

# **MRO FTT/NAS & FLC**

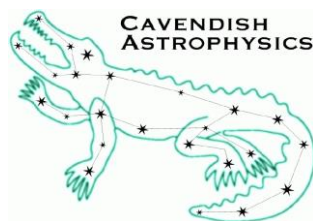
## **FLC/FTT VCMF Install Requirements**

**MRO-PRO-CAM-1100-0183**

**The Cambridge FTT Team**

**rev 1.0**

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## Change Record

Revision	Date	Author(s)	Changes
0.1	2015-09-22	MF	Initial draft content
0.2	2016-05-18	MF	Revision to limit content and refer to specific assembly procedures
1.0	2016-05-26	MF	First release

## Objective

The purpose of this document is to describe the facilities required to operate the FLC and FTT systems at the UTM within the VCMF, making reference to the document describing the assembly and positioning of the First Light Camera version of the Fast Tip Tilt camera system to be placed on the UT Nasmyth table.

## Scope

The document describes the facilities required in the VCMF to operate the FLC (without a camera enclosure) and the FTT when installed with a camera enclosure. It does not describe the assembly and install procedure for the FLC or FTT and assumes that the EMCCD camera provided by MROI is used as the detector.

## Reference Documents

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

RD2 [First Light Camera Description](#) (MRO-TRE-CAM-1200-0181)

## Applicable Documents

See: <http://www.mrao.cam.ac.uk/projects/OAS/pmwiki/pmwiki.php/MROIFastTipTilt/Manuals>

AD1 [First Light Camera Assembly Procedure](#) (MRO-PRO-CAM-1200-0180)

AD2 First Light Camera STEP file

AD3 First Light Camera Drawing Set

AD4 FTT Assembly Procedure (TBR)

AD5 FTT STEP file (TBR)

AD6 FTT Drawing Set (TBR)

AD7 [FTTNAS-EIE Services](#) (MRO-ICD-CAM-1000-0109)

AD8 [FTTNAS-FTTA](#) (MRO-ICD-CAM-1100-0108)

AD9 [Software Release Notes](#) (MRO-MAN-CAM-1160-0163)

AD10 [Software User Manual](#) (MRO-MAN-CAM-1160-016)

## Acronyms and Abbreviations

EMCCD	Electron Multiplied Charge Coupled Device	TBC	To be confirmed
FTT	Fast Tip-Tilt	TBD	To be determined
FLC	First Light Camera	TBR	To be released
MROI	Magdalena Ridge Observatory Interferometer	UT	Unit Telescope
NAS	Narrow-field Acquisition System	VCMF	Visitor Centre & Maintenance Facility
NMT	New Mexico Tech		
SAT	Site Acceptance Test		

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# 1 FLC/FTT Install and Commissioning Requirements

## 1.1 Introduction

This initial set of requirements are those required to install an FLC or FTT system on a telescope located in the Maintenance Facility located on the ridge (known as VCMF – visitor centre and maintenance facility). This is to ensure that all the services and facilities required are provided for initial commissioning of both the FLC/FTT system and the telescope. Requirements are divided into three categories: services, communications and software.

## 1.2 Services required for the FLC (without camera enclosure and electronics chassis)

### 1.2.1 FLC Installation

The FLC system is a simple variant of the FTT system and is used only to test a UT when a full FTT system is not available. The EMCCD camera may be used without an environmental enclosure provided the temperature does not drop below 0°C and the dew point is at least 5°C below the environmental temperature. For details of the FLC and its installation see AD1. Detailed drawings and a STEP file are also available, see AD3 and AD2.

### 1.2.2 Location

The FLC/FTT rack-mount computer cannot be positioned more than 4m to 5m away from the camera mounted on the Nasmyth table. This is because the camera cable length is 6m and cannot be extended. See AD7.

Apart from the camera cable there is the Peltier power supply that plugs into the camera and requires an electrical utility socket within 3m or so, either on the telescope or sufficiently close by.

