Tango based GMRT Control and monitor system (TGC)

Operation Manual

Compiled By: Navanath J. Shinde.

1. Introduction

This document will provide information about configuration of GMRT Subsystems using New TANGO based Next Generation GMRT Monitoring and Control (M&C) System Software developed by TCS and NCRA. Now onward it is formally called the Tango Based **G**MRT **C**ontrol and monitor (**TGC**) system.

1.1. CMC Server Login :-

> ssh -X cmcuser@cmsserver(192.168.70.2)

> *password :* ***.***

> *gui.sh* *****OR*****

> ssh -X cmcuser@cmsserver(192.168.70.2)

> *cd /opt/tangoworkspace/CentralNode/Utility*

> *cd ./gui.sh &*

**** *LOG ON using above login screen*********

*** Workstation 0**

Username : Test_Super_Operator1

Password : ****.***

*** Workstation 1 (Use any one of the workstation out of Six)**

Username : Test_Operator

Password : ****.***

Note : if maximum number of allowed users exceeds then refer Troubleshooting Section, point no 12.0 which is Part of SOP to clear login sessions.

1.2. LMC Login :-

>ssh -X lmcuser@192.168.31.2

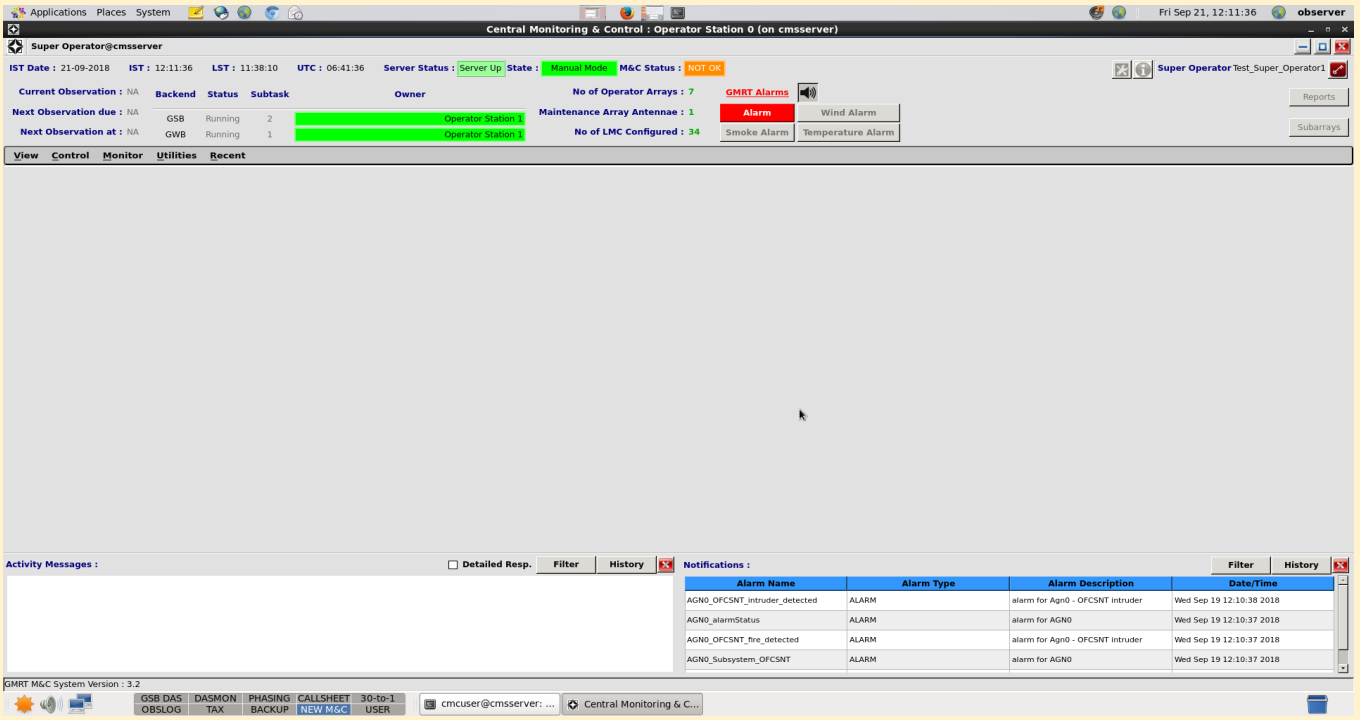
[any of the ip from 192.168.31.2 .... 192.168.60.2]

> **Password** : - ****.***

> /opt/tangoworkspace/ControlNode/Utility/gui.sh

Username : Test_Lmc

Password : ****.***



2. Switching Between ONLINE & TGC

In online USER-terminal, use run files 'ONLCTRL.001' and 'TGCCTRL.001'. please use the following commands to switch between ONLINE and TGC.

2.1 Control Switching ONLINE to TGC System

a. ssh -X observer@shivneri

>***@****

> run tgcctrl

or

> run tgc5ctrl for suba 5.

or

>tgcctrl.sh -m -g -s 4 # for selective system switching

-m MCMControl

-g GABControl

-s <SUBARRAY Number>

b. *> ssh -X lmcuser@192.168.70.21*

> cd /usr/local/gmrtSys

>./mcm_ctrl.sh

usage:->./mcm_ctrl.sh <0 allmcm> <TGC> <space separated antenna list, otherwise all antenna> // antenna names in small letter e.g. c00 c01 and not c0

Notes : 1. This runfile will disable all MCMs, disable online control of the servo, and starts all device-client processes on antenna-base PC. It loads GAB TGC-firmware (In this case 'gabs' ondisp window will show disconnected status). To monitor servo window, issue 'enasrv' command in online-terminal

2.2 Control Switching TGC to ONLINE System

>run onlctrl

or

>run onl1ctrl for suba 1.

>onlctrl.sh -m -g -s 4 # for selective control switching

-m MCMControl

-g GABControl

-s <Subarray Number>

Notes :- This runfile will stop all TGC mcm-deviceclients running on individual antennaPCs, and load GAB-Online firmware (Check 'gabs' window in ondisplay.5).Also, it aborts the ongoing tracking for given antenna.

e.g >ssh -X lmcuser@192.168.70.21 (ngmnc)

> ssh -X lmcuser@192.168.70.21

> cd /usr/local/gmrtSys

>./mcm_ctrl.sh

usage:->./mcm_ctrl.sh <0 allmcm> <ONL> <space separated antenna list, otherwise all antenna> // antenna names in small letter e.g. c00 c01 and not c0

3.Antennas Array Configuration

3.1 How to Allocate Antenna in Separate AGN (Array) :-

Step 1. Open another terminal and login on cmcserver using cmcuser

> ssh -Y cmcuser@cmsserver // gmrt.123 is password

> Password : ****.***

> /opt/tangoworkspace/CentralNode/Utility/gui.sh &

*** OR **

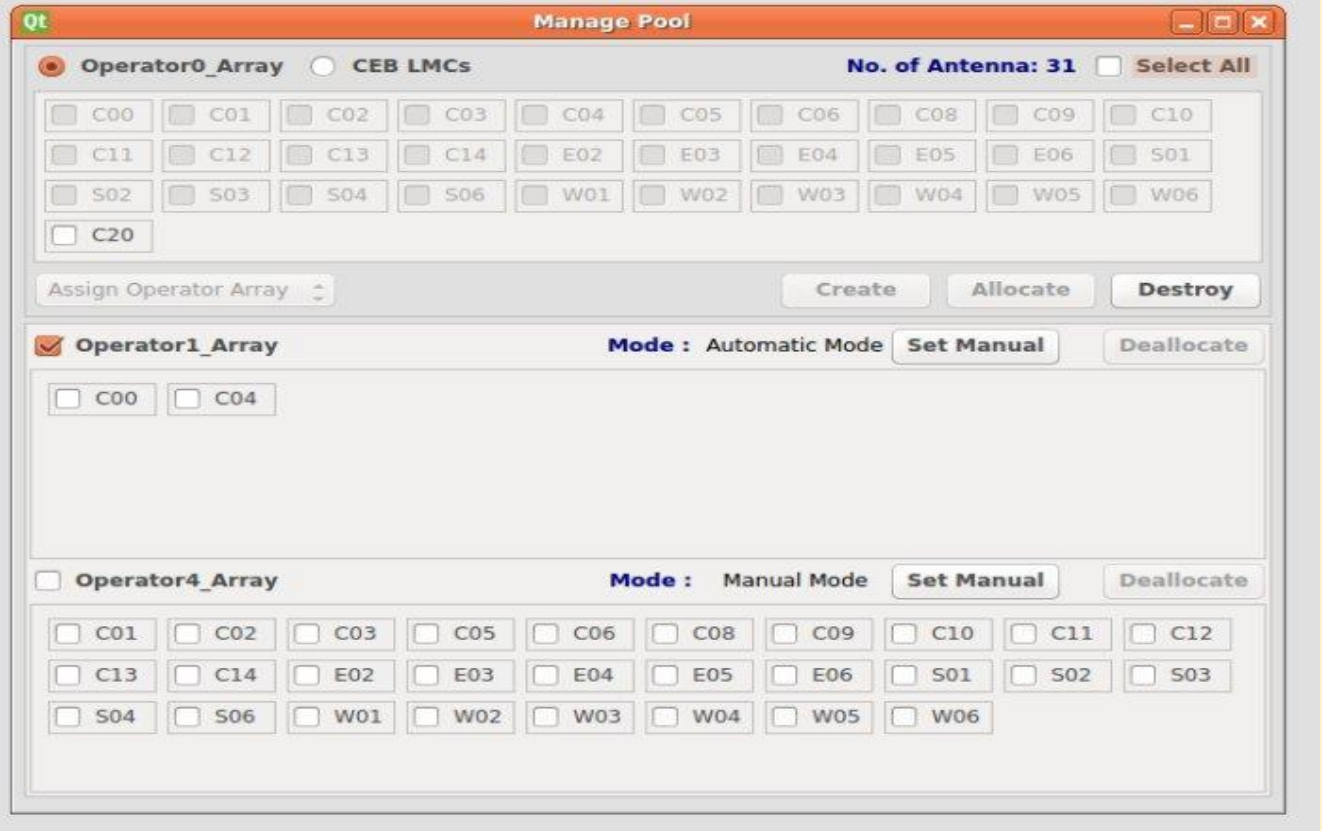
Step 1. Open one more GUI on any one of the client pc in the control room where the New M&C Environment of GUI is set. (tgcserver3 or tgcservr4)

> /opt/tangoworkspace/CentralNode/Utility/gui.sh &

Step 2. Select Operator0 workstation to login as “Test_Super_Operator" using root password

Step 3 . To Allocate required antenna in two separate subarray(AGNs) that is in to any one of the AGN/Array i.e. (1 to 5)

Go To TGC GUI ⇨ Select “**Control”** Menu ⇨ Select “**Manage_pool**” Tab



Step 4. Select require antennas in any one or more subarrays and Click **Allocate** Button.

Step 5. Now You need to Open one more GUI for that Open another terminal and login on cmcserver using cmcuser

> ssh -Y cmcuser@cmsserver

> Password : ****.***

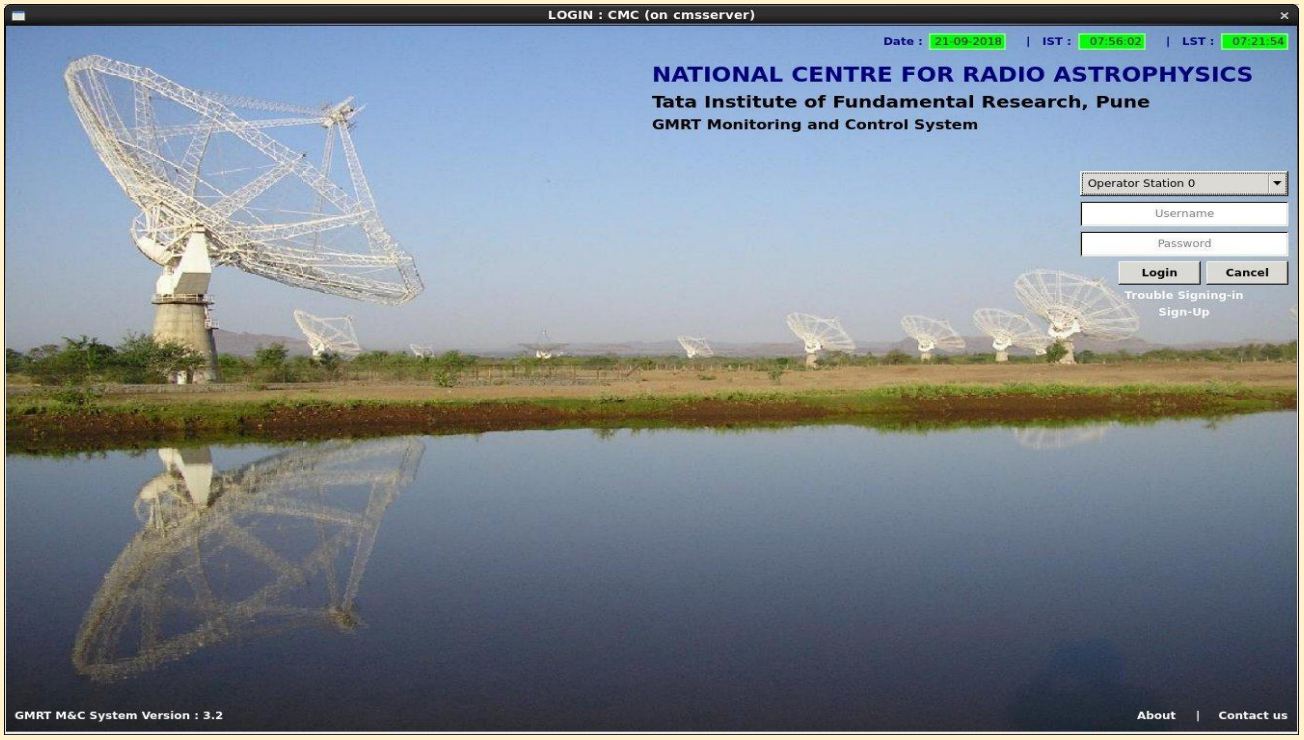
> /opt/tangoworkspace/CentralNode/Utility/gui.sh

******OR******

Step 6 : Open one more GUI on any one of the client pcs in control room where the New M&C Environment of GUI is set.

> /opt/tangoworkspace/CentralNode/Utility/gui.sh &

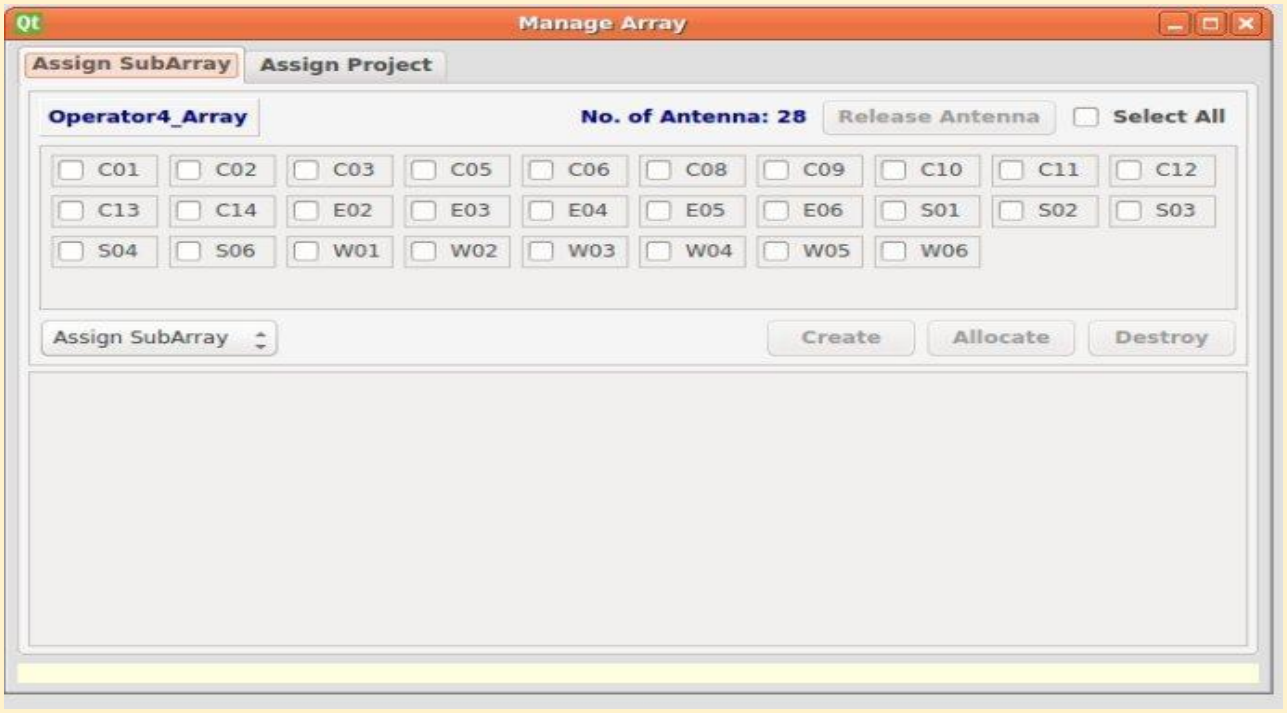
Here is the login Screen to Select Any one of workstations (1 to 6) Except Workstation 0 to login as “Test_Operator” using it's password



Note : Login to the Respective Workstation where the Superoprator has Given Antenna Access. For Example. Suppose the Super Operator defined Antenna in the AGN4 then use Workstation 4 to take control As Test Operator using Following Steps.

Step 7. To Accept required antenna in AGN that is in any one of the AGN from 1 to 5.

Go To M&C GUI ⇨ Select "**Control**" Menu ⇨ Select " **Manage Array**" Tab



Step 8. Select require antennas in any one or more subarrays and Click **Allocate** Button.

