



# X-ray / Cryogenic Test Facility

New Cryogenic Optical Test Capability at MSFC's SOMTC

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# X-ray / Cryogenic Test Facility

## Primary Facility

- 20' diameter x 60' length horizontal test volume
- 1700' of 3', 4', & 5' diameter tube connecting chamber to x-ray sources
- Thermal Environment: 20K to 344K
- Vacuum Environment:  $< 5 \times 10^{(-7)}$  Torr
- Large (6000 sq ft), Class 1000 clean room

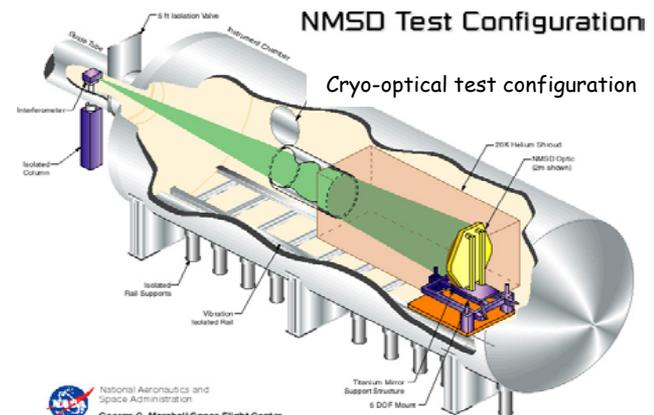
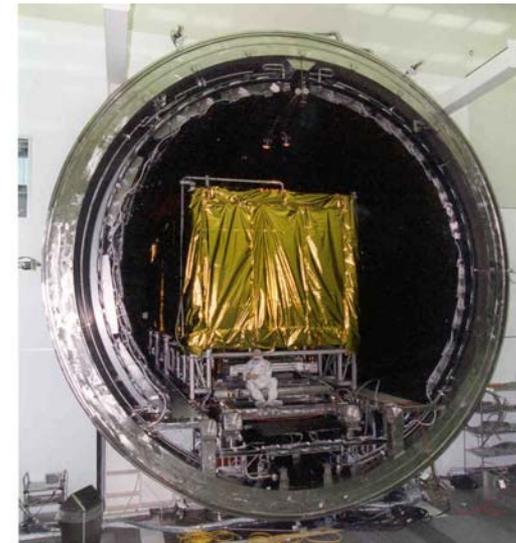




# X-ray / Cryogenic Test Facility

## Primary Facility Uses to Date

- X-ray optics and detector calibration
- Thermal cycle and balance testing of instruments
- Dynamic characterization testing of inflatable structures at varying temperatures
- Cryogenic testing of direct incidence optics
- Cryogenic deformation testing of composite structures

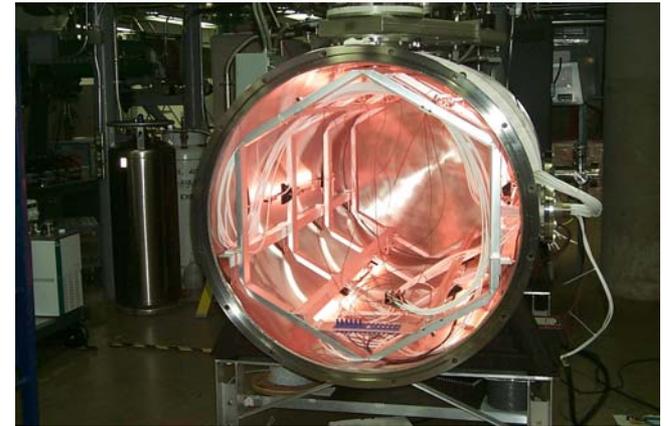




# X-ray / Cryogenic Test Facility

## Other Capabilities

- 4' x 8' Preconditioning Chamber
  - $5 \times 10^{-6}$  Torr
  - Ambient to 250F
  - 24 infrared tubular quartz tungsten filament lamps each rated at 1600 Watts
  - TQCM and LN<sub>2</sub> Cold Plate
  
