

Space Technology Mission Directorate Game Changing Development Program **Super-lightweight Aerospace Composites (SAC)**

Project Goals

- Reduce space structure mass, including carbon nanotube (CNT) composite tanks suitable for Nuclear Thermal Propulsion cryogenic storage of hydrogen.
- Advance the manufacturing readiness level (MRL) of CNT materials suitable for structural applications in aerospace systems and transfer composite fabrication processes for these systems to MSFC and/or commercial entities.

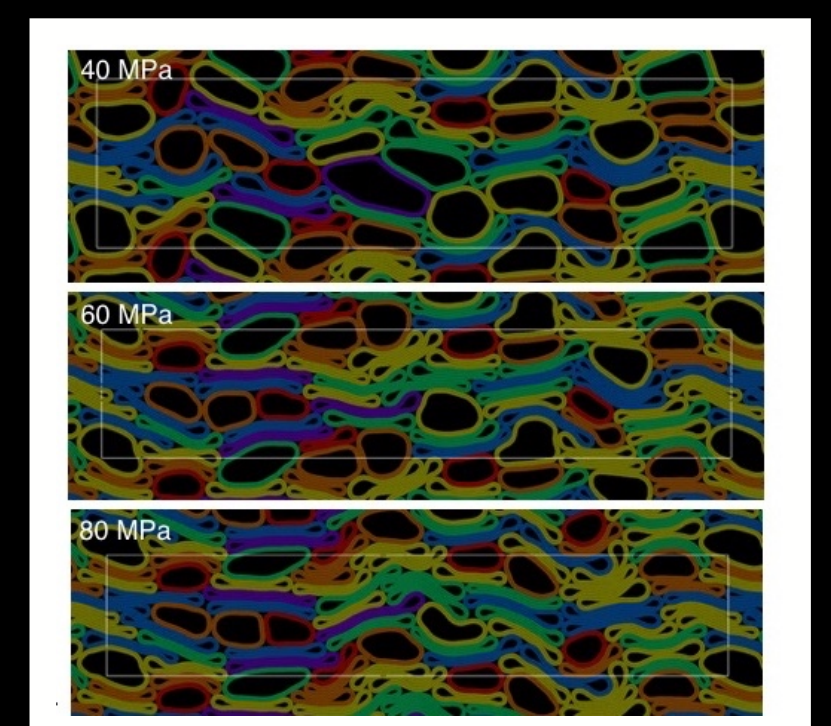
Results/Summary

- Manufacturing of CNT advanced to yield hundreds of kilometers of high strength yarn.
- Material strengths continue to increase as manufacturing process improved.
- Available yarn has been used to fabricate all-CNT fabric for composite process development.
- CNT yarn was used to produce prototype linerless CNT composite demonstration article.