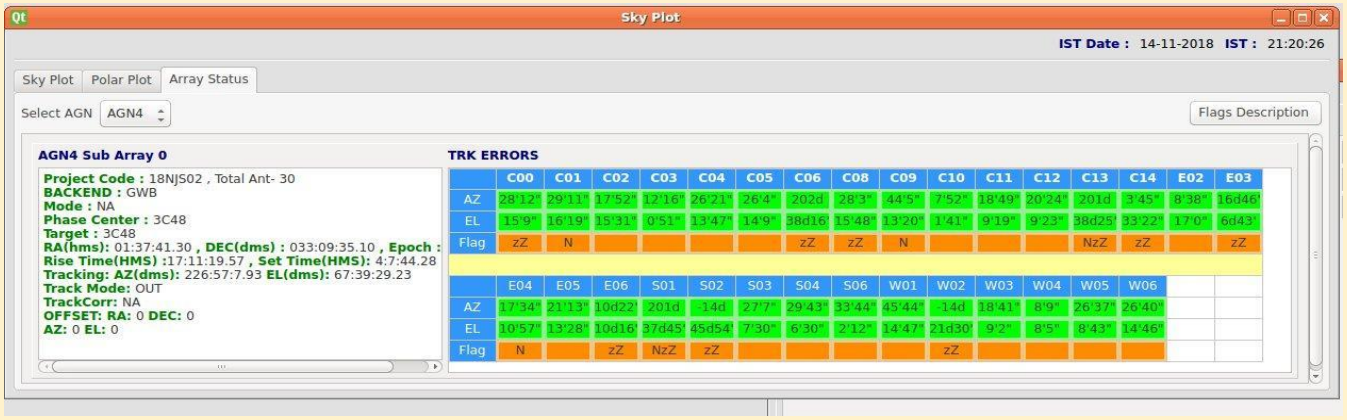
3.2 Resource Allocation to AGN (Array)

Go To M&C GUI ⇨ Select "**Control**" Menu ⇨ Select " **Manage Pool**" Tab **CEB LMC's"** ⇨ Select "**GSB/GWB/GAB**" ⇨ Select " **operator2_Array**" Tab and Click ⇨ **Create/Allocate/Destroy** button as per requirement of **add,update or Release**

3.3 How to Monitor Antenna Array Status :-

Go To TGC GUI ⇨ Select "**View** " Menu ⇨ Select " Sky Plot " Submenu

1. Click on "Array Status" tab.
2. Select Respective AGN to Check Allocated Antenna Status in different Sub arrays from drop down list of AGNs.



4. Antenna Array Tracking & Monitoring

4.1 How to manage Antenna source catalog.

Go To **TGC** GUI ⇨ Select "**Control**" Menu ⇨ Select " **Operation Control**" Sub menu

A. Manage :

1. **To Upload New Catalog**
   a. Use the browse button to add required Name of the Catalog of it's absolute path

   /opt/tangoworkspace/CentralNode/Configuration/CsvFiles/Catalogs/src_list.csv

   b. Click on Upload Button.
   c. Please select type of the catalog by clicking on type1 or type **2** and User Catalog or GMRT Catalog.
2. **Use Catalog.**

   To Use Newly added catalog Click on Click Box of Respective Catalog Name anand press the Use catlog button.
3. **Remove Catalog**

   To Remove catalog from Use select to name of catalog which you don't want to use press Remove Catalog Button.

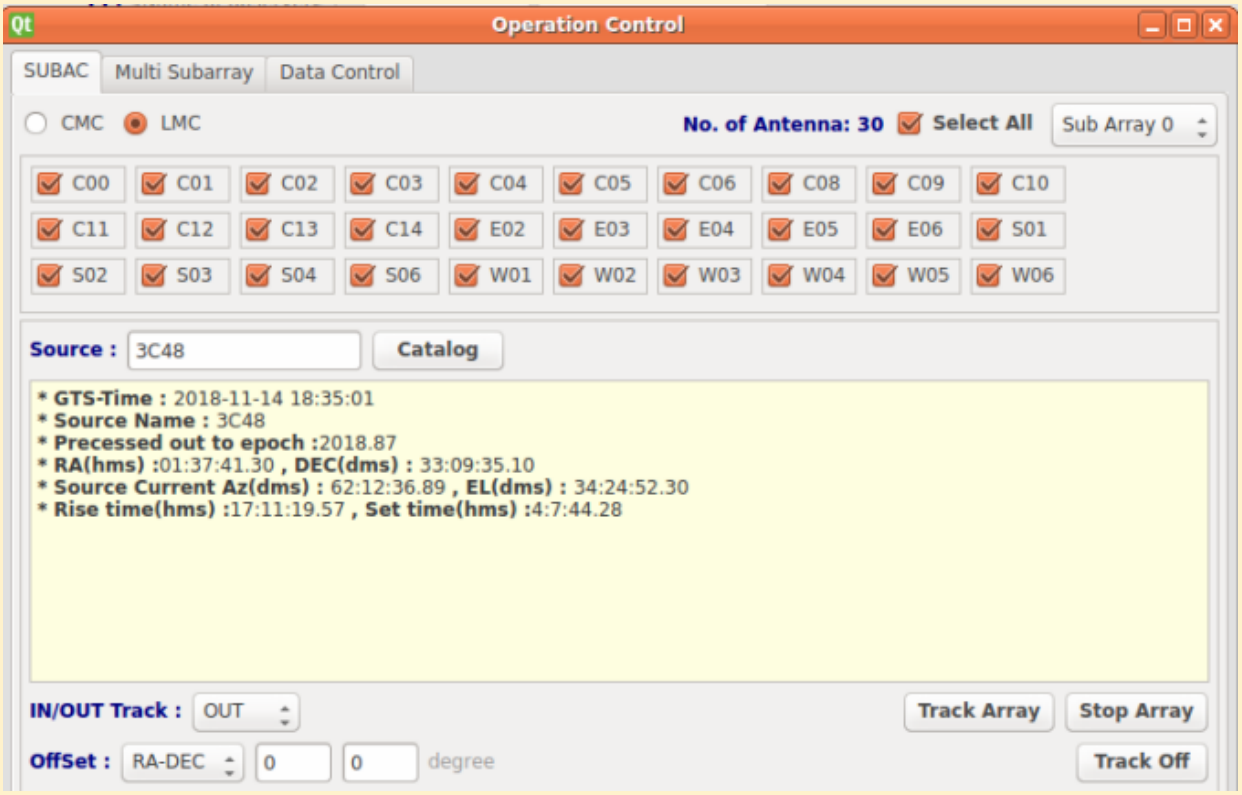
   Note : only Those catalogs can be removed which are being added by user(owner) and not in use.

4.2 How to Send Antenna Array on Source.

Go To **TGC** GUI ⇨ Select "**Control**" Menu ⇨ Select " **Operation Control**" Sub menu

1. In Operation Control Window Click on "**SUBAC**" tab.
2. Select "**LMC**" Radio Button.
3. To Select **No. of Antenna** Use Check Boxes for individual antenna or use the Select **All** Checkbox

4. Use Drop down box to Select Sub Array 0. (Subarray wise Selection)
5. Type Source name in **"Input Box"** and Press the Enter Key. **Example** : 3C48 **Enter**
6. Click on "**Catalog Button"** to Add,Remove,Edit or Update Source List and Source Parameters.



7. Select Track "**IN**" or "**OUT**" and Click on "**Track Array**" Button.

4.1 How to Monitor Antenna Tracking Status :-

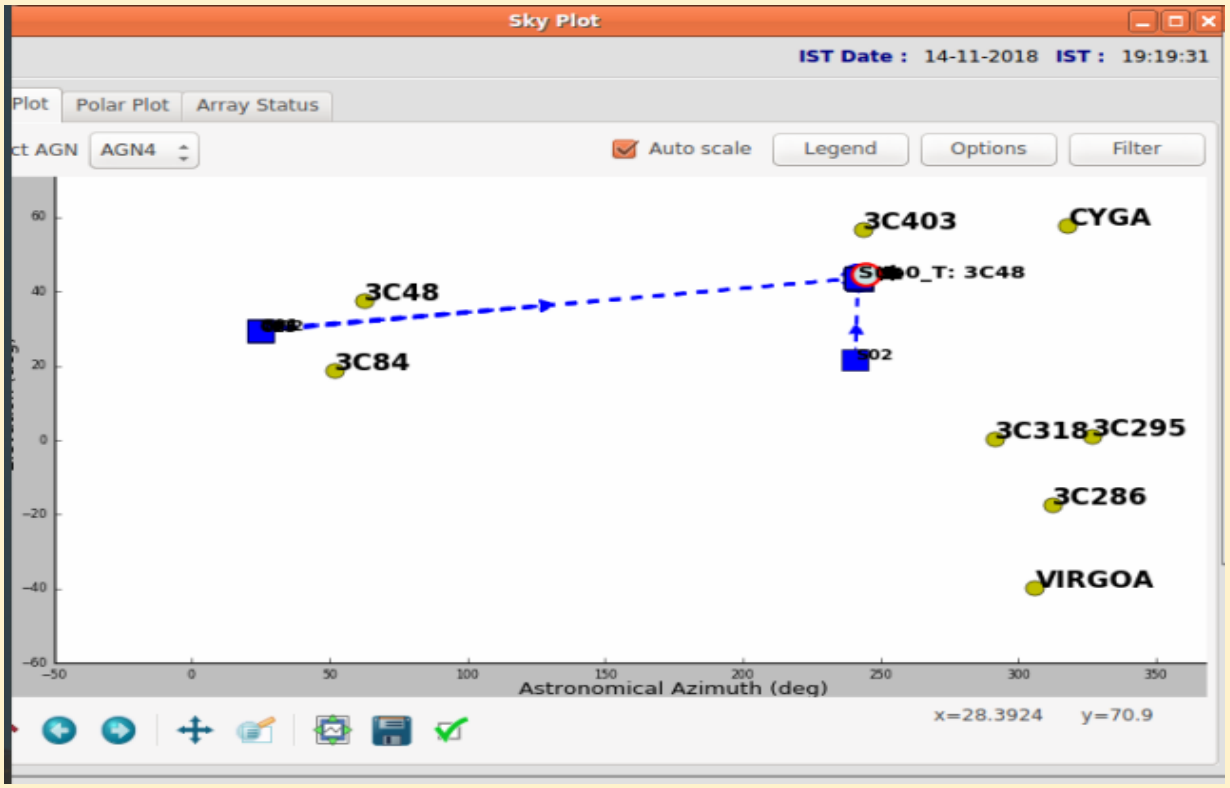
a) Skyplot :-

Go To TGC GUI ⇨ Select "View " Menu ⇨ Select " Skyplot" Submenu

1. Click on "**Skyplot**" tab.
2. Select Respective **AGN** to Check Antenna tracking to Astronomical Source for all Sub arrays by selecting drop down list of required AGNs.
3. Use Filter button

4. Click on Auto Scale Checkbox.

5. Use Option button.

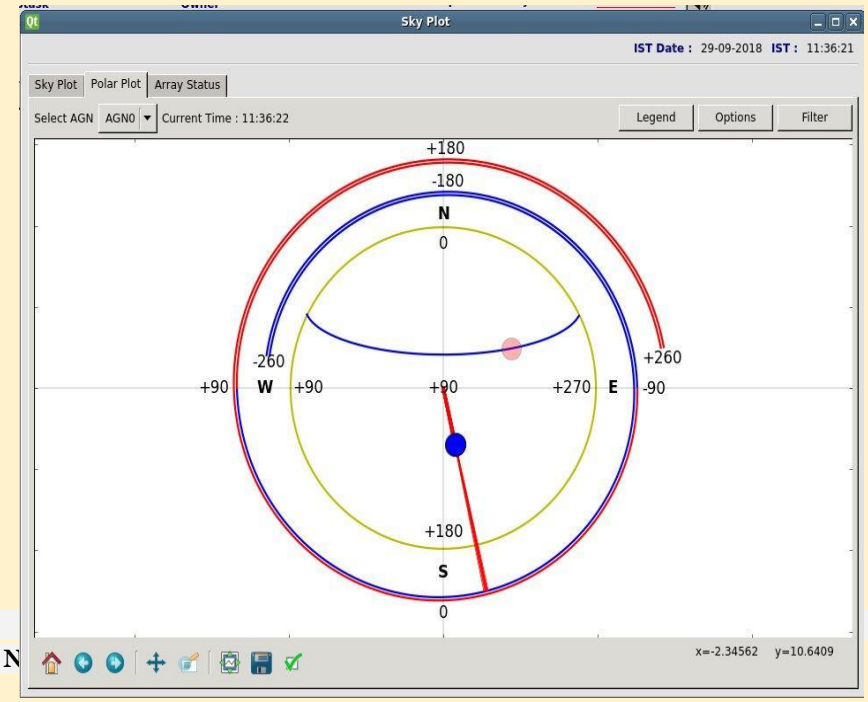


b) Polar plot :-

Go To TGC GUI ⇨ Select "**View**" Menu ⇨ Select " **Skyplot**" Submenu

1. Click on "**Polar Plot**" tab.

2. Select Respective AGN to Monitor Antenna Polar Status in different Sub arrays from drop down list of AGNs.



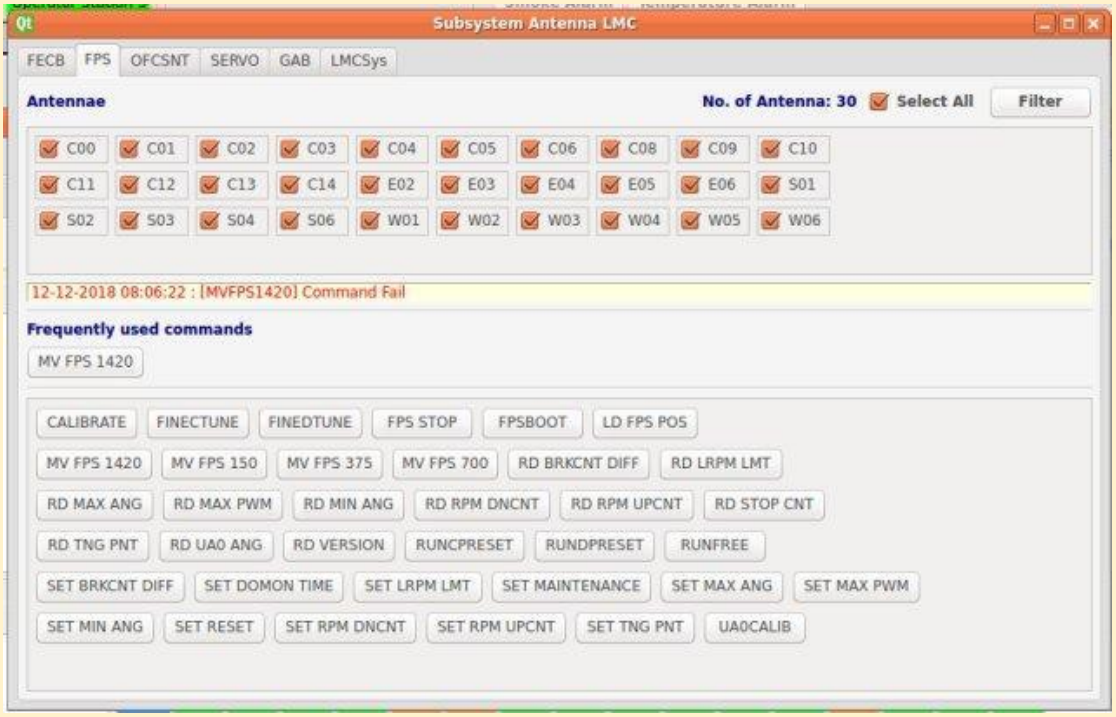
5. Antenna Sub System Configuration

5.1 Feed Position System Configuration

Go To **TGC GUI** ⇨ Select "**Control**" Menu ⇨ Select "**Sub-System**" SubMenu

Select "**Antenna-LMC**" ⇨ Click on "**FPS**" tab ⇨ "**Select all**" antenna from

label Click Box / Use Filter ⇨ Click on button from list of **FPS** Commands.



a) Load FPS Counts

1. on lmcuser@192.168.70.21

   > /usr/local/gmrtSys/fpscopyload.py

2. In tgc GUI Control-> SystemVariable-> FPS Load-- this will upload the latest FPS Count file.

   > Click on 'Apply' (Don't need to save this file..)

3. TGC-GUI - Select FPS system and issue "ldfpspos" command without any argument.

4. TGC-GUI - Select FPS

   >initfps 0

>mvfps 1420, 150, 700, 325

In case of feed rotation problem is there --

* Select sigcon system -- issue rebootfps command

* Select FPS system -- issue FPSBOOT, Calibrate command

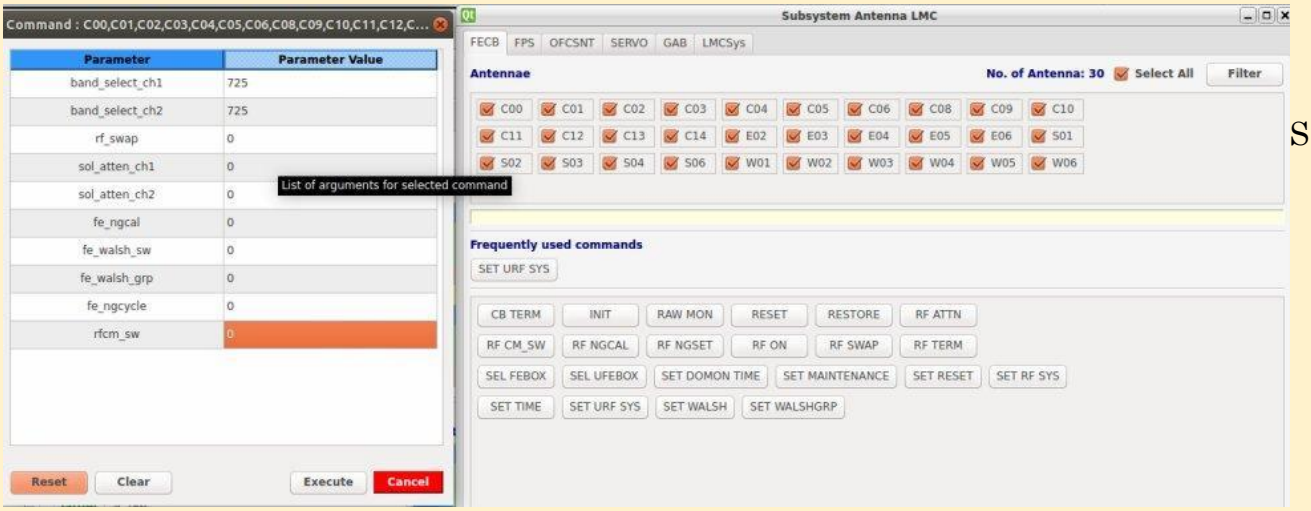
Rotate Feed at 1420, 150, 700, 375

5.2 FrontEnd Settings

GoTo **TGC GUI** ⇨ Select "**Control**" Menu ⇨ Select " **Sub-System**" SubMenu

Select "**Antenna-LMC**" ⇨ Click on "**FECB**" tab ⇨ "**Select all**" antenna from

Click Box/Use Filter ⇨ Select "**SET URF_SYS**" Cmd with input Parameters.



