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Change of Record

Issue Change	Section	Reason for

Contents

Applicable Documents

AD1   SPIRE-RAL-NOT-000622   Telescope Simulator Optical Design,   Issue: 3.0

AD2   SPIRE-RAL-NOT-000734   Set-up and alignment procedure for the Telescope Simulator Imaging Mirror,   Issue: 2.0

AD3   SPIRE-RAL-NOT-001172   Test Facility Control System Requirements,   Draft: 0.4

AD4   SPIRE_RAL_NOT_001710 Motion Controller Software Design Specification

AD5   SPIRE_RAL_NOT_001711 Motion Controller Software Procedures

1 List of Acronyms

AZ	Azimuth
EL	Elevation
DSS	Data Socket Server
FA	Focus Adjustment
FOV	Field of View
GV	Global Variable
MC	Motion Controller
MM4006	Model of Newport Motion Controller
PC	Personal Computer
RAL	Rutherford Appleton Laboratory
SCOS (Space Craft Operating System)	
SPIRE	Spectral and Photometric Imaging Receiver
TBC	To Be Confirmed
TBD	To Be Determined
TFCS	Test Facility Control System
Tel.Sim.	Telescope Simulator Control System
VI	Virtual Instrument
ZOM	Zemax Optical Model

2 Scope of Document

This document specifies the procedures for the running of SPIRE Test Facility Motion Controller Software using its remote interface via the SCOS.

The Motion Controller Software has been developed using Labview 6i™ to comply with the EGSE interface development and includes all the user requirements and software functions that were required to carry out testing.

3 Introduction

The Telescope Simulator Control Software was designed to control the Newport Motion Controller box for automated FOV scan control of the SPIRE Instrument. It was designed in LabVIEW $6i^{TM}$ and interfaces with the Newport unit via an IEEE-GPIB connection.

A Global Variable was created to allow remote access to the Telescope Simulator Software from a PC outside the testing Laboratory.

4 Procedure

1) In the clean room, make sure the Newport Motion Controller box is powered and is turned on with the front panel of the box active, not in Stand-by mode. Axes 1-4 with there current positions should be listed on the Motion Controller's Display screen.

2) If the mains power has been cut off to the Motion Controller and it was not left in Stand-by mode, the port number and communication mode of the box may have reset. These need to be checked. The port should be set to 10 and the communication mode to IEEE. Please contact Marc Ferlet if this occurs.

3) Once the Motion Controller box is powered up and initialised, the Telescope Simulator Control Software needs to be opened on the TFCS PC. The control interface is called Motion Controller Master and can be found in:

   D:/Motion Controller IEEE/Motion Controller Master_ELS

   This folder (D:/Motion Controller IEEE) also contains the library of sub-vi's that are contained within the top level control under Motion Controller_ELS.

4) Once the Front panel of the Telescope Simulator Control Software has launched, check that the correct port number is set on the front panel in the grey box in the top left hand side of the window. It should be set to:

   GPIB0::10::INSTR

5) The Global Variable is located in the (D:/Motion Controller IEEE/Motion Controller_ELS) library folder. Double click on TelSim_Global_ELS.vi to launch the Global Variable.

6) To run the command software, you need to press the grey box with a white arrow in it in the top left hand corner on the LabVIEW task bar on the front panel of the Motion Control Software.

This will command the Newport Motion Controller box into IEEE remote mode and the PC now has full control. This can be checked by looking at the display screen on the front of the Newport unit which should now have a banner across the screen displaying the message "IEEE Remote Mode".

7) The Mode indicator button should read "Local" for the Front panel to have control. Press the "Get Control" button on the Global Variable below the Indicator button which will then place the control of the Newport unit with the Global. It will then read "Remote", this means that the Global Variable has control of the Telescope Simulator, not the front panel.

8) The first command that will need to be sent is the Turn Motor On command. This can be engaged by pushing the "Motor On/Off" button in which should engage the green light on the button. The button should remain down to keep the motor on and if it is lifted, it will turn the motor off. The "Motor On/Off" button must be down for the axes to be moved.

9) To start a set of testing, all axes will probably need to be set in there home positions which has been pre set as zero on every axis. This zero or home for the axes places the test beam at the centre of the field of view of the Photometer of the SPIRE Instrument. The "Move Actuators Home" button will place all the axes in there home positions.

10) To move the 5 axes to a specific position in the field of view of the instrument all that is needed is the (Yesa, Zesa) coordinate position. Input the position required in each box in turn and when you have entered to desired destination, push "Engage YZ". This command will execute a DLL to interpolate through the coordinate tables and place the axes in the correct positions.

11) To send a command to the Newport Motion Controller box which is not hard wired into the Front panel, the Engage Command string can be used. The Newport unit has two character short code for each command which can be sent from this string. Axis numbers and Displacement amounts can also be included in these commands. The procedure for using this function is:

➢ Type the appropriate two character short code into the "Command" string box.

➢ If an axis number is needed, selected the correct one from the "Axes" box and press the "Include Axis Number" button on which the indicating light should turn green. The button should remain down. If no specific axis is needed, then the command will be sent to all axes if it involves motion.

➢ If a displacement in needed, type in the desired value into the "Displacement" box and press the "Include Displacement" button on which the indicating light should turn green. The button should remain down.

➢ Once all the desired parts of the command have been included, press the "Engage Command" button. This will send the command and the green indicator light will light

up, then the "Include Displacement" and "Include Axis Number" buttons should return to there upright positions and the green indicator lights on all the buttons will go out.

