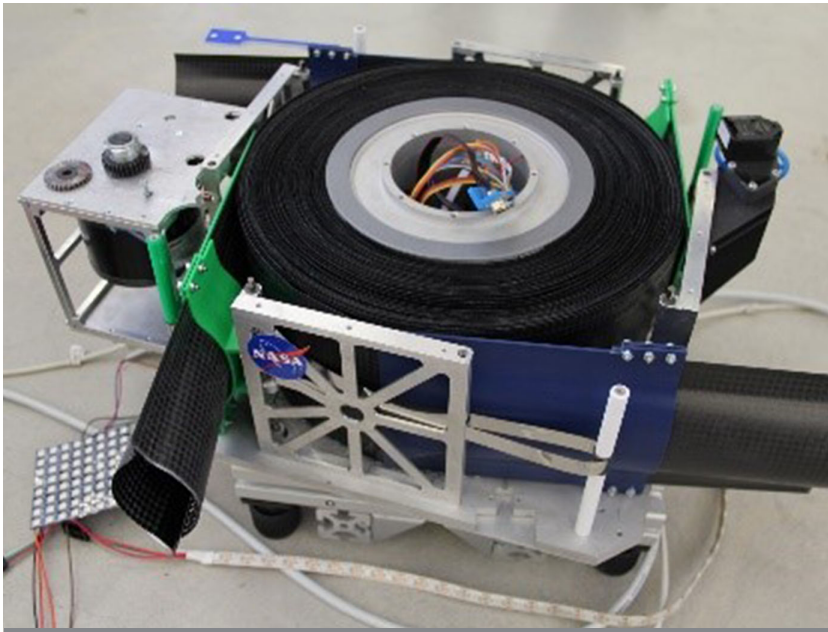


## TECHNOLOGY SOLUTION

### Mechanical and Fluid Systems



# Deployable Composite Boom

## Low weight bistable collapsible tubular mast

A sister to SHEARLESS booms, the Bistable Collapsible Tubular Mast (Bi-CTM) boom, offers compact storage on a cylindrical drum that deploys a composite material boom with a closed tubular cross section that has unmatched bending and torsional stiffness for the mass of the thin-shell structure. The Bi-CTM is also scalable for long booms given the load carrying capacity.

The Bi-CTM's two omega-shaped composite thin-shells form a bonded closed section which can spool onto a relatively compact drum for compact launch packaging and provide unparalleled stiffness to mass ratio when deployed. When using the booms as beam-column structures with a primarily compressive load component, this ratio determines the structural mass efficiency of the components, making the Bi-CTM exceptional for lightweight deployable structural rigging with higher load demands.

The improved dimensional and thermal stability offered by the closed-section shape and low coefficient of thermal expansion materials of the Bi-CTM, enables the use of the boom technology in precision applications that require high stability in harsh environments.

### BENEFITS

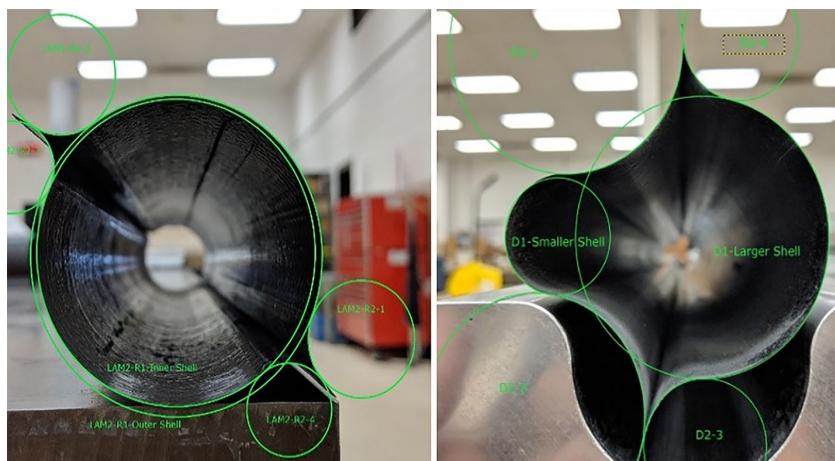
- Enables a lightweight expandable structure that can be stowed compactly
- Enhanced torsional stiffness
- Enhanced dimensional and thermal stability for precision applications
- Inexpensive to fabricate
- Highly customizable design



## More Information

Compared to the majority of deployable thin-shell booms, which have at best a semi-open cross section, this true closed-cross-section boom is stronger, while keeping the compact nature of rollable booms, and is able to overcome both bend and twist buckling related limitations.

Bi-CTM boom design optimization provides for maximized area moments of inertia and torsional constant, which related to the boom stiffness and the loading capacity, while remaining a bistable design.

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The technology has several potential applications:

- Deployable space structures (solar panels, antennas, solar sails, life support augmentation devices, instrument booms, hinges, etc.)
- Deployable terrestrial structures (emergency shelters, clean rooms, inflatable erectable observation or communication towers, etc.)
- Backpack solar collectors
- Inspection booms (down-pipe cameras, hazardous environment inspection)

Patent No: 11,199,005; 11,761,207

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