

MODS Mechanical Status I

Tom OBrien

The Ohio State University

Department of Astronomy

MODS Overall Mechanical Progress

MODS Mechanical Work Completed

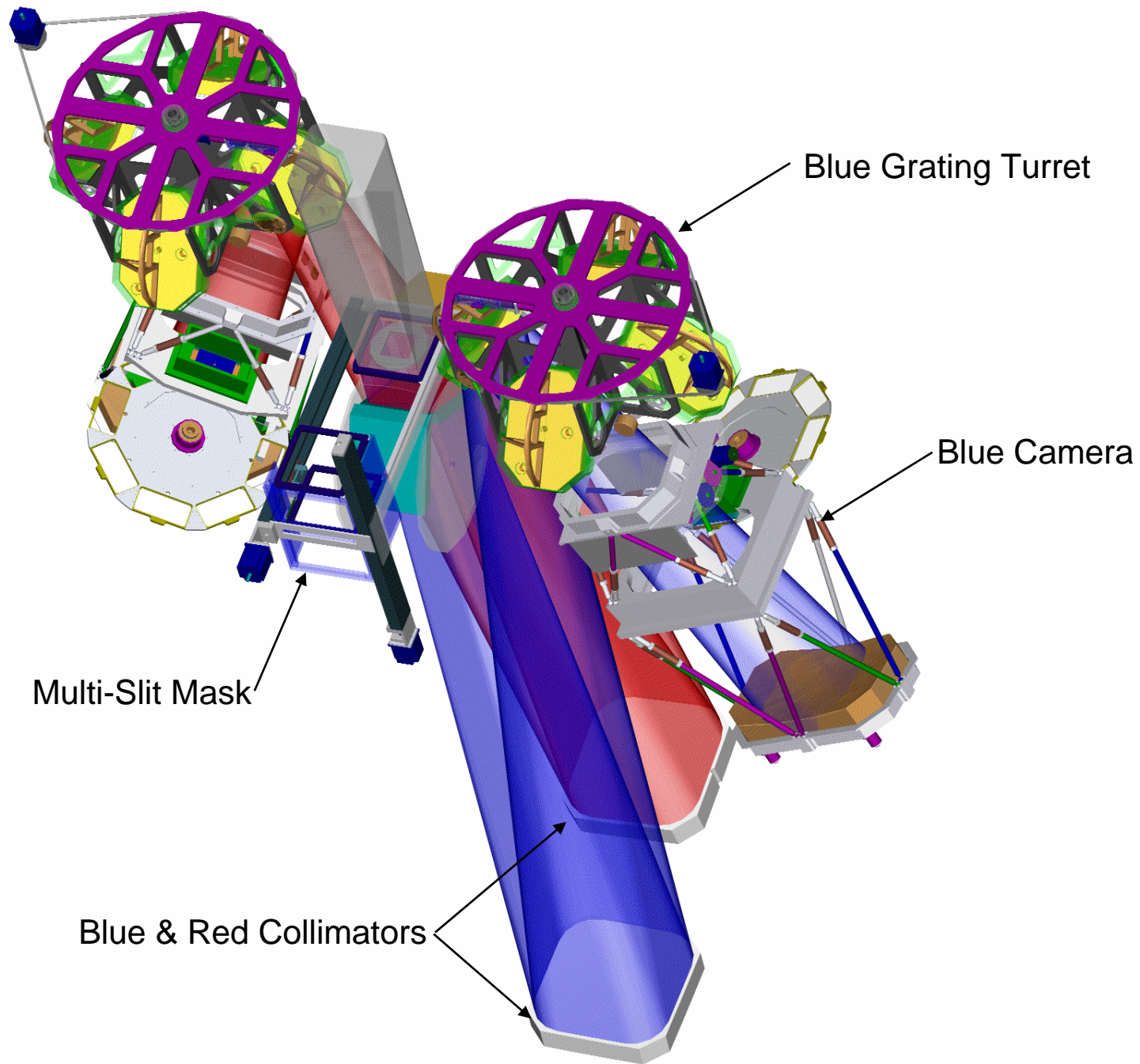
- MODS#1 Structure Completed and Delivered
- All Handling carts & equipment designed, fabricated, & delivered
- All opto-mechanical analyses & optics supports designed
- All mechanisms designed
- Mechanism parts fabrication and component delivery nearly complete
- Preliminary Assembly & Test & Documentation on most mechanisms