➢ The Read Return will only display a message from the Newport unit if the command sent specifically requested it.

➢ See Appendix 1 for a short table of relevant commands but all possible two character short codes can be found in the Newport Motion Controller box manual with full explanations of there uses.

12) Notice the "Requested Positions" and "Actual Positions" tables. These indicate where the actuators where commanded to go in the "Requested Positions" table and reads back from the Newport unit the "Actual Positions" that the axes are located at. This is to compare the axes positions and check they are performing correctly.

13) Once all the desired commands have been executed, it is time to stop the program running. Firstly, the "Motor On/Off" button needs to be pressed again to bring it up so the indicating light goes dark and the motor has been turned off.

14) Then, to stop the program running, the "Port Close" button is pressed. This will cut off communication with the Newport Motion Controller box and this can be checked by observing the Newport unit's display screen which should no longer have the "IEEE Remote Mode" banner across it but now should display Axes 1 to 4 with there respective axis positions.

15) To run the testing sequence again once the "Port Close" has been engaged, return to point 5) of this tech note and Run through the sequence again.

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Technical Note	**Ref:**	SPIRE-RAL-NOT-001712
Telescope Simulator Control System: Beam Steering Software: Procedure: Global Variable	**Issue:**	Draft 1.0
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Appendix 1)

A screen dump of the Global Variable for the Telescope Simulator Control Software.
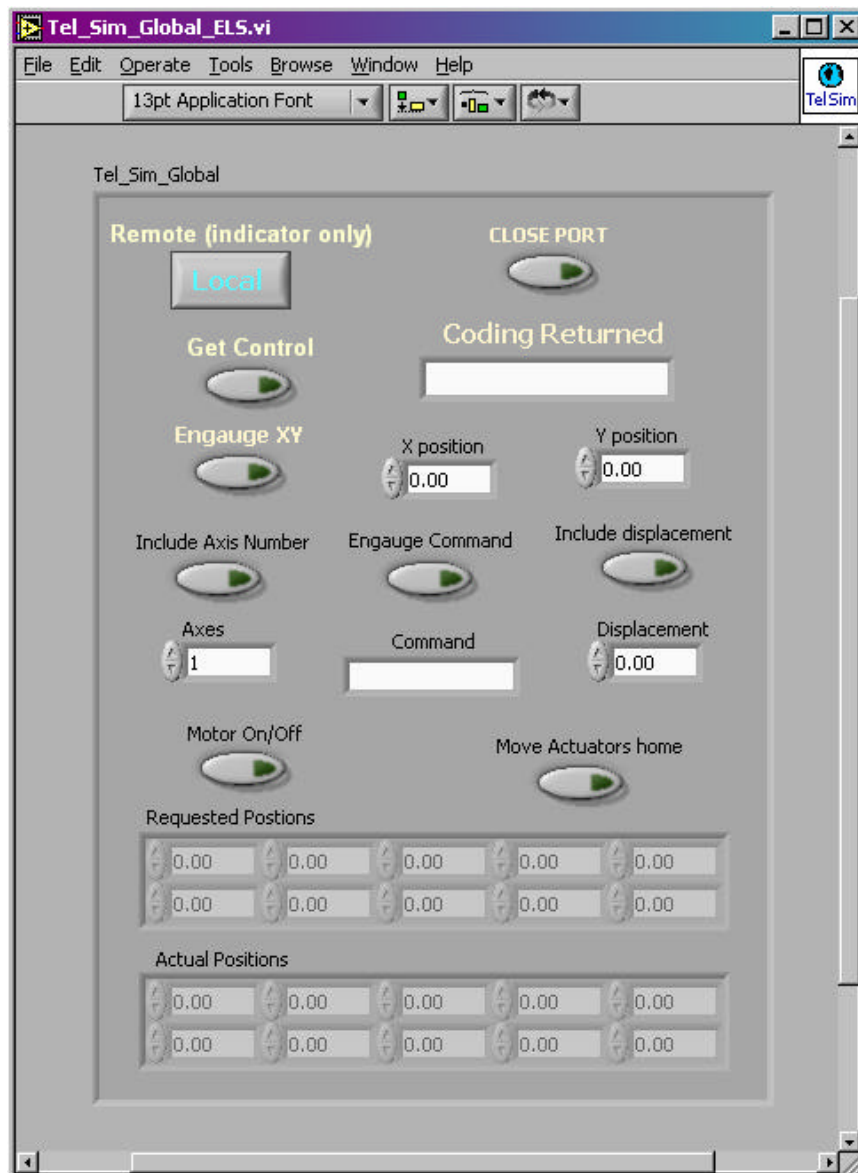
Appendix 2)

Table of two Character short code commands for the Newport Motion Controller box. (A full list of commands is available in the Newport MM4006 Manual)

SPIRE

Technical Note

Telescope Simulator Control System: Beam
Steering Software: Procedure: Global Variable

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Axes number	Short code	Value	Description
	*IDN?		Identity of Controller (should read: MM4006 Newport Motion Controller)
	MF		Motor Off
	MO		Motor On
[xx]	**DH**		Define Home
[xx]	**OR**	[nn]	Search for Home
xx	**PA**	nn	Move to Absolute Position
xx	**PR**	nn	Move to Relative Position
[xx]	**ST**		Stop Motion
[xx]	**ZP**		Zero Position
[xx]	**TP**		Read Actual Position
xx	**TL**		Read Left Travel Limit
xx	**TR**		Read Right Travel Limit
[xx]	**MS**		Read Motor Status
	TS		Read Controller status