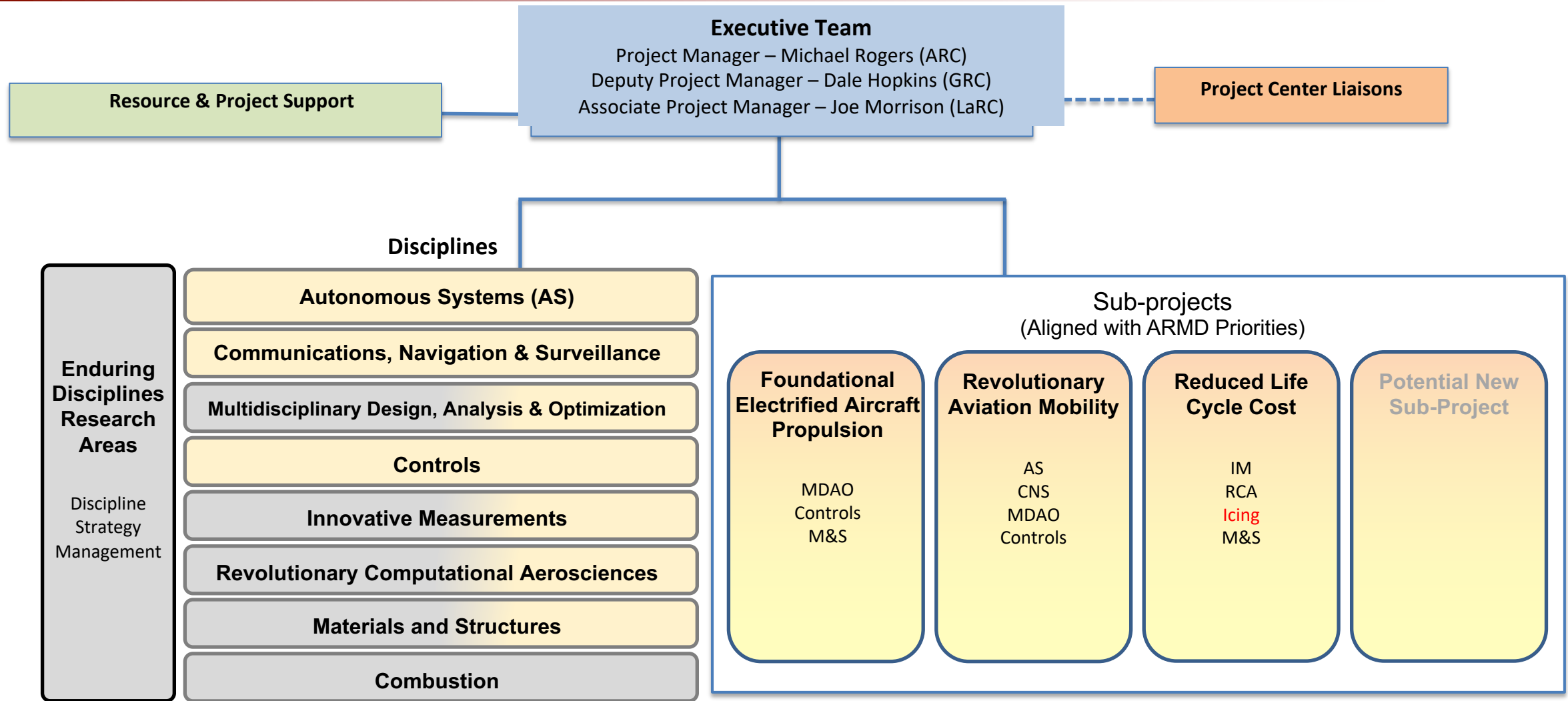
- Research content is continually evolving to **advance community visions** and address stakeholder needs for **foundational research across all six ARMD Strategic Thrusts**
- Ensures that critical aeronautics **core competencies** are maintained for the nation, while delivering **multidisciplinary system-level results with impact**
- Develops tools and technologies that **change the way aeronautics research is done**



Culture of TACP encourages taking risks, supports failure, and demands learning as we grow and move on to the next challenge



T³ Organizational Structure



T³ conducts foundational research with its discipline-based expertise to enable innovation in aeronautics & executes multidisciplinary projects to apply concepts in a system-level context

