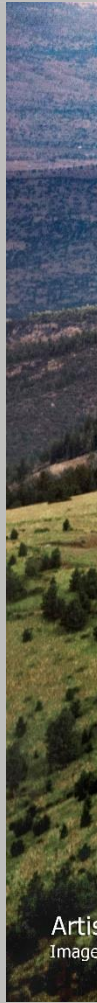
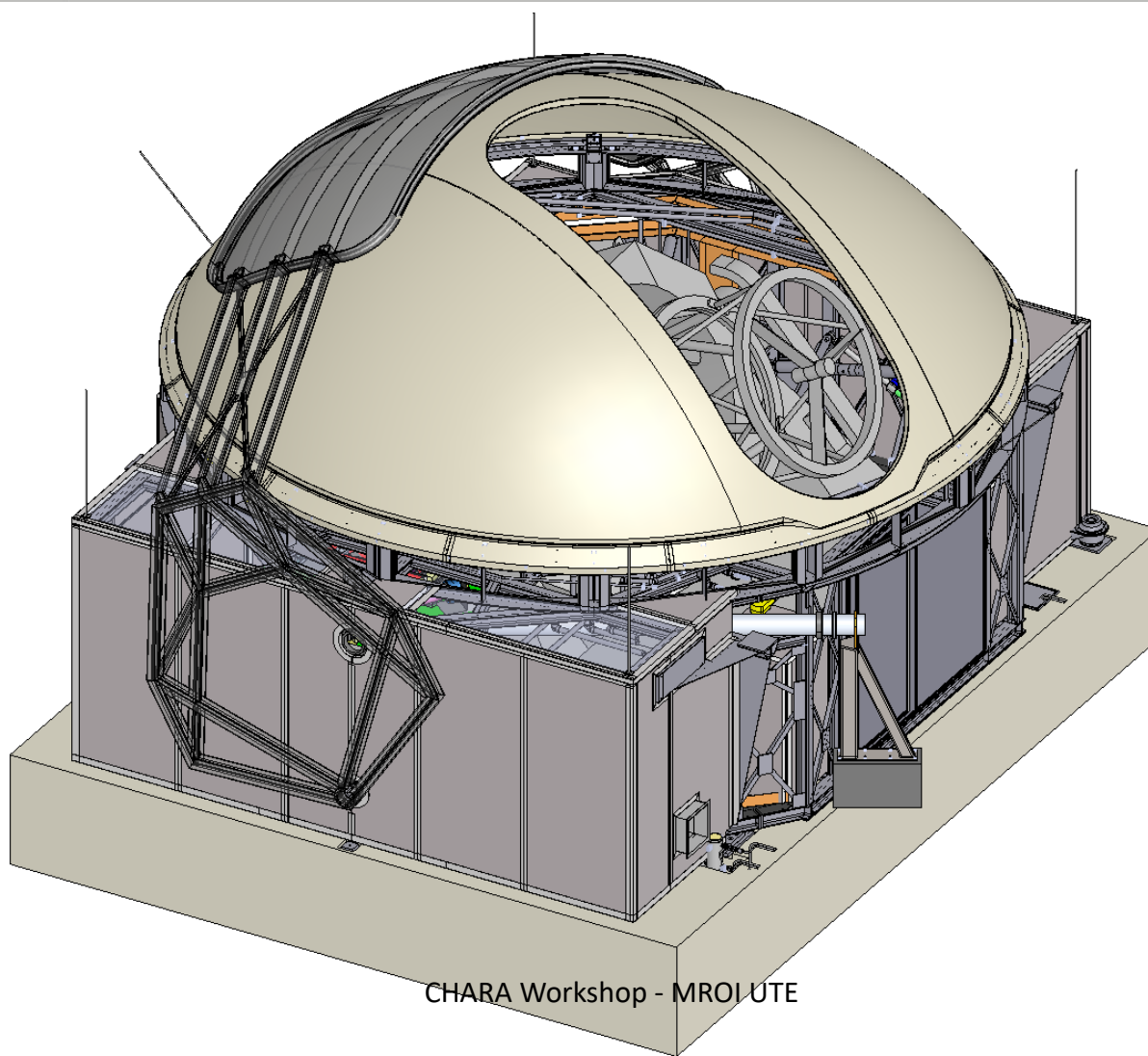
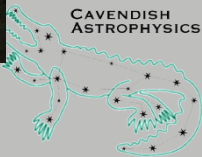


# MAGDALENA RIDGE OBSERVATORY INTERFEROMETER ENCLOSURE



CHARA Workshop - MROI UTE

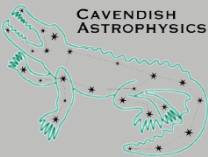




# Enclosure Specifications

## Operational Modes

- Observation Mode: telescope is being operated for on-sky observations
- Shut-down Mode: telescope is parked and being sheltered from the environment
- Relocation Mode: enclosure is being used to transport the telescope from one foundation pad to another

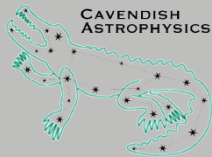




# Astronomical Observation Specifications

## Enclosure Movement to Support Slew Rate

- 10 degrees within 20 seconds
- Anywhere within operation field of regard within 120 seconds



# Astronomical Observation Specifications

Enclosure will not transmit vibrations into the telescope

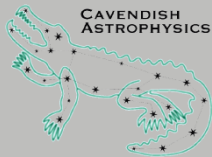
- Structure avoids bridging vibration isolation gap between enclosure and telescope foundations
- All mechanisms that move when observing target mounted on suitable vibration isolators
- No loose or flexible components free to vibrate in wind in Observation Mode
- Remain in fixed position during observation of target for duration of 10 minutes or less



# Astronomical Observation Specifications

Enclosure will shield telescope from wind

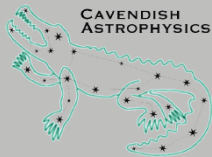
- Provide at least 50% reduction in wind speed to the envelope
- No more than 10% wind acceleration permissible at location of secondary mirror





# Mechanical Interface- Related Specifications

- Enclosures designed to have separate foundations from the telescopes such that vibrations of the enclosures are not coupled to the telescope pier.
- Enclosure foundation provided interface shall have placement accuracy of  $\pm 12\text{mm}$ .

