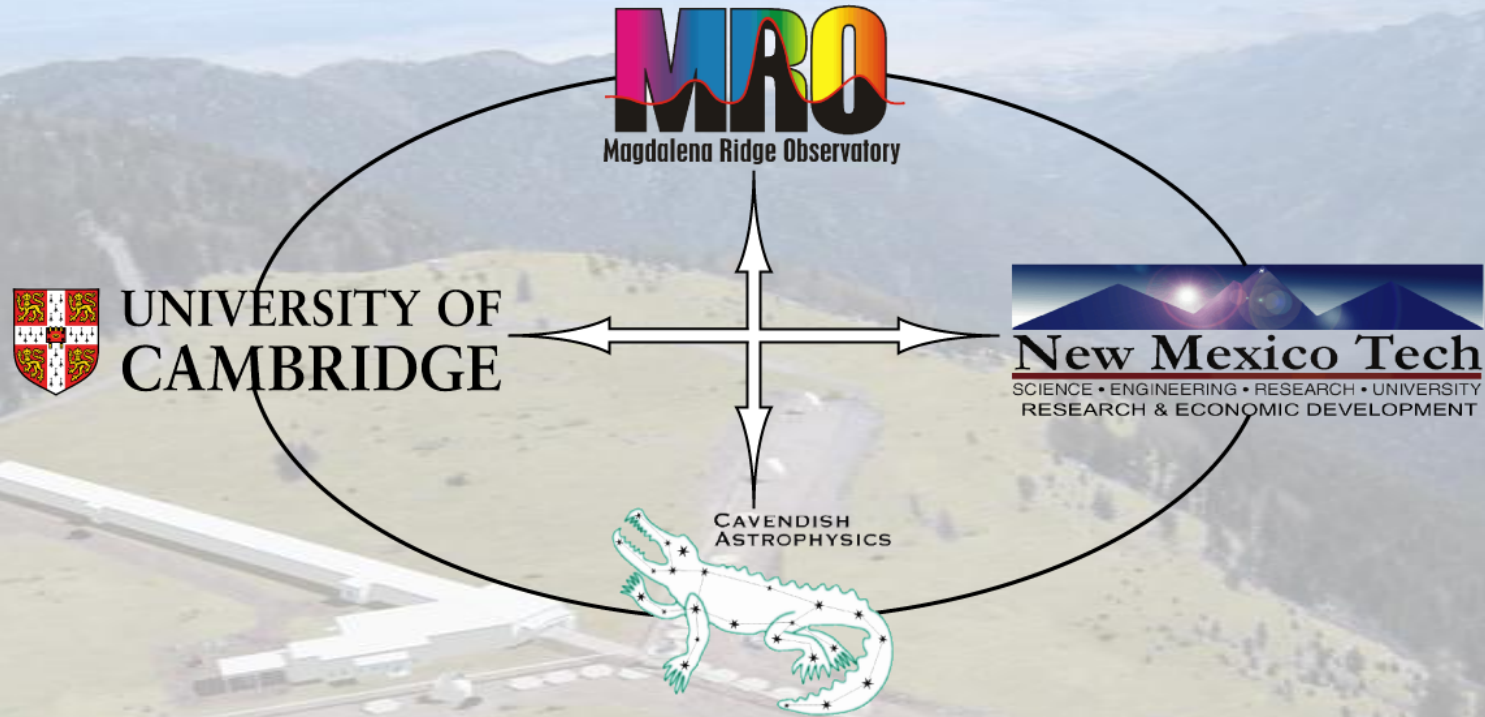# FRINGE TRACKING AT THE MRO INTERFEROMETER
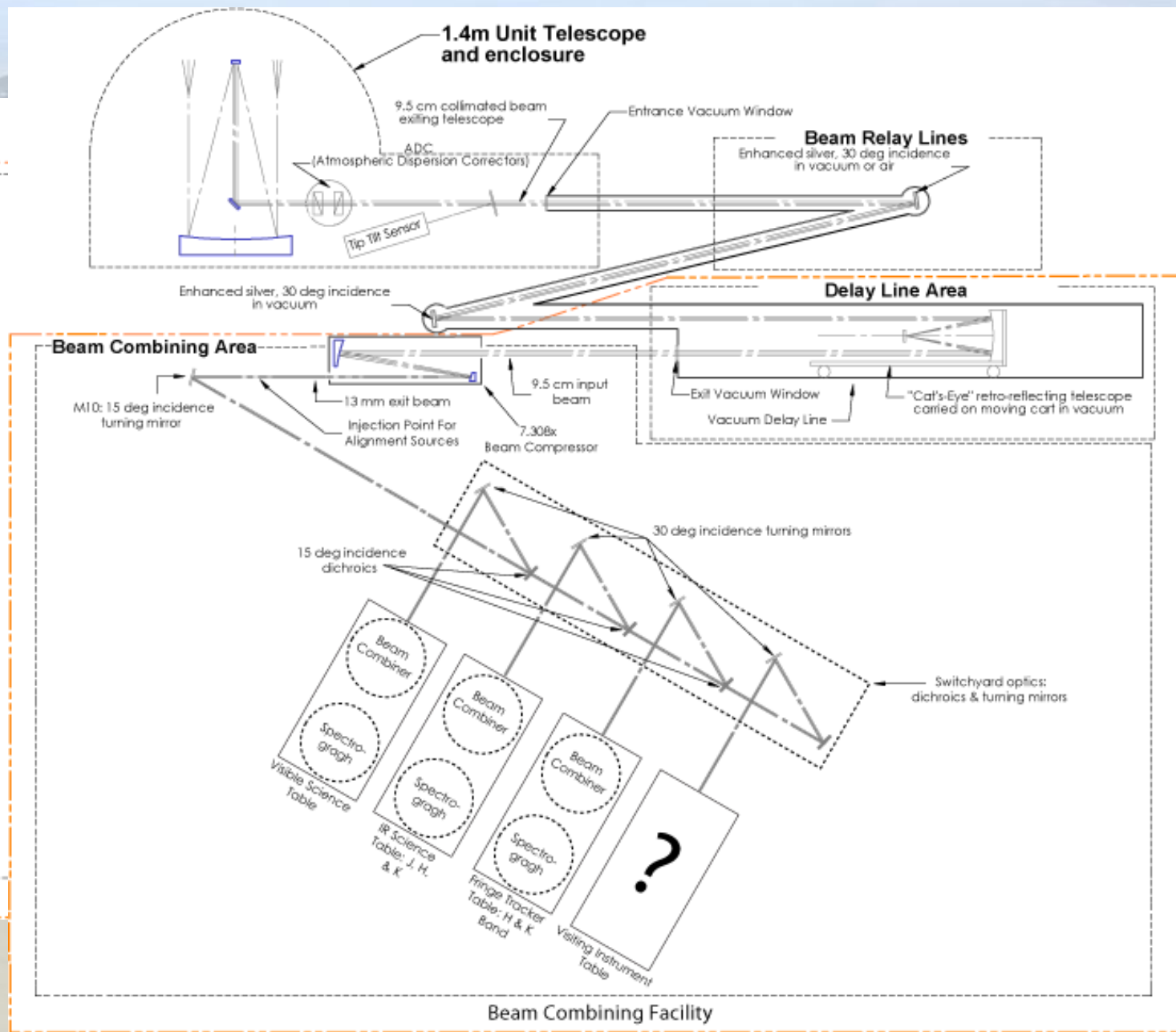