> SET URF_SYS 725 725 0 0 0 0 0 0 0 0

Parameters	Band 2(130-230)	Band 3(250-500)	Band 4(550-900)	Band 5(1000-1450)
Band Select ch1	150	470	725	1420
Band Select ch2	150	470	725	1420
Rf_swap	0	0	0	0
sol_atten_ch1	14	0	0	0
sol_atten_ch2	14	0	0	0
fe_ngcal	0	0	0	0
fe_walsh_sw	0	0	0	0
fo_walsh_grp	0	0	0	0
fe_ngcycle	0	0	0	0

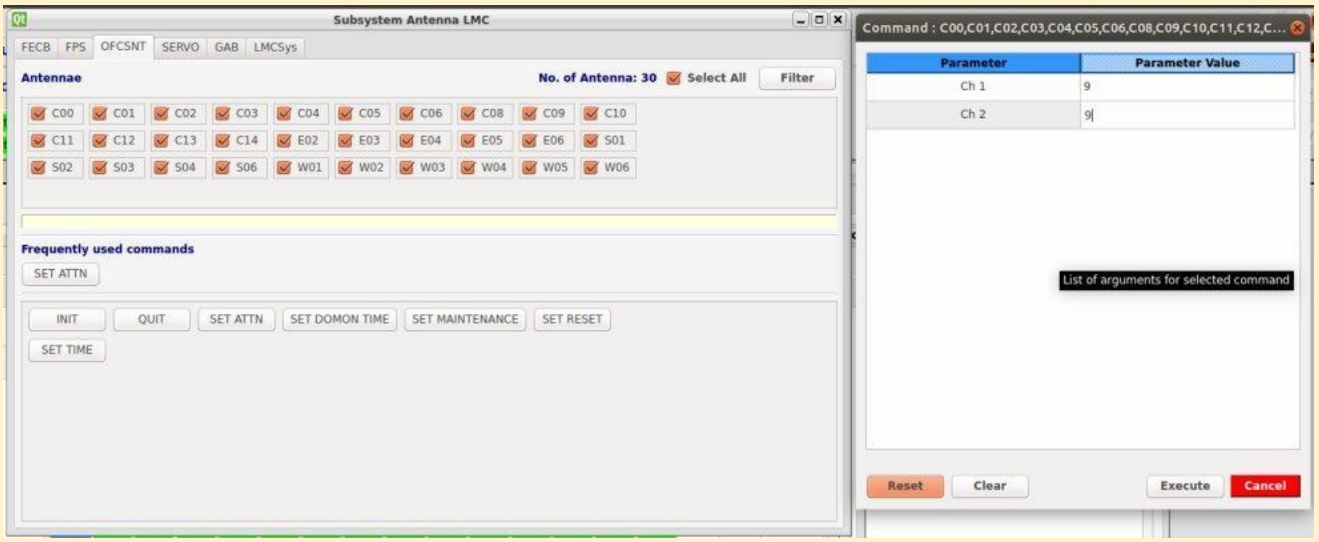
rfcm_sw	0	0	0	0

5.3 Fiber Optics Settings

Go To **TGC GUI** ⇨ Select "**Control**" Menu ⇨ Select "**Sub-System**" Submenu

Select "**Antenna-LMC**" ⇨ Click on "**OFCSNT**" tab ⇨ " **Select all**" antenna from

Click Box/Use Filter ⇨ Select "**SET ATTN**" Cmd with input Parameters.



> command : SET ATTN

5.4 Analog Back End Settings(GAB)

GoTo **TGCGUI** ⇨ Select "Control" Menu ⇨ Select "Sub-System"Submenu

Select "Antenna-LMC" ⇨ Click on "GAB" tab ⇨ "Select all" antenna from

Click Box/Use Filter ⇨ Select "SET GAB CONF" Cmd with its input value.

GAB Parameters	Band 2(130-230)	Band 3(250-500)	Band 4(550-900)	Band 5(1000-1450)
Lo Freq Ch1	300	500	550/750/950	1060/1260/1460
Lo Freq Ch1	300	500	550/750/950	1060/1260/1460
Attn Ch1	12	12	12	12
Attn Ch2	12	12	12	12

I/p Mode1 Ch1	0	0	0	0
I/p Mode1 Ch1	0	0	0	0
Mixer. Path ch1	0	0	0	0
Mixer. Path ch2	0	0	0	0
I/p Mode2 ch1	0	0	0	0
I/p Mode2 ch2	0	0	0	0
Filter RF ch1	7	6	3	1
Filter RF ch2	7	6	3	[1]1
LPF Freq Ch1	100/200	100/200/400	100/200/400	100/200/400

5.5 IFLO(SIGCON) Settings

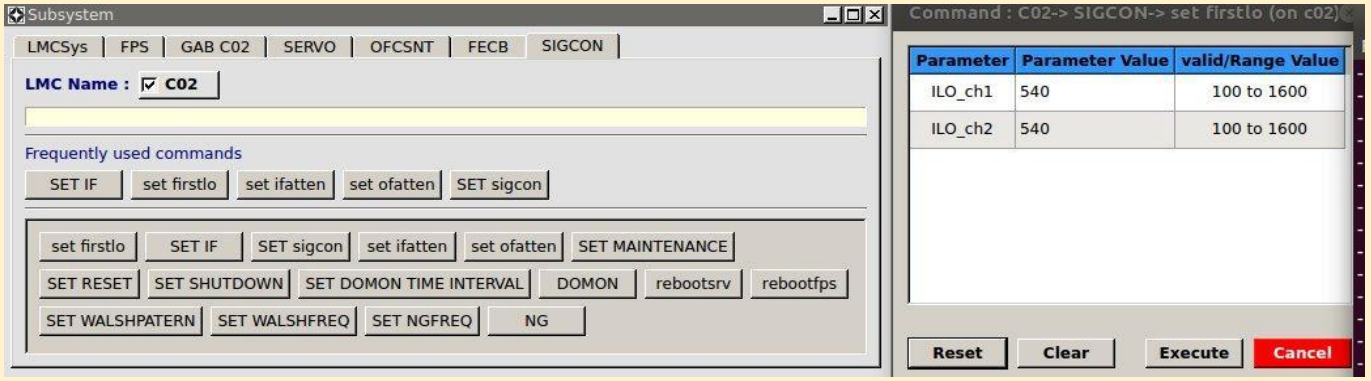
Go To TGC GUI ⇨ Select “Control” Menu ⇨ elect “Sub-System”Submenu

Select “Antenna-LMC” ⇨ Click on “SIGCON” ⇨ ab “Select all” antenna

Click Box/Use Filter ⇨ Select “ required IFLO” Cmds with its input value.

1. **First Local Oscillation (LO1) Settings :**

Using this “**Set firstlo”** signal conditioning command, **s**et First Local Oscillator (LO1) In step of 1 Mhz upto 600 MHz and In step of 5 Mhz above 600 MHz upto 1600 MHz.

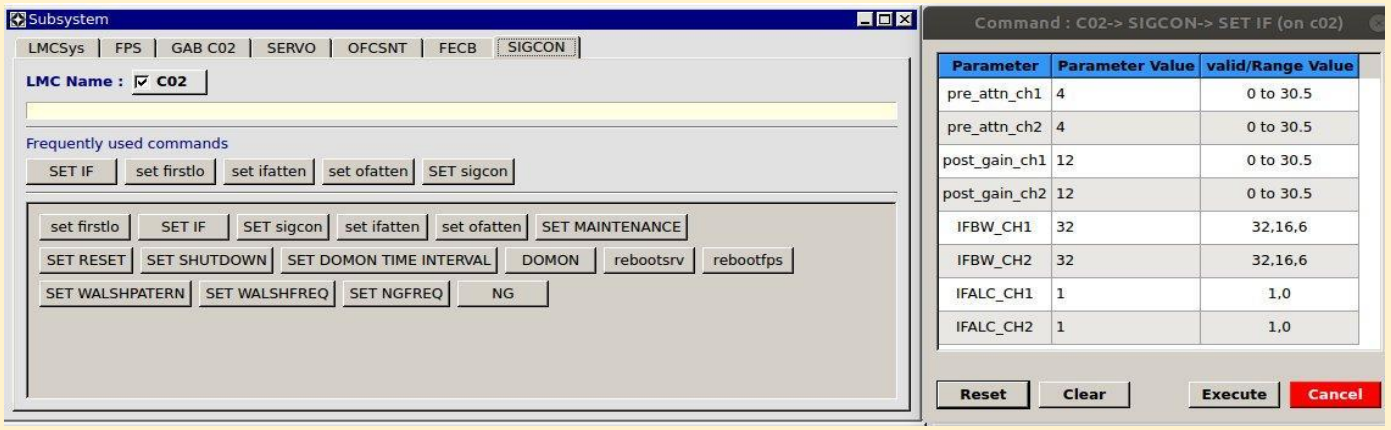


2. **Intermediate Frequency (IF) Parameters Settings :**

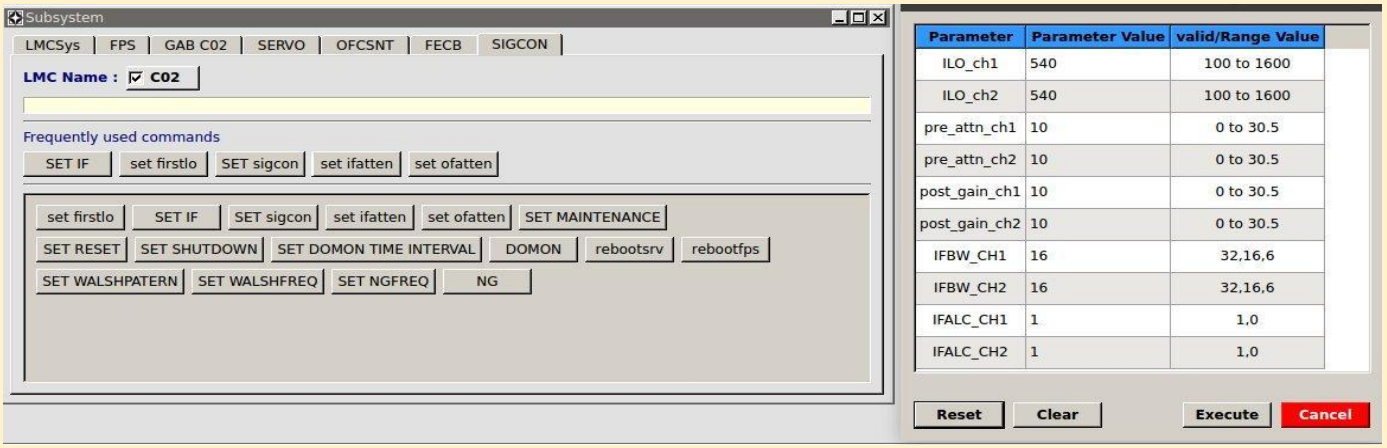
Using this “**SET IF”** command set IF parameters like Bandwidth (32 MHz/16

[1] 1

MHz/6 MHz) , GAIN Values between 0 to 30 dBm , IF Attenuation Values for 0 to 30 dBm and ALC ON and OFF settings for both IF Channels (ch1-130 and ch2-175) respectively.

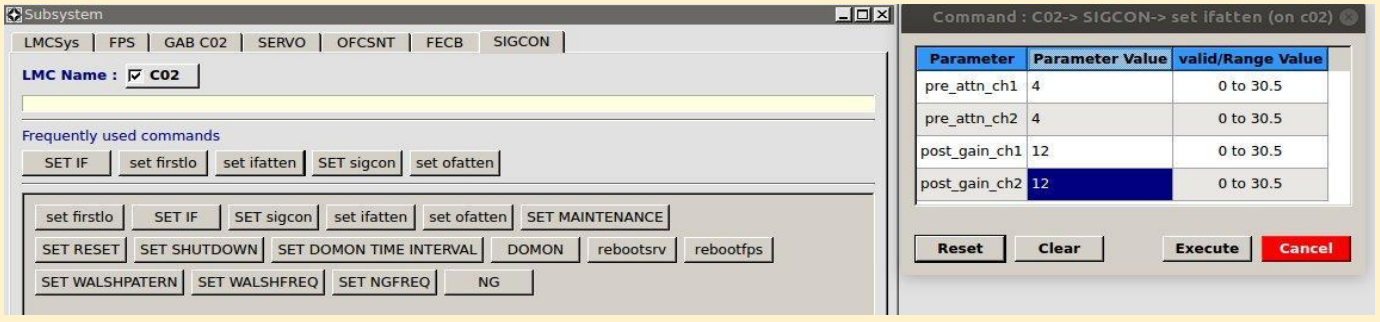


3. **SET sigcon :** Using this command universally one can set set all IF and LO

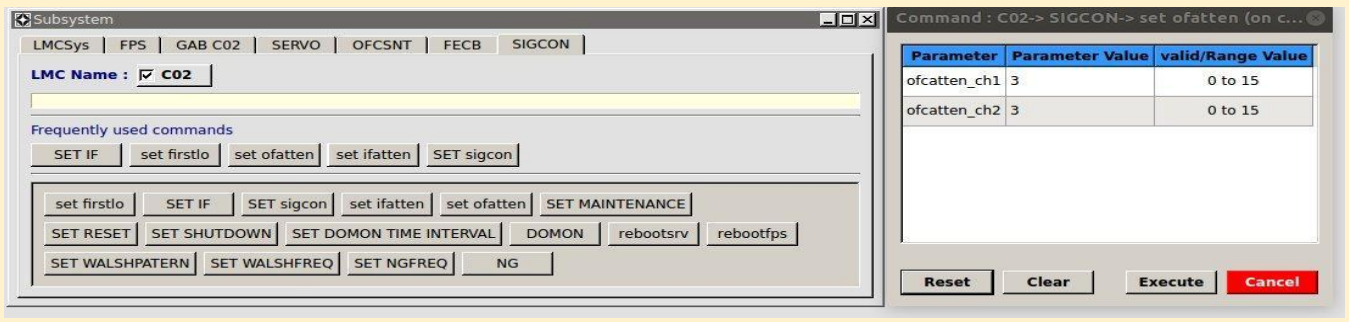


parameters.

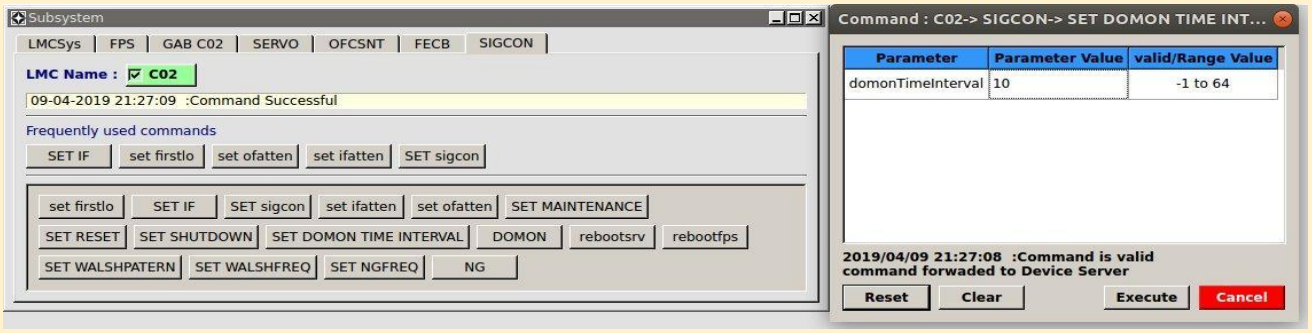
4. **Set ifatten :-**



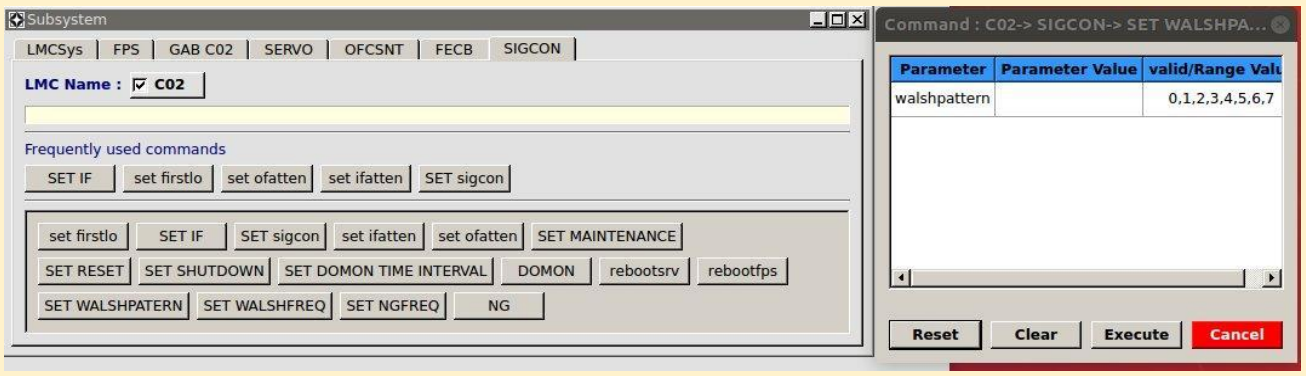
5. **Set of attun :-**



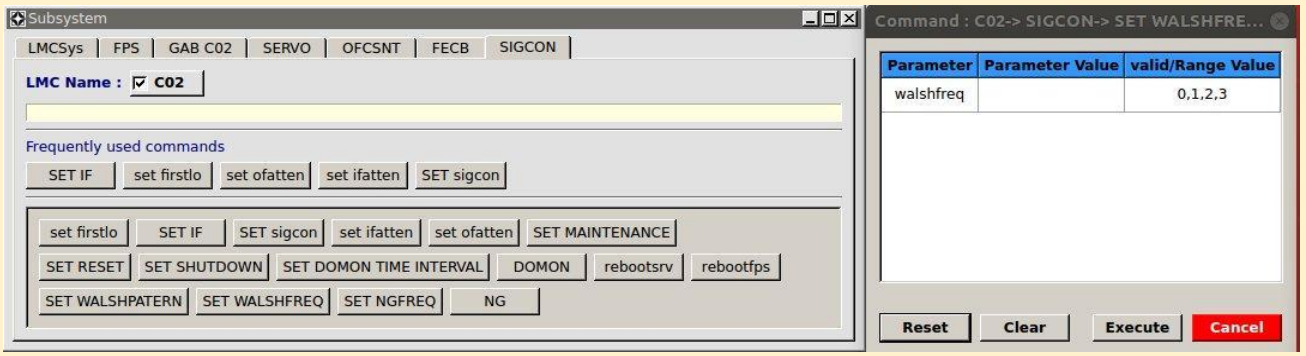
6. **SET MAINTENANCE :-** To put System in Maintenance mode.
7. **SET RESET :-** To give power ON reset to System.
8. **SET SHUTDOWN :** To Shutdown system.
9. **SET DOMON TIME INTERVAL :-** domon time interval is in second