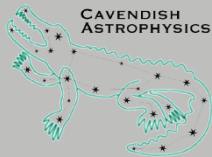




# Enclosure Thermal Specifications

## Thermal criteria 1 hour after sunset

- Temperature of any part of enclosure within 15cm of the telescope optical beam shall differ in temperature from outside air by no more than  $\pm 2^{\circ}$  C
- Temperature of any exposed surface inside enclosure shall differ in temperature from outside air by no more than  $\pm 5^{\circ}$  C

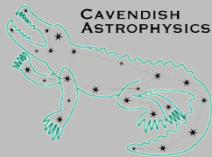




# Enclosure Thermal Specifications

## Optimal Observing Environment

- Enclosure hardware shall dissipate total of no more than 30W of power to air within 15cm of path traversed by collimated beam of light
- Total heat dissipation to air (averaged over any 5-minute period) of all enclosure equipment shall not exceed 200W



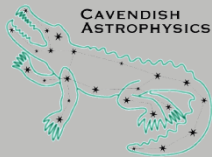




# Enclosure Thermal Specifications

Enclosure vented to provide air flow

- Ambient wind speeds above 3 m/s enclosure provides internal wind speed of at least 1 m/s around majority of telescope



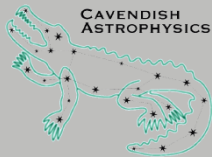


# Astronomical Observation Specifications

## Operational Field of Regard

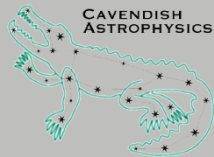
- Objects above 30 degrees in elevation
- Objects accessed with inner axis rotation angle between  $+40^\circ$  and  $-50^\circ$  (West & East respectively)

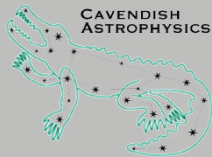
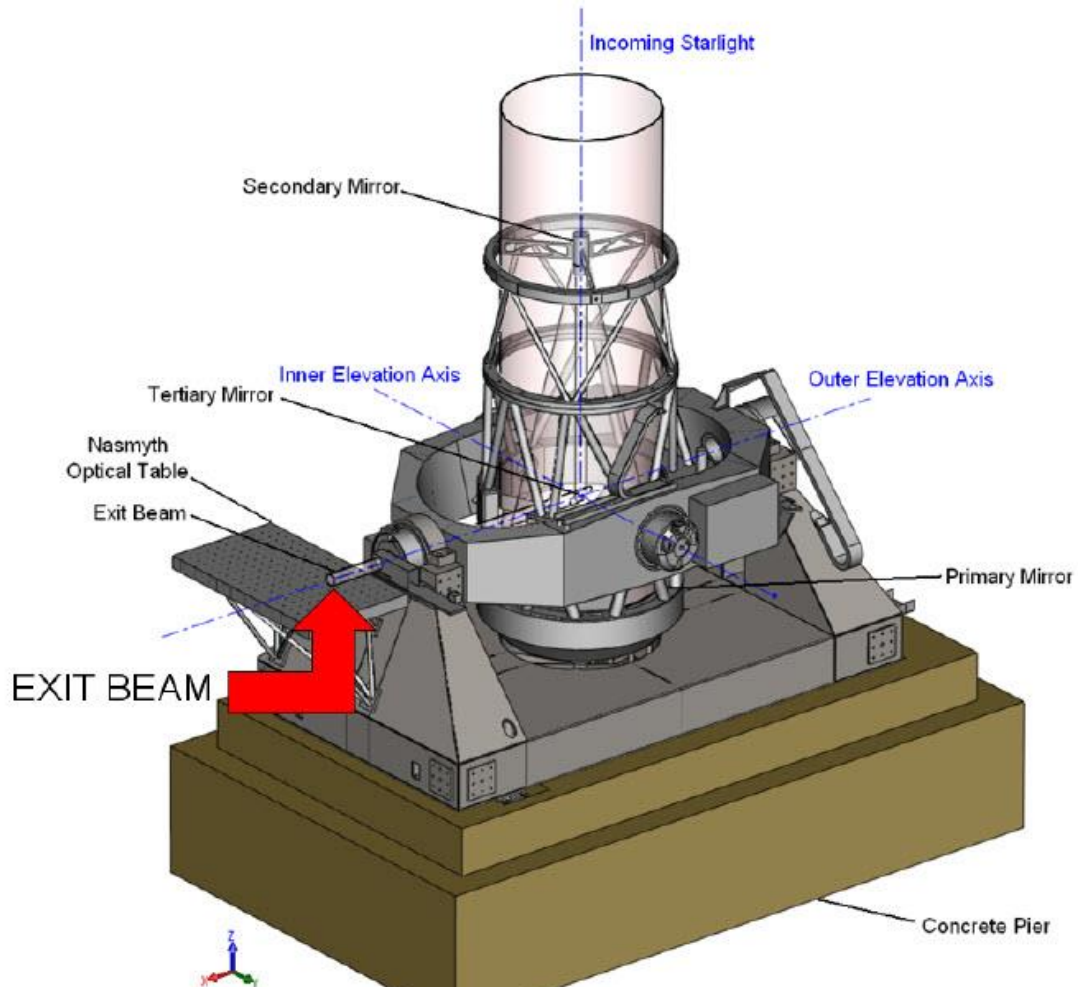
In close-packed array configuration an **enclosure shall not obscure the operational field of regard of any nearby telescope.**



