



# CNT Yarn Woven Laminates



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### Objectives

- To create a method of manufacturing woven CNT yarn panels
- Investigate mechanical properties of panels for use in NASA aerospace application

### Prepreg Process

**Panel Layup**

- Yarn weave
- Fresh resin
- Yarn weave with 2 BMI coats
- Fresh resin
- Yarn weave

### Early Loom

**TGA**

**SEM Cross Section**

**Tensile Test Specimens**

**Tensile Failure**

**W1 Stress vs. Strain**

**Key Take Aways**

- Volume fraction is too low for desired results as much of the panel is made up of voids
- Use less pressure in pressing treatment as not to deform yarns
- Use more pressure during curing process

### Current Loom

**Load Panel Post Filament Winding**

**Tight Packing Density**

**Key Take Aways**

- Improved alignment and packing density due to use of filament winder
- Improved manufacturing speed to double the pace of early loom

### Adhesion Experiment

Pull out test performed to determine which adhesive binds to CNT yarns best for use on current loom.

**Average Pullout Force**

Superglue specimens on sanded plates yielded the strongest average interface strength.

### Adhesion Experiment

- Manufacture panels using new loom and optimal adhesive method
- Perform mechanical testing on new panels
- Compare results to wrapped panels and W1