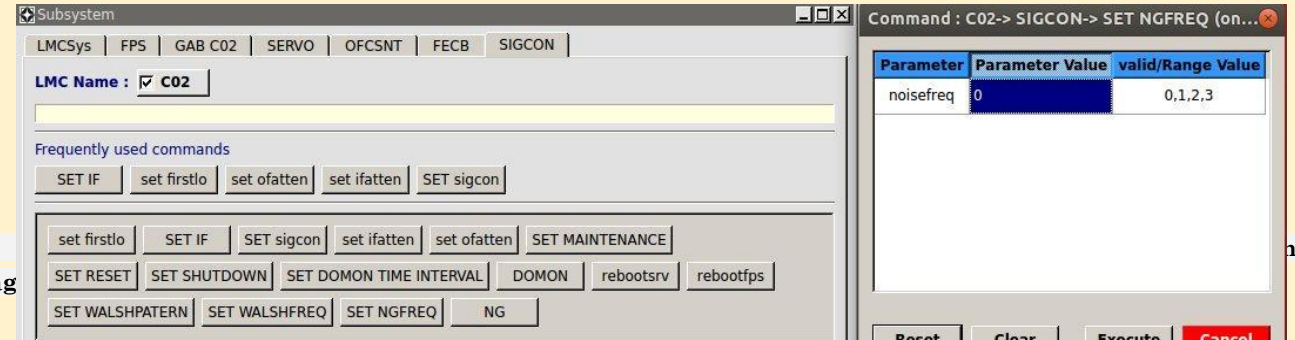
10. **rebootsrv :-** Boot Servo through MCM 0.
11. **rebootfps :** Boot FPS through MCM0
12. **SET WALSHPATTERN**



13. **SET WALSHFREQ**

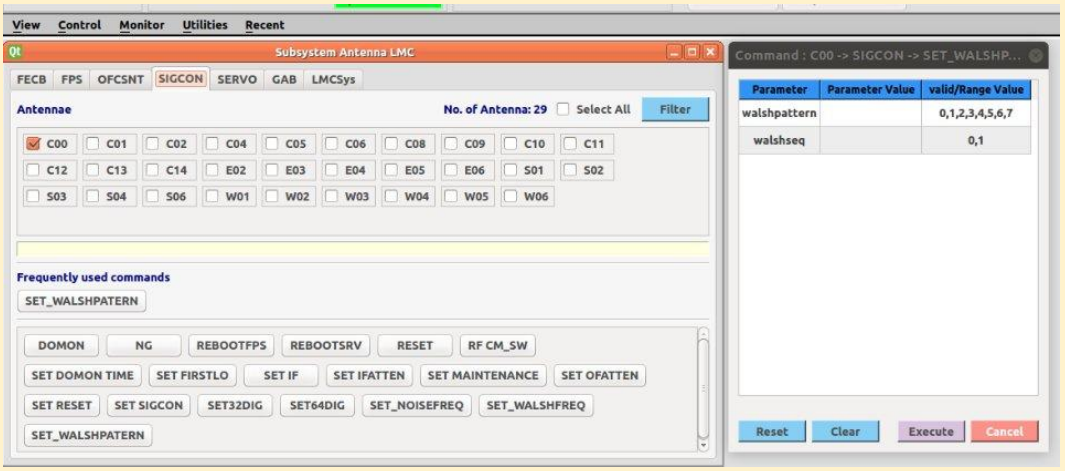


14. **SET NGFREQ**



15. WALSH PATTERN & WALSH Frequency Settings

Note: set using GUI.



>walshpatern <walshpattern> <walshseq>

where "walshpattern" :0 - WalshOff,

:1 - CH1=Cal1 & CH2=WalshOff,

:2 - CH1=WalshOff & CH2=Cal32

:3 - CH1=Cal1 & CH2=Cal32,

:4 - Cal1,

:5 - Cal32

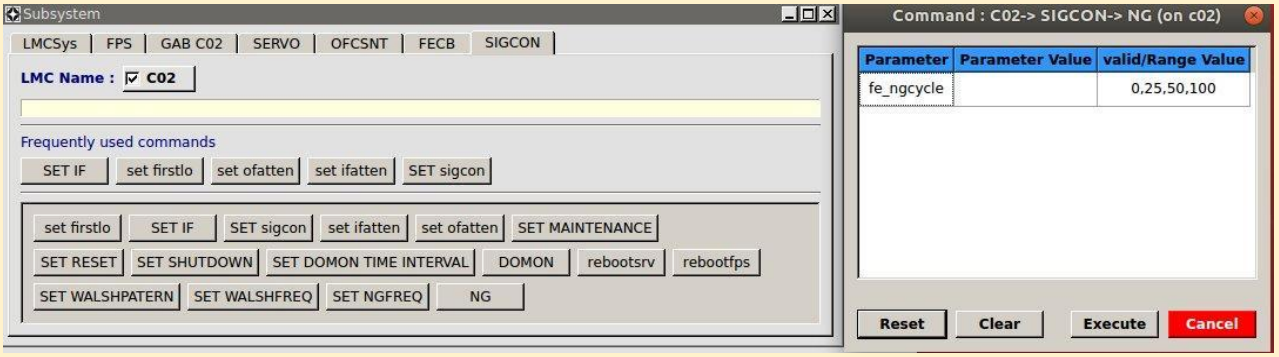
:6 - CH1:Basic & CH2=WalshOff,

: 7 - CH1=Walsh Off & CH2=Basic

"walshseq" : 0 - OFF ,

: 1 - ON

16.NG



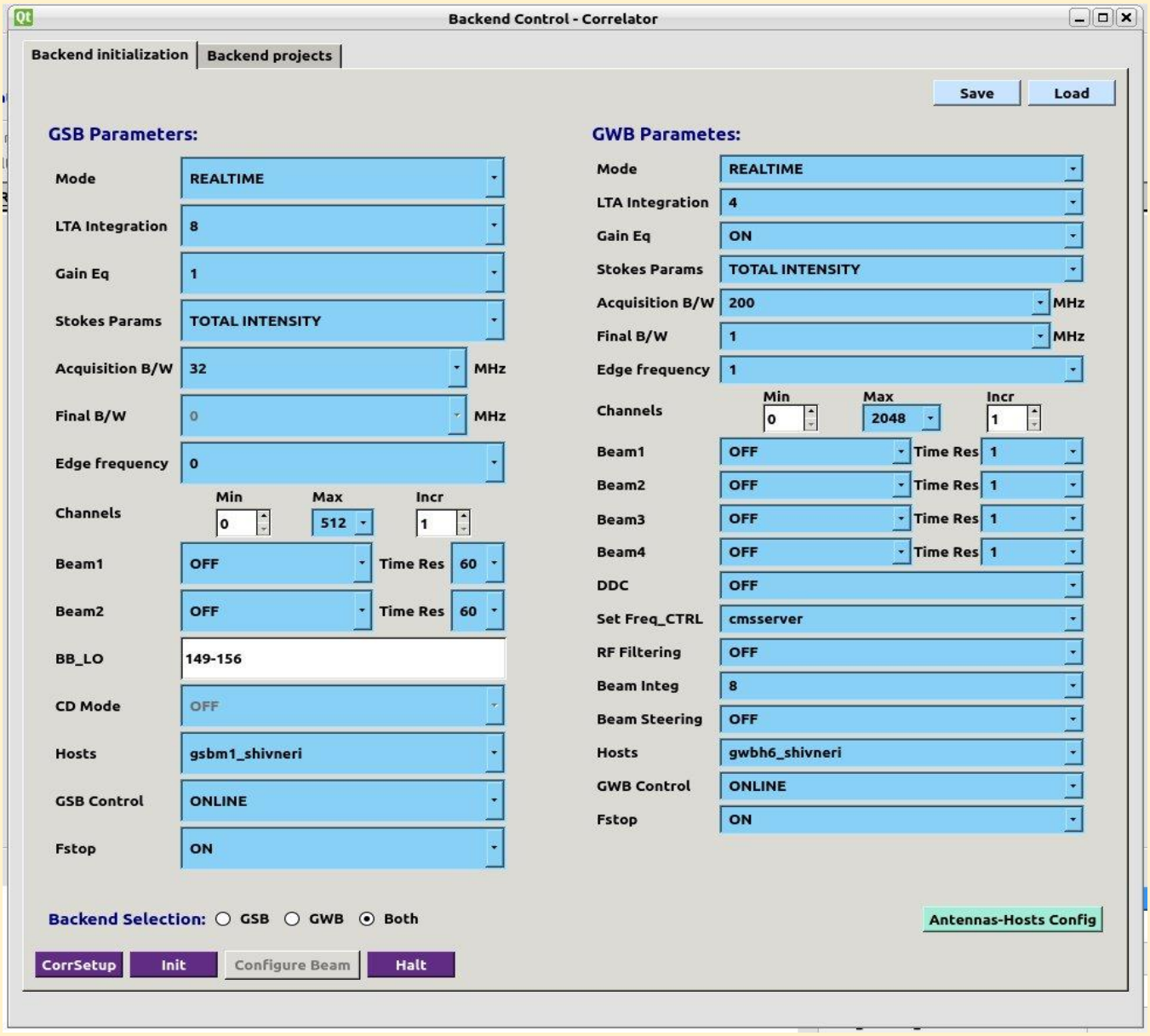
5.6 How To Start DAS chain (GSB/GWB)

Go To TGC GUI ⇨ Select “Control” Menu ⇨ Select “BackEnd” Submenu

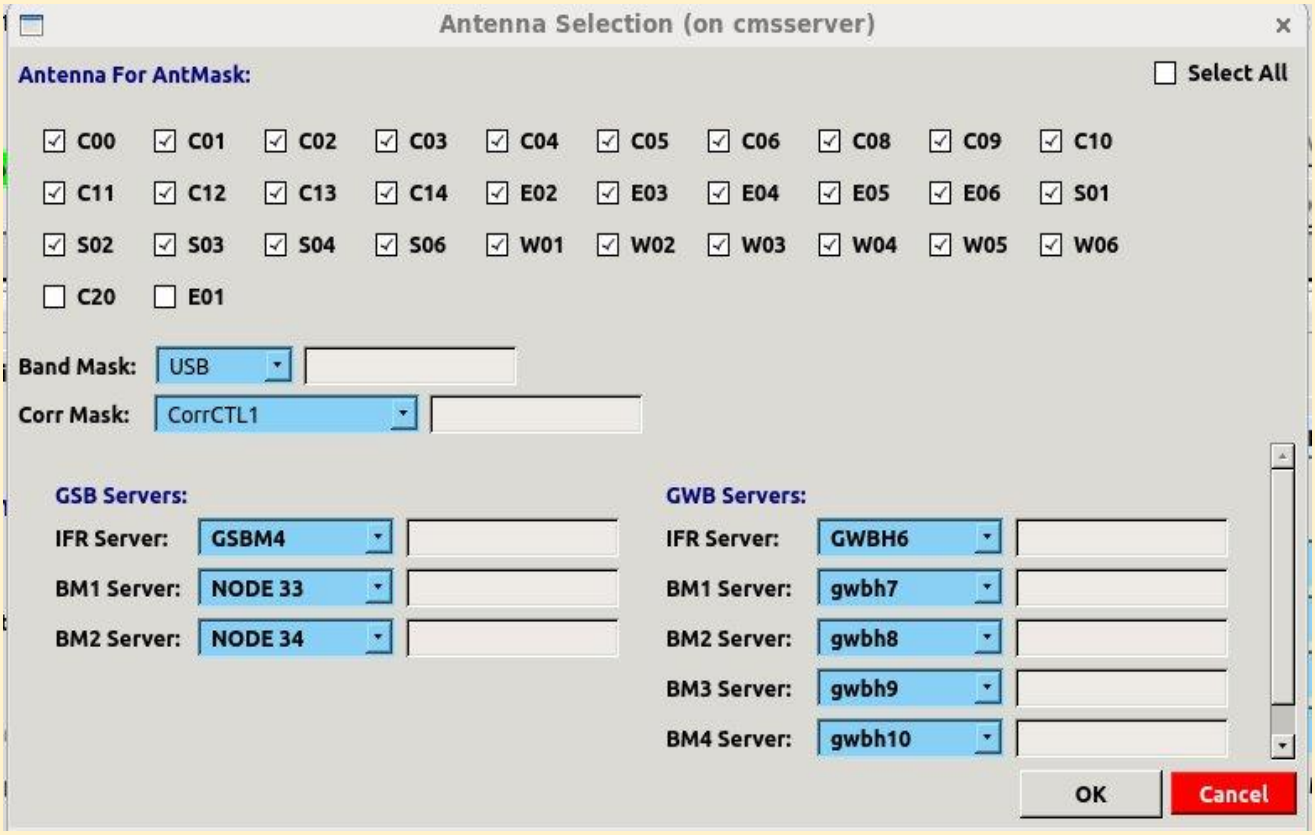
Select “Correlator Control” ⇨ Click on “ BackEnd Initialization” tab

Click “Backend Selection” ⇨ Select “CorrSetup ” Cmd with its input value.

1. Click on “**Backend Initialisation**” tab.
2. **Set GSB and GWB Parameters.**



3. **Set AntMask, BandMask and CorrMask and GSB/GWB Servers using Antenna-Host Config Button . Click Ok to Set.**



4. **Band Mask :** should be set to always "**USB**" for GSB ,GWB or both GSB and GWB.

5. Click the CorrSetup Button.

To Start GSB Das Chain in Release Mode.

> ssh -Y observer@astro8
> cd /home/observer/bin/released
> ./ifr_dasconsole
=> use Start menu to Start all window
=> kill sockcmd

To Start GWB Das Chain Release Mode.

> ssh -Y observer@astro8
> cd /home/observer/bin/gwb-release
> ./gwbcorr
=> use Start menu to Start all window => kill sockcmd Window.

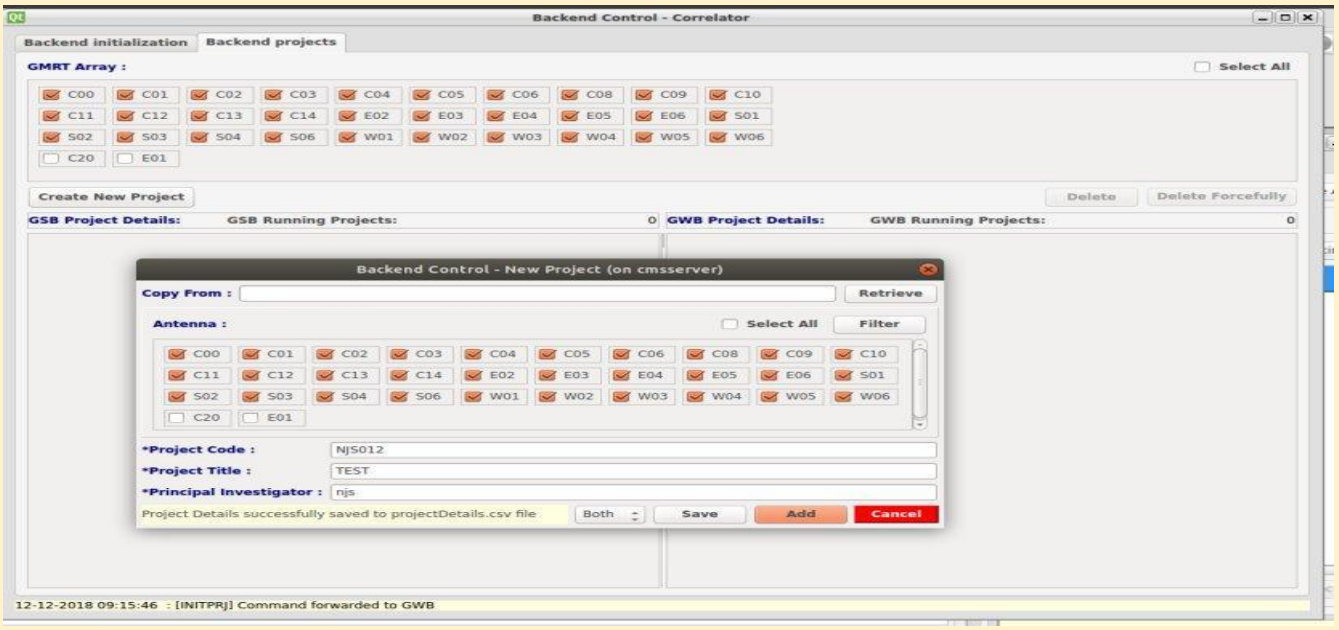
6. Click to start the ACQ programme in **GSB AND/OR GWB ifr_dasconsole** window and wait till it reaches at ready for init for gsb.