- 4' x 8' CryoOptical Test Chamber
  - Finally to the topic of this discussion



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# New Cryogenic Optical Test Capability

## 4' x 8' CryoOptical Test Chamber Features

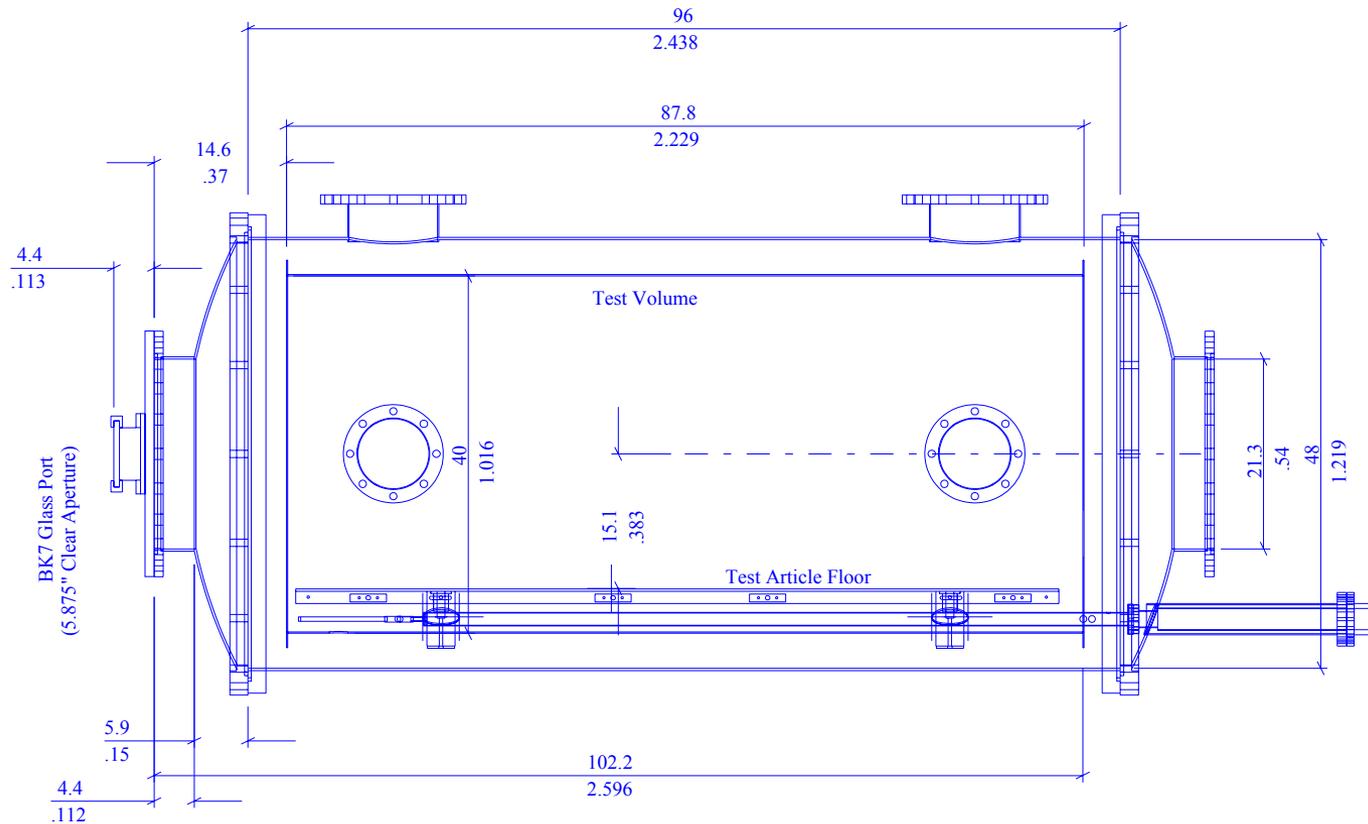
- Test Volume: 1.02 m diameter x 2.23 m deep
- Refrigeration: ~ 1 kW at 20K via reverse Brayton cycle refrigerator. Programmable rates are possible. Control selectable to 0.1 K.
- Temperature Range: 310K to 12K
- Vacuum Level:  $5 \times 10^{-6}$  Torr (ambient temperature) via turbomolecular pump
- Optical Instrumentation: WaveScope, PhaseCam, and IPI available
- Heat Transfer maximized by use of free-molecular conductivity methods
- Window: 142 mm clear aperture BK-7 existing. Apertures to 20" dia w/o chamber modification
- Temperature Instrumentation: Silicon diodes and thermocouples
- Additional electrical/fluid feedthroughs are available
- Actively cooled test stands



