



# MODS Commissioning Plan

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# MODS Commissioning Plan

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Lab Acceptance Testing at OSU

Re-assembly & Testing at LBTO

Integration with the LBT System

MODS+LBT Performance Testing

MODS Science Verification

Commissioning Data Products

Personnel and Time

# Lab Acceptance Testing at OSU

The goal of lab testing is to demonstrate that MODS can perform to specifications as a scientific instrument.

- Specific tests & metrics TBD.
- Part of this testing establishes benchmark performance prior to disassembly & shipping.
- These same tests will be performed at LBT following re-assembly to verify quantitatively that the instrument has been restored to its benchmark "lab acceptance" state.

# Re-Assembly & Testing at LBTO

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Before commissioning, MODS must be

- Reassembled in on Mt. Graham
- Tested to verify that we have returned it to the pre-shipment operational state.
- Once it has passed these tests to the satisfaction of Team MODS and LBTO, commissioning may start.

Requirements:

- Lab space at LBTO to re-assemble & test MODS
- Housing for Team MODS engineering personnel

# Integration with the LBT System

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## Integration of MODS with LBT

- Installation at Gregorian focus (physical interface)
- Install & test power, network, AGW cameras.
- Balancing for rotation and moment.

## Integration of MODS data-taking systems

- Installation of MODS computers (1 rack/MODS)
- Integrate with IIF and AGW systems
- Install public MODS User Interface applications on the observing console computer.

# MODS+LBT Performance Testing

## Quantitative performance testing:

- Imaging and spectral throughput.
- Imaging and photometric quality of direct images.
- Spectrophotometric quality of long-slit spectra.
- Instrument setup & calibration overheads.
- Object acquisition & observing setup overheads (acquire target, setup AGW, focus LBT, etc.)
- Operational stability of the system (flats, lamps, focus, grating tilts, etc.)
- Configuration repeatability (masks, gratings, etc.)

# MODS Science Verification

## Goals: Can MODS acquire scientifically useful

- flat-field and spectral lamp calibrations?
- images (shallow & deep exposures, point-sources & extended sources)?
- long-slit spectra (bright & faint objects, point-sources and extended sources, emission and continuum sources)?
- flux-calibrated spectra (flux standard stars)?
- multi-slit spectra of a representative target field?

# Commissioning Data Products

All MODS calibration and science verification data will become "public" immediately after baseline reduction by Team MODS.

- Calibration Frames (flats, lamp spectra, flux stars)
- Direct Images (photometric & astrometric frames, plus illustrative "pretty pictures").
- Long-Slit Spectra (raw, reduced, extracted)
- Multi-Slit Spectra (raw, reduced, extracted)
- Derived Quantities (sensitivity & noise analyses, stability analyses, etc.)



# Personnel and Time

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Like Integration & Testing, a detailed commissioning team plan is begin developed this year.

- Depends on what version of MODS is delivered.

Will provide estimates of

- Pre-telescope time required
- On-telescope time required
- Number of personnel to be at LBTO at various stages.
- Responsible personnel for various phases.