7. Start Collect for Both GSB and GWB.

8. Click on the init button for Backend Initialisation to init Both GSB AND/OR GWB.

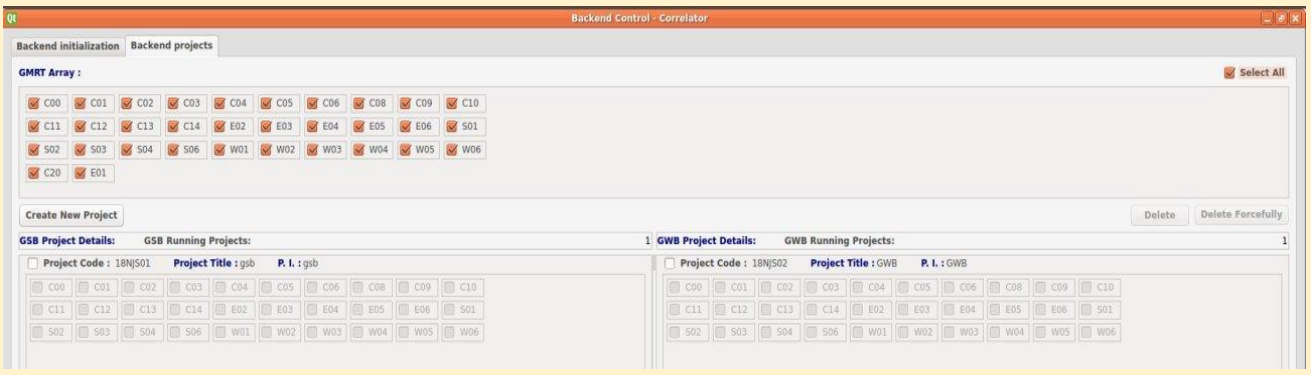
9. Wait for Minutes Pulse Trigger in GSB .

10. Enter Project Code,Project Title, Project Observer.



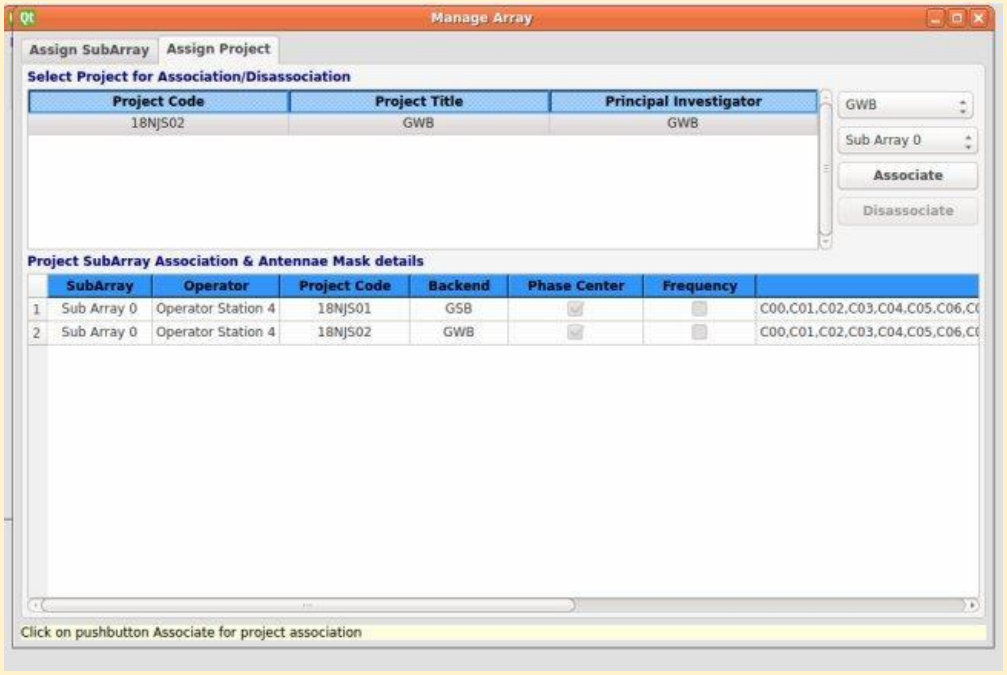
11. Start Project (add) for Both GSB and GWB.

To TGC GUI ⇨ Select “Control” Menu ⇨ Select “BackEnd” Submenu ⇨ Select “Correlator Control” ⇨ Click on “ BackEnd Project” tab ⇨ Select Antenna List ⇨ Click on the Create New Project.



12. Project Association

Go To **TGC GUI** ⇨ Select “**Control**” Menu ⇨ Select“**Operation Control**” Submenu ⇨ Select “**Data Control**” ⇨ Click on “**BackEnd Project**” tab ⇨ Select **Antenna List** ⇨ Click on **Assign Project**



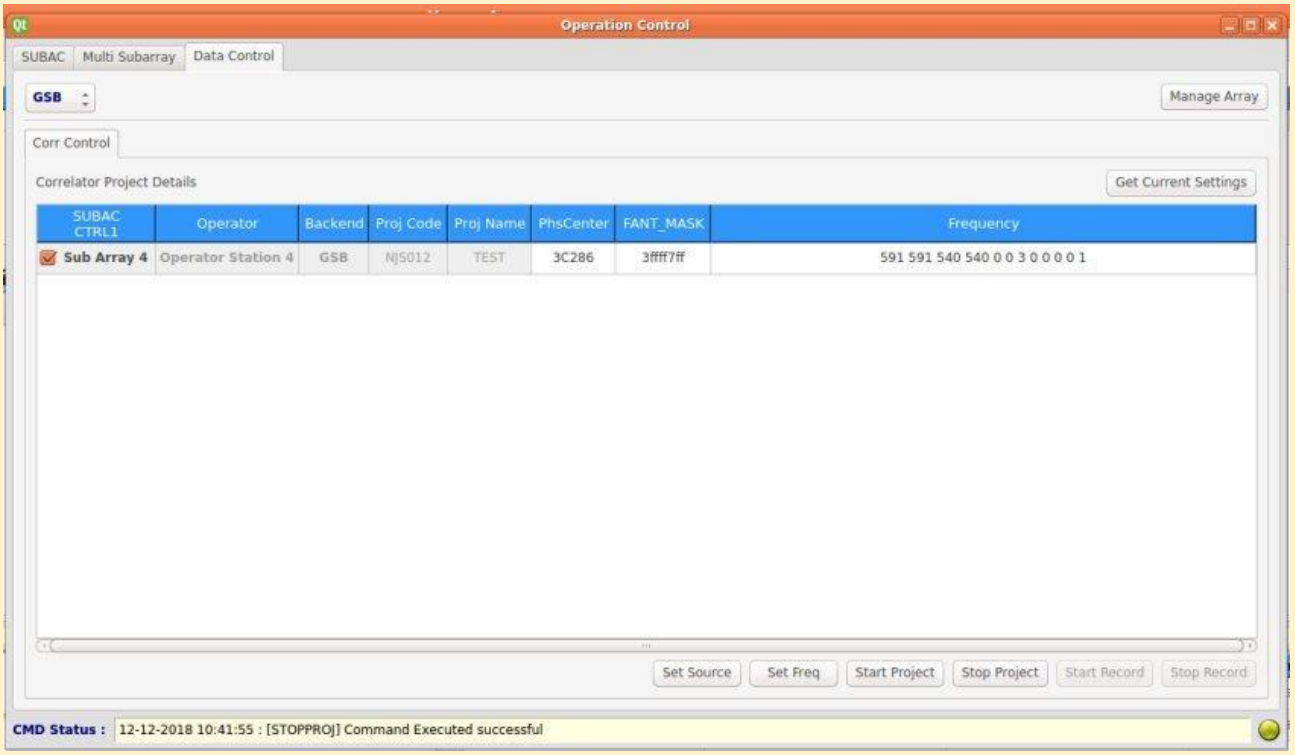
13. Phase centre and Frequency parameter (tpa) settings.

Write Source name and Click on **set source**

Enter Frequency parameters and Click on **Set freq**

Start Project to start the Data aca Scan(DAS)

Use **Stop Project to Stop DAS.**



6. Preparation for Observation

6.1 Source List

First "scp" the old source list given by the user to **192.168.70.2** machine and then using following steps one can convert old say "**src.list**" to "**src.csv" format.**

Note : before copy make sure that old src.list has to be run through "mksrclist" programme to correct any irregularity between SRCName,RA,DEC and epoch in terms of space if any and create new format source list using following steps..

1. login as cmcuser at **192.168.70.2**
2. ssh -X cmcuser@cmsserver(192.168.70.2)
3. cd /data1/gtac/cmd/prjcode/date *//sample directory structure/format*
4. > conv_csv.py src**.list** > src.**csv** *// converting old src list to new csv format.*

6.2 Command file conversion from obs.cmd to tgc.py :-

Simple command file script template is located in following area defalt area of TGC

>ssh -X cmcuser@cmsserver(192.168.70.2)

> /data1/gtac/cmd/prjcode/date/**Int_Loop_cmd.py**

First "scp" the gtac command file from astro@lenyadri or astro@ *shivneri:/odisk/gta/cmc/prjcode/obs.cmd* provided by the user to **192.168.70.2** machine and then using following steps one can convert old say "**obs.cmd**" to "**obs.py" format.**

1. login as cmcuser at **192.168.70.2**
2. ssh -X cmcuser@cmsserver(192.168.70.2)
3. cd /data1/gtac/cmd/prjcode/date *//sample directory structure/format*
4. ***> /home/cmcuser/bin/conv_cmd.py obs.cmd > obs.py*** *// converting old* ***.cmd*** *file format to to new TGC working* ***.py*** *format.* c) How to Start command(observation) File using script

7. How To Start Observation through Script using GUI.

7.1 Continuum Observation for Both GSB and GWB.

Step 1. Rotate feed to desired frequency band.

Step 2. Set RF,LO,IF, GAB,OFC => Refer "5. Antenna SubSystem Configuration"

Step 3. Configure Correlator (GSB and GWB).

Step 4. Start DAS chain

Step 5. Set TPA

(1) GWB -Give TPA : Note for continuum obs DDCLO is zero (0 0)

Formula : RF1 RF2 +/-GABLO +/-GABLO DDCLO DDCLO 3/12

Default TPA for GWB		
Freq. Band	**USB(3)**	**LSB(12)**
Band 5	1060 1060 1060 1060 0 0 3	1460 1460 -1460 -1460 0 0 12
Band 4	550 550 550 550 0 0 3	950 950 -950 -950 0 0 12
Band3	-	500 500 -500 -500 0 0 12
Band2	100 100 100 100 0 0 3	300 300 -300 -300 0 0 12

Note : Select GAB filter Bandwidth accordingly

(2) In case of GSB, the same as ONLINE shall be followed i.e. no change in TGC.

Default TPA for GSB		
Freq. Band	**LSB(12)**	**USB(3)**
1420 MHz	1409 1409 1460 1460 51 51	-
1390 MHz	-	1371 1371 1320 1320 51 51
1280 MHz	-	1281 1281 1230 1230 51 51
1170 Mhz	-	1151 1151 1100 1100 51 51
725 MHz	-	591 591 540 540 51 51
470 MHz	-	306 306 255 255 51 51
150 MHz	156 156 218 218 62 62	-

Step 5. Check fringe status and Start cmd file

7.2 Spectral Line Observation for Both GSB and GWB.

A. GSB

Step 0. Login as observer@astro8 machine

Setp 1.

Note : setup LO5 carefully.

a. login to bblo machine.

> ssh -X elab@bblo

> ***** (.elab123)**

b. set lo5 using following cmd file.

> bbloset -a 61.4500

B. GWB

Step 0. Login as observer@astro8 machine.

>*gwb_tune.pl* <LINE FREQ: MHz.> <GAB LO> <CHANNELs> <FINAL_BW>

GAB LO : From 100MHz to 1500 MHz

CHANNELs : 1024/2048/4096/8192/16384

FINAL_BW : 100/50/25/12.5/6.25/3.125/1.5625

Example :

> /***home/observer/bin/gwb_tune.pl 1420.4 1460 8192 12.5***

Step 1. Rotate feed to desired frequency band.

Step 2. Set RF,LO,IF, GAB,OFC => Refer "5. Antenna SubSystem Configuration"

Step 3. Configure Correlator (GSB and GWB).

Step 4. Start a DAS chain. for both GSB and GWB.

Step 5. Use the following formulae to set TPA values for spectral mode.

In GWB give TPA for given project, as follows -

RF1 RF2 (+/-)GABLO (+/-)GABLO DDCLO DDCLO

Note : +sign is for the USB, and -sign is for LSB. and for GWB last 3/12 value doesn't matter.

In GSB give TPA for given project, as follows -

RF1 RF2 LO1 LO2 LO5 LO5 (3-USB/12-LSB).

* Note that +sign is for the USB, and -sign is for LSB. Last 3/12 value Matters in GSB..

Step 6. Check fringe status and Start cmd file

7.3 Pulsar Observation (beam configuration)

(a) Using the Control->backend->Correlator Control window, select the appropriate Bem configuration, and send the core config command.

(b) Using the Control->backend->Beam Control, configure the beam settings. Left pannel of IA/PA init and scan header parameters keep as it is for time being, only associate the projects.

(i) at the bottom, "Beam Selection" - select desired beam.

(ii) Send "beam-setup" command

(iii) Start the pulsar consoles - observer@astro8:/home/observer

> /home/observer/bin/released/gsb_dasconsole-33-34

> /home/observer/bin/gwb-release/gwb_psr_das

> start all programs.

(iv) give "beam init" from the GUI.

(v) give "Beam start" (After sending this command, you need to restart GWB scan, otherwise only previously antennas will get add into the GAC and not selected under the currently associated project).

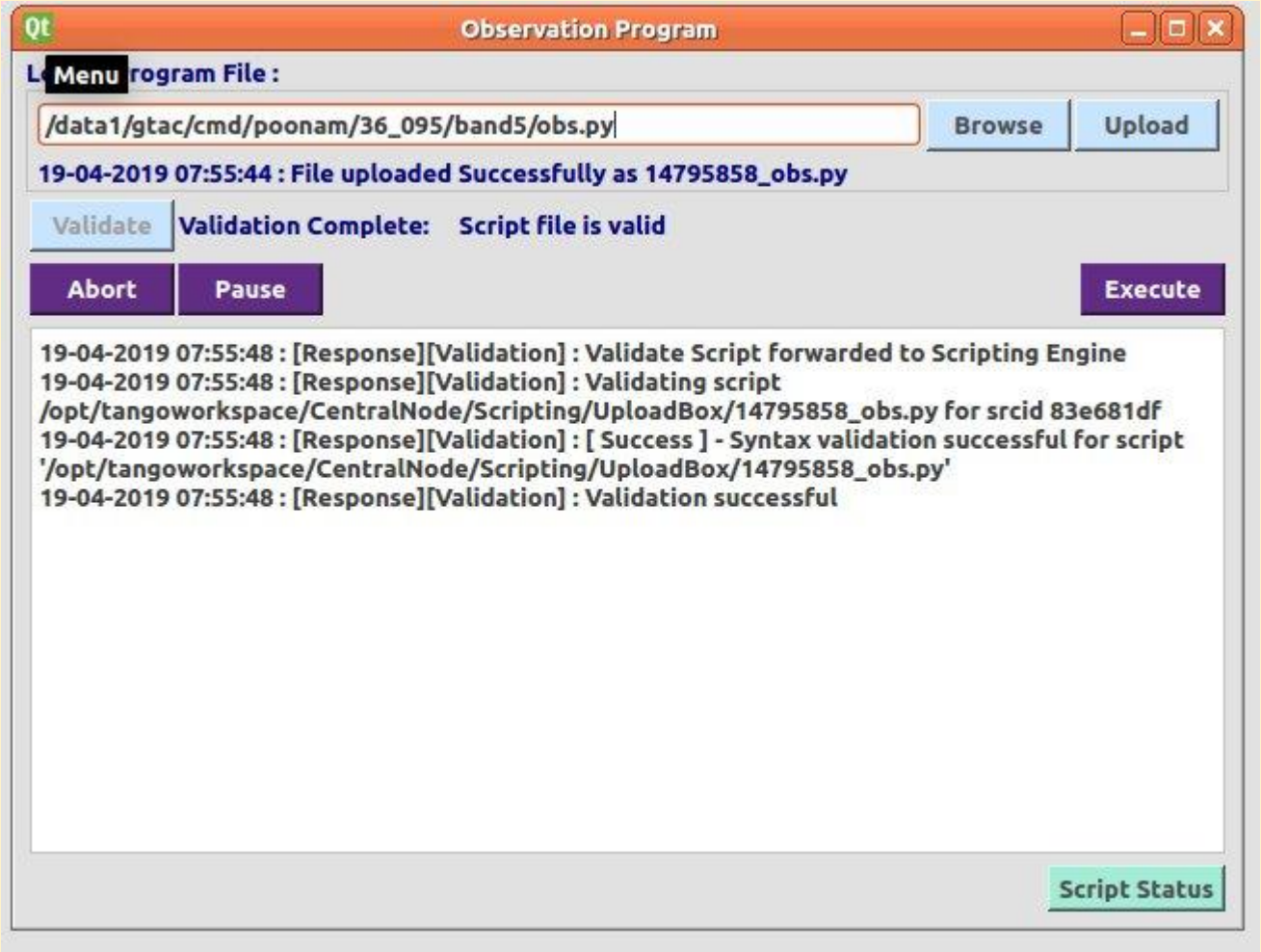
(vi) give "beam stop/start" and beam finish command as per the requirement.

7.4 How to start/run command file using TGC GUI.

GUI ⇨ Select “Control” Menu ⇨ Select“Observation program” Submenu

Browse the observation script “Input Box” ⇨ Click on “ Upload” Button ⇨

And Click on ⇨ “Validate” Button ⇨ Click on “Execute” to run the script.



You can Abort or Pause the running script and also check the status of running script using **Abort**, **Pause** and **Status** Button provided on the gui respectively.