➤ **Other MROI System Papers:**

- **7013-19 (Array Opto-Mechanical Design - Thursday)**

- **7013-22/7019-7 (Unit Telescope Design - Tuesday/Software - Thursday)**

- **7013-23/126/159 (Delay Line Production - Tuesday/Innovation/Control - Thursday)**

- **7013-31 (Science & Commissioning Update - Tuesday)**

- **7013-76 (Near-IR Science Combiner - Thursday)**

- **7013-127 (Automated Alignment System - Thursday)**

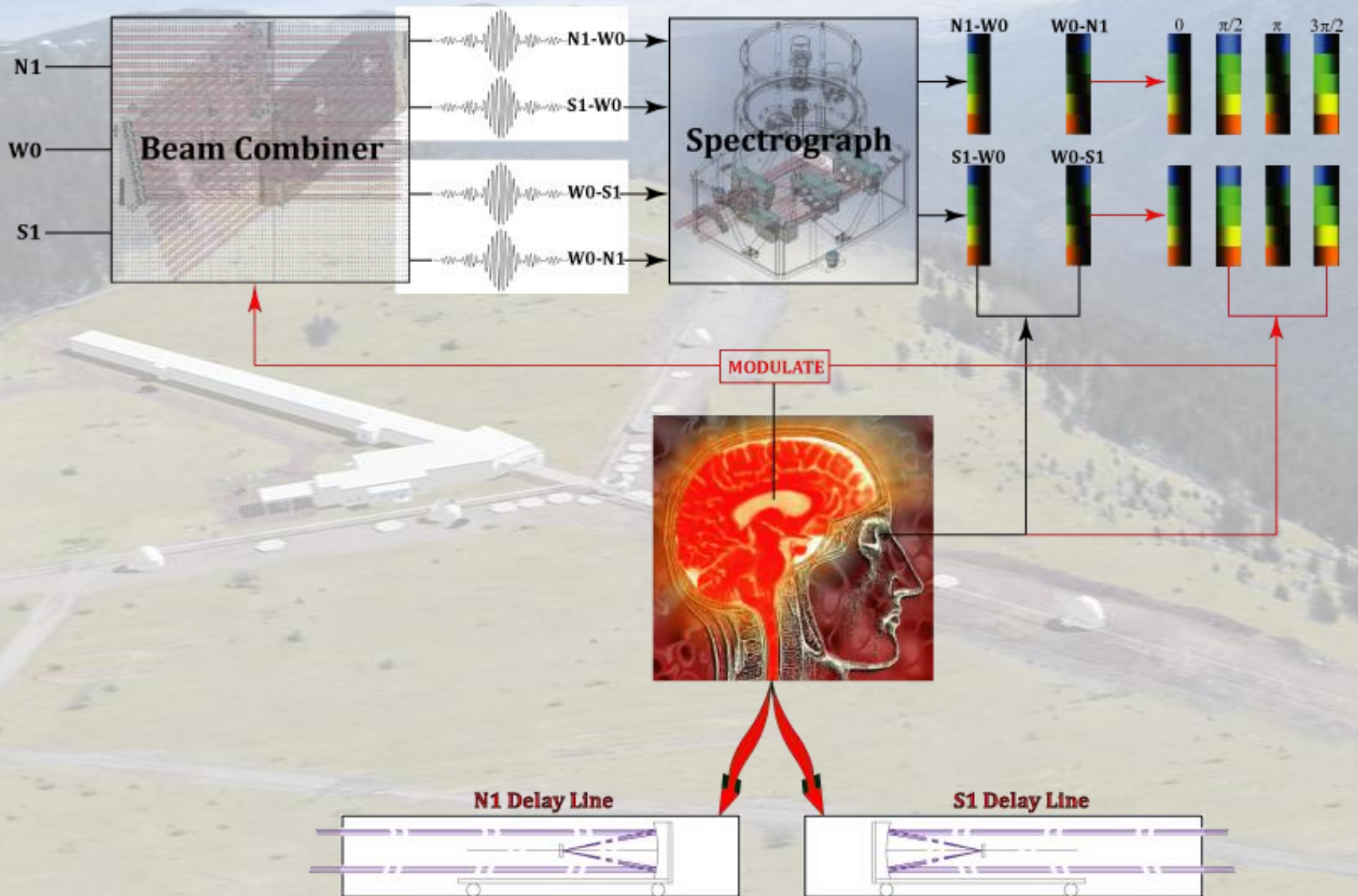- **7013-132 (custom beamsplitter & AR coatings - Thursday)**

Key Design Elements

➢ Pupil plane beam combiner for baseline bootstrapping.

➢ Custom beamsplitter and AR coatings minimize visibility losses due to intensity mismatch, polarization, and group delay.

➢ H or K_s-Band (does not share with science combiner).

➢ Modular design accommodates from 2 to 10 UTs.

➢ 5 (6 UTs) combination pairs multiplexed onto a single detector.