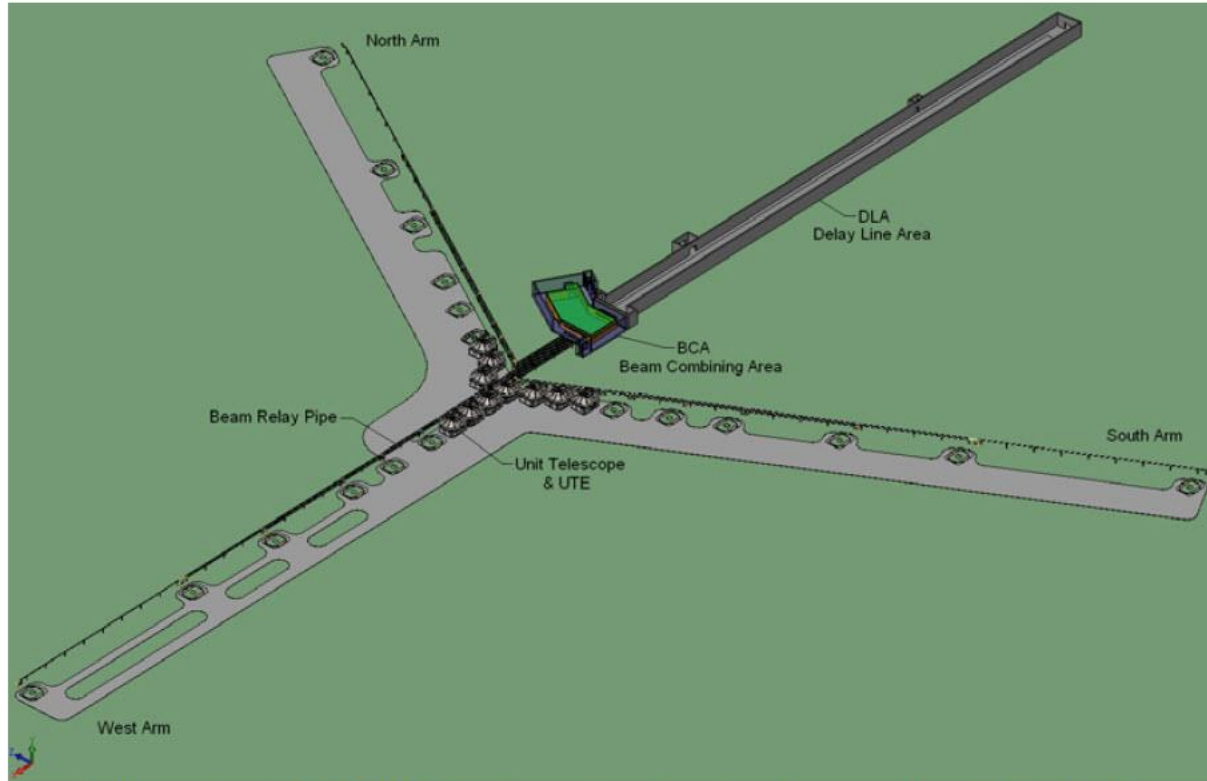


# Transportable





# Array Configuration



**Figure 2 - Plan view of the MRO Interferometer showing the general equilateral “Y” arrangement of the array arms with the proposed locations of the 28 telescope stations. The Beam Combining Facility, into which light from the individual telescopes will be directed, is the grey shaded structure running east from the vertex of the array. This drawing is schematic only and is not intended to indicate a preference for a particular design for the enclosures or relocation system.**