8.Pointing Procedure (Grid, Cross and Self)

8.0 How to create pointing cmd file

1. Login to TGC Machine.

   >cmcuser@cmsserver:~$ gridpntg_cmd_create.py

   Usage: gridpntg_cmd_create.py Source_name Obs_band (in MHz) track (outer/inner) <EL_or_AZ_or_Both> <No_of_grids> <Command_file>

   e.g > gridpntg_cmd_create.py 3C48 1390 outer both

2. *launch cmd file from MNCScript Manager or through GUI for*

   /data1/gtac/cmd/pntg/pointing.py

8.1 How to update/load Model Pointing offsets.

1. To Copy pointing offsets file login to cmsserver

> ssh -X cmcuser@cmsserver(192.168.70.2)

> password : ****.***

2. Goto directory

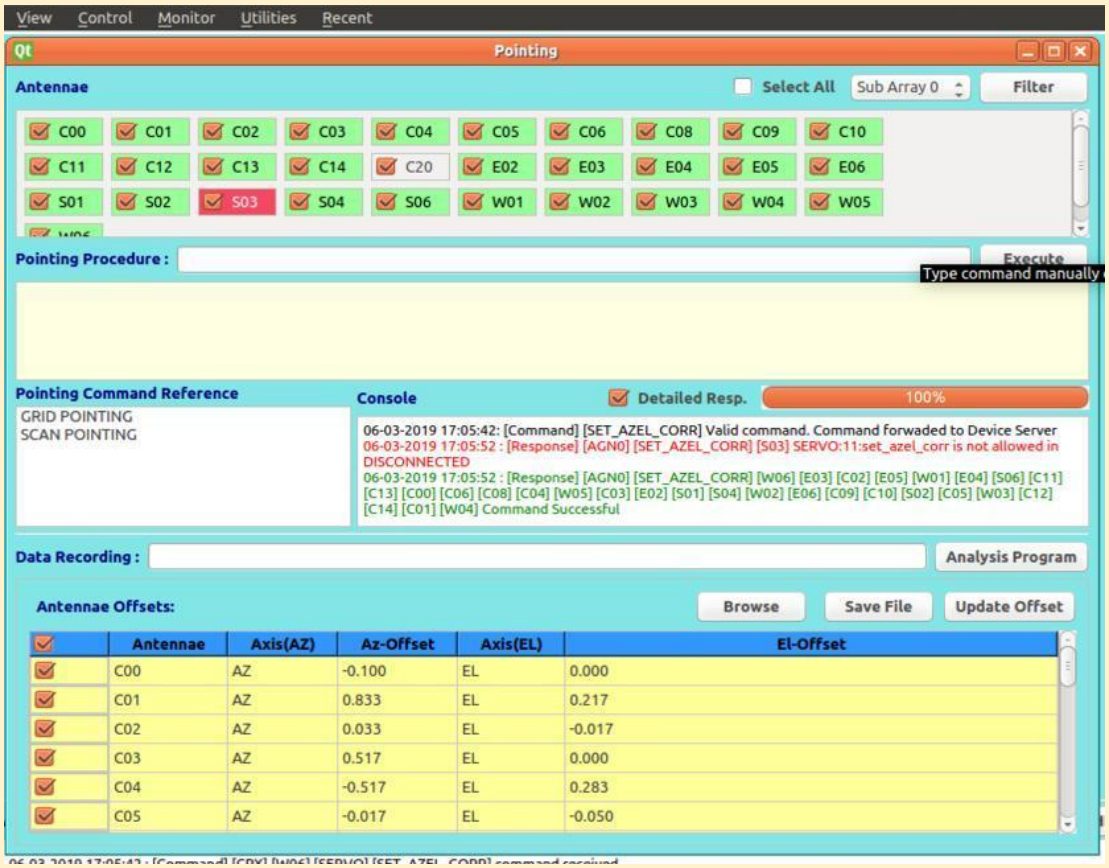
>cd /opt/tangoworkspace/CentralNode/Configuration/CsvFiles/Pointing

3. Run the programme to copy offsets.

>./copy_online_offset.pl

4. Go to TGC GUI either using Super Operator or GUI running at workstation(AGN)

M&C GUI ⇨ Control ⇨ Pointing



5. Click on the Browse button

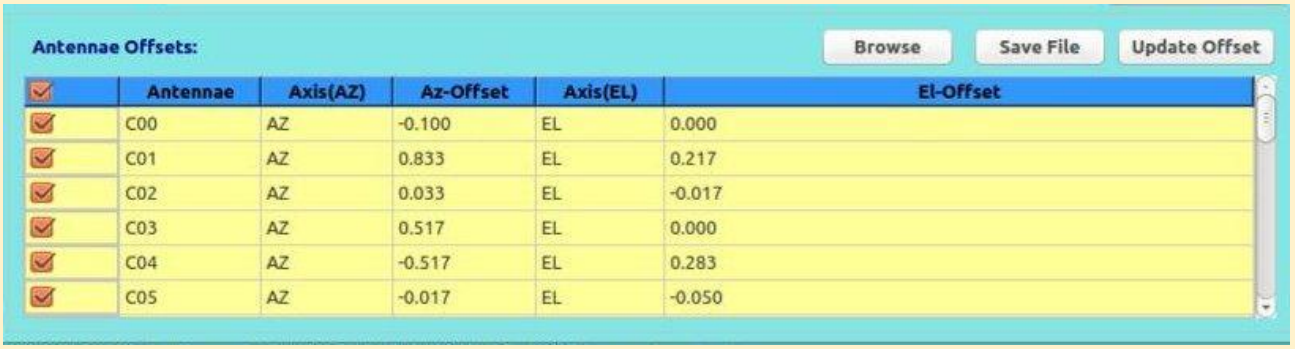
> /opt/tangoworkspace/CentralNode/Configuration/CsvFiles/Pointing/el_offset.cs

6. click **open** or **double click** to load and check table values get updated.

>/opt/tangoworkspace/CentralNode/Configuration/CsvFiles/Pointing/az_offset.csv

7. select Antenne list (checkbox)

8. click on **update offset** button to load offsets to antennas.



	Antennae	Axis(AZ)	Az-Offset	Axis(EL)	El-Offset
☑	C00	AZ	-0.100	EL	0.000
☑	C01	AZ	0.833	EL	0.217
☑	C02	AZ	0.033	EL	-0.017
☑	C03	AZ	0.517	EL	0.000
☑	C04	AZ	-0.517	EL	0.283
☑	C05	AZ	-0.017	EL	-0.050

8.2 How to calculate Pointing offsets :-

Option 1: Using TGC GUI :-

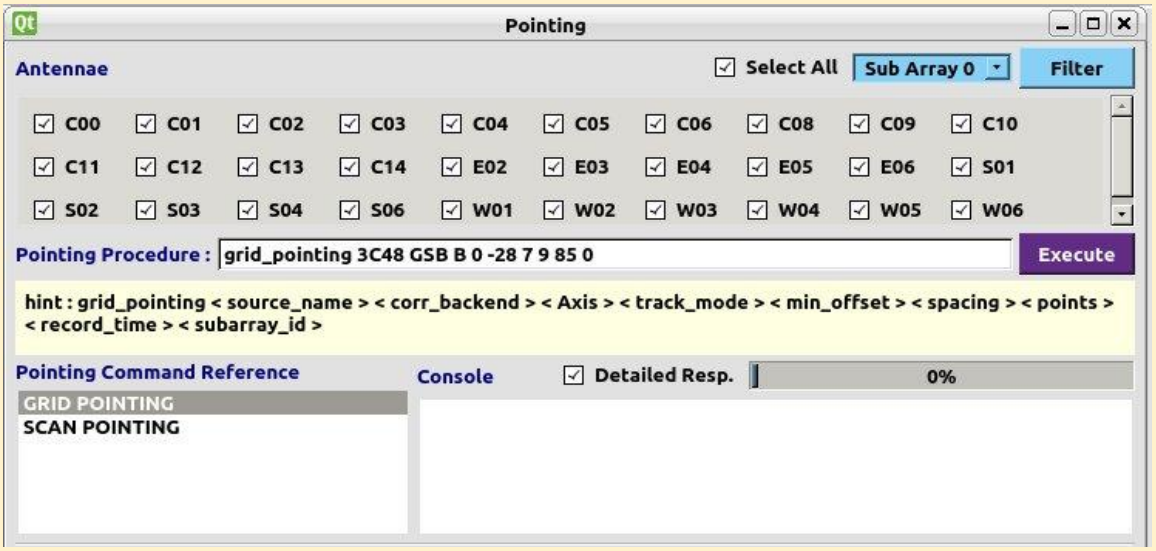
M&C GUI ⇨ Control ⇨ Pointing

>Grid Pointing :- grid_pointing < source_name > < corr_backend > < Axis > < track_mode > < min_offset > < spacing > < points > < record_time > < subarray_id >

>grid_pointing 3C48 GSB BOTH 1 -28 7 9 85 0 ------- For Example L Band

********** Grid Pointing help with default Arguments **********

Freq. Band	Good Point Calibrator	Corr Backend GSB/ GWB/ BOTH	Axis E/A/ B	track_ mode inner(0) outer(1)	minimum offsets	spacing	points	record_time	Subar
Band 3	**3C48**	**GSB**	**E**	**1**	**-68**	**17**	**9**	**48**	**0**
Band 4	**3C286**	**GWB**	**A**	**0**	**-44**	**11**	**9**	**48**	**0**
Band 5	**3C147**	**BOTH**	E/A	**1**	**-28**	**7**	**9**	**48**	**0**



Option 2: Using Observation Program

GUI ⇨ Select "Control" Menu ⇨ Select"Observation program" Submenu

Browse the pointing script ⇨ Click on " Upload" Button ⇨

And Click on ⇨ "Validate" Button ⇨ Click on "Execute" to run the script.

1. **/opt/tangoworkspace/CentralNode/Scripting/UploadBox/pointing_gsb.py**
2. **/opt/tangoworkspace/CentralNode/Scripting/UploadBox/pointing_gwb.py**
3. **/opt/tangoworkspace/CentralNode/Scripting/UploadBox/pointing_both.py**

Note : Make relevant changes in source name and track and freq.

8.3 Pointing data Analysis and apply to Antennas

a. **Pointing data Analysis :-**

> ssh -X observer@oper2: /odisk/online1/pointing

>mkdir "DDMMYY" e.g mkdir 10oct2019.

>/home/observer/bin/pntg.pl -f /rawdata/2feb/test.lta -c 20 -C 150 -a both -r C09

b. **Update or Load pointing offsets to antenna using section 8.1 (Steps 1 to 8)**

8.4 How to Use pointing model (use pointing)

c. **pointing model**

Go to GUI ⇨ Select "**Control**" Menu ⇨ Select"**Expert Console**" Submenu ⇨

Select "**LMCs**" tab ⇨ Select All antennas ⇨ Click on " **Servo** " Subsystem ⇨

Command Terminal : Use pointing 1 and Click execute

9. Power Equalisation

9.1. GSB Power Equalisation

Step 1 : Login to machine.

> ssh -X cmcuser@cmsserver(192.168.70.2)

> cd /home/cmcuser/bin/

> ./gsb_peq // This will open External Power eq GUI from gsbm4 Machine

ANTENNA	C00	C01	C02	C03	C04	C05	C06	C08	C09	C10	C11	C12	C13	C14	S01
ATTEN P1	20	24	24	24	24	24	20	22	20	18	18	18	20	20	20
GAIN P1	11.0	4.0	4.0	4.0	4.0	4.0	14.0	10.0	14.0	14.0	14.0	13.0	12.0	12.0	12.0
ATTEN P2	18	24	24	24	24	24	22	22	20	18	20	22	18	20	22
GAIN P2	14.0	4.0	4.0	4.0	4.0	4.0	8.0	9.0	13.0	14.0	13.0	12.0	13.0	12.0	12.0
ANTENNA	S02	S03	S04	S06	E02	E03	E04	E05	E06	W01	W02	W03	W04	W05	W06
ATTEN P1	22	20	18	20	20	20	24	24	18	24	24	24	26	20	18
GAIN P1	11.0	14.0	13.0	12.0	12.0	11.0	4.0	4.0	14.0	4.0	4.0	4.0	8.0	12.0	14.0
ATTEN P2	22	20	20	20	20	22	24	24	20	24	24	24	26	18	18
GAIN P2	12.0	14.0	13.0	11.0	13.0	9.0	4.0	4.0	13.0	4.0	4.0	4.0	8.0	14.0	14.0

Step 2: Set power eq level, channel range and Click power eq button.

Step 3: Open MNCScriptManager

> **launch_script** ('/opt/tangoworkspace/CentralNode/Scripting/UploadBox/ifpowereq.py')

// this loads IF attenuations and gains to antennas

Step 4: Open dasmon.pl on gsbm4 machine & monitor bandmon the power level.

Step 5: Repeat step 2 and 3 till the power level equalizes to optimum level 120 counts.

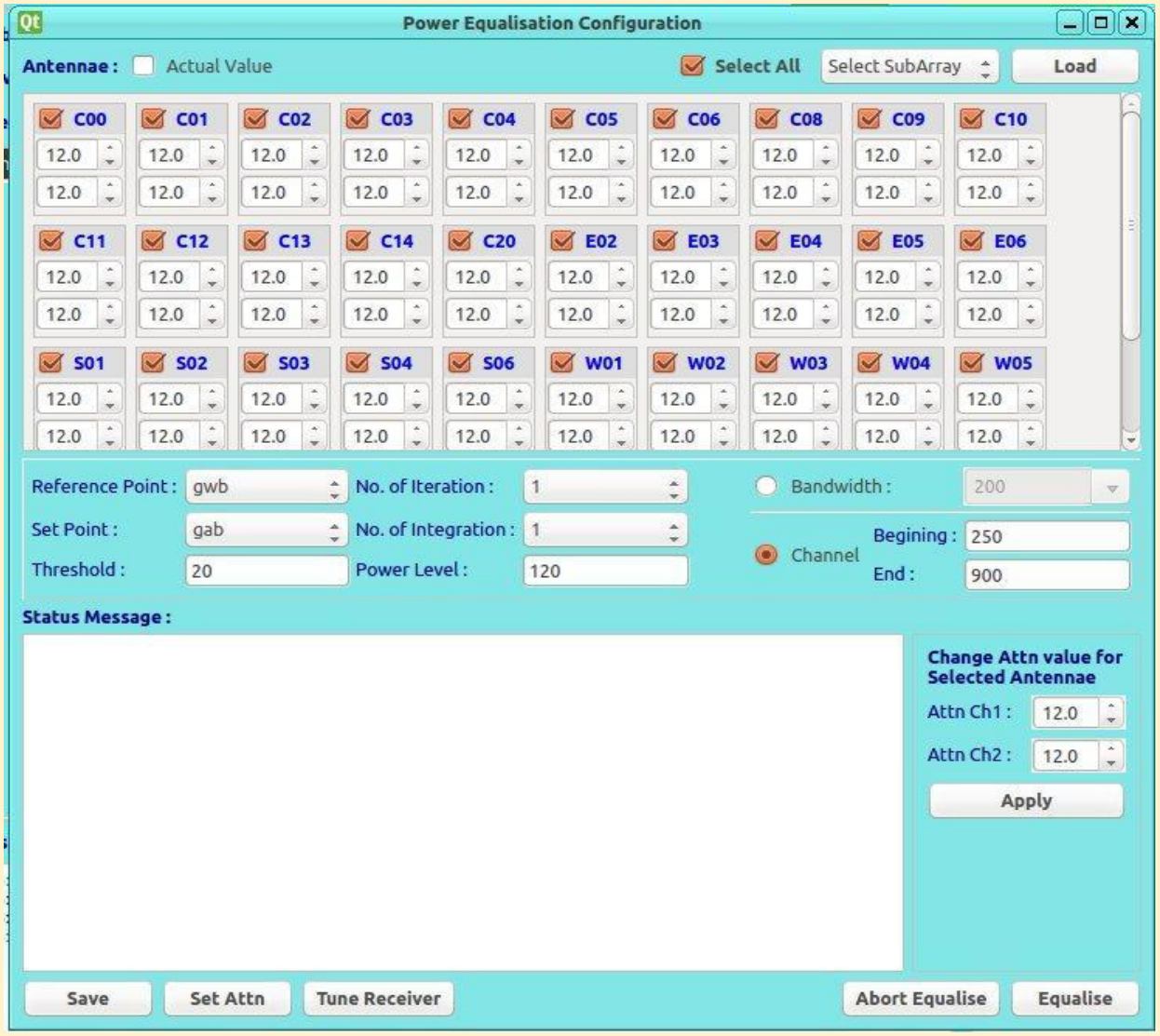
9.2. GWB Power Equalisation

A. Option 1: Using TGC GUI :-

Step 1 : Login to machine cmcuser@192.168.70.2

Step 2 : Open Power GWB power eq GUI.

GoTo **TGCGUI** ⇨ Select"**Control**"Menu ⇨ Select "**TuneReceiver**"Submenu ⇨ Select "**Power Equalization**" ⇨ Select inputs ⇨ click **equalise**



Note : In GWB power equalise reads GWB Total output Power and algorithm set at GAB Attenuations.

Step 3 : before power eq start please Enable datamon for GWB.

M&C GUI ⇨ **Control** ⇨ **Expert Tab** ⇨ **digital backend** ⇨ **GWB** ⇨

DATASERVER ⇨ **enadatamon** <PRJCODE> 5 1'

Step 4: Open monitoring window Bandplot

M&C GUI ⇨ Monitor- ⇨ bandplot ⇨ GWB

Note : **'datatime'** stamp should be updating it means data is coming !! and also Use filter settings : select relevant project code and log scale for bandmon.

Step 5 : Change all attunations to default value 12.0,12.0 and **Click apply**

Step 4 : Set reference point at "gwb"**setpoint** at "**gab"Threshold** at "10 or 20", set **No. iteration** "1", **No. of Integration** "1", Power **level** "120" and **Channel** 250 to 900.

Step 5 : Select relevant SubArray

Step 6 : Click on the power eq button.

Step 7 : Repeat step 7 till the power level equalizes to optimum level 120 counts.