➢ 2-way combiner measures complementary outputs simultaneously.
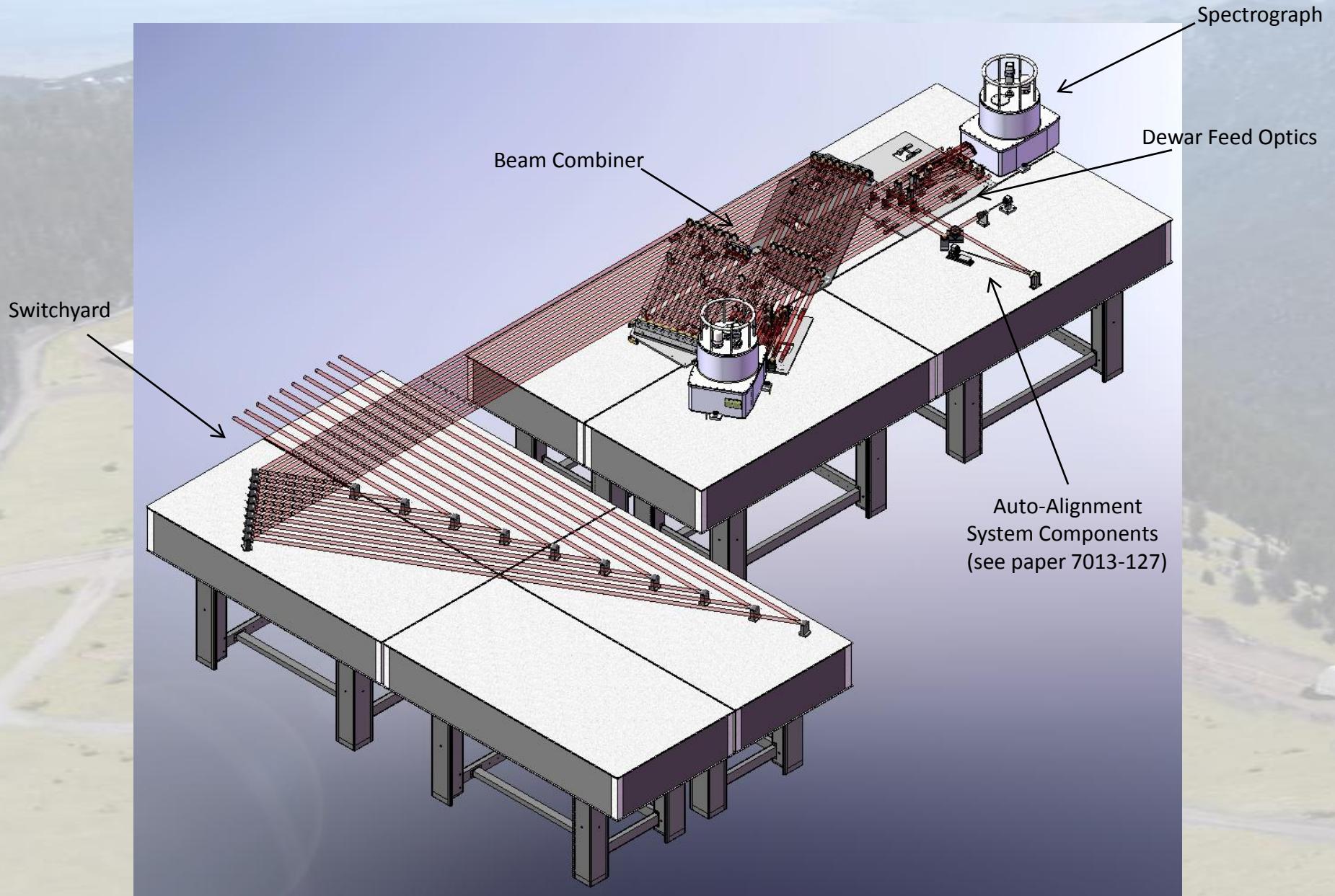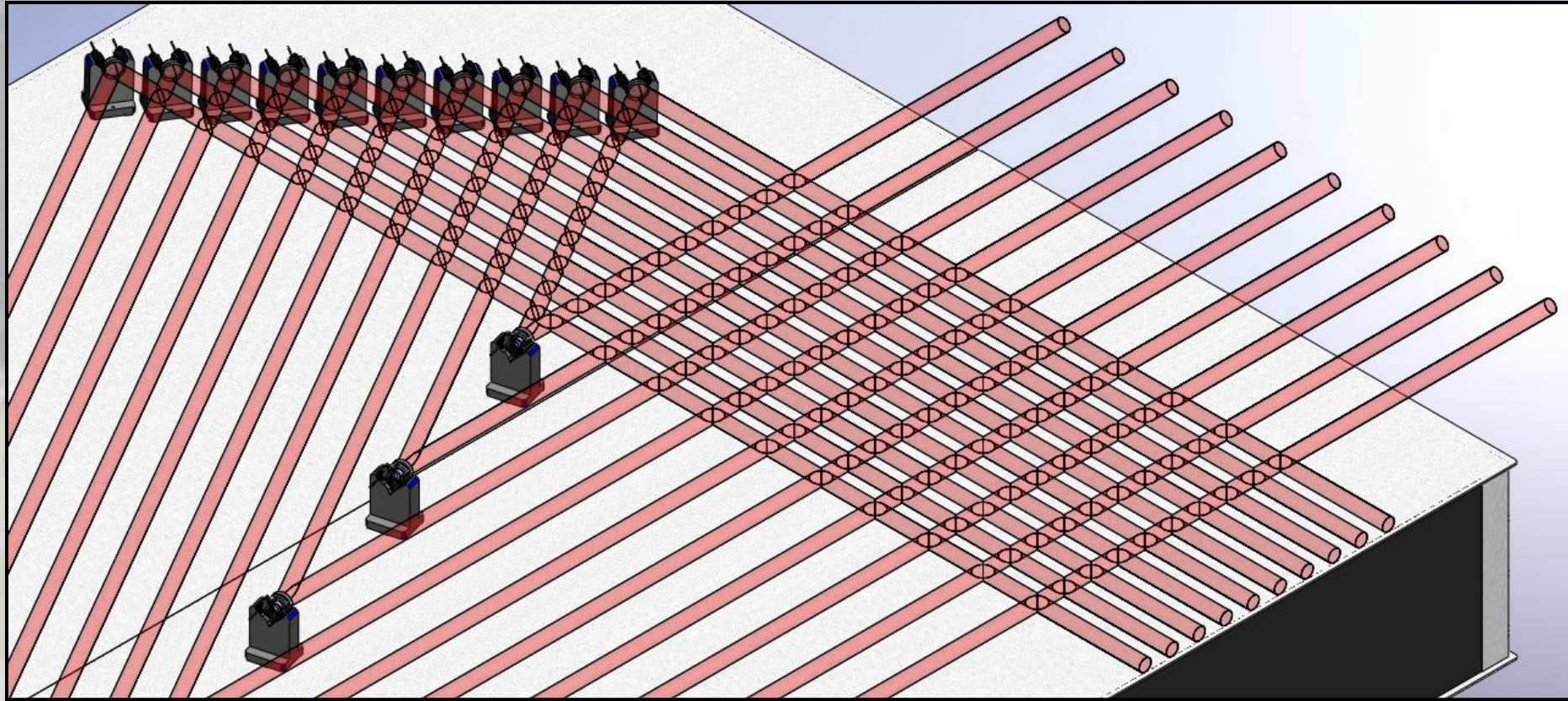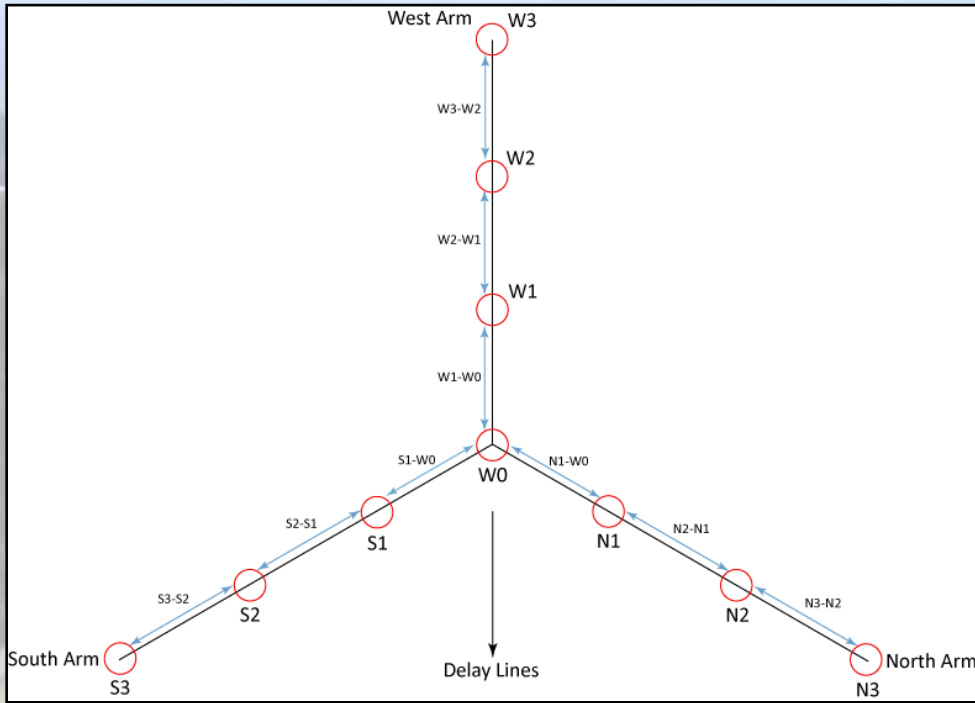
Location In Optical Train