Reduced Life Cycle Cost (RLCC) Sub-project Overview

Purpose: Reduce the life cycle cost of aircraft to enable the U.S. aircraft industry to stay competitive worldwide

Aircraft Life Cycle Phases

Research, Development, Test & Evaluation

Production

Operations & Maintenance

Disposal

Challenges

Significant delays if issues are not discovered until flight testing

Time to manufacture and assemble aircraft is costly

Maintenance performed on a specified schedule may not be needed at the prescribed time

RLCC Project Objectives

Obj 1: Enabling Certification by Analysis (CbA) to reduce surprises during flight tests

Obj 2: Increasing manufacturing rate & reducing weight of materials during production

Obj 3: Decreasing amount of required maintenance during Operations and Maintenance Phase

Approaches

Develop, implement, and validate computationally efficient, physics-based methods and tools to:

1. Enable aircraft CbA for 1st phase of the life cycle
2. Design and predict the processing and life cycle performance of advanced materials and structures for 2nd phase of the life cycle

IM, RCA, and M&S disciplines enable the RLCC sub-project

Foundational Electrified Aircraft Propulsion (FEAP) Sub-project Overview

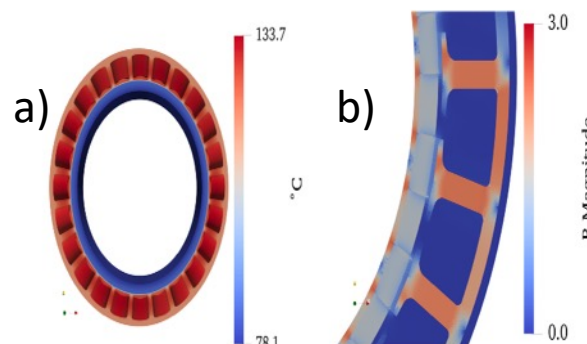
Enables the performance, reliability & durability of electrified propulsion systems by conducting enduring research & developing innovative materials, components, tools & methods that support needs in ARMD mission programs

Objective 1: Enable high voltage and high-power distribution for EAP Systems
(M&S)



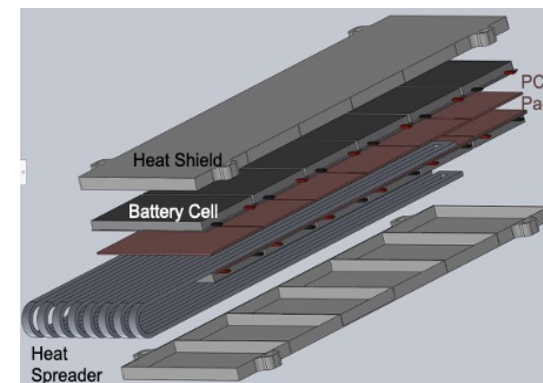
Power Cable Model For Electric Materials

Objective 2: Develop optimization tools and methods for electric and hybrid-electric vehicle design
(MDAO, Controls)



a) Electric Motor stator thermal analysis
b) Stator magnetic flux-density

Objective 3: Develop safe battery technologies to improve performance metrics for EAP
(M&S, MDAO)



Preliminary Battery Design Pack Configuration



Revolutionary Aviation Mobility Sub-project Overview



TTT research in AAM supports the ARMD mission programs by providing a pipeline of solutions and knowledge for **foundational challenges in enabling an AAM market.**

The sub-project goal will be accomplished through transdisciplinary research that is predicted to be critical to meet **UML-4+** goals.

Content supports ARMD Strategic **Thrusts 1, 5, and 6**

GOAL Provide leading edge tools, technologies, and research findings to enable increasingly autonomous AAM transportation in the UML-4+ timeframe

OBJECTIVES



Enable scalable operations to achieve the full vision and potential of AAM through development of targeted tools and techniques critical for m:N operations of autonomous fleets {AS}



Explore and develop airspace management and operations architectures and tools in expectation of increased heterogeneous air traffic {AS, CNS, MDAO}



Develop modeling, performance, and control tools & techniques for advanced urban capable aircraft {Controls, MDAO}



[Future] Explore and demonstrate approaches for scaled vehicle production {M&S}