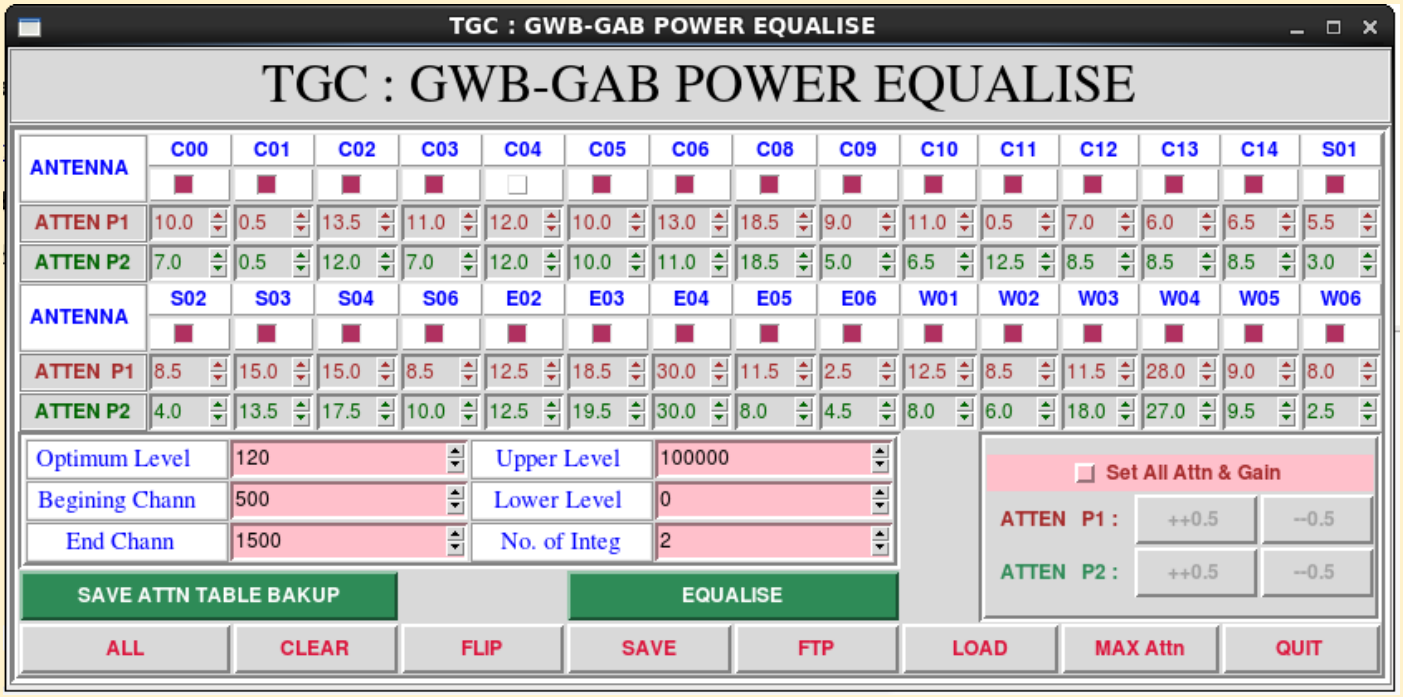
B. Option 2: Using External Power eq. GUI :-

Step 1 : Login to machine.

> ssh -X cmcuser@cmsserver(192.168.70.2)

> cd /home/cmcuser/bin/

> ./gwb_peq // This will open External Power eq GUI from gwbh6 Machine



Step 2: Set power eq level, channel range and Click power eq button.

Step 3: Open MNCScriptManager

> **launch_script** ('/opt/tangoworkspace/CentralNode/Scripting/UploadBox/gwbpowereq.py')

// this loads gab attenuations and gains to antennas

Step 4: Open dasmon.pl on gwbh6 machine & monitor bandmon the power level.

Step 5: Repeat step 2 and 3 till the power level equalize to optimum level 120 counts.

9.3. 30 to1 Power Equalisation

A. Option 1

Step 1 : Login to machine

>ssh -X cmcuser@cmsserver(192.168.70.2)

>cd /home/cmcuser/bin/

> ./ifpeq.sh 0 CYGA 325 32 # This is first Iteration

Usage : ./ifpeq.sh ITERATION SOURCE FREQUENCY IF-BW

ITERATION = 0 (for First) and 1 (for Intertative/repeating)

SOURCE = VIRGOA/CYGA/CASA/CRAB/NG/*

FREQUENCY = 150/235/325/610/1060/1170/1280/1390/1420/*

IF-BW = 6/16/32 MHz

Step 2: Set iteration number, Source Name,Frequency and Bandwidth.

Step 3: Open MNCScriptManager

> **launch_script** ('/opt/tangoworkspace/CentralNode/Scripting/UploadBox/ofmpeq.py')

// this IF attenuations and gains to antennas

Step 4: Repeat two Iteration by setting Iteration flag to 1

> ./ifpeq.sh 1 CYGA 325 32

B. Option 2

[observer@oper2 ~]$ mkdeflcmd_ofm.pl -h

USAGE : /home/observer/bin/mkdeflcmd_ofm.pl <source> <frequency> <bw> <online> <track> <flag-ants>

Example : /home/observer/bin/mkdeflcmd_ofm.pl casa 610 32 shivneri outer "C05,E03,W02,S01"

ONLINE : shivneri/lenyadri/tgc

FOR ONLINE:

1. Please run /ifpeq0 for 0th Iteration from userX window.
2. "run ofmpeq" 3times from userX.
3. Please run /ifpeq1 for 1st/successive Iteration from userX window.
4. "run ofmpeq" 3times from userX.

5. Repeat steps 3 and 4 above till you get the optimum levels
for each antenna.
At the point when you are satisfied with 30-to-1 power
levels, then start the command file.

Command file saved as "astro@shivneri:/odisk/gtac/cmd/pmqc/deflection.cmd"

FOR TGC:

1. On cmcuser@192.168.70.2 run "ifpeq0.sh" for 0th Iteration from userX window.
2. then run the script by using "launch_script 'ofmpeq.py'".
3. Please run "ifpeq1.sh" for 1st/successive Iteration from userX window.
4. then run the script by using "launch_script 'ofmpeq.py'".
5. Repeat steps 3 and 4 above till you get the optimum levels
for each antenna.

For TGC : 1. Record ON Source data Manually.
2. Record OFF Source data Manually.

10.Phasing

10.1. GSB phasing

> ssh -X cmcuser@cmsserver(192.168.70.2)

> cd ~/bin

> cd /home/cmcuser/utility_scripts/phase

> phase_gsb.pl -r C09 -t 30 -s 4

Note :to load zero phasing using the following command. restart scan

> ./phase_zero_gsb.pl

10.2. GWB phasing

> ssh -X cmcuser@cmsserver(192.168.70.2)

> cd ~/bin

> ./phase_gwb.pl -r C09 -t 30 -p TST -c 100 -C 1500 -l rantsol

-h # This help message

-r # ref antenna (default first antenna)

-t # recording time in sec. (default 20sec)

-p # prj (default first project)

-c # start chan no (default first chan)

-C # end chan no (default last chan)

-w # wide band phasing on (default off)

-a # list of phasing antennas (default project antennas)

-l # rantsol / xtract / flagcal / zero (default rantsol)

Note :

1. By Default no. of Antenna added for project will be phased.
2. use w option to enable wind band phasing
3. to load zero phasing by using -l zero

> ./phase_gwb.pl -l zero (restart das scan)

or

>./phase_zero_gwb.pl (enter and restarted das scan)

11. MNC ScriptManager

11.1 Login to AGN using "MNCGMRTScriptManager"

>ssh -X cmcuser@cmsserver(192.168.70.2)

>**password** : ****.***

>MNCScriptManager // Script terminal like User

>cmcuser@cmsserver:*/opt/tangoworkspace/CentralNode/Scripting/*MNCScriptManager

————————-OR————————--

>MNCScriptManager Enter

Scripting hosts configured:

1 : AGN1 // Select AGN form 1 to 5 only.

2 : AGN2

3 : AGN3

4 : AGN4

5 : AGN5

6 : AGN6 // only for Engineers can log in

// Operator is not allowed to login at agn6

7 : CPX // o**nly Super Operator has Access to cpx.**

Enter your choice : 1 //Select AGN index number

>MNCGMRTScriptManager[2]: *login*('Test_Operator','gmrt.123')

[Success] - Login successful

Result[2]: 'Test_Operator Logged in successfully!'

>MNCGMRTScriptManager[12]: *execute_command*('C01','SERVO', 'hold')

>MNCGMRTScriptManager[12] : help "cmd name"

>MNCGMRTScriptManager[12] : exit

- get_api_list , get_node_child,...
- launch_script , validate, pause,stop_script
- some commands.

11.2 Tune Telescope Using "MNCGMRTScriptManager"

A) Load source and Track array

>MNCGMRTScriptManager[12] : load_source '3c286'

>MNCGMRTScriptManager[12] : track_array 0 // 0 is default subarray of AGN 1.

B) FPS Configurations

a) Reboot

>MNCGMRTScriptManager[12] : fpsboot 0 (enter) // for all ants in subarray 0

b) Initialisation

>MNCGMRTScriptManager[12] : initfps 0 (enter)

c) FPS Count Load

>MNCGMRTScriptManager[12] : ldfpspos(0) //(0 for user0)

d) Calibration

>MNCGMRTScriptManager[12] : runclbrt 0 (enter) // Calibrate all ants in subarry 0

e) Feed Rotation

>MNCGMRTScriptManager[12] : mvfps325 0 (enter)

>MNCGMRTScriptManager[12] : mvfps1420 0 (enter)

>MNCGMRTScriptManager[12] : mvfps150 0 (enter)

>MNCGMRTScriptManager[12] : mvfps610 0 (enter)

f) FPS Reset through MCM 0

>MNCGMRTScriptManager[12] : fpsrst 'c00'

Sr. No.	Methods for Feed Position System.	Description of Command	Example
1.	fpsboot	To Boot FPS Subsystem	❖ fpsboot 'c01,c02' ❖ fpsboot 'c01'
2.	initfps	To Initialize FPS Subsystem after reset.	❖ initfps 'c01' ❖ initfps 0
3.	ldfpspos	To Load fps old encoder counts and new absolute encoders counts.	❖ ldfpspos('c01') ❖ ldfpspos 0 (subarray id)
4.	runclbrt	To Calibrate FPS (Valid for old FPS)	❖ runclbrt 'c02' ❖ runclbrt 0
5.	mvfps150 mvfps325 mvfps610 mvfps1420	To mvfps to the frequency band2,band3,band4 and band5.	❖ mvfps150 'c01' ❖ mvfps150(0) ❖ mvfps325 ❖ mvfps610(0) ❖ mvfps1420(0)

6.	fpsrst	To Boot/reset FPS System	❖ fpsrst 'c01,c02' ❖ fpsrst 'c01'

C) Front End Settings

a) Set URF Sys

>MNCGMRTScriptManager[12] :

>seturfsys(subar/antname,rf_ch1, rf_ch2, rf_swap,sol_atten_ch1,sol_atten_ch2, fe_ngcal, fe_walsh_sw,fe_walsh_grp, fe_ngcycle,rfcm_sw,setwalsh,walshfreq,noisefreq)

>seturfsys(0,'725','725',0,0,0,0,0,0,0,0,0,0,0) // default 610 Mhz setup

where,

1.band_select_ch1 and ch2 :-

150,190,235,290,325,350,410,470,600,610,685,725,770,850,1060,1170,1280,1390,1420

2 **rf_swap val =** 0,1;

3. **sol_atten_ch1 val =** 0,14,30,44,-1,1;

4. **sol_atten_ch2 val =** 0,14,30,44,-1,1;

5. **fe_ngcal val =** -1,0,1,2,3;

6. **fe_walsh_sw val =** 0,1;

7. **fe_walsh_grp =** 0,1;

8. **fe_ngcycle val =** 0,25,50,100;

9. **rfcm_sw =** 0,1

b) Walsh Setup : *Note : Use SIGCON system to set Walsh Parameters.*

c) RF Swap

>MNCGMRTScriptManager**[12] : set_rfswap(arguments)**

d) RF Termination

>MNCGMRTScriptManager[12] : set_cbterm(arg1,arg2)

Example : set_cbterm('c01,c02',1,0,0,1)

set_cbterm('c01,c02',1,0)

set_cbterm('c02')

set_cbterm(1)

e) FE Termination

>MNCGMRTScriptManager[12] : set_feterm(arg1,arg2)

Example : set_feterm 'c02'

set_feterm('c02,c01',1,2)

set_feterm('c02,c01',1)

set_feterm(0)

f) Noise ON

>MNCGMRTScriptManager[12] : set_ngon(100)

Note : Set Noise generator ON(100/50/25)

g) Noise OFF

>MNCGMRTScriptManager[12] : set_ngoff //set noise generator OFF

h) Get FECB parameters

>MNCGMRTScriptManager**[12] : get_fecb_para** // get current set parameter to fecb

D) LO (SIGCON) Setup

> MNCGMRTScriptManager**[12] : setilo(subar or antname,chan1_lo,chan2_lo)**

> MNCGMRTScriptManager**[12] : setilo (0,540,540)** # 0 is sub array

> MNCGMRTScriptManager**[12] : setilo('C00',540,540)**

E) IF (SIGCON) Setup

>MNCGMRTScriptManager[12]:setif(subar/antname,ch1_gain,ch1_attn,ch2_gain,ch2_attn,ch1_bw,ch2_bw,ch1_alc,ch2_alc)

>MNCGMRTScriptManager[12] : setif('c00',4,12,4,12,16,16,1,1) # first argument for individual or list of ants.

>MNCGMRTScriptManager[12] : setif(0,4,12,4,12,16,16,1,1) # first argument is sub array

>MNCGMRTScriptManager[12] : setif(0,4,12,4,12,32,32,1,1) # IF setup for GSB with ALC ON

F) GAB Parameters settings

a) GAB LO

>MNCGMRTScriptManager[12] : set_gab_lo(subar,LO1,LO2)

>MNCGMRTScriptManager[12] :set_gab_lo(0,500000,500000) // set for all array

>MNCGMRTScriptManager[12]: set_gab_lo('C00',500000,500000) // for individual ant

b) GAB Attn

>MNCGMRTScriptManager[12] :set_gab_attn('C02','14.5','14.0',timeout=0) // set gab attn

>MNCGMRTScriptManager[12] :set_gab_attn(0,'10.5','10.5') // set for all array

c) GAB LPF

>MNCGMRTScriptManager[12] : set_gab_lpf(subar,GAB_BW1,GAB_BW2) // set LPF

>MNCGMRTScriptManager[12]:set_gab_lpf(0,200,200 // 0 is sub array

>MNCGMRTScriptManager[12]: set_gab_lpf('C00',200,200)

d) GAB Full Config

>MNCGMRTScriptManager[12]:set gabconf <lo_freq_Ch1> <lo_freq_Ch2> <attn_Ch1> <attn_ch2><i/p_mode1_Ch1><i/p_mode1_Ch2><mixer/direct_path_Ch1><mixer/direct_path_Ch2><i/p_mode2_Ch1><i/p_mode2_Ch2><filter_RF_Ch1><filter_RF_Ch2><LPF_freq_Ch1> <LPF_freq_Ch2> <Spare_Ch1> <Spare_Ch2>

>set_gab('C02',,550000,550000,12,12,0,0,0,0,0,0,3,3,200,200,0,0)

>set_gab(0,550000,550000,12,12,0,0,0,0,0,0,3,3,200,200,0,0)

// Note : It sets all parameters of GAB except GAB LO.

Note : set GAB LO exclusively

e.g > set_gab_lo('C00',550000,550000)

G) OFC Parameters settings

>MNCGMRTScriptManager[12] : setofatten(0,9,9) # ofatten setup // to sub array 0

>MNCGMRTScriptManager[12] : setofatten('C00','C01',9,9) # ofatten setup // to ant list

H) Correlator Configuration

a) GSB /GWB Parameters Setup

Note : to use cmd line core config please use GUI and save prjcode_date.csv file. Time being

carefully update GSB LO5 *GSB_BB_LO,149000000.0:156000000.0*

>MNCGMRTScriptManager[12]:corr_setup('BOTH','/opt/tangoworkspace/CentralNode/Configuration/CsvFiles/correlator/prjcode_date.csv')

Note: 1. Start the acq for GSB and GWB ... wait for initialisation

2. then start collect for both GSB and GWB

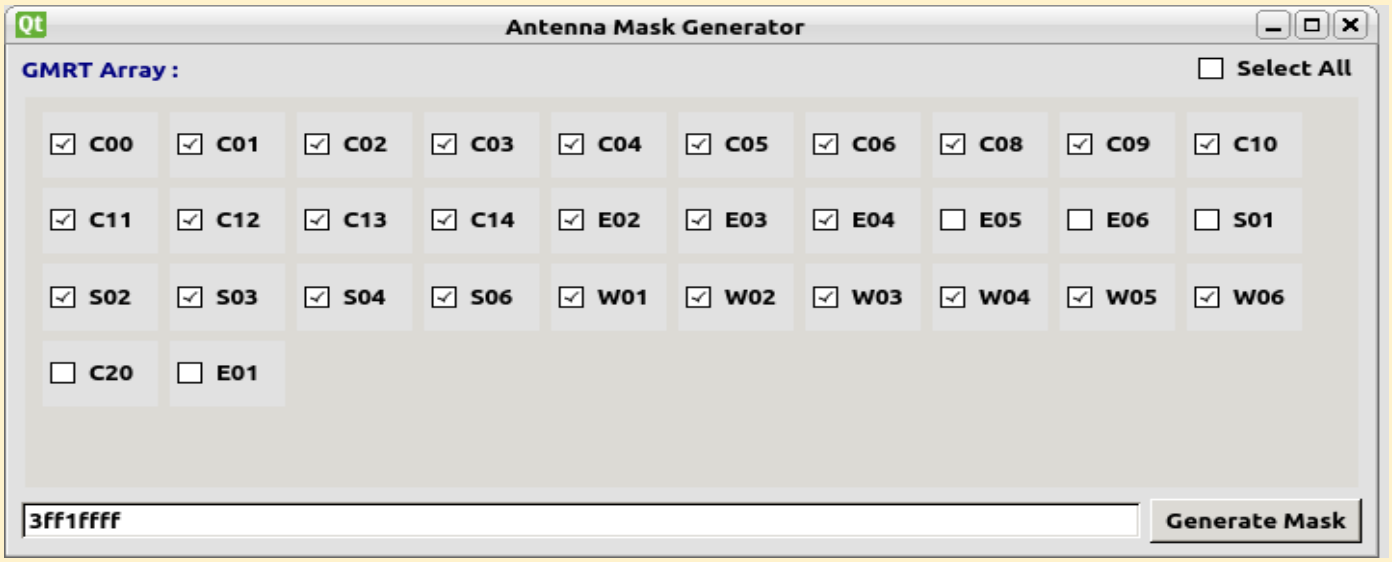
b) Init DAS Chain

>MNCGMRTScriptManager[12]:init_corr('BOTH','/opt/tangoworkspace/CentralNode/Configuration/CsvFiles/correlator/prjcode_date.csv')

c) Create Project

>MNCGMRTScriptManager[12] : create_proj('BOTH','TEST',**'3fffffff'**,'observer','prj_title')

Note : 3fffffff is Ant mask for all ants except C20 and E01. you can also generate the mask by using **TGC GUI => Utilities => AntennaMask**



d) Associate Project

>MNCGMRTScriptManager[12] : associate('0','19TGC01', 'BOTH','3fffffff','1')

Note : 3fffffff antenna mask can be changed as per no or ants in Array.

e) add Source

>MNCGMRTScriptManager[12] : load_source(target)

>MNCGMRTScriptManager[12]: target = '3C48' # define the target

>MNCGMRTScriptManager[12]: addpsource(target,'BOTH') //add source to BOTH GSB and GWB.