System Overview

System Architecture

Spectrograph

Dewar Feed Optics

Beam Combiner

Switchyard

Auto-Alignment
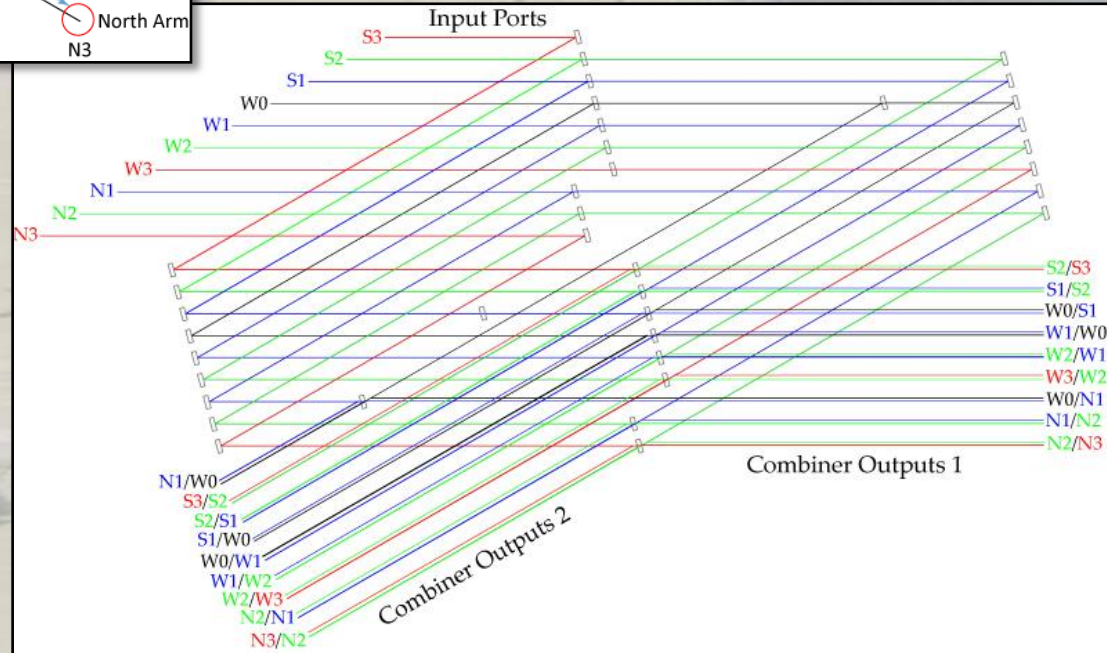System Components
(see paper 7013-127)