# New Cryogenic Optical Test Capability

## XRCF 4' Cryogenic Chamber

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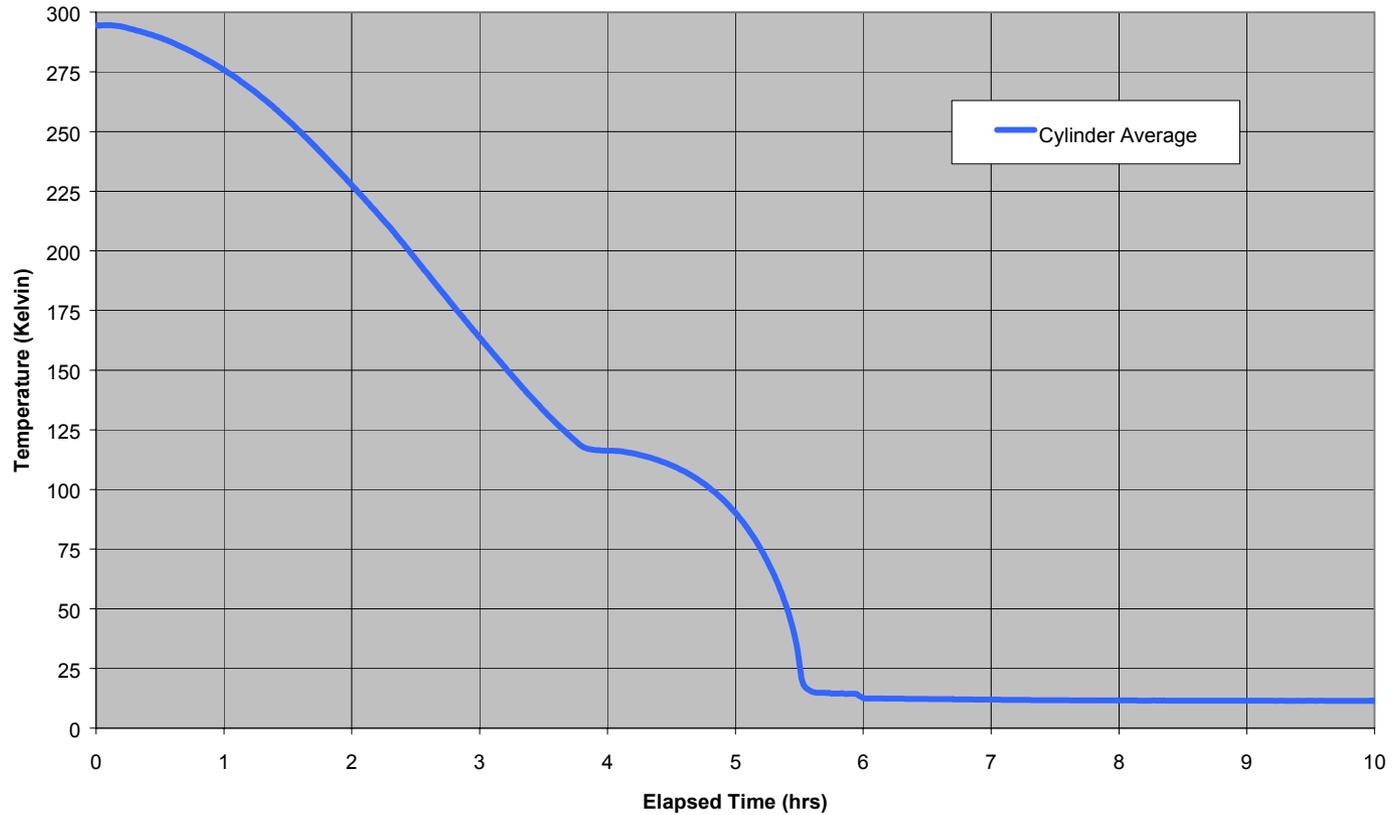
Key Dimensions (inches over meters)