>MNCGMRTScriptManager[12]: addpsource(target,'gsb') // add source to GSB.

>MNCGMRTScriptManager[12]: addpsource(target,'gwb') // add source to GWB.

f) Set Source

Note : set source for both GSB and GWB (BOTH/GSB/GWB depends on users requirement)

>MNCGMRTScriptManager[12]: set_source('BOTH',0,target) OR

>MNCGMRTScriptManager[12]: set_source('GWB,0,target) OR

>MNCGMRTScriptManager[12]: set_source('GSB',0,target)

g) Set Frequency parameters

Note : set frequency(TPA) separately for GSB and GWB.

>MNCGMRTScriptManager[12] :set_frequency('gsb',0,591,591,540,540,51,51,3) # tpa values for GSB

>MNCGMRTScriptManager[12]:set_frequency('gwb',0,550,550,0,0,550,550,3) # tpa values for GWB

h) Start Project (Start das scan)

Note : strtndas for both GSB and GWB

>MNCGMRTScriptManager[12] :start_proj('both',0) #Stop Project (Stop das scan)

: **stop_proj('both',0**) # stpndas for both GSB and GWB

i) Start cmd file

>MNCGMRTScriptManager[12] : launch_script('/data1/gtac/cmd/prjcode/date/tmp.py')

j) Stop cmd file

k) Halt Corr Chain.

>MNCGMRTScriptManager[12] : halt_corr('both') # hltndas for both GSB and GWB

H) Servo Commands

a) Apply Servo brakes

>MNCGMRTScriptManager[12] : brake('Ant Name','elevation axis','azimuth axis')

: brake 'c01,c02'

: brake 'c01,c02' , 'e','a'

: brake 'c01,c02' , 'e'

b) Release brakes

>MNCGMRTScriptManager[2]: hold 'c00,c05,c10'

c) StopTracking

>MNCGMRTScriptManager[2]: stop_track_array('c00,c05,c10')

>MNCGMRTScriptManager[2]: stop_track_array('c00,c05,c10')

d) Off Source Tracking

i) **Track Source with Offsets in Elevation axis**
ii) **Track Source with Offsets in AZimuth axis**
iii) **Track Source with Offsets in Declination**
iv) **Track Source with Offsets in Right Ascension**

e) Position in Antenna Coordinate System.

MNCGMRTScriptManager[2]: amv('c01,c02,' azimuth angle', 'elevation angle")

>amv('c01,c02','80:00:00','50:00:00')

>amv('c01,c02','80:00:00','50:00:00','60:00:00','70:00:00')

f) Position in Astronomical coordinate System

MNCGMRTScriptManager[2]:> amv('c01,c02','RA',Dec') for each antenna.

> amv('c01,c02','80:00:00','50:00:00')

> amv('c01,c02','80:00:00','50:00:00','60:00:00','70:00:00')

g) Servo reset

MNCGMRTScriptManager[2]: **reset_servo 'c01,c03'**

h) Stow Antenna :-

MNCGMRTScriptManager[2]: **stow ('c00')** axis = is default.

i) Release Stow

MNCGMRTScriptManager[2]: **stow_release ('c00','a')** # Azimuth axis stow release

MNCGMRTScriptManager[2]: **stow_release ('c00','e')** # Eleve axis stow release

: **stow_release ('c00','b')** # both axes stow release

:stow_release(0,timeout=100) # for all ants in subarray 0

j) Park Antennas

MNCGMRTScriptManager[2]: **park 'C01'** # park C01

: **park 0,timeout=120** # park ants in subarray 0

k) Scan Source

i) azel

MNCGMRTScriptManager[2]: **scan_az_el('Ant Name',az value', 'elevation value')**

: **scan_az_el 'c01'**

: **scan_az_el('C01,C02',1,2)**

: **scan_az_el(1)**

ii) radec

MNCGMRTScriptManager[2]**: scan_ra_dec(Ant Name',RA, 'Dec')**

: scan_ra_dec 'c01'

: scan_ra_dec('C01,C02',1,2)

: scan_ra_dec(1)

H) Pointing offsets Commands

a. Load ant offsets for all ants

MNCGMRTScriptManager[2] :***load_ant_offset(0)***

b. Load ant offsets for selective ants

>load_ant_offset(0,ants='C00,C02',offset_file='*/opt/tangoworkspace/CentralNode/Configuration/CsvFiles/Pointing/NLDANTO.001*')

12. Troubleshooting

12.0 Unable to login TGC // allowed maximum instances exceeded

If the maximum number of allowed users exceeds a certain number then it can be clear all login sessions using the following steps.

Step 1: login to CMC machine.

> ssh -X cmcuser@192.168.70.2

Step 2: run the script to clear login session from AGN

> cd /home/cmcuser/bin

> ./remove_user_login.py AGN0 *### Removes users from Super user*

> ./remove_user_login.py AGN1 *### Removes users from AGN1*

> ./remove_user_login.py AGN2 *### Removes users from AGN2*

> *./remove_user_login.py AGN3* *### Removes users from AGN3*

> *./remove_user_login.py AGN4* *### Removes users from AGN4*

> *./remove_user_login.py AGN5* *### Removes users from AGN5*

Step 3: Now try to login TGC

12.1 Antenna LMC system showing "disconnect" status

Step 0:- First Check the status of LMC by running the ping_LMC.py script kept at the below location in cmsserver machine (192.168.70.2) as cmcuser

>ssh -X cmcuser@cmsserver(192.168.70.2

>cd utility_scripts/Ping_Python

>./python ping_LMC.py

Step 1 :- login to ngmnc(192.168.70.21) as lmcuser

> ssh -Y lmcuser@**192.168.70.21** (ngmnc)

> password :****.***

> cd /usr/local/gmrtSys

Step 2 :- First fire the starter script using following command

>./lmc_strtr.sh c00,c01,e02...etc // ***comma separated list of antenna***

Usage : ./lmc_strtr.sh or (antlmc,ceb,eant,want etc.)

Step 3 : Select List of Antenna using Master Control window using Test_Super_Operator Login(Operator Station 0)

TGC GUI ⇨ Select "**Control**" Menu ⇨ Select "**Master Control**" SubMenu ⇨

Select "**Antenna node**" tab ⇨ Click on "**List of Antenna** " to start/stop/restart

⇨ Click on button **to issue** ⇨ Command (**also change mode**)

Step 4 : To Monitor LMC Connecting status

TGC GUI ⇨ Select "**View**" Menu ⇨ Select "**DashBoard**" SubMenu ⇨

Select "**CMC Status**" tab ⇨ Click on "AGN "

12.2 Antenna's not tracking to the Source.

First ensure that all Servo IO-DS are connected ?

a. If Servo is disconnected:-login to servo pc104 using root@192.168.x.3 machine.

>cd deviceClient0.5/

>sh ./stop_client.sh

&

> sh ./start_client.sh

b. If Servo is communicating:- Check whether it is in manual mode?

c. Try Restarting BATH programme of Non tracking LMC.

For Example:

lmcuser@c01:/opt/tangoworkspace/ControlNode/Utility/starterDsScripts$ ./BATCH

Note : At present **array_status** give last status, if servo/LMC is not communicating.

(i) Check servo of that LMC is up.

(ii)Give command "dsrestart BATCH" to LMCsys in expert console.

12.3 How to Restart GSB or GWB dataserver ds if corrconfig fails

To TGC GUI ⇨ Select "Control" Menu ⇨ Select "Expert Console" Submenu

"Digital Backend" tab ⇨ Select "GSB or GWB" radio button ⇨ Select "CLMCSys"

"GWBSys" Sub system ⇨ Select "dsrestart" Cmd with its argument as "dataserver"

Click "Execute" Button ⇨ Select "dsrestart" Cmd with its argument as "dataserver"

12.4 Correlator DS shows Disconnected Status.

Note : Disconnected status means the 'Client' program is not communicating to the Sub-system Tango device-server.

To Start Simulated DS clients login to the GSB LMC and GWB LMC. First Make sure that GSB, GWB All IOs are communicating (OK status in dashboard) If Disconnected Then only start it.

a) GSB

> ssh -X gsbuser@gsbm1

> ****.***

> cd */home/gsbuser/lmcuser/bin*

> *launch.sh* * *No argument = will start both corrctl1 and collect.*

or

> launch.sh corrctl1 (this starts collect client on gsbm1 machine)

&

> launch.sh collect (this starts collect client on gsbm4 machine)

b) GSB (BEAM Clients)

> ssh gsbuser@gsbm1:/mnt/code/gsbuser/lmcuser//bin/launch.sh <node1> <node2> e.g. 33 34 or 47 48

c) GWB

> ssh gpuuser@gwbh6:/home/gpuuser/lmcuser/bin/launch.sh ***corrctl1***

> ssh gpuuser@gwbh6:/home/gpuuser/lmcuser/bin/launch.sh ***collect***

> gpuuser@gwbh6:/home/gpuuser/lmcuser/bin/launch.sh

<no argument both deviceclient starts>

d) GWB (BEAM Clients)

> gpuuser@ gwbh6 : /home/gpuuser/lmcuser/bin/beamlaunch.sh

12.5 Key Points to Remember

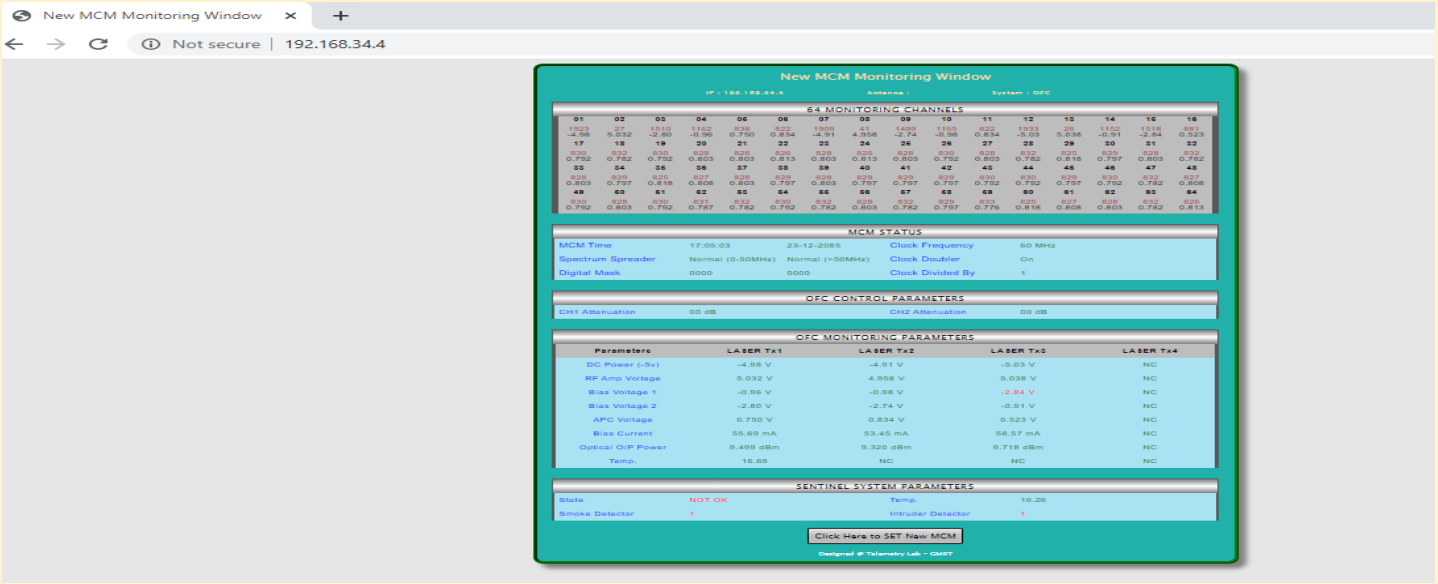
Make sure that no previous console-GUI running of GSB/GWB.

1. Sockcmd is not required.
2. Give Corr config commands whenever you open a new GUI.
3. Project code Limit is strictly Seven Character's only.
4. Project code characters should be CAPITAL LETTERS only.
5. ~~Project code Handling for two corr/subarray at a time - is in progress, command can be issued Sequentially.~~
6. USB band is always taken for the band-mask
7. In OperationControl->DataControl window addsource, setsource need for the subarray.
8. For Default catalog no need to give addsource.
9. Set Optical fiber Attenuations using SIGCON System only. time being, do not use OFC.

12.6 Present Constraints

12.7 Power ON Miltech PC Remotely & Reset OFC

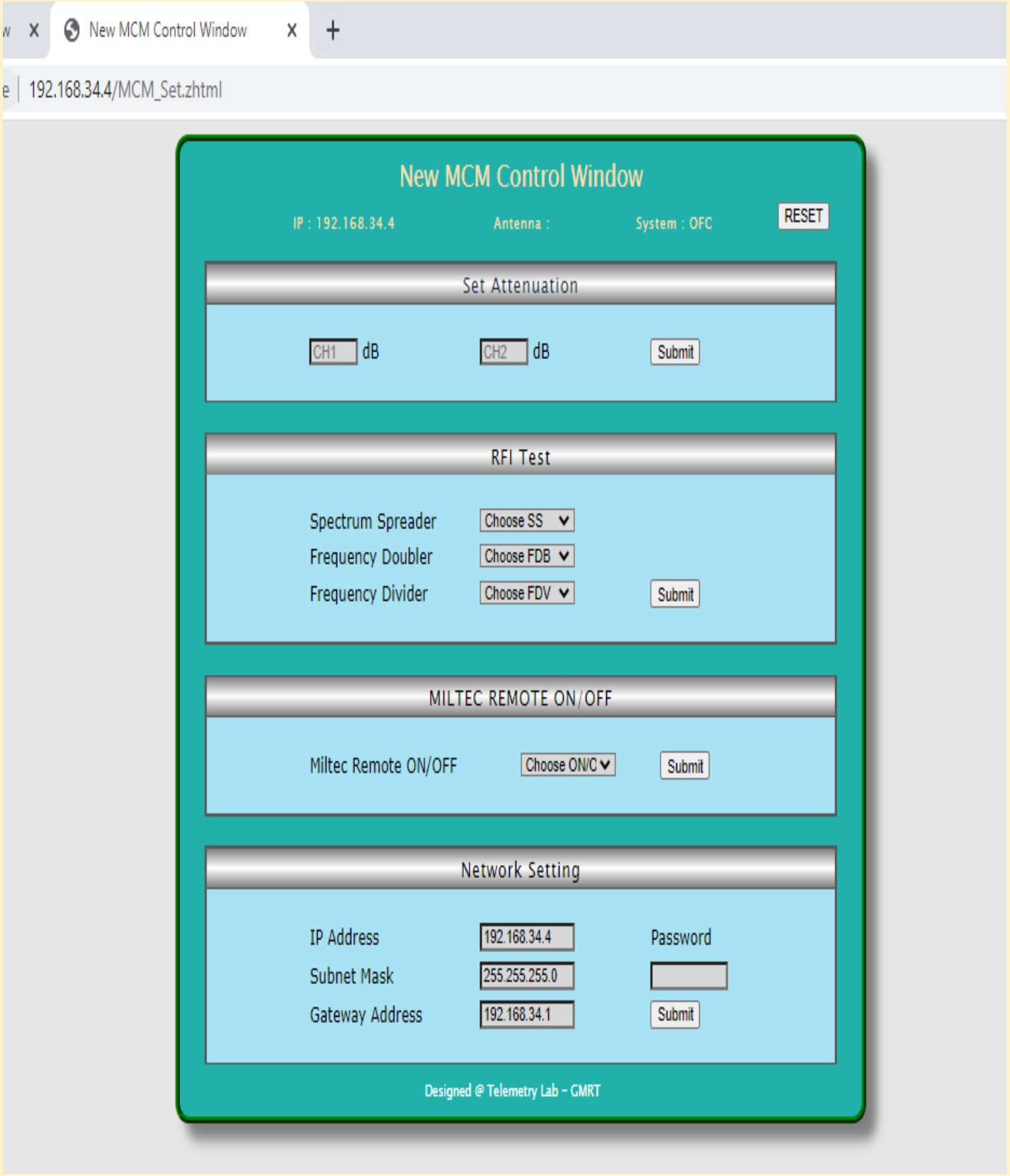
Step 1: Open respective antennae Rabbit MCM IP (192.168.xx.4) on any browser.



