

SPACE-READY COMPOSITE RODS & TUBES

Processes

- Roll-wrapped carbon tubes for multi-directional performance
- Pultruded carbon rods and tubes for linear consistency

Precision

- Ground OD tolerance to ± 0.005 "
- Thin walls to ~ 0.013 "
- Unprecedented wrapped tube centricity

Materials versatility

- Facility and workflow support for customer-supplied specialty prepregs (e.g., cyanate-ester with intermediate modulus carbon fiber)
- Low outgassing
- Excellent thermal cycling
- ISO 9001:2015 certification
- In-process quality control and metrology
- Documented process traceability and material tracking
- Comprehensive visual inspection

Space

- UAV-helicopter landing legs (NASA Ingenuity)
- Deep space battery casings (NASA Artemis)

Space-adjacent platforms

- Commercial/military drone landing gear, frames
- Satellite frame parts



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UNIQUE ENTITY ID
NCGJKFMEFTM5

CAGE NUMBER
7YXK6

NAICS CODES
326199: All Other Plastics
Product Manufacturing
332710: Machine Shops

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MINI-CASE STUDY:

NASA *Ingenuity* Robotic Space Helicopter

CHALLENGE

Engineer robotic helicopter landing leg tubes from NASA-specified, UV-resistant prepreg with ultra-high impact resistance for hard landings and harsh environmental conditions on Mars.

APPROACH

- **Materials compliance:** Used NASA-specified, UV-resistant resins and fibers
- **Design for impact:** Optimized layup and geometry for maximum energy absorption and durability
- **Iterative development:** Ran small-batch tests to quickly refine designs and document changes
- **Open engineering access:** Gave the NASA team direct access to Goodwinds Composites' engineers for rapid design decisions and adjustments

OUTCOME

[NASA's Ingenuity helicopter](#) arrived on Mars on February 18, 2021 carried and deployed by the Perseverance rover. Ingenuity made its first powered, controlled flight on April 19, 2021 — a historic demonstration that human-made aircraft could fly on Mars.

- **Success:** Ingenuity flew 72 times, proving the value of aerial scouting for future Mars missions
- **Mission end:** Retired January 18, 2024, celebrated as a "fighter" for far outlasting its original design



PROJECT OVERVIEW

CUSTOMER: NASA
(Ingenuity helicopter)

COMPONENT: Landing legs
(composite tubes)

ROLE: Engineering collaboration, materials conformance, small-batch manufacturing



5 REASONS TO PARTNER WITH GOODWINDS COMPOSITES

- Direct engineer access
- Small-run flexibility
- Traceability
- Short lead times
- US-based facilities and suppliers

We're excited about mission-critical, first-of-its-kind space work and look forward to helping you! [Connect with a Goodwinds Composites engineer](#) to get started.