MODS Overall Mechanical Progress

MODS Mechanical Work Remaining

- Design and fabrication of Enclosure
- Bond flexures to large optics and install in cells
- Testing of IMCS in MODS
- Mechanism Wiring
- Final Performance testing of mechanics
- Mechanism testing with final electronics and software



Blue Grating Turret

Blue Camera

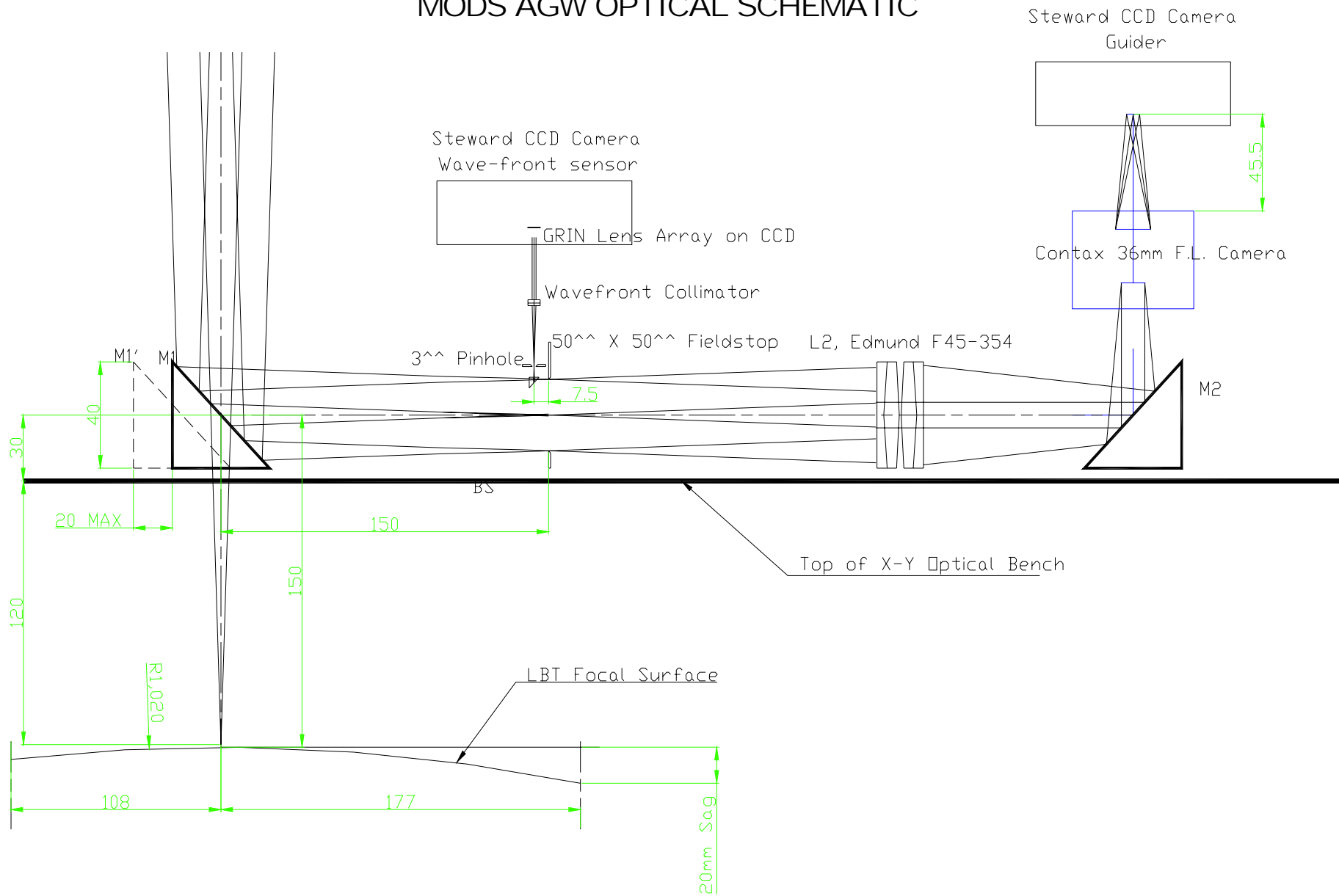
Multi-Slit Mask

Blue & Red Collimators

MODS Mechanical Progress, TPO

- FRONT Acquisition, Guide, & Wavefront
- Multi-Slit Select & Insert
- Collimator Tip/Tilt/Focus
- Cameras
 - Shutter, Filter Wheel, Camera Focus
- Detector Dewar Design
- IMCS (Image Motion Compensation System)
- Instrument Enclosure

MODS AGW OPTICAL SCHEMATIC



MODS Front AGW System

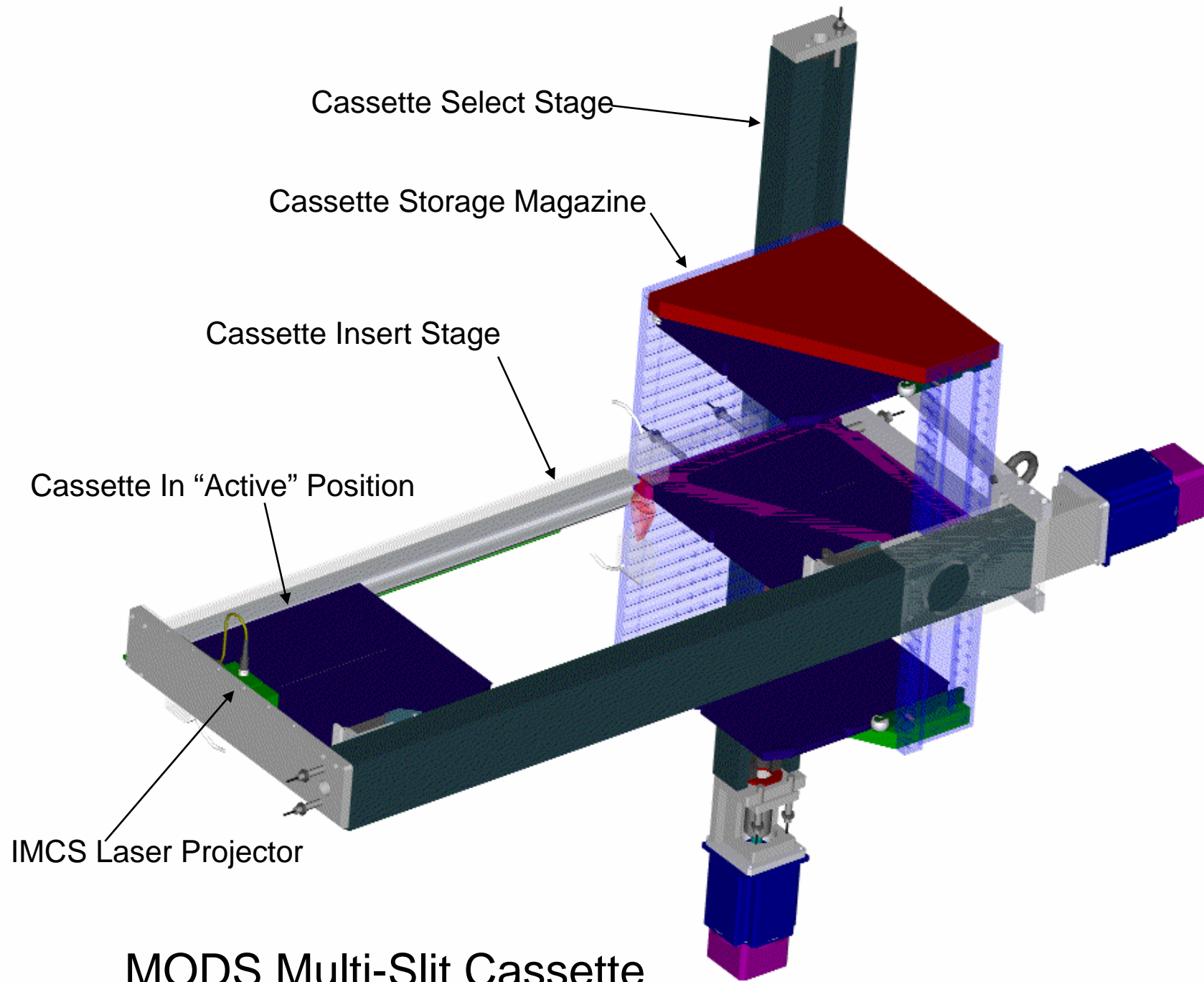
Front AGW Work Completed

- Interface of Front AGW with Red Fold #2, multi-slit mechanism and MODS structure
- X-Y Stage detail design, fabrication
- Layout of Guide and Wavefront optics
- Design of Lens Cells, mirror supports, camera mounts, etc.
- Focus mechanism detail design & fabrication
- Filter wheel (for Guide camera) detail design & fabrication
- Received machined parts & commercial components
- Preliminary Assembly & Test in process
- Designed & built accessories for camera testing

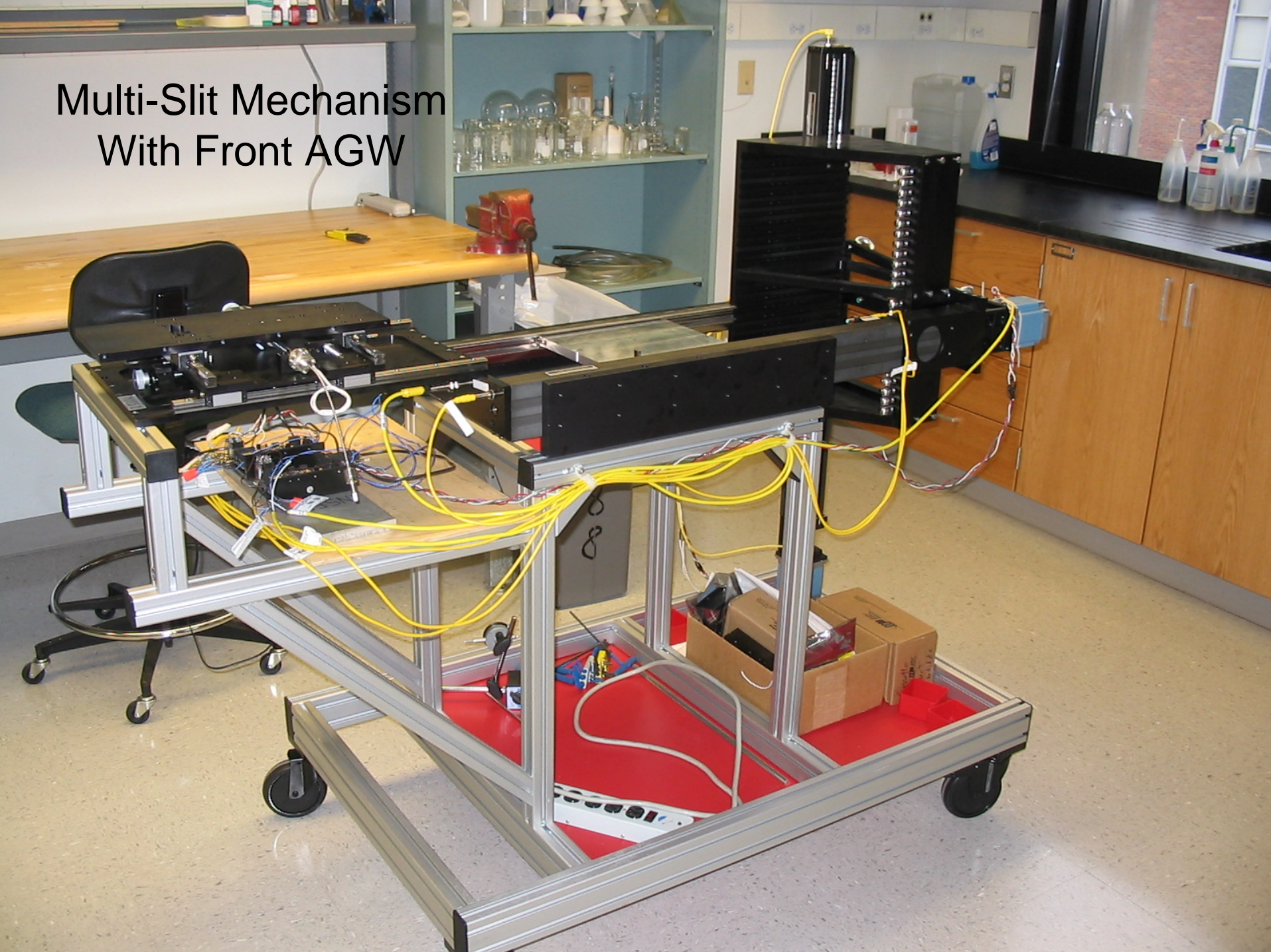
MODS Front AGW System

Front AGW Work Remaining

- Final Performance testing of AGW mechanics
- Mount optics
- Optical testing
- Mechanism Wiring



Multi-Slit Mechanism With Front AGW



MODS Multi-Slit System

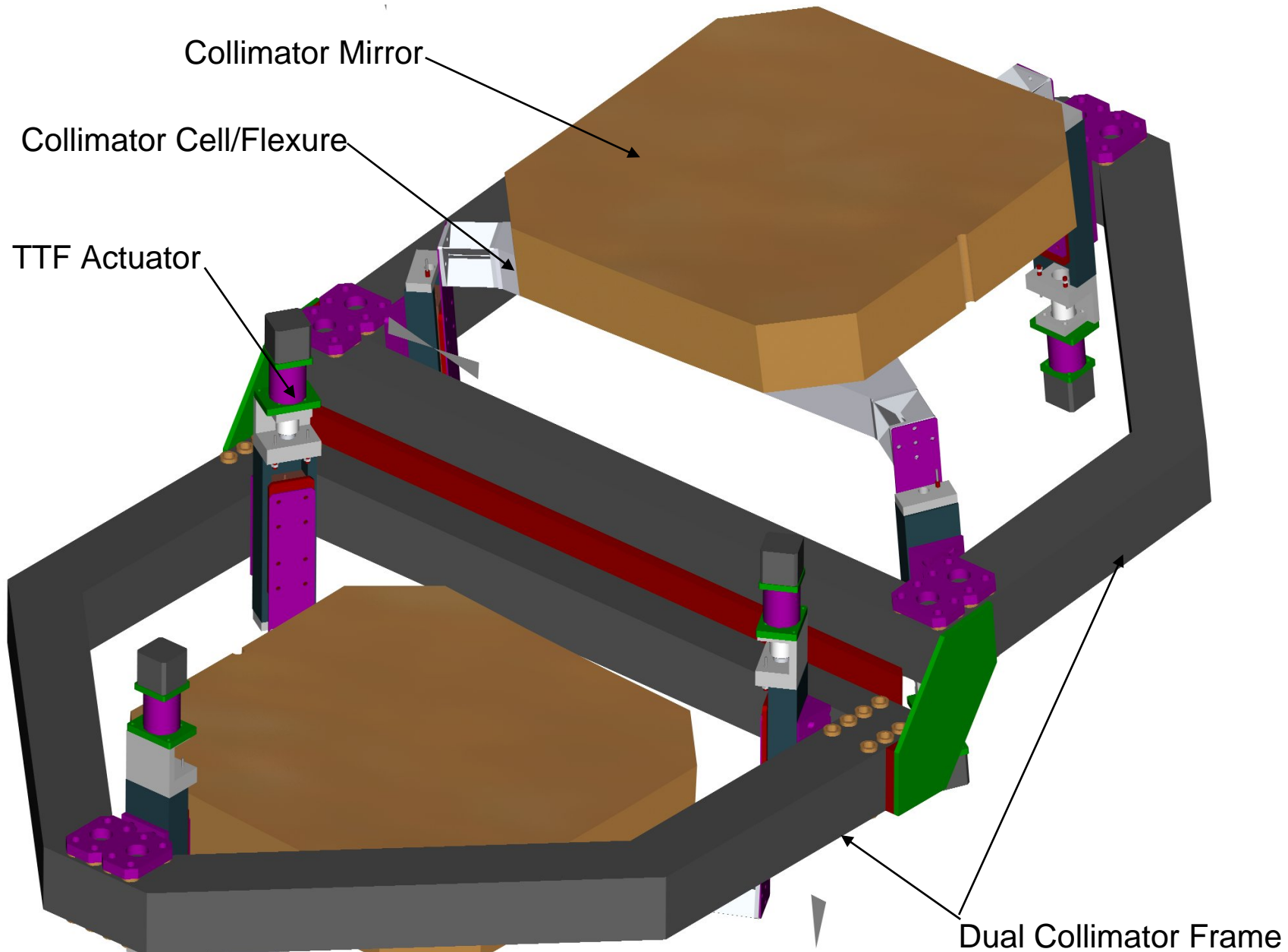
Front Multi-Slit Work Completed

- Detail Design complete
- Received machined parts & commercial components
- Handling cart designed and fabricated
- Preliminary Assembly & Test
- Verified function of cassette frame transfer gadget
- Preliminary integration with Front AGW

MODS Multi-Slit System

Multi-Slit Mechanism Work Remaining

- Final Performance testing of mechanics, including software and hardware interlocks
- Testing in all gravity orientations
- Finalize design of multi-slit masks and mask frames
- Mechanism Wiring



MODS Dual Collimator System

MODS Collimator TTF

Collimator TTF Work Completed

- Received machined parts & commercial components for 12 TTF units
- Fabrication of mirror cells and flexures for MODS1
- Preliminary Assembly & Test
- Performance verified with bench testing, hysteresis, repeatability, etc.
- Tested in IMCS bench experiment
- Designed and ordered collimator mirror covers

MODS Collimator TTF

Collimator TTF Work Remaining

- Assemble 12 copies of mechanism
- Mechanism Wiring
- Red & Blue Collimators need to have flexures epoxy bonded into optics hardpoints

Camera Primary & Focus

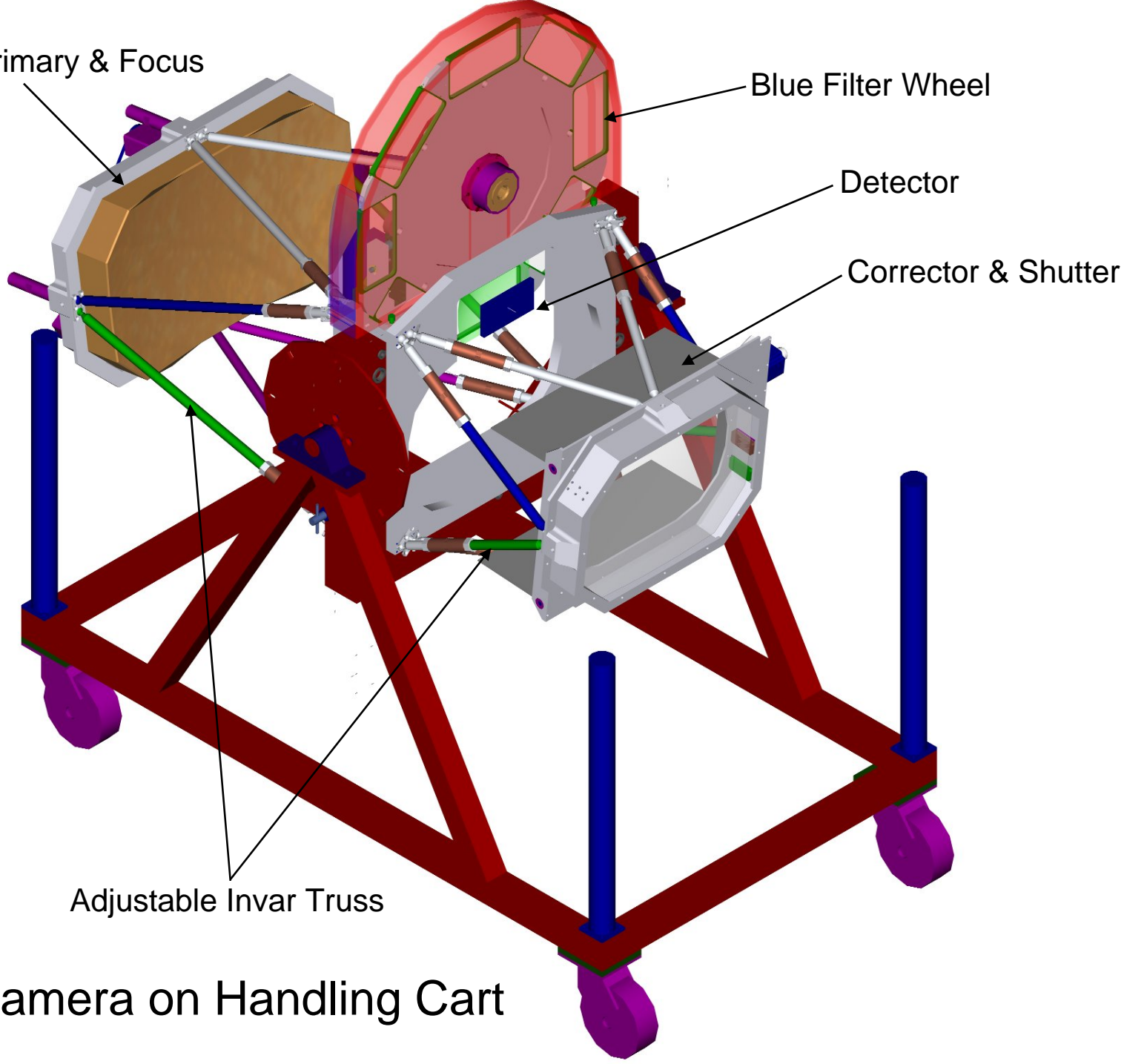
Blue Filter Wheel

Detector

Corrector & Shutter

Adjustable Invar Truss

Blue Camera on Handling Cart



MODS#1 Cameras

Camera Work Completed

- Blue Invar truss assembled
- Blue shutter assembled and integrated
- Blue Filter wheel assembled and integrated
- Blue Camera Focus assembled and tested
- Red camera truss, shutter, filter wheel, and camera focus fabricated but not assembled

MODS#1 Cameras

Camera Work Remaining

- Assemble Red Camera
- Trial mount cameras on MODS structure
- Design & fabricate light tight enclosures
- Mount Optics
- Perform Optical alignment
- Mechanism Wiring

MODS Detector Dewar

MODS Detector Dewar Work Completed

- Envelope for detector Dewar is defined
- Interface of detector Dewar to camera is defined
- Design of Field Flattener Cell is complete

MODS Detector Dewar

MODS Detector Dewar Work Remaining

- Definition of Cooling system
- Design of Cooling system
- Thermal analysis of Dewar & CCD
- Mechanical mounting of 4k x 4k CCD
- Fabrication of 5 dewars for MODS#1 & 2 and Test Dewar

MODS Enclosure

Enclosure Work Completed

- Maximum permitted envelope on LBT is defined
- Preliminary Design Requirements & Specifications document has been circulated

MODS Enclosure

Enclosure Work Remaining

- Develop fabrication concepts for enclosure
- Establish locations of electronics boxes
- Analyze thermal performance
- Detail design enclosure
- Identify suitable vendor for Enclosure fabrication
- Design of External Baffle extension

MODS Image Motion Compensation System (IMCS)

IMCS Work Completed

- Lab experiments completed with good results
- Reference Laser block designed & tested
- Adjustable IMCS Bypass Grating Cell Designed and Fabricated
- Bypass Gratings ordered
- Dichroic transmission 75% at 1.55micron

MODS IMCS

IMCS Work Remaining

- De-commission IMCS lab set-up
- Install IMCS Lasers in Multi-Slit assembly
- Mount mirror on collimator cell with three TTF actuators
- Mount bypass grating to imaging flat & imaging flat onto grating select
- Mount spare camera mirror in Blue camera
- Mount Germanium quad cell in Blue camera
- Test IMCS on MODS structure with variable gravity vector

THANK YOU!