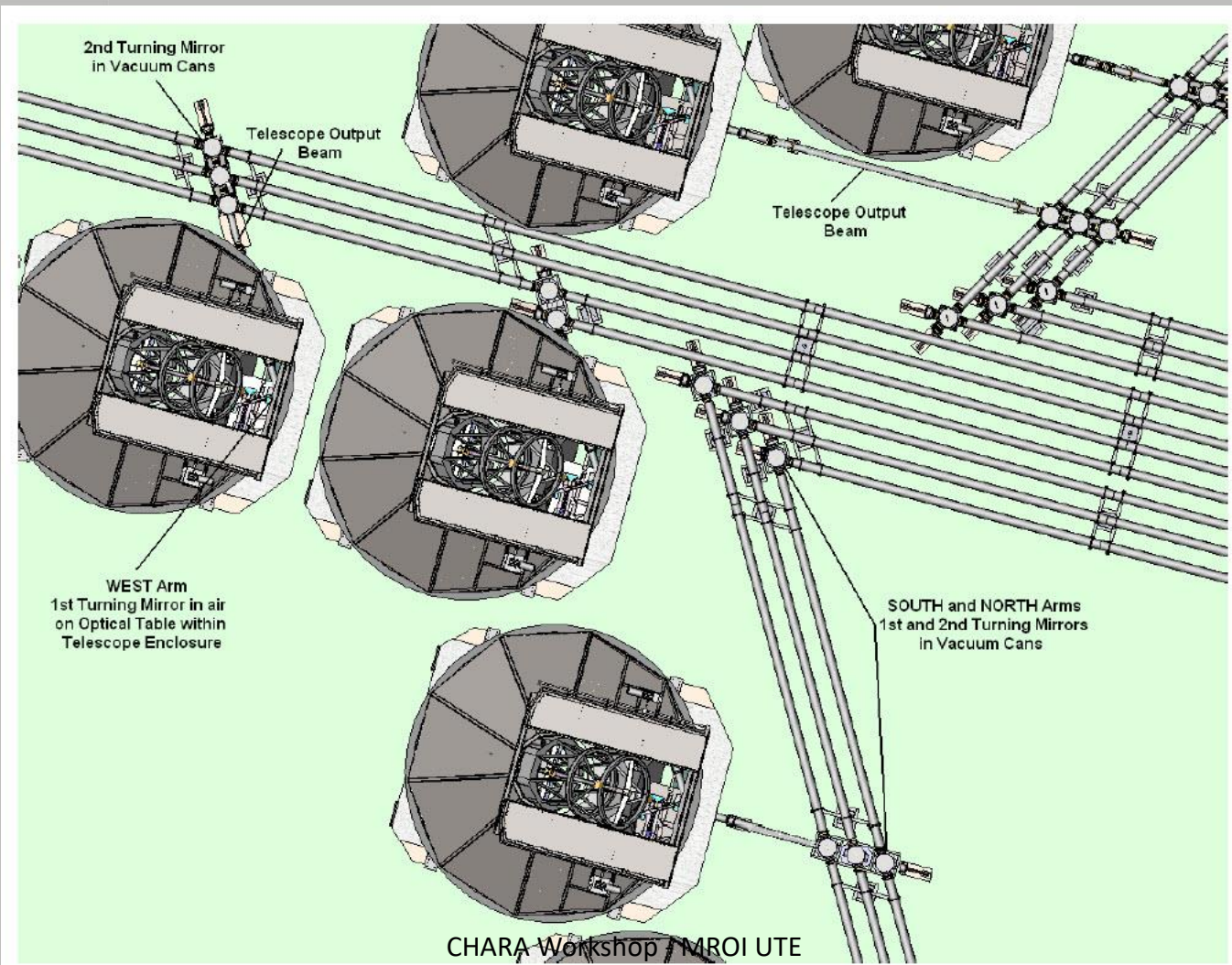


# Center of the Array

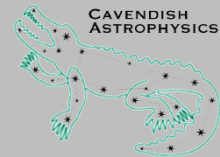
North

West

East



South

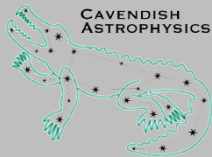


# 1.4m Diameter Telescope



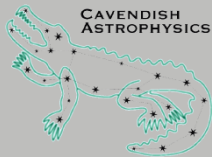
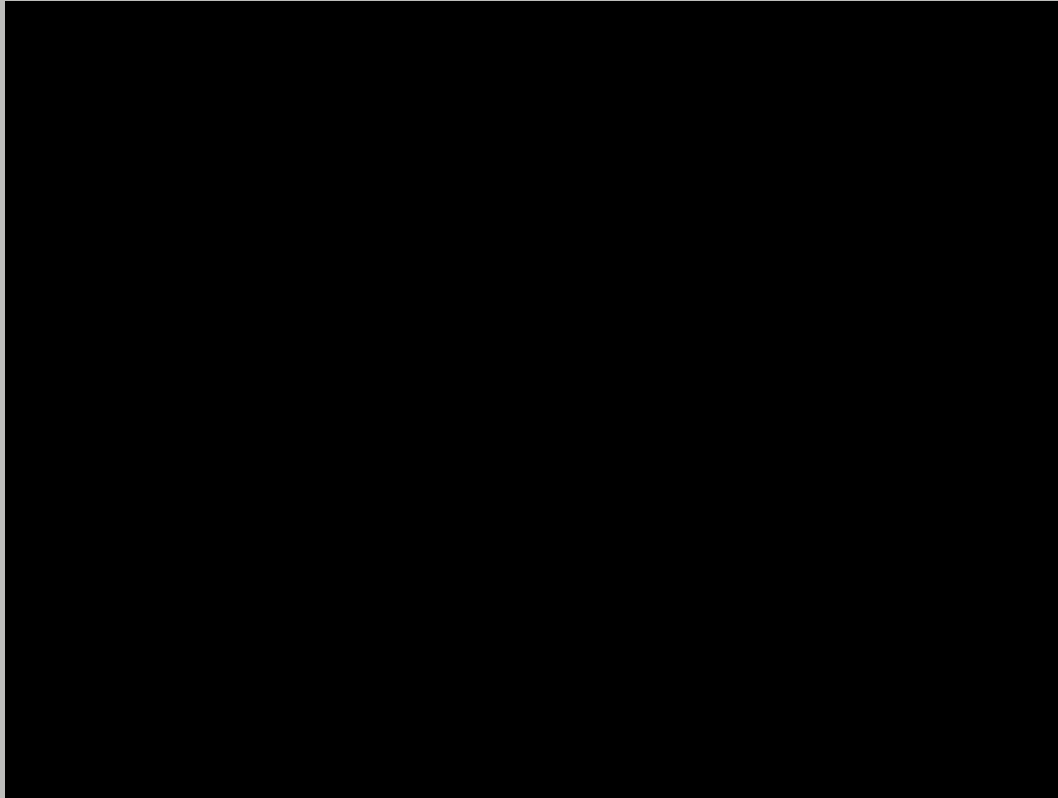
4/5/2018