### 1.2.3 Dry Air

Dry air is not required for operation of the FLC camera without enclosure.

### 1.2.4 Cooling Loop

Cooling is not required for operation of the FLC camera without enclosure.

### 1.2.5 Utility Supplies

Normal utility supplies are expected close to the location designated for the rack holding the FLC/FTT computer (110VAC 60Hz single phase). See also utility supply for the camera Peltier power supply in section 1.2.2.

### 1.2.6 Communications

Local network access is required for the FLC/FTT rack-mount computer and also as a means to get files to a portable PC.

### 1.2.7 Software

Latest release of FLC/FTT software must be installed on the FLC/FTT rack-mount computer. See AD9 and AD10.

## 1.3 Services required for the FTT/FLC with camera enclosure and electronics chassis

### 1.3.1 FLC/FTT Installation

The FLC/FTT system installation is more complicated as it involves environmental control of the

enclosure within which the EMCCD camera operates and this requires fluid cooling and dry air services. Apart from the EMCCD camera cable, dry air, control and sensing cables also run between the camera enclosure location and the FTT electronics chassis located close to the FTT rack mounted computer in the electronics rack. A schematic of the relationship between the camera and its enclosure, the services interface, the electronics chassis, the FTT rack-mounted computer and the Physik Instrumente FTT controller is shown in Figure 1.

### **1.3.2 Location**

The FLC/FTT rack-mount computer cannot be positioned more than 4m to 5m away from the camera mounted on the Nasmyth table. This is because the camera cable length is 6m and cannot be extended. See AD7.

Apart from the camera cable there are other links between the camera enclosure and the electronics chassis which connect via an interface plate at the edge of the Nasmyth table: one cable carrying camera enclosure status, power and control signals, one cable for the Peltier power supply, two dry air pipes (controlled inflow and outflow). Other connections from the camera enclosure are made to a local services interface plate near the Nasmyth table. These are: two coolant pipes (flow and return) which connect to a flow valve and flow meter on the interface plate which in turn are connected to Cooling Loop 2 (not the telescope cooling loop). A cable runs from the coolant flow sensor to the Nasmyth table interface plate and from there to the electronics chassis.

The FLC/FTT rack-mounted computer will need to be within 1m of the AMOS supplied PI Tip-tilt secondary control electronics (as planned in the EIE enclosure rack designation) and will thus require either relocation of the PI controller or that the AMOS rack and FLC/FTT rack be located side by side.

### **1.3.3 Dry Air**

Dry air is not essential for operation but is desirable in order to perform SATs of the FLC/FTT system. The dry air is to be connected to the air regulator, filter and auto-drain mounted on the services panel close to the Nasmyth table and should be provided as specified in AD7. From there the air supply is passed to the FTT electronics chassis where the flow to the camera enclosure and back is controlled and measured.

### **1.3.4 Cooling Loop**

Cooling for the camera enclosure is necessary unless the camera enclosure is left open and the camera fan used to take heat out of the camera itself. What is required is a cooling loop with the specifications of Cooling Loop 2. That is, the cooling loop should track a few degrees below ambient (but not below 0 C) and must not exceed the pressure stated in AD7.

### **1.3.5 Utility Supplies**

Normal utility supplies are expected close to the location designated for the rack holding the FLC/FTT electronics (110-120VAC 60Hz single phase).

## **1.4 Communications**

Local network access is required for the FLC/FTT computer and also as a means to get files to a portable PC.

## **1.5 Software**

Latest release of FLC/FTT software must be installed on the FLC/FTT rack mount computer. A second computer, located in the 'control room' of the VCMF, is also necessary for remote control of the FLC/FTT. The control GUI and analysis GUI components of the software must be installed on the second computer.

## **1.6 Interfaces**

Interfaces between the FLC/FTT system and the EIE supplied enclosure services are detailed in AD7 and those between the electronics chassis and the AMOS supplied PI FTT controller are in AD8.

