



THE VALUE OF PERFORMANCE.

**NORTHROP GRUMMAN**

## *Articulated Mast Systems*

*Unmatched Stiffness, Strength and Stability—100% Success Heritage*

**N**orthrop Grumman's articulated mast systems are designed and manufactured for the deployment of a variety of critical spacecraft payloads, such as solar array blanket deployment, large aperture radar antennas and optical focal length deployment.

### **Performance Features**

- High deployment reliability and repeatability
- Extensive flight heritage
- Superior stiffness and stability for critical deployed payloads
- Retraction capability
- Validated on-orbit strength and stiffness performance: Lengths up to 60 m (197 ft) Stiffness >  $5 \times 10^9$  lb-in<sup>2</sup> Strength > 72,000 in-lb bending load capacity
- Precision payload deployment operation with or without active controls

### **Application Benefits**

- Tailorable for specific mission requirements
- Compact, efficient stowage volume, < 5% of length
- Substantial cabling and utility accommodation
- High deployment push force capability

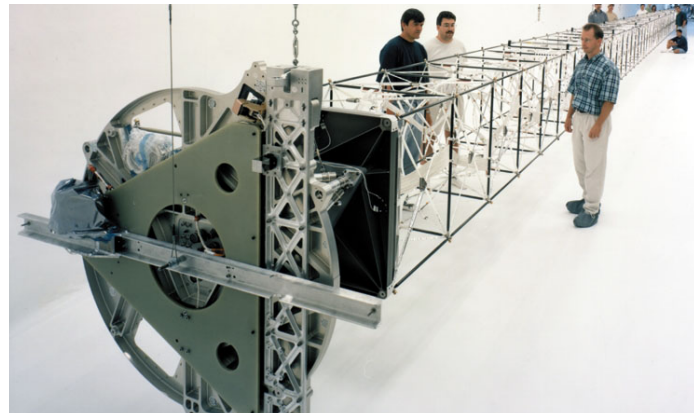
Deployed Placement Repeatability	
Focal length defocus	+/- .3 mm
In-plane offset of optical bench	+/- 1.5 mm
Rotation about optical axis (twist)	<+/-0.1 deg
Stability	
Focal length defocus	+/- .1 mm
In-plane offset of optical bench	+/- 2.6 mm
Tip and tilt of optical bench	<+/-0.014 deg



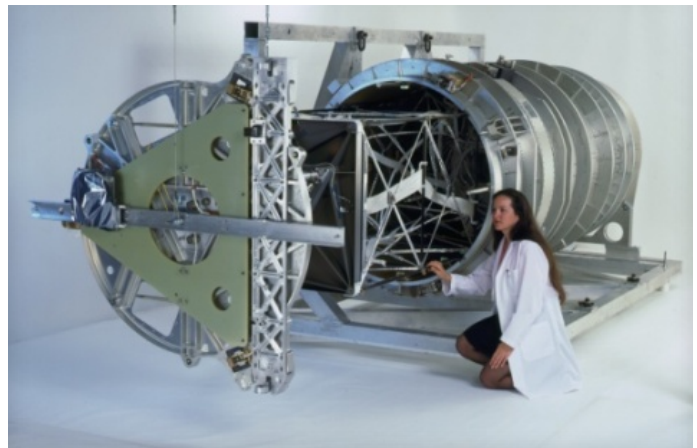
NuSTAR 10 m Mast

## 100% Flight Success Record

Program	Customer	Launch Date
MODES	McDonnell Douglas	12-Sep-91
TSS	Martin Marietta	31-Jul-92
MODES II	McDonnell Douglas	4-Mar-94
TSS Reflight	Martin Marietta	22-Feb-96
IPEX II	JPL	7-Aug-97
SRTM	JPL	11-Feb-00
ISS(STS-97)	Lockheed Martin	30-Nov-00
ISS (STS-115)	Lockheed Martin	9-Sep-06
ISS (STS-117)	Lockheed Martin	8-Jun-07
ISS (STS-119)	Lockheed Martin	15-Mar-09
NuSTAR Mast	Caltech/JPL	13-Jun-12



SRTM 60 m Mast



## SRTM Deployment Accuracy and Repeatability

Length	$< \pm 1.3$ mm (from +66 °C to - 60 °C)
Tip Translation in Shear	$< \pm 0.25$ mm
Tip Twist in Torsion	$< \pm 0.02^\circ$
Tip Rotation in Bending	$<< \pm 0.005^\circ$

## More Information

Northrop Grumman Space Components  
 Deployables  
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