PROJECT SUMMARY 5558

Advanced Composite Assembly Innovation (ACAI)

Design and manufacture of advanced and lightweight structures for aircraft Spinner Dome.

PROBLEM

This project is focused on addressing the icing protection technology on the aircraft Spinner Dome and assessing the use of a new electro-thermal icing protection system using an all-thermoplastic composite structure.

OBJECTIVE

The objective of this project is to demonstrate the HELIOS thermoplastic Ice Protection Technology, as a robust and reliable solution for the aircraft Spinner Dome in three phases. This project focuses on Phase I, which includes the development of a Spinner Dome demonstration.

AMERICA MAKES TECHNOLOGY DEVELOPMENT ROADMAP

This project aligns to:

DESIGN

ASTM PROCESS CATEGORY
Material Extrusion

EQUIPMENT
NA

MATERIAL
Polymer and Ceramic Composites

TECHNICAL APPROACH

Qarbon Aerospace will lead this project effort that will include the following:

- Perform an icing protection analysis to meet Spinner Dome requirements, and design, manufacture, and test a prototype structure.
- Manufacture test panels and perform mechanical and/or electrical characterization tests for candidate thermoplastic composite material(s).
- Characterize forming material properties with expected and actual outcomes through trials and development processing of subscale Prototype Spinner Domes.
- Make recommendations to the Spinner Dome based on the forming process simulations and trials. Manufacture a subscale Spinner Dome prototype.
- Conduct a manufacturing cost estimate for producing the Prototype Spinner Dome in a production-intent environment.
- Survey opportunities for thermoplastic composites to be utilized on Department of Defense platforms.
- Purchase prototype equipment to evolve automated manufacturing process techniques to optimize time and efficiency for thermoplastic product manufacture in production representative parts.

PROJECT START DATE

September 2023

EXPECTED END DATE

December 2024

EXPECTED DELIVERABLES

- Material characterization report
- Prototype test unit(s)
- Prototype Spinner Dome
- Final Spinner Dome technical report
- Equipment required to deliver manufactured structure
- DD Form 882 - Report of Subject Inventions and Subcontracts

FUNDING

$3,680,000 total project budget

PROJECT PARTICIPANTS

Project Principal:
Qarbon Aerospace

Other Project Participants:
Composite Automation
Ray Engineering, LLC

Public Participants:
U.S. Department of Defense