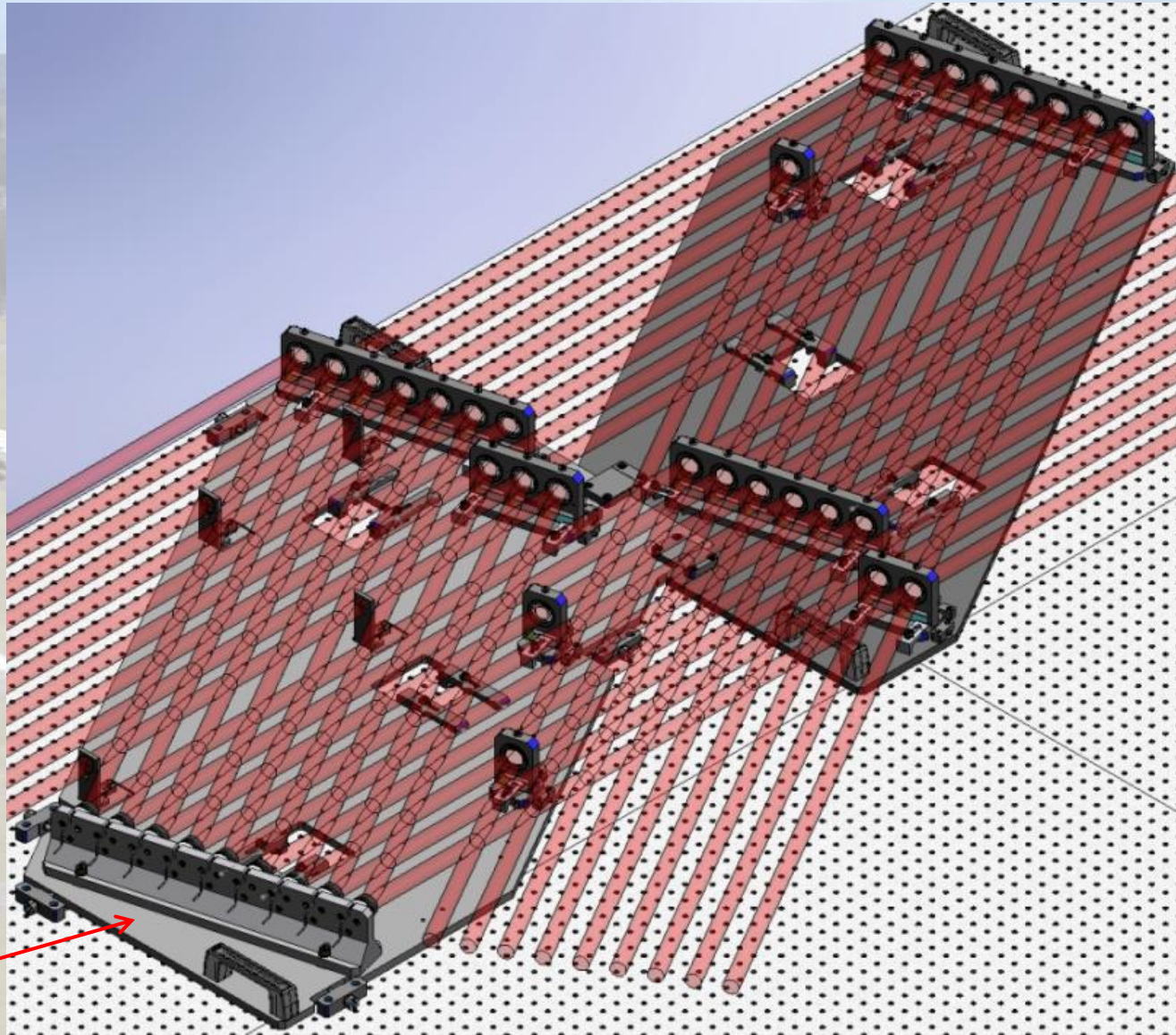# Switchyard: Configurator of the Phase Plane

Array Geometry To Combiner Architecture
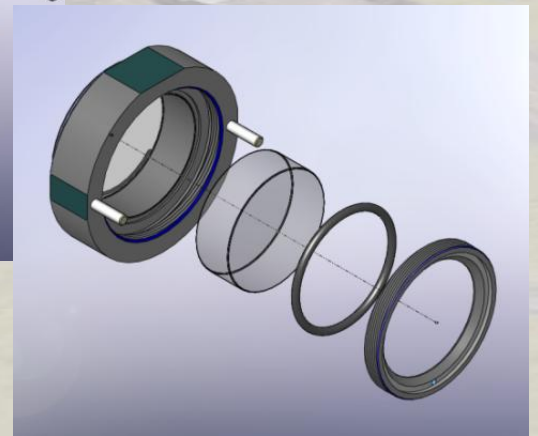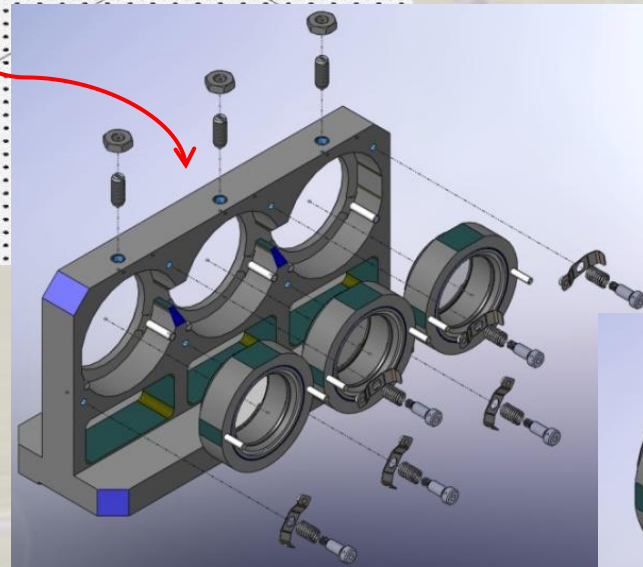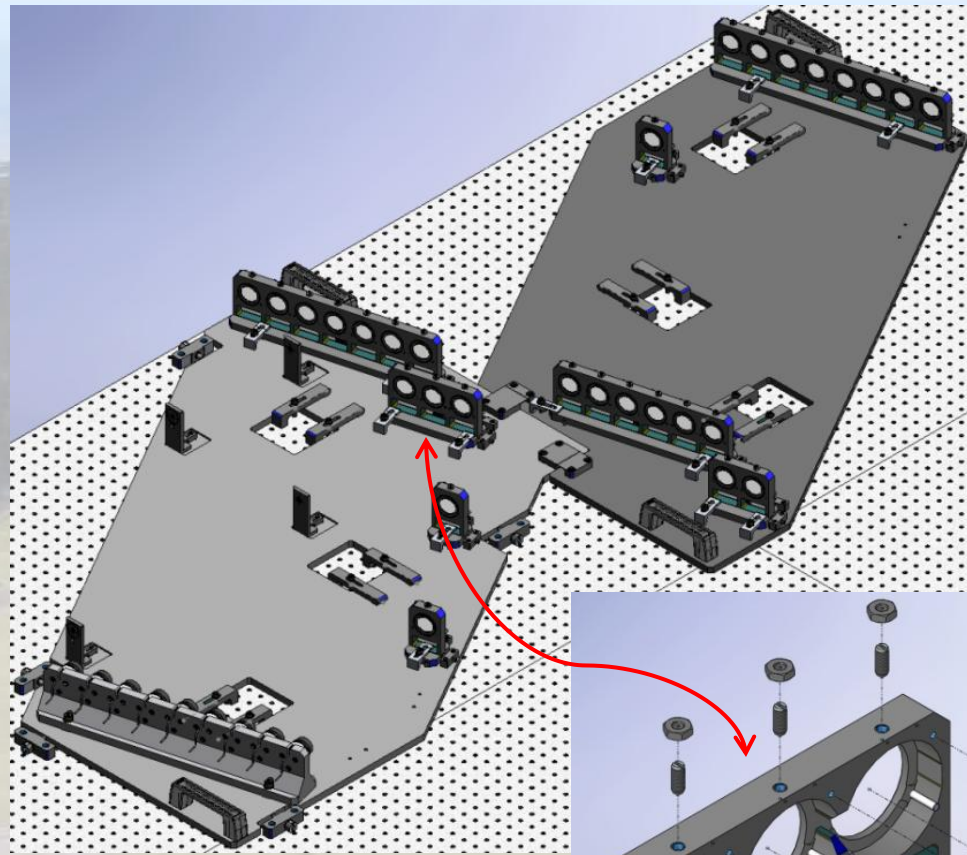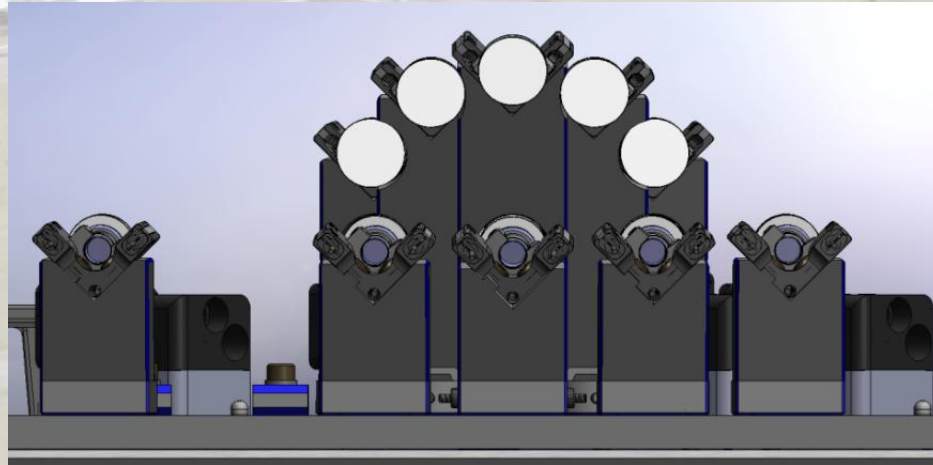

