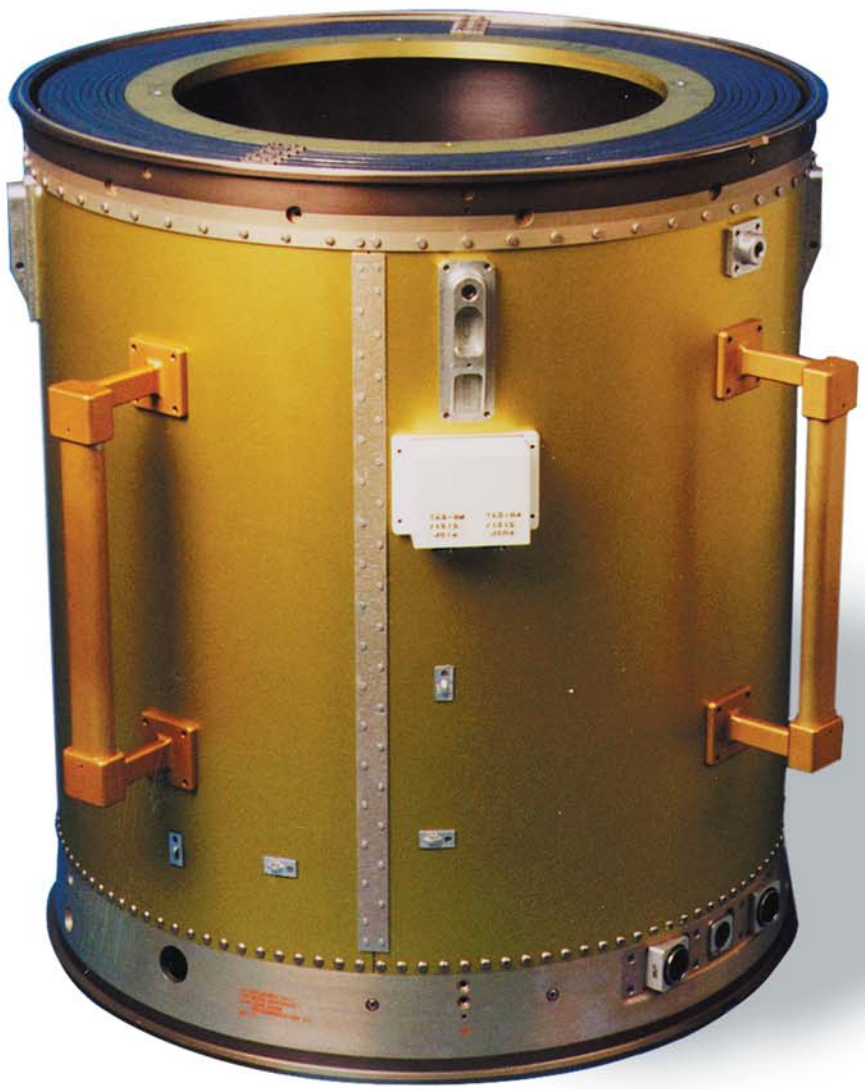
NORTHROP GRUMMAN
Space Technology
Astro Aerospace

ISIS TELESCOPIC MAST™



ISIS TELESCOPIC MAST™

Description:
The Inflatable Sunshield in Space (ISIS) (U.S. Patent No. 5,315,795) is a system designed to carry a cantilevered 300 lb payload into space and then deploy it 22 feet. It was originally designed for use on a Space Shuttle Hitchhiker pallet to deploy payloads away from the shuttle within the boom. This design is scaleable over a broad range, from 2-inch diameter to 30 inches and up, to achieve stiffness, strength, and length tailored to match specific requirements, and can be modified to carry larger or smaller payloads. It can also be made from GFRP, carbon-carbon and other materials. It includes large payload umbilical harnesses. The harnesses are stowed within the boom.

Space Applications:

- Payload support structure
- Payload separation device
- Deployable experiment boom
- Survivable mast for laser or pellet attack
- Large deployable antenna support structure
- Extendible docking probe
- Solar sail support structure

Performance	Units
Stowed Diameter	24.0 in (0.61 m)
Stowed Length Deployer & Mast	26.75 in (0.68 m)
Total Weight of Mast and Deployer less CFE	91.5 lb (41.5 kg)
Mast Average Diameter	20.25 in (0.51 m)
Bending Strength	16,400 in/lb (1,853 Nm)
Torsional Strength	24,900in/lb (2,813 Nm)
Axial Strength	2,400 lb (10.7 kN)
Bending Stiffness EI Installed	6.1×10^8 lb/in^2 (1.93×10^6 Nm^2)
Stiffness EA for a Round Mast	11.4×10^6 lb (50.7×10^6 kN)
Deployed Natural Frequency with 300 lb Tip Mass	1.7 Hz
Total Stowed Volume	9,761 in^3 (0.16 m^2)
Number of Telescopic Segments	12 segments
Mast Segment Length	22.63 in (0.57 m)
Payload Carrying Capacity for Launch	300 lb (136 kg)
Average Power to Deploy	10 W
Material	Aluminum
Payload Umbilical Cable Capacity	2, 1 inch dia cables 2, 2.5 cm dia cables)
Typical Time to Deploy	3:13 min.

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