**GE Aviation Boron Nitride Coating**

### Original Objectives
- Reduce Boron Nitride coating process cycle time by at least 50%
- Ensure consistent application of coating to required areas regardless of operator or shift
- Prevent application of coating to areas not allowed to be coated
- Gain cross-functional / business to business / cross-business project collaboration experience
- Gain project management experience

### Requirements
- Establish baseline process understanding
- Establish project plan, deliverable milestones and timelines
- Identify solution options and alternatives
- Use systematic problem solving techniques such as Define, Measure, Analyze, Improve, Control (DMAIC)

### Concepts
1. **Custom Brush**: Build a brush that is shaped like the component to reduce manual painting time.
2. **Pneumatic**: Use pneumatic pad printer with 6 fixtures to apply coating.
3. **Fixture with multiple brushes**: Build manual system with multiple brushes that follow a set path.

### Problem Statement
Application of Boron Nitride coating prior to thermal processing of CMC components is a manual process which is inconsistent, time-consuming, and poor application has led to scrap parts.

### Final Design/Results *
- Final design uses a CNC machine programmed to perform the coating process.
- Vacuum fixture for quick loading/unloading
- Holds 6 brushes
- 6 paint reservoirs
- Infrared drying station
- Drum roller for Boron Nitride consistency

### Modified Objectives*
- Modify test report to create instructions for future completion
- Replace capstone symposium with a closeout with the sponsor
- Team adapted to unprecedented situation
- Without lab access, transition project work to instructions and simulations
- Write G-code to operate CNC system.
- Complete fabrication drawings and instructions
- Complete assembly instructions

### Summary
- Completed 30+ critical components
- Research done on topics related to process
- Drying station reduces drying time by an estimated 50%
- Generated 3000+ lines of G-code to operate CNC system.
- Estimated cycle for a single coating on 6 parts is under 3 minutes with load/unload time.
- More consistent application and repeatability of process.

### Team 07 Members
- Andrew Reardon - Engineering Technology
- Brain Hady - Engineering Technology
- Levi Gentle - Mechanical Engineering
- Jose Ramirez - Mechanical Engineering

### Mentor and Sponsor
- Mentor: Dr. Ritenour
- Sponsor: General Electric

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* On March 16, 2020 classes and labs were closed to students due to the COVID-19 Pandemic. Without access to fabrication and testing equipment, Objectives and Deliverables were modified accordingly.