CHARA Workshop - MROI UTE



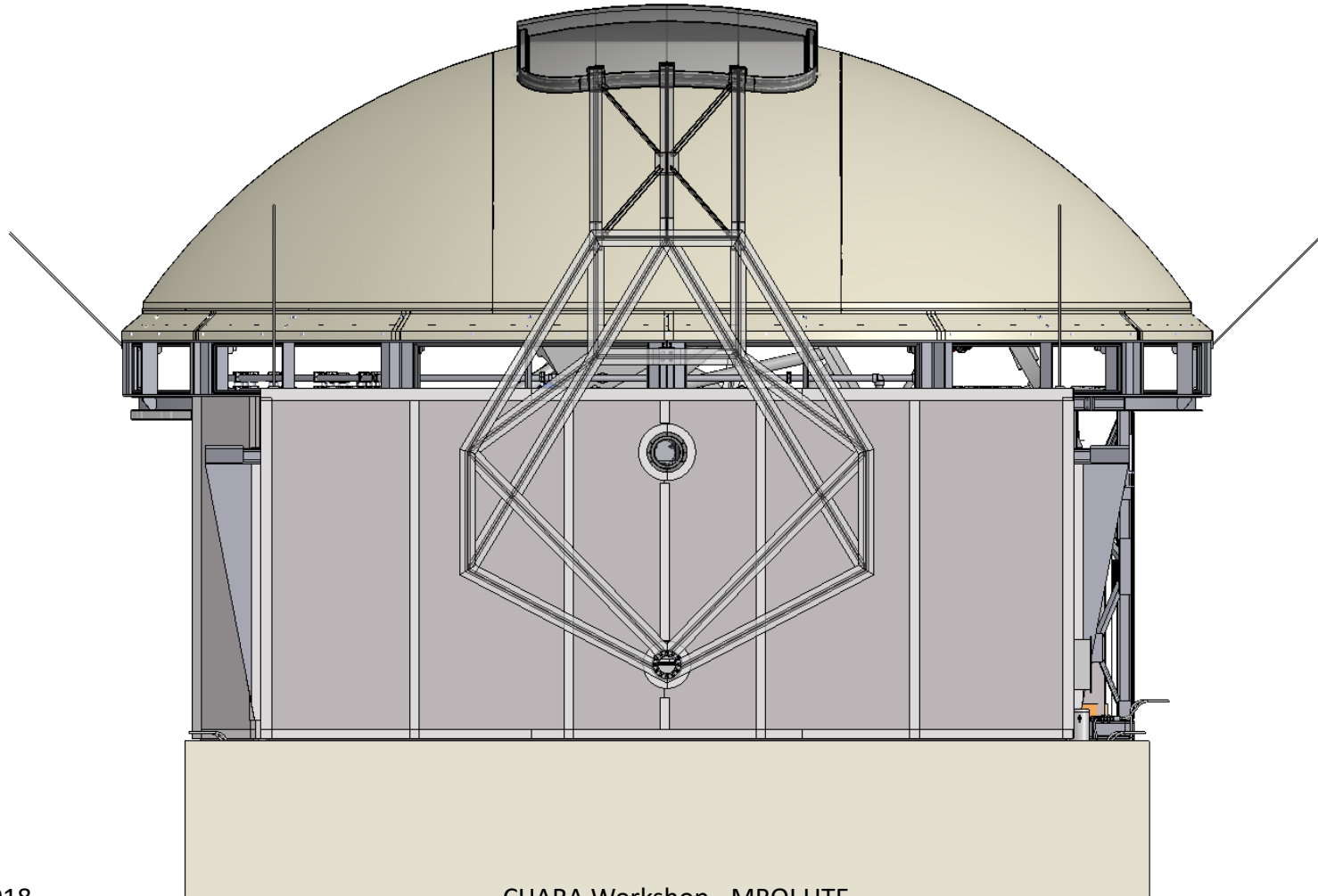


# Animated Design Concept

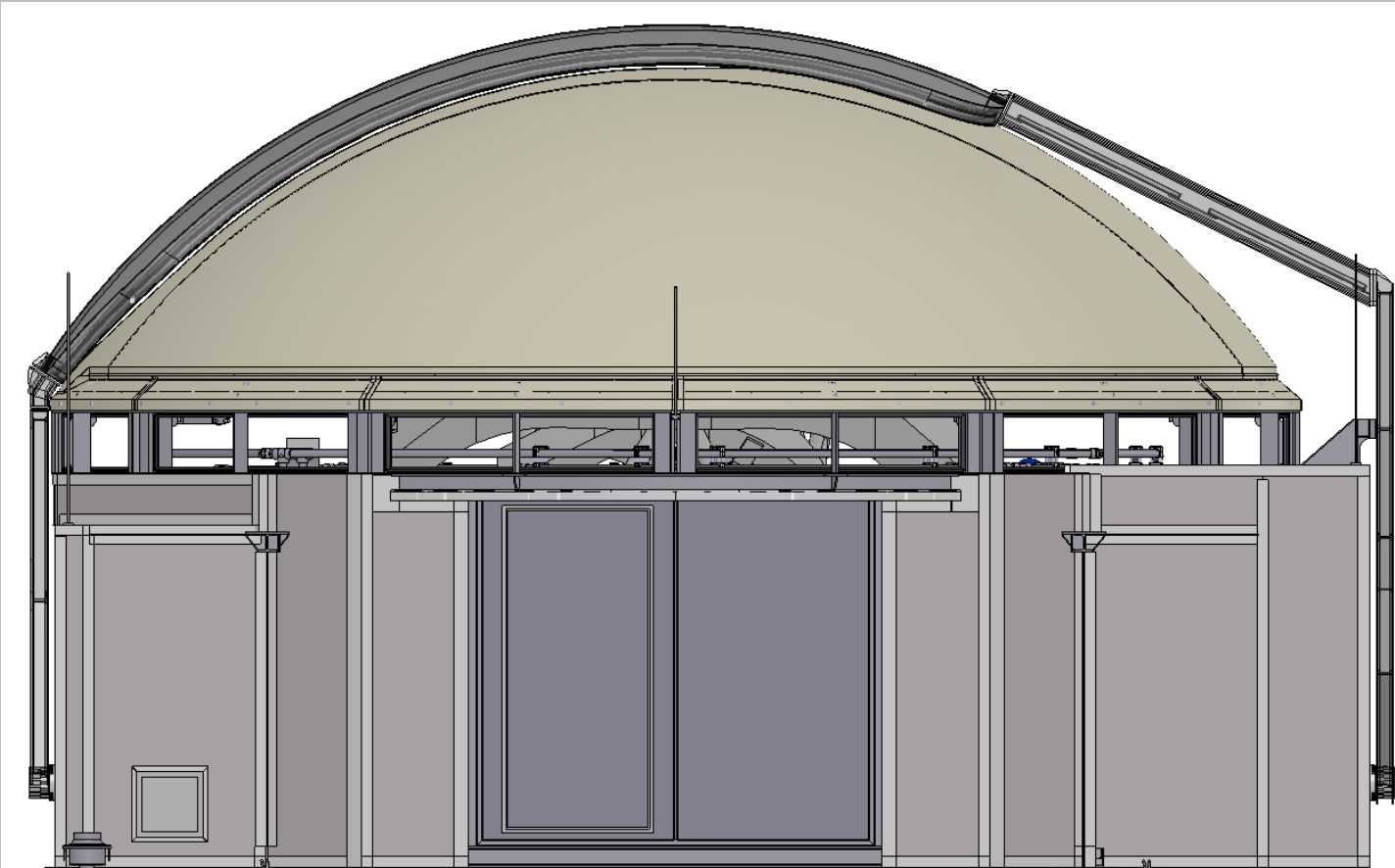




# Side Elevation

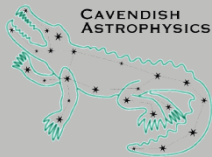


# Front Elevation

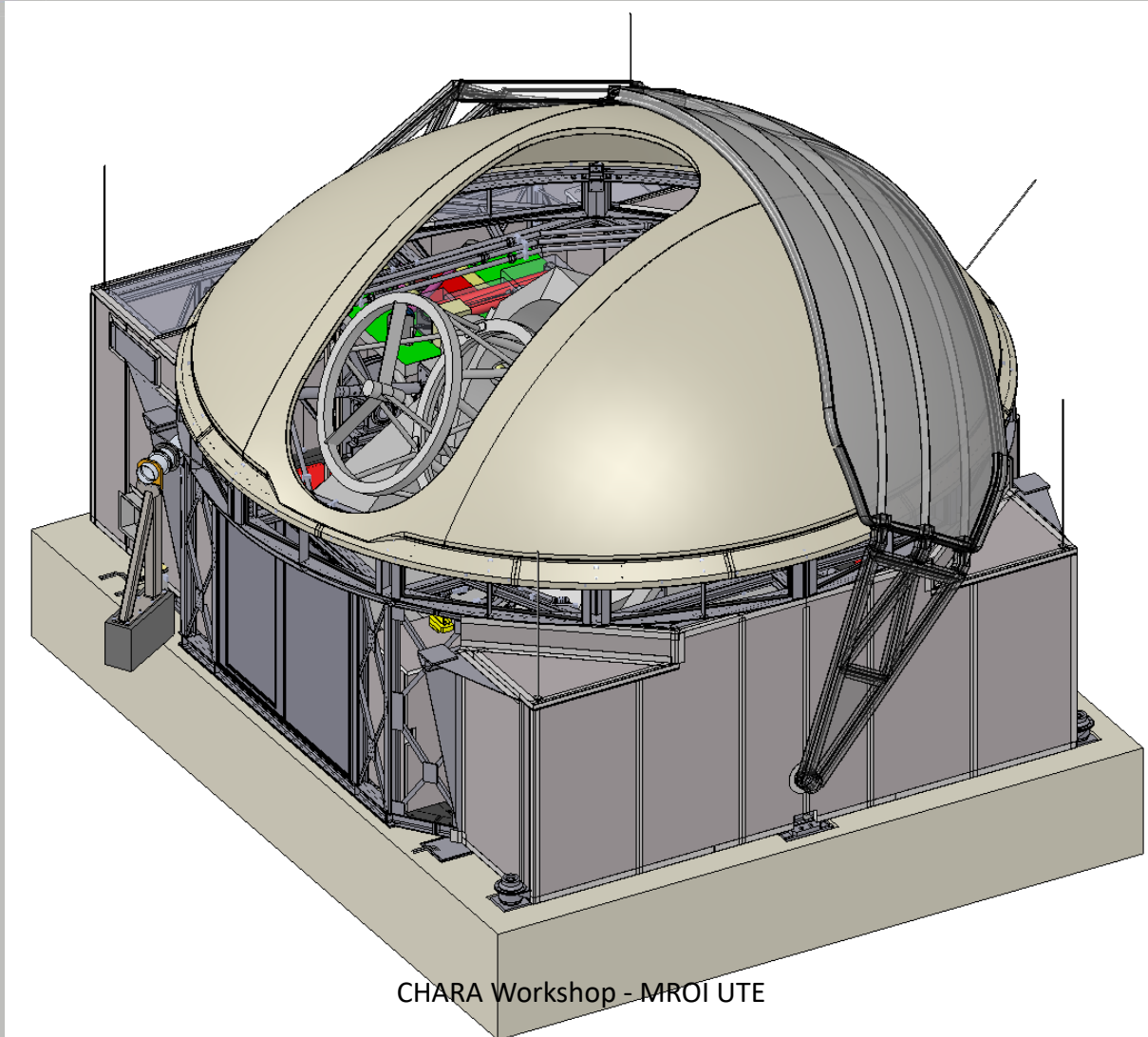


4/5/2018

CHARA Workshop - MROI UTE

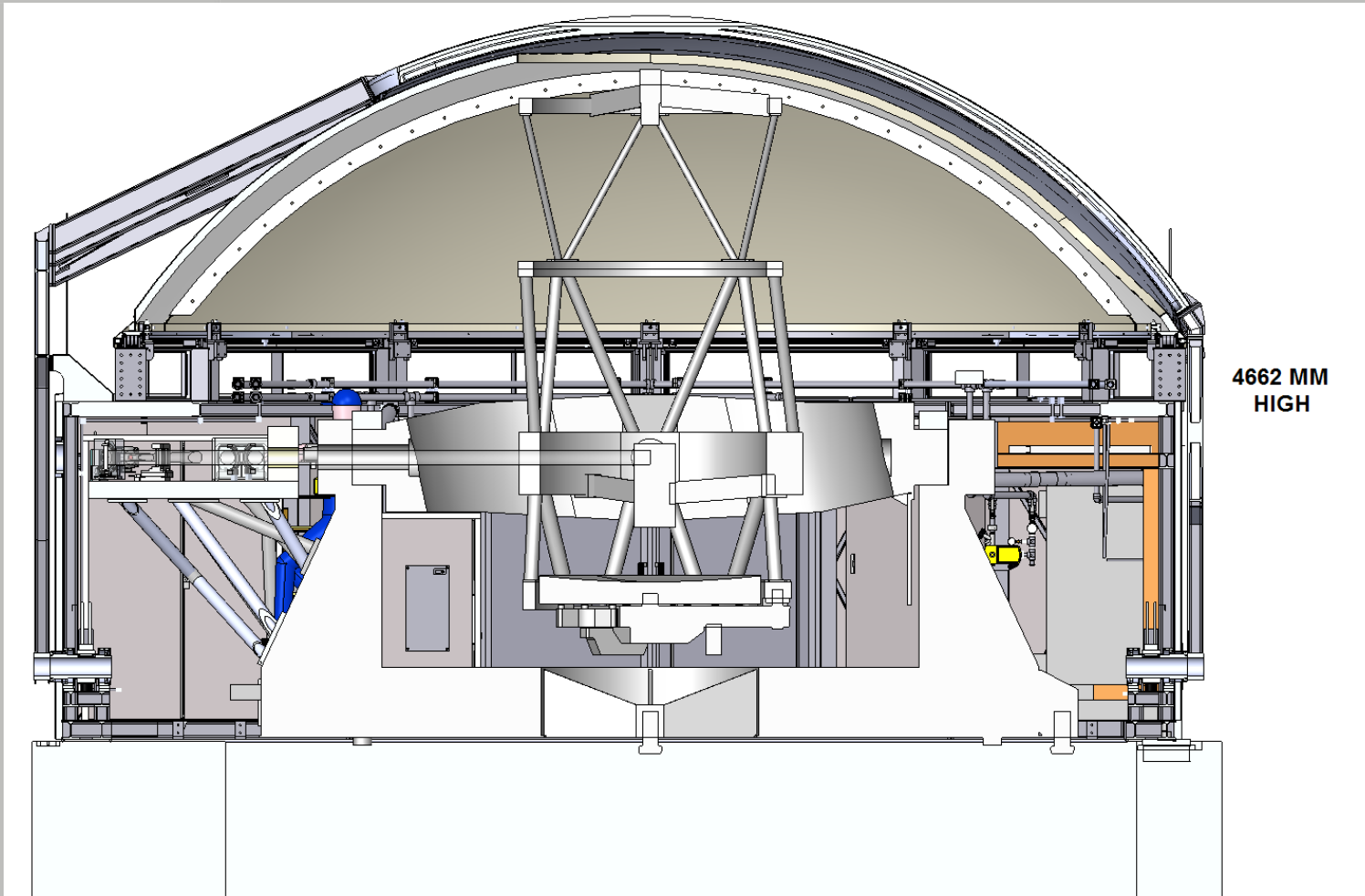


# Isometric





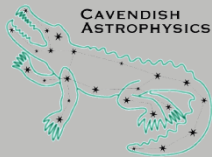