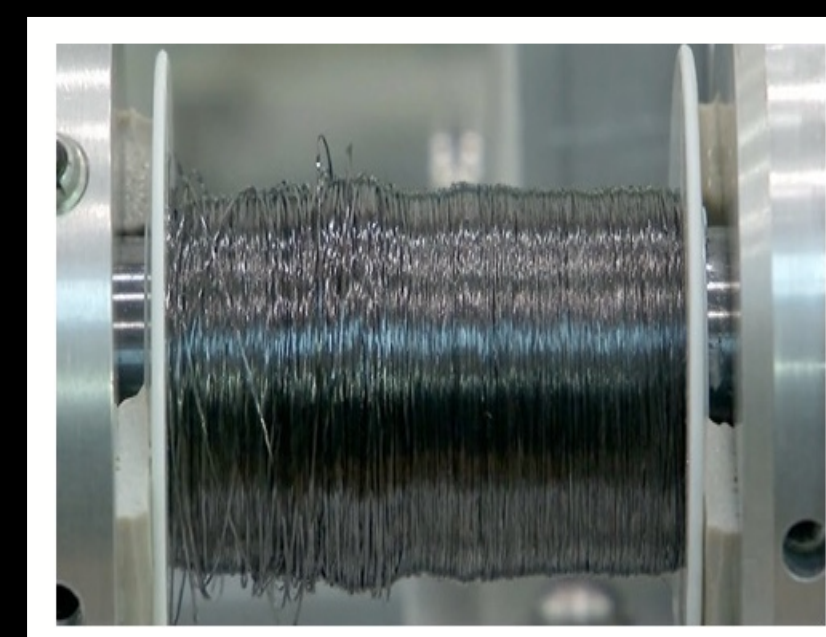
Technical Approach



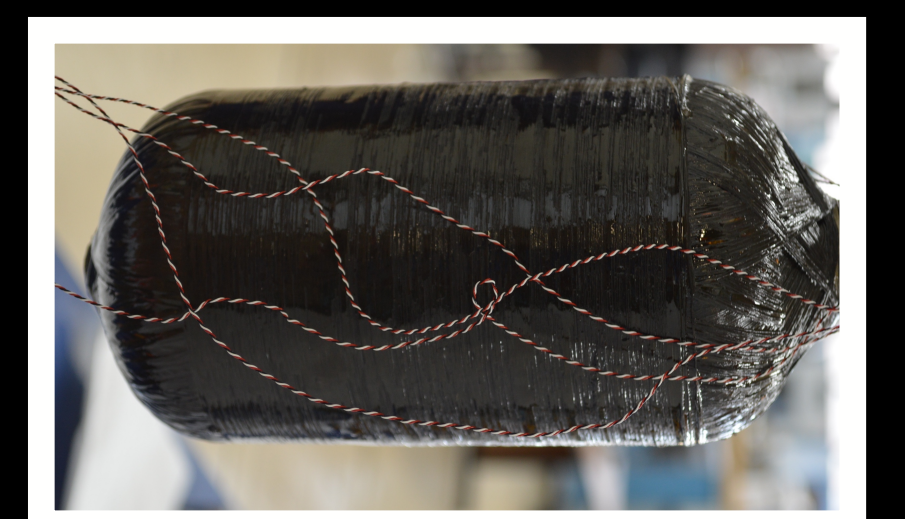
Manufacturing
Scale-Up



Modeling Guided
Manufacturing



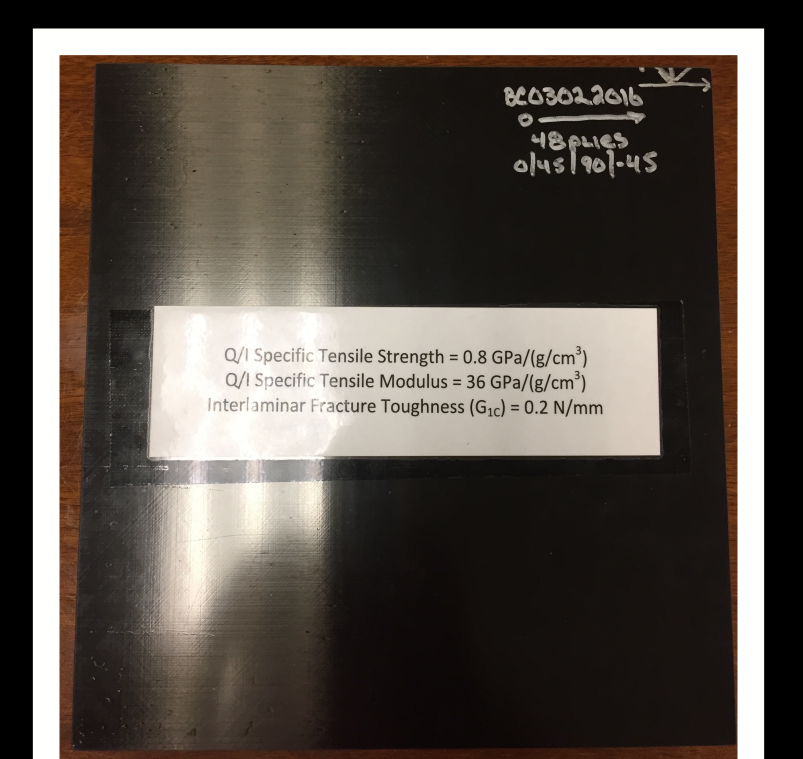
High Strength
CNT Yarn



Linerless CNT
Pressure Vessel
Demo Article



CNT Fabric



High Strength CNT
Composite Panels