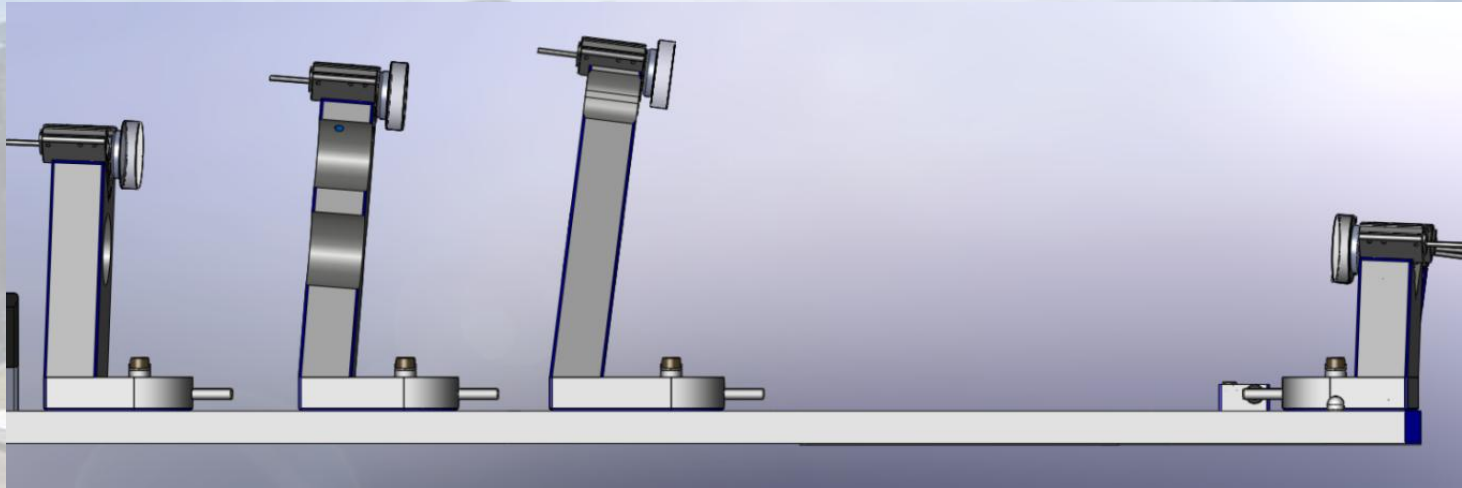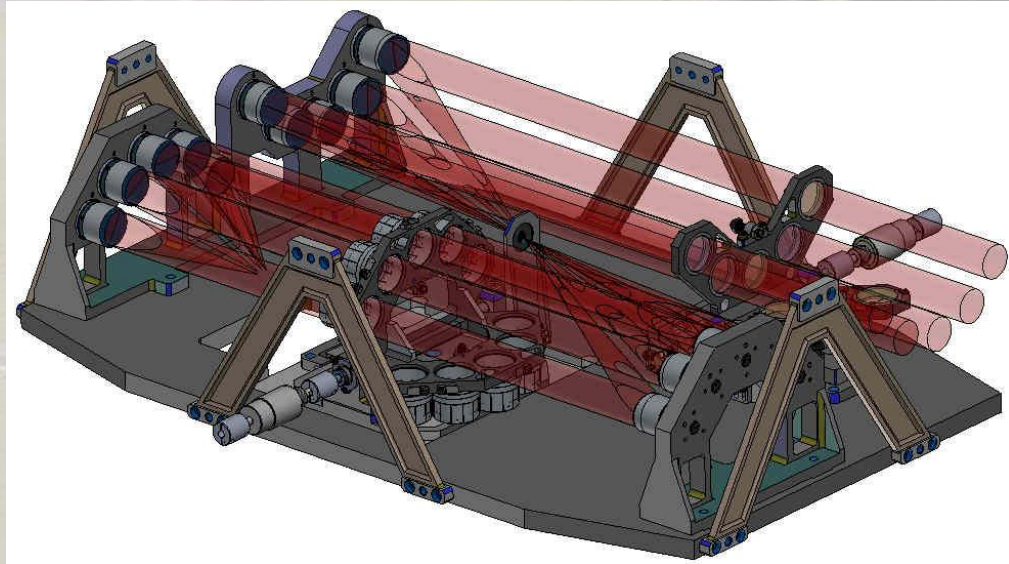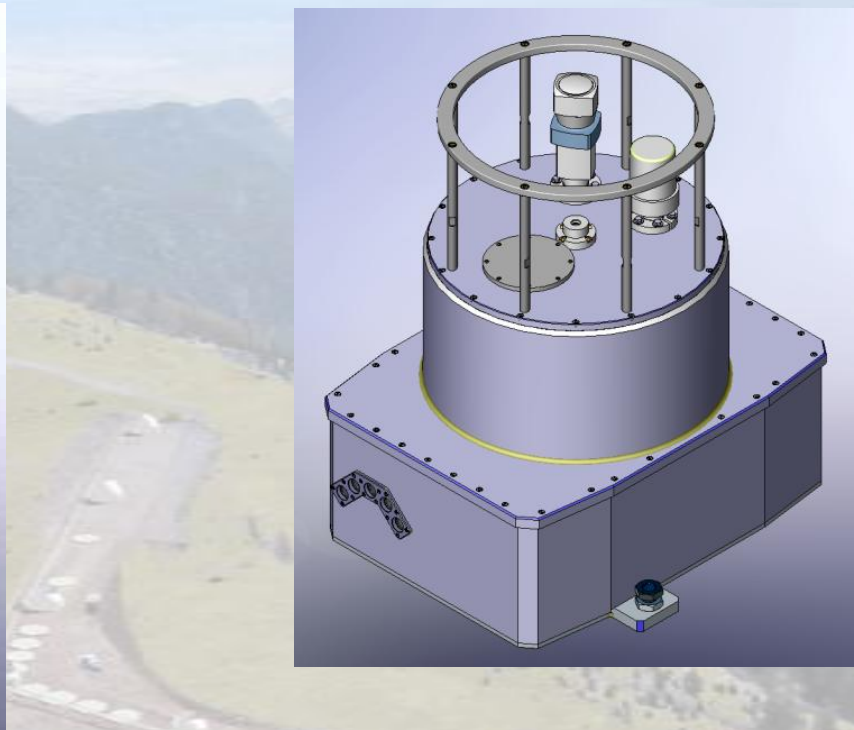Combiner Analysis/Coating Designs: 7013-132
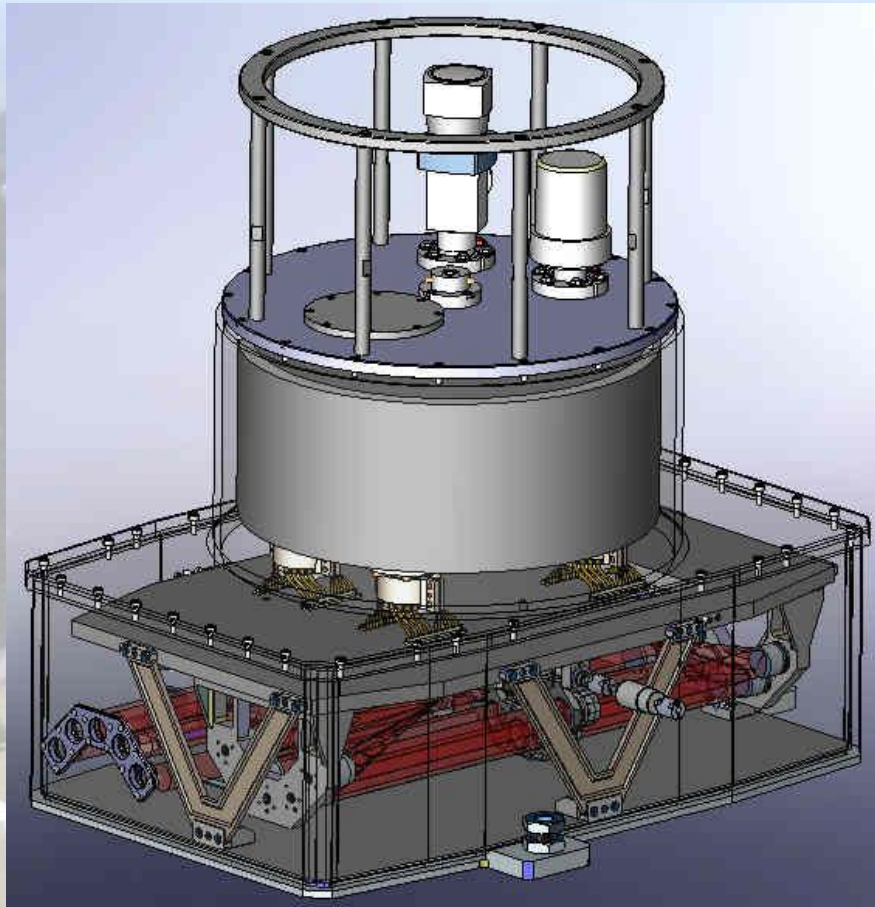
OPD Modulation Strategy