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# New Cryogenic Optical Test Capability

CryoOptical Test Chamber  
Shroud Verification Test



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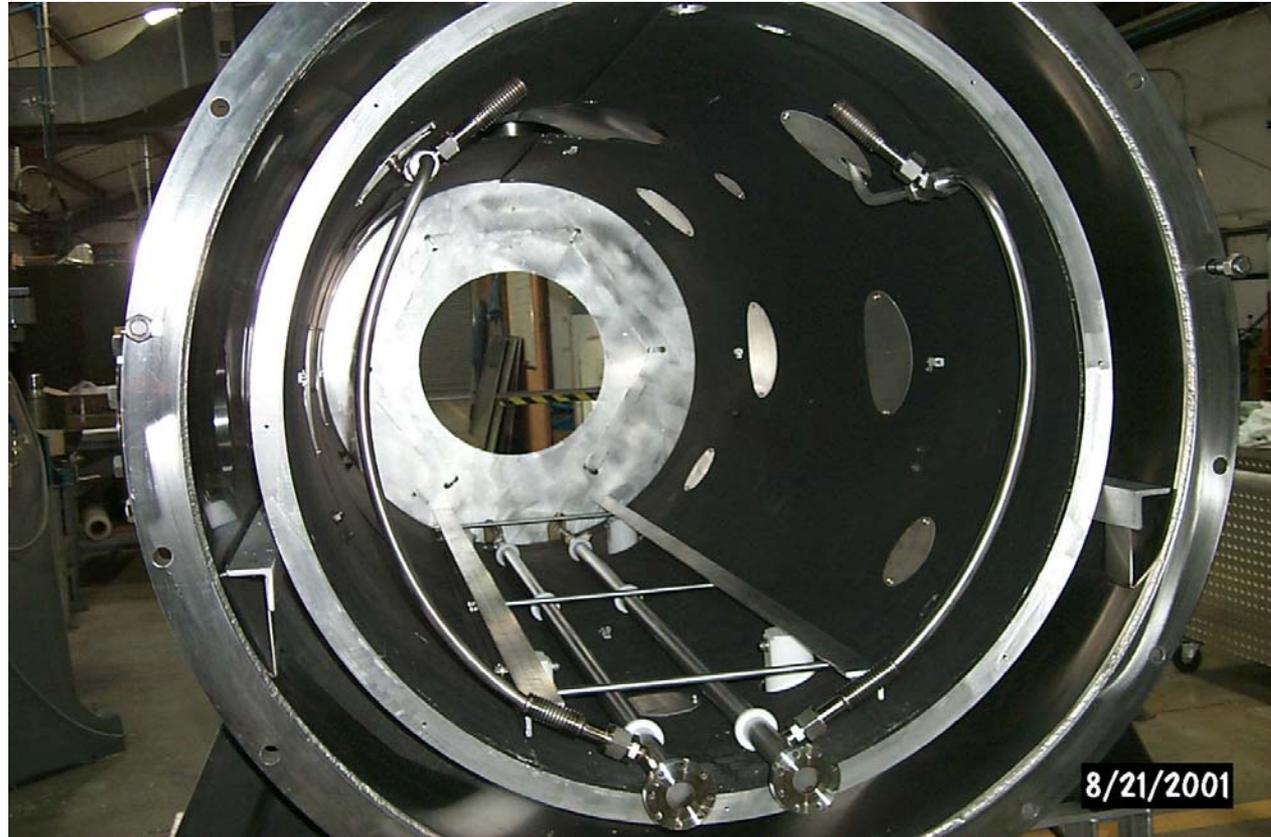
# New Cryogenic Optical Test Capability



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## New Cryogenic Optical Test Capability



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