# Section



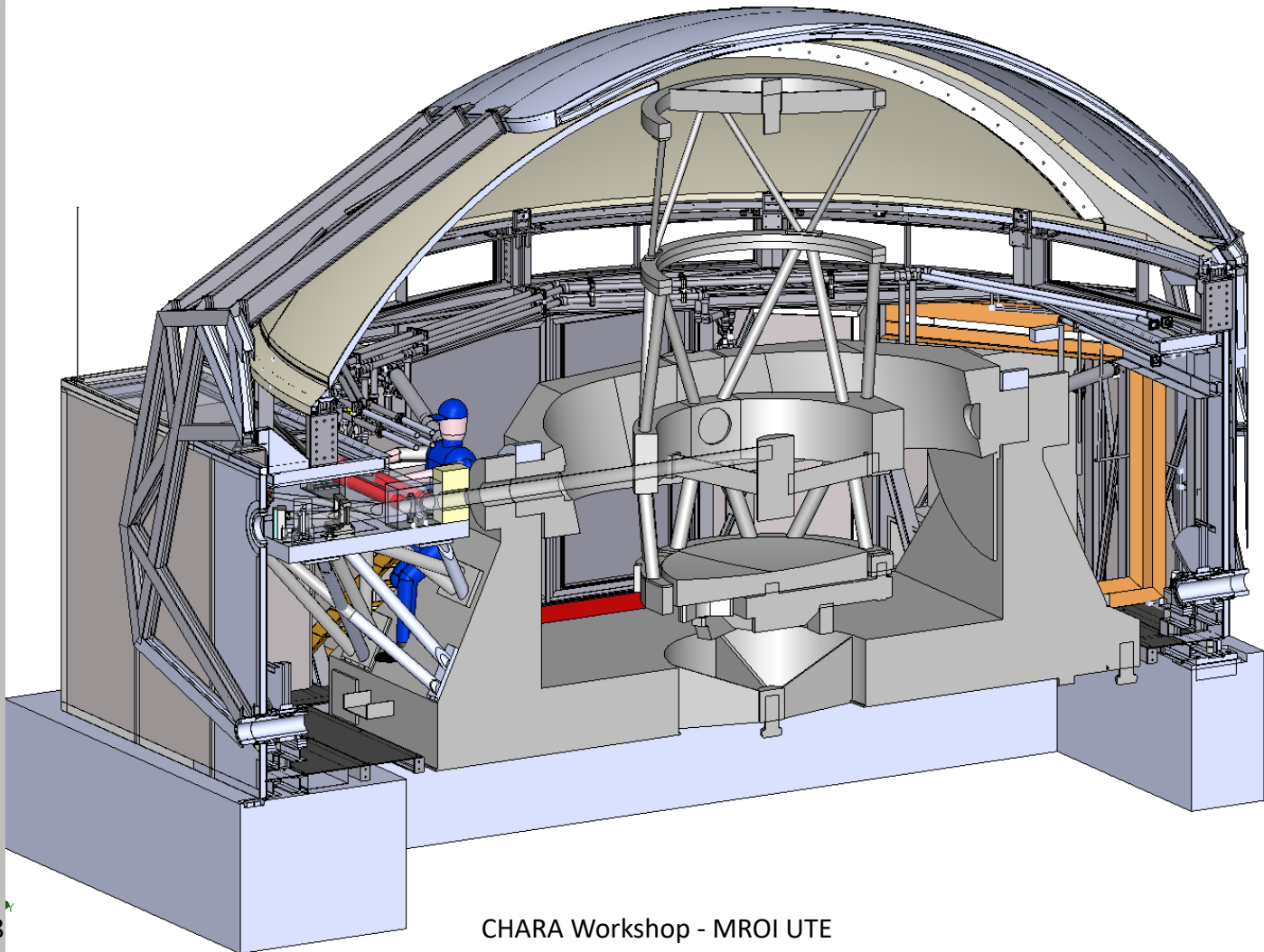
4662 MM  
HIGH

7511 MM LONG  
CHARA Workshop - MROI UTE

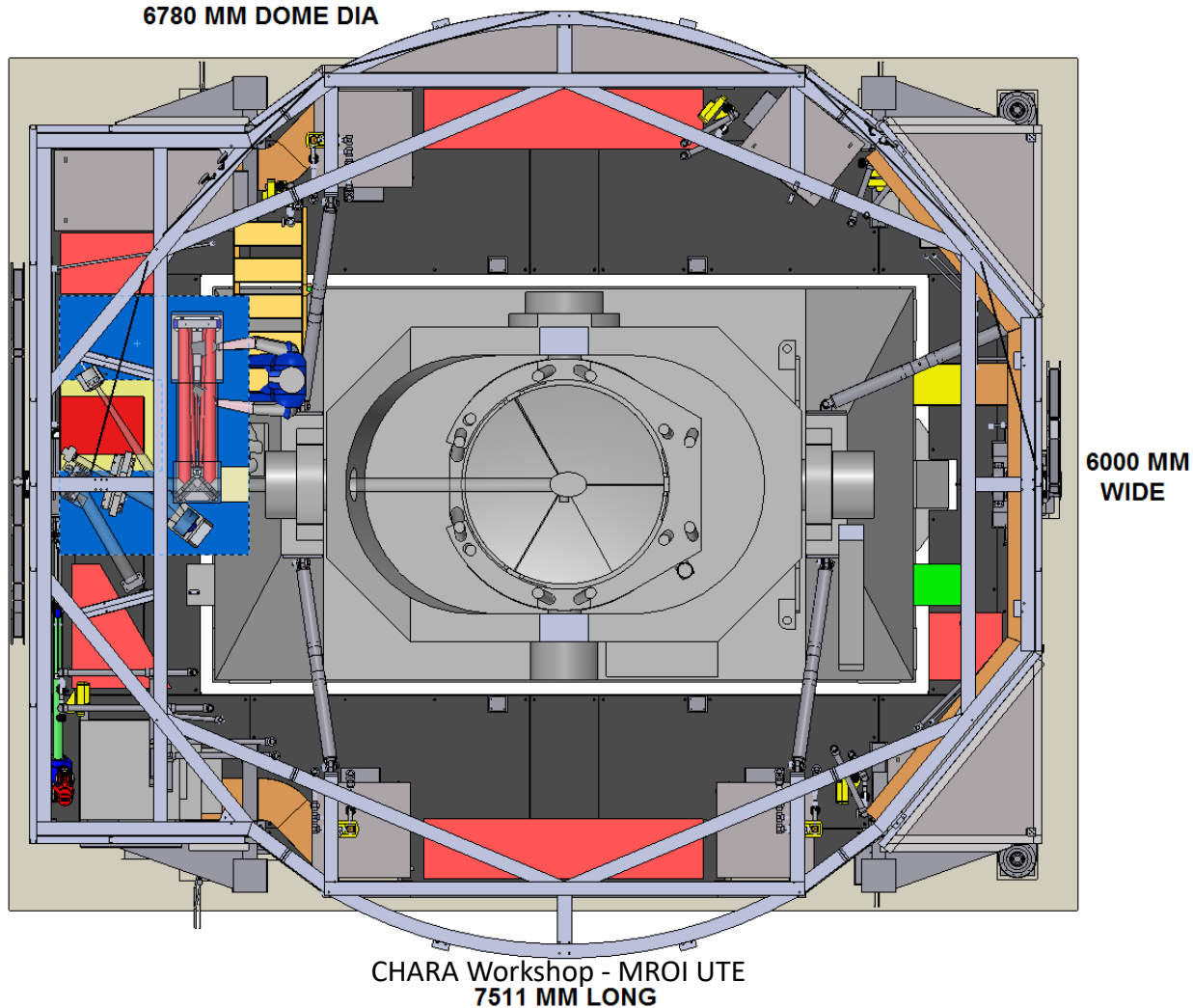
4/5/2018



# Section



# Plan

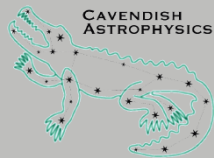


# Completed Fabrication





# Dummy Mass

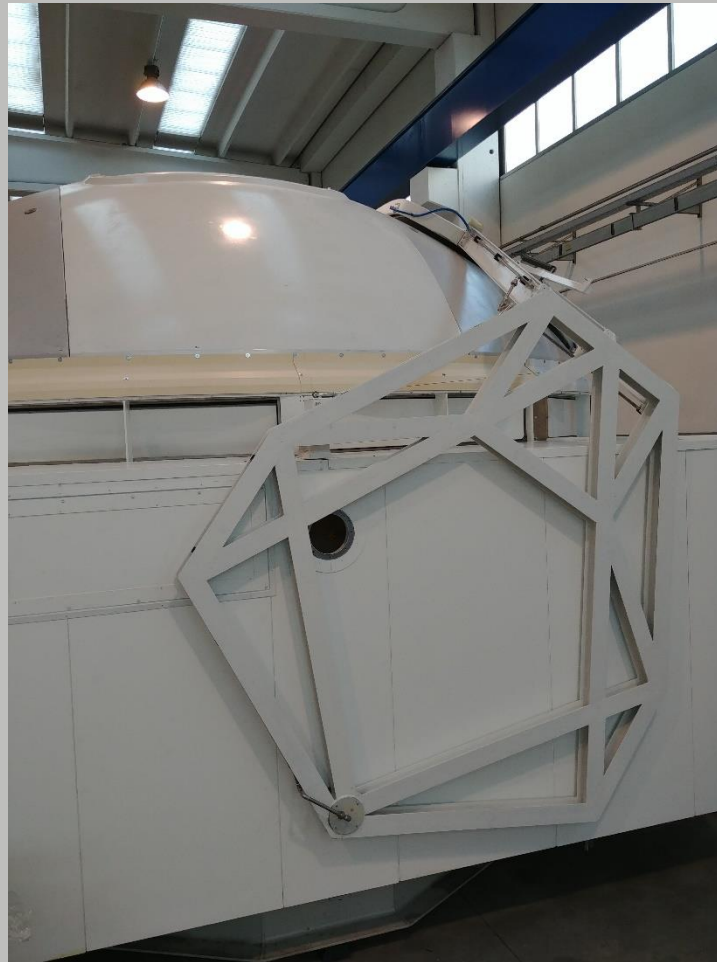




# Exit Beam Relay



# Port for Exit Beam Relay



# Mirror Removal Trolley



# Services Interface



# Example Electronic Cabinet



# Shutter Opened



4/5/2018

CHARA Workshop - MROI UTE

# Video Dome Rotation



# Video Dome Rotation





# Video Lifting



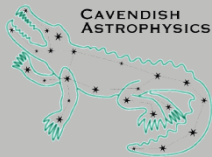


# Graphic on Array



4/5/2018

CHARA Workshop - MROI UTE



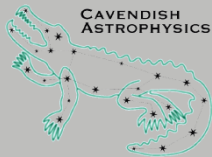


## EIE

- Andrea Busatta
- Davide Marzotto
- Cristina Battistel

## MROI

- Chris Haniff
- David Buscher
- Michelle Creech-Eakman
- Andres Olivares
- Fernando Santoro
- Robert Blasi





# Contact Information

- Dr Ifan Payne
- Program Director
- Magdalena Ridge Observatory,  
New Mexico Tech
- [ipayne@mro.nmt.edu](mailto:ipayne@mro.nmt.edu)
- (575) 835 6808
- [www.mro.nmt.edu](http://www.mro.nmt.edu)