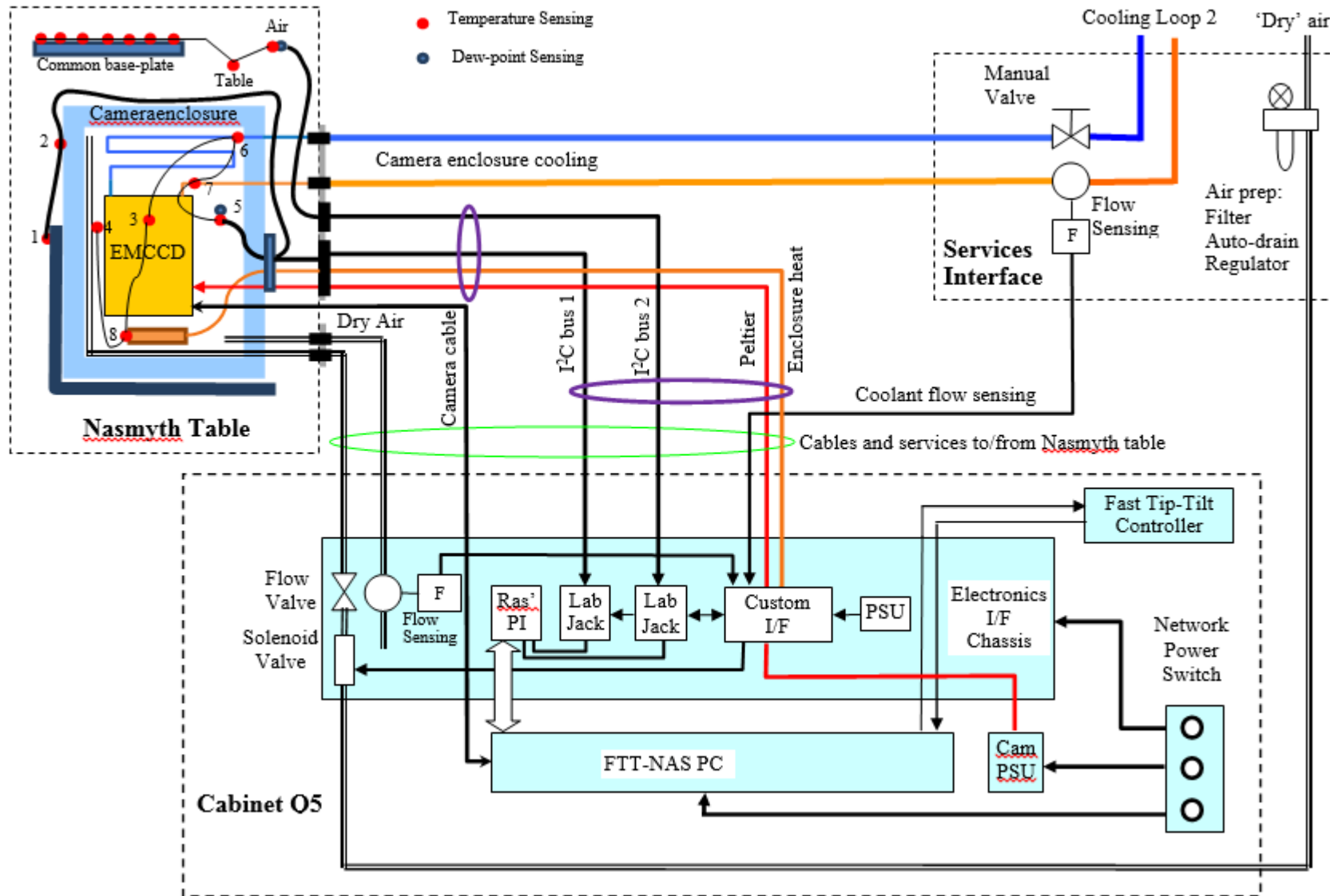


Figure 1 FTT/FLC Electronics and services

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