Pathlength
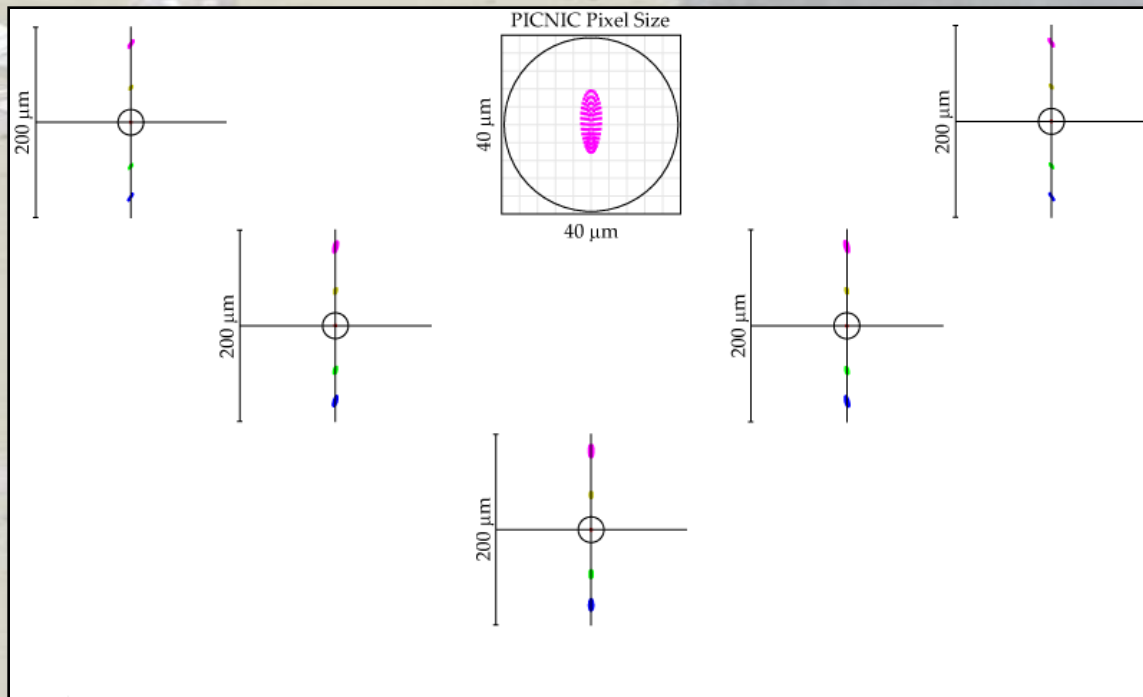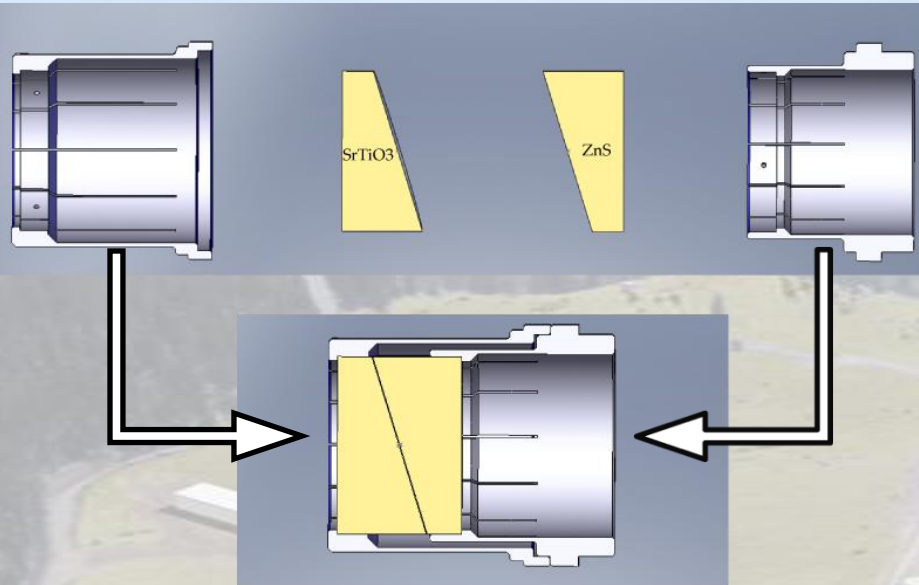Modulators

Modular Design Approach

Dewar Feed Optics

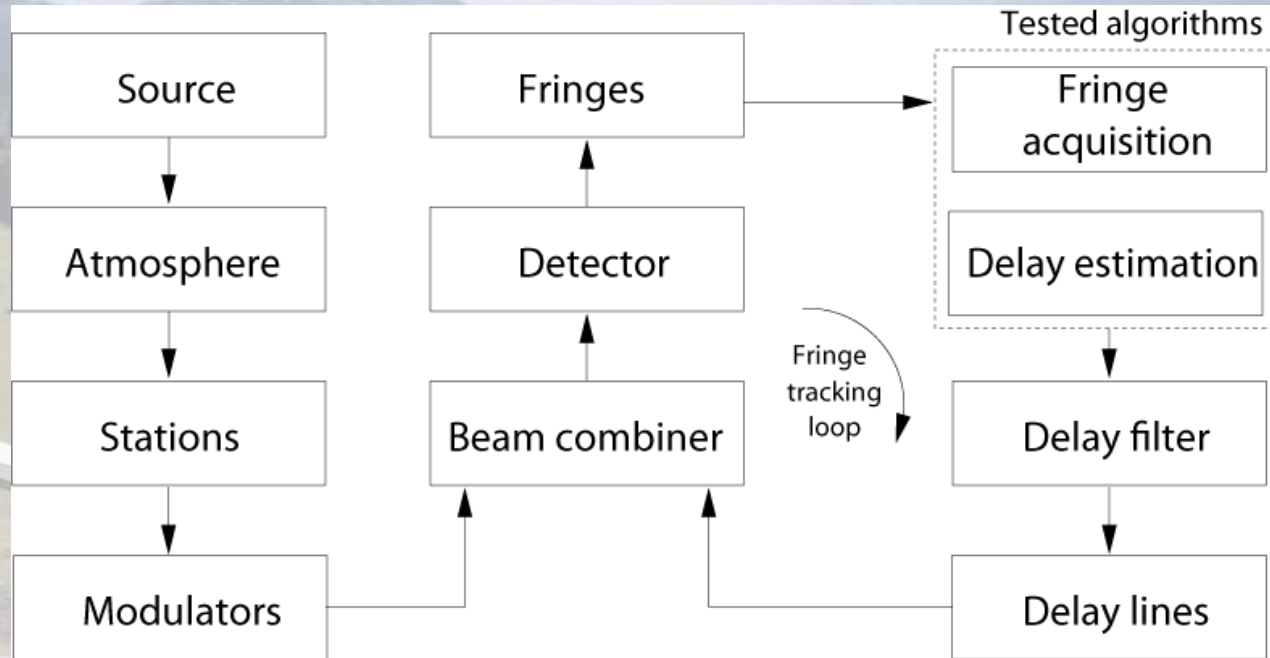# Key Dewar Design Features

Diffraction Limited Performance at H & K

Algorithm Development

Simulator Diagram:

Tracking Modes:

➢ Classic Cophasing as well as Coherencing Algorithms
- Double Fourier Interferometry (Pedretti 2005)
- Envelope Tracking (Thureau 2003)
- Sliding Window (Wilson 2005)
➢ Predictive Algorithm
- Recursive Least Squares (Morel 2000)
- More General Bayesian Techniques (Padilla 1995)

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➤ Our Cambridge Partners