



## LBT PROJECT 2x8,4m TELESCOPE

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# LBT PROJECT 2 X 8,4m OPTICAL TELESCOPE

## MODS Software Handover

	<b>Signature</b>	<b>Date</b>
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Reviewed		
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## 1. Revision History

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a	3-Oct-2017	First draft	K Summers, LBTO J Mason, OSU
b	6-Mar-2018	Update software manager, IssueTraks	K Summers, LBTO

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### **3. List Of Abbreviations**

AGw	Acquisition, Guide and Wavefront Sensing
CRB	Computer room B at LBTO
FTE	Full Time Employee
ICD	Interface Control Document
IIF	Instrument Interface (TCS subsystem)
IR	Infrared
ISIS	
IMCS	Image Motion Compensation System (MODS subsystem)
KVM	Kernel-based Virtual Machine
LBTO	Large Binocular Telescope Observatory
MODS	Multi-Object Double Spectrograph
MOU	Memorandum of Understanding
OSU	The Ohio State University
PAO	Preliminary Acceptance Ohio
SciOps	LBTO Science Operations group
TCS	Telescope Control System
TTF	Tip/Tilt/Focus
VCAN	LBTO's document repository, Vault

#### **4. About this document**

This document is the software handover document for the MODS instrument software. Included are all known reference materials to be transferred from the MODS (development) team to the LBTO (maintenance) team. Also captured are training needs, action items, and risk for acceptance/handover.

##### **4.1. Purpose**

The purpose of this document is two-fold. The document serves to capture, as best known at the time of handover, all development knowledge (documents, code, tools, training, etc.) for MODS software. The document framework is structured loosely on an idealized software handover model described by a generic model (see reference documents). The coverage of MODS resources, as measured against this more idealized handover framework, helps management assess overall project handover risk, which in turn can then be mitigated through creation of a tailored support MOU with the MODS team.

##### **4.2. Reference Documents**

- [1] Summers, Doug “LBTO Software Handover Process”, May 4, 2016
- [2] Summers, Doug, “Software Handover Process”, MS Power Point, LBTO 2/26/2013
- [3] <http://www.astronomy.ohio-state.edu/MODS/>
- [4] <https://wiki.lbto.org/bin/view/Instrumentation/SciInstrMODS>
- [5] <https://wiki.lbto.org/bin/view/Software/MODSSoftwareHandover>

#### **5. Planning**

The planning task includes functions that are to be performed by both the development team and maintenance team. Some items are to be performed jointly, while others are separate. Items are summarized in the table below. These items have action item status (addressed elsewhere in the doc).

Planning task	<b>Dev. Team</b>	<b>Maint. Team</b>
Assign Resources and FTE levels.	X	X
Identify project documents	X	
Review Documents List (Incomplete or Incorrect items)	X	X
Feedback for corrective actions on documents		X
Create known bug list for discussions	X	
Identify question and training needs	X	X
Factor SciOps/Commissioning bug list for inclusion		X
Create Corrective Action list	X	X

Corrective action work	X	
Agreement for non-critical issues responsibility	X	X
Handover presentation/Review preparation	X	X
Prepare for document and code access/transfer	X	
Prepare LBTO SVN area and document repository		X
Document installation and build procedure	X	
Conducting an installation and build		X
Software User/Maintenance Manual readiness	X	
Review User/Maintenance Manual, conduct run-time exercise		X
Assess risk for input to management/MOU strategy	X	X

### **5.1. Handover Expertise**

Key resources who will be assigned from each team to champion the handover / transition effort are defined in the subparagraphs below. The expected level of FTE allocated to the effort is also provided.

#### **5.1.1. LBTO team personnel**

Kellee Summers will be the primary software contact. Matthieu Bec will review and manage the process. Olga Kuhn may be called upon for input and guidance.

#### **5.1.2. MODS team Personnel**

Rick Pogge and Jerry Mason will be the OSU software contacts.

#### **5.1.3. Third-Party SW Expertise**

A list of contacts which supply third-party software expertise may be required.

Does the MODS development team consider the ISIS server 3<sup>rd</sup> party?

### **6. MODS SW Project Management**

Did the MODS development use a defect tracking system or development status tracking system? Any history here we want to preserve by passing on to the maintenance team?

If not, then this paragraph is N/A.

### **7. Configuration Management**

The development team should explain the MODS documentation and code management systems being used.

The MODS SVN repository will be transitioned entirely to the LBTO SVN system using a batch (tarball) process. The structure of the LBTO SVN repository starting at the MODS top level will mirror the layout of the MODS SVN repository.

The LBTO MODS SVN access instructions can be found on the LBTO wiki:

<https://wiki.lbto.org/bin/view/Software/MODSSoftwareBuild>.

This wiki page will also provide the tagging procedures for MODS software releases after handover.

## 8. Handover Materials / Deliverables

The development team is in the best position to know materials developed in the course of building the instrument and developing the software. All candidate materials should be identified.

### 8.1. Documents

All user manuals, maintenance manuals, or original software requirements documents, should be supplied by the development team.

The list of documents (currently identified by the maintenance team) that are applicable to software handover include:

Document	Type	Version/Date	Status
MODS Software Description Document <i>proposed by RP</i>	Software Architecture, Design	LBTO wiki Software/MODSSoftwareDescriptionDocument	Started on the wiki
MODS Instrument Software Design OSU-MODS-2004-002	Design	1.4 2004 August 25	needs update
MODS Observing Scripts OSU-MODS-2011-002	Script User Guide	1.3.2 2013 January 20	complete
MODS Network Infrastructure Requirements OSU-MODS-2013-004	Installation	1.1.0 2014 April 14	Needs update
MODS LBT Data Dictionary Parameters OSU-MODS-2009-008	Requirements	2.1.3 2014 July 31	?
MODS Instrument Alert Conditions OSU-MODS-2013-006	Requirements	0.1.1 2013 December 30	?
MODS Instrument Manual OSU-MODS-2011-003.	User Guide	2013 January 20	complete
MODS observing procedures, troubleshooting, power-down procedures, etc	Operations Procedures	LBTO wiki Instrumentation/SciInstrMODS	complete
modsShutdown MODS Server Shutdown Script OSU-MODS-2014-001	SW maint doc	1.1.0 2016 November 7	

### 8.2. Source Code

In February, 2015, Ray Gonzalez of OSU populated an LBTO repository with a “mods-2.1.0”, this is a cursory view of that set of code. This does not include any of the tools used on the observing hosts, like Python code modsMask, modsAlign, ...



- The MODS UI code is mostly C and C++ using Qt-4 for the MODS user interface.
- The communication code is C?
- There are tools in Python, perl, ...
- TclTK – IMCS GUIs

<b>modsUI</b>	
imsTool	
item	
lbttes	main program of the LBTO IIF interface
mods	several directories of Qt GUI source code
modsPerl	
Scripts	
Utilities/iifUtils	LBTO IIF interface; Ice implementation
Utilities.isisClient	
Utilities/skyUtils	
<b>mmc_3.0.3</b>	MODS Mechanism Controller server
API	
app	
microlynx	islmlynx exe
mmcServers	
<b>utilities</b>	
ISLUtils	
INSTRUtills	
WAGOUtills	
<b>include</b>	
<b>modsalloc</b>	
<b>modsIIFICE</b>	simulator for IIF?
<b>Config</b>	
<b>Documents</b>	
<b>TclTK</b>	
<b>plc</b>	
<b>Delete the following from LBTO's SVN:</b>	

agw_1.2.0	this is a duplicate of what we have in mods/trunk/agw
ulib	build products
bin	only build products?
obj	build product

### 8.3. Wiki Content

Is there any portion of the MODS documentation which is maintained in an in-house Wiki?

## 9. Host Administration (IT)

### 9.1. Host/OS

The MODS computer infrastructure is described in the *MODS Network Infrastructure Requirements*.

Does MODS use SELinux?

### 9.2. OS Package Configuration

Not every OS package needs to be listed, but atypical, special packages, or particular versions. For instance:

- are any of the machines web servers? requirements for particular Apache?
- samba required?
- we build on these machines so they have to be development environments? gcc, Ice, boost, what else?
- postgresql and mysql are on mods1; is that req'd? what for ?
- particular perl versions?
- python
- IDL?
- java
- minicom
- php

### 9.3. Account Management

Administrator and user names and passwords for MODS computers and KVM has been captured and documented in the password database tool at LBTO. These include the following accounts:

- a. mods user for mods1, mods2, mods1data, mods2data
- b. mods user for the CRB rack 9 KVM

are there other accounts we need? islprog, isluser

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#### **9.4. Network Architecture**

The MODS network architecture is described in the *MODS Network Infrastructure Requirements*, including the MODS VLAN hardware and all IP addresses.

Any details missing from the doc? special switch port assignments? ISIPort, BasePort in modsUI.ini? other ISIS ports?

#### **9.5. System Performance (baseline)**

Is there any special configuration or any restrictions on operating system resources?

#### **9.6. Spares Strategy**

#### **9.7. Required Third Party Products**

The list of third party software products includes...

#### **9.8. Licenses and Maintenance Agreements**

What software licenses and maintenance agreements are needed?

### **10. Application Configuration**

#### **10.1. Environment**

What environment (parameters, scripts, etc.) are necessary to configure the instrument control?

#### **10.2. Periodic procedures**

What periodic procedures or cron tasks does the software or databases depend upon?

-- manual cleanup of FITS files?

### **11. Engineering Tools, Test Procedures, Monitoring Tools**

This would include software that may have been produced during instrument development for laboratory use.

-- sieve snap procedure

-- some tools documented here:

<https://wiki.lbto.org/bin/view/Instrumentation/MODSSupportUtils>.

-- IDL/perl/IRAF/bash scripts

-- peek/poke

-- minicom used for serial devices? something else?

-- cron job currently to trigger temperature alarms to LBTO Alarm Handler

## 12. Outstanding bugs/issues and resolution strategy

The MODS updating TCS DD entries should probably be completed before handover. Wasn't that worked a long time ago?

What other outstanding software tasks should be completed before handover?

As of the March 2018, here are the open MODS ITs that are software related. See <https://wiki/lbto.org/bin/view/Software/MODSSoftwareIssueTrakStatus> for up-to-date information.

IT	Detail	Status
<a href="#">7018</a>	setxy returns bad error number	
<a href="#">6939</a>	synchronous offset timeout problem	binocular issue - solved with sequencer?
<a href="#">6645</a>	guide star on MODS1-Agw fainter than MODS2	at the moment, I don't think we have any ideas here
<a href="#">6570</a>	timeouts, communications glitches or signs of race conditions	<i>mselect busy or already in progress messages</i>
<a href="#">6543</a>	MODS1 Red IMCS lock timing out	problem with zero points? not a problem like 5767, with the laser not coming on
<del><a href="#">6502</a></del>	<del>MODS2R acq images show mask motion</del>	transient issue, closed
<a href="#">6501</a>	modsAlign XPA\$ERROR invalid command name	
<a href="#">6500</a>	MODS1R lagging	RP closed, but has been reopened in Nov-2017
<a href="#">5931</a>	MODS should always send guide star magnitude to GCS	enhancement
<a href="#">5861</a>	MODS1 Red exposure control hung on readout	
<a href="#">5713</a>	MODS Exposure Time Not Updating Between ACQ and OBS scripts	Olga thinks operator error on abort
<a href="#">5395</a>	MODS AGW XY stages reporting incorrect coordinates ?	This is still a problem; see also <a href="#">6541</a>
<del><a href="#">5303</a></del>	<del>Suggested changes/reorganization of MODS image headers</del>	enhancement RP deferred until LBTO FITS spec is updated.
<a href="#">5222</a>	MODS1 Red and Blue exposure controls hung on "Writing image..."	enhancement Need the script engine to catch PI_NAME > 68 characters
<a href="#">5175</a>	MODS2 red IC error state	<i>this is very old and should be closed</i>
<a href="#">5122</a>	MODS1 AGW not where expected	<i>same as 5395 - reporting zero</i>
<a href="#">5087</a>	mods1data froze	
<a href="#">5086</a>	IC program spontaneously quit on MODS1 Red computer M1.RC	<i>probably should be closed - not the computer issue anymore</i>
<a href="#">4814</a>	MODS red channel quadrant 1 readout malfunctioning	<i>should be closed, was fixed by swapping the sequencer board</i>
<a href="#">4716</a>	Vignetting in MODS1 Red Channel	<i>closed, nothing can be done about it</i>
<a href="#">4586</a>	MODS abort or retry causing subsequent script errors	just needs clarification in the troubleshooting notes

The team has decided that the following IssueTraks will be resolved before handover.

Issue Trak	Date	Description	Responsible Team

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### 13. Training

Training described in this section would typically be for questions on design or architecture, algorithmic concepts, or instructions for installing or building the code. It also includes run-time monitoring and debugging, use of engineering tools, test procedures and/or simulation.

#### 13.1. Maintenance Team Training Viewpoint

Below are listed training topics which the maintenance team thinks would be useful. Builds and run-time exercises are excluded here as the maintenance team has demonstrated successful experience conducting these.

##### 13.1.1. Run-time Application Process Dependencies

Details of process hierarchy (order) of starting and stopping all of the MODS software services is available on the LBTO wiki:

<http://wiki.lbto.org/bin/view/Instrumentation/MODSStartUp>

Make sure this is up to date with all the MODS2 info.

##### 13.1.2. Configuration Files

What configuration data is necessary to control the instrument? Maybe these will be part of the Software Description document?

<b>MODS directory on instrument control computer (mods1, mods2)</b>	
agwfilt.tab	AGW filter positions and names
agw.ini	filter positions, focus offsets, SFP/AGW coordinate transform coefficients
bconfig.tab rconfig.tab	TTF zero points for the IMCS
bfilter.tab rfilter.tab	camera filter wheel position, name, focus, description
bgrating.tab rgrating.tab	position, name, description of grating turret
bgrtilt1.tab rgtilt1.tab	low-resolution grating preset tilt table
bgrtilt2.tab rgtilt2.tab	second grating preset tilt table (not used, nothing in this file)
ccdroi.tab	ROI coordinates for the different modes. For example "3Kx3K" is a mode name.
dichroic.tab	position, name, focus, description for the dichroic beam selector drum
dm_blue.ini dm_red.ini	<i>maybe not used?seen in source area, but not in config area</i> dataman client runtime configuration
ieb_B.tab	MicroLYNX controller assignments for all the IEB mechanisms

ieb_R.tab	
iterm.ini	iterm runtime configuration file – ISIS server config, time specifier, etc.
llb.tab	configurable preset power settings for IR and visible lasers
maskSnap.pro	nota config file, but a test script
modsendv.ini	modsendv agent runtime configuration – ISIS server config, WAGO IP addresses
modsUI.ini	UI runtime configuration – ISIS ports, MODS 1 or 2, TCS, instrument systems in use.
newtab.txt	mask table
slitmask.tab	position, name, description for installed masks
<b>IIF directory</b>	
config.client lbtIIF.client lbtSim.client osuLab.client	Ice configuration for instrument proxies.
iifDD.left iifDD.right modsDD.left modsDD.right	TCS data dictionary variable names. The names in the iifDD files are for reading from TCS. Names in the modsDD files are for writing MODS instrument info to TCS.
lbttes.ini	runtime configuration for the lbttes service – ISIS server info, Ice parameters, side, ...
mechanisms.ini	IPs and ports for WAGOs, MicroLynx controllers, shared memory indexes
<b>Data server computer (mods1data, mods2data)</b>	
mNbc_disk1	
mNbc_disk2	
mNrc_disk1	
mNrc_disk2	

### 13.1.3. Spare System test

Should we plan a switch-over test using one of the spare ICs or data computers?

See System Administration below.

### 13.1.4. Monitoring logs, Errors, and Performance

LBTO has some experience with MODS logging on the instrument computers (agw.log, mmc.log, Env log). Do any tools exist for consolidating/grepping the logs?

Although the DOS IC computers are not part of the handover, LBTO needs to know how to find log information on those machines.

Is there any logging for tools run on the obs machines?

### 13.1.5. Post Run Analysis

Is there any analysis/validation software of this type? This might be test software that was used in the laboratory during development to verify proper functioning of the instrument.

### 13.1.6. Engineering Tools

Are there any engineering tools available?

### 13.1.7. Test/Debug procedures and tools

Any advice about debugging techniques specific to MODS software would be valuable. What analysis tools and network analysis tools have the developers used successfully?

### 13.1.8. Offline Data Analysis tools

Are there any data analysis software tools which were designed to diagnose problems with the instrument? These might be programs to calibrate or align the detector or optics or analyze noise, quantum efficiency, detector problems, etc.

## 14. Build Exercise

LBTO needs to be able to build all parts of the MODS software.

A sample build exercise has been done during MODS2 PAO, but not with the latest version of the code. The SW build procedure will be located on the LBTO wiki:

<https://wiki.lbto.org/bin/view/Software/MODSSoftwareBuild>.

## 15. Run-time exercise

A runtime exercise should be done by the maintenance team using a build created by the maintenance team.

## 16. Action Item List

### 16.1. Action Items for the Maintenance Team

Item	Description	Due Date	Complete?
1	Assign Resources and FTE levels.		X
2	Review Documents List (Incomplete or Incorrect items)		X
3	Feedback for corrective actions on documents		
4	Identify question and training needs		
5	Factor SciOps/Commissioning bug list for inclusion		
6	Create Corrective Action list		
7	Agreement for non-critical issues responsibility		
8	Handover presentation/Review preparation		
9	Prepare LBTO SVN area and document repository		X

10	Conduct a build and installation		
11	Review User/Maintenance Manual, conduct run-time exercise		
12	Assess risk for input to management/MOU strategy		

**16.2. Action Items for the Development Team**

Item	Description	Due Date	Complete?
1	Assign Resources and FTE levels.		
2	Identify project documents		
3	Review Documents List (Incomplete or Incorrect items)		
4	Create known bug list for discussions		
5	Identify question and training needs		
6	Create Corrective Action list		
7	Corrective action work		
8	Agreement for non-critical issues responsibility		
9	Handover presentation/Review preparation		
10	Prepare for document and code access/transfer		
11	Document installation and build procedure		
12	Software User/Maintenance Manual readiness		
13	Assess risk for input to management/MOU strategy		

**17. Risk Assessment**



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