MRO FTT/NAS & FLC

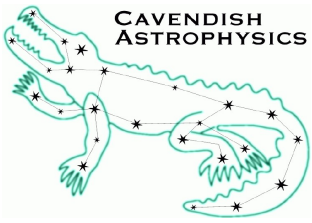
FTT/NAS Interim Preliminary Design Report

MRO-TRE-CAM-1100-0142

The Cambridge FTT Team

rev 0.1

28 February 2012



Cavendish Laboratory
JJ Thomson Avenue
Cambridge CB3 0HE
UK

Change Record

Revision	Date	Author(s)	Changes
0.1	2012-02-28	JSY	Outline

Objective

XXX

Scope

XXX

Reference Documents

RD1 Technical Requirements: Fast Tip-Tilt/Narrow-field Acquisition System (INT-403-ENG-0003) – rev 2.2, May 20th 2010

Applicable Documents

AD1 Design of an MROI System (INT-409-ENG-0020)

Acronyms and Abbreviations

FTT Fast Tip-Tilt

FLC First Light Camera

ICD Interface Control Document

ISS Interferometer Supervisory System

MROI Magdalena Ridge Observatory Interferometer

NAS Narrow-field Acquisition System

NMT New Mexico Tech

TBC To be confirmed

TBD To be determined

Table of Contents

1 Introduction

Outline the components of work that have been carried out in the PDR phase.

Describe what is covered in this report and refer to other review documents.

Refer to top level requirements document and indicate what, if anything, has changed since CoDR.

2 System Overview

Overview of current design of system together with a high-level description and diagram. Paraphrase description of overall concept from CoDR report: acquisition/fast guiding camera in thermal enclosure etc. Overview of general opto-mechanical design approach adopted, e.g. common base-plate, symmetry, non adjustable mounts etc.

Refer to derived requirements document and indicate what, if anything of importance, has changed since CoDR. Explain the meaning of the stability tolerances, i.e. that they are displacements w.r.t. the symmetric expansion of the entire layout.

Outline the major risks and what the tests are addressing.

3 Opto-mechanical tests

3.1 Thermal test facilities

3.1.1 Component tests

Description of test layout and the thermal enclosure including diagram(s) and photograph.

Overview of the types of test that will be conducted with the facility.

List of tests to be conducted.

3.1.2 Integrated test

Description of test layout and the thermal enclosure including diagram(s) and photograph.

Overview of the types of test that will be conducted with the facility.

List of (sub-)tests to be conducted.

3.2 Dichroic/fold mirror mount tilt stability test

3.2.1 Mount design

Brief descriptions of mount as used for dichroic or mirror, with a 3d drawing.

3.2.2 Test

Refer to type of test, the procedure used and present the results with any necessary additional information.

3.2.3 Discussion

Comparison of result with requirements/error budget and what our expectations are, if appropriate.

3.3 Lens mount stability test

3.3.1 Mount design

Brief description of mount, with a 3d drawing.

3.3.2 Test

Refer to type of test, the procedure used and present the results with any necessary additional information.

3.3.3 Discussion

Comparison of result with requirements/error budget and what our expectations are, if appropriate.

3.4 Fold mirror mount piston stability test

3.4.1 Mount design

Refer to dichroic mount section. Emphasise issues to do with piston stability.

3.4.2 Test

Refer to type of test, the procedure used and present the results with any necessary additional information.

3.4.3 Discussion

Comparison of result with requirements/error budget and what our expectations are, if appropriate.

3.5 Camera mount

3.5.1 Mount design

Brief description of mount, with a 3d drawing. Emphasise separation of mount from enclosure structure and the thermal break issues. Emphasise that it is not mounted on same baseplate as other mounts and this places requirements on its thermal performance.

Argument as to why no specific camera mount test is needed.

3.5.2 Test

This subsection N/A?

3.5.3 Discussion

This subsection N/A?

3.6 Common baseplate (integrated) test

Includes any test of the camera mount which is performed as part of the integrated test.

3.6.1 Baseplate design

Brief description of common baseplate and its kinematic mounting arrangement.

3.6.2 Test

Refer to type of test, the procedure used and present the results with any necessary additional information.

3.6.3 Discussion

Comparison of results with requirements/error budget and what our expectations are, if appropriate.

4 EMCCD Camera Performance

Description of final custom clocking scheme.

Test results from our validation of the custom clocking scheme.

5 Camera Enclosure

5.1 Enclosure design

Description of camera enclosure, its relationship to camera mount and emphasise what is different from CoDR design.

5.2 Test results

Brief presentation of any test/simulation results supporting the camera enclosure design.

6 Electronics and services

Overview of electronics rack; differences from CoDR.

Outline of proposed cooling scheme and environmental monitoring and refer to detailed description of algorithms in software report.

Status of interfaces

7 Conclusions

7.1 Optical mount stability

Overview of test results and our expectations to meet requirements

7.2 Closed-loop bandwidth

High level statements about camera and expected system performance.

7.3 Software

Summarize conclusions from separate software report.

7.4 Schedule & prospects

Work flow to end of current funding and beyond.

Statements about costs for major items of the system.

Statement about risks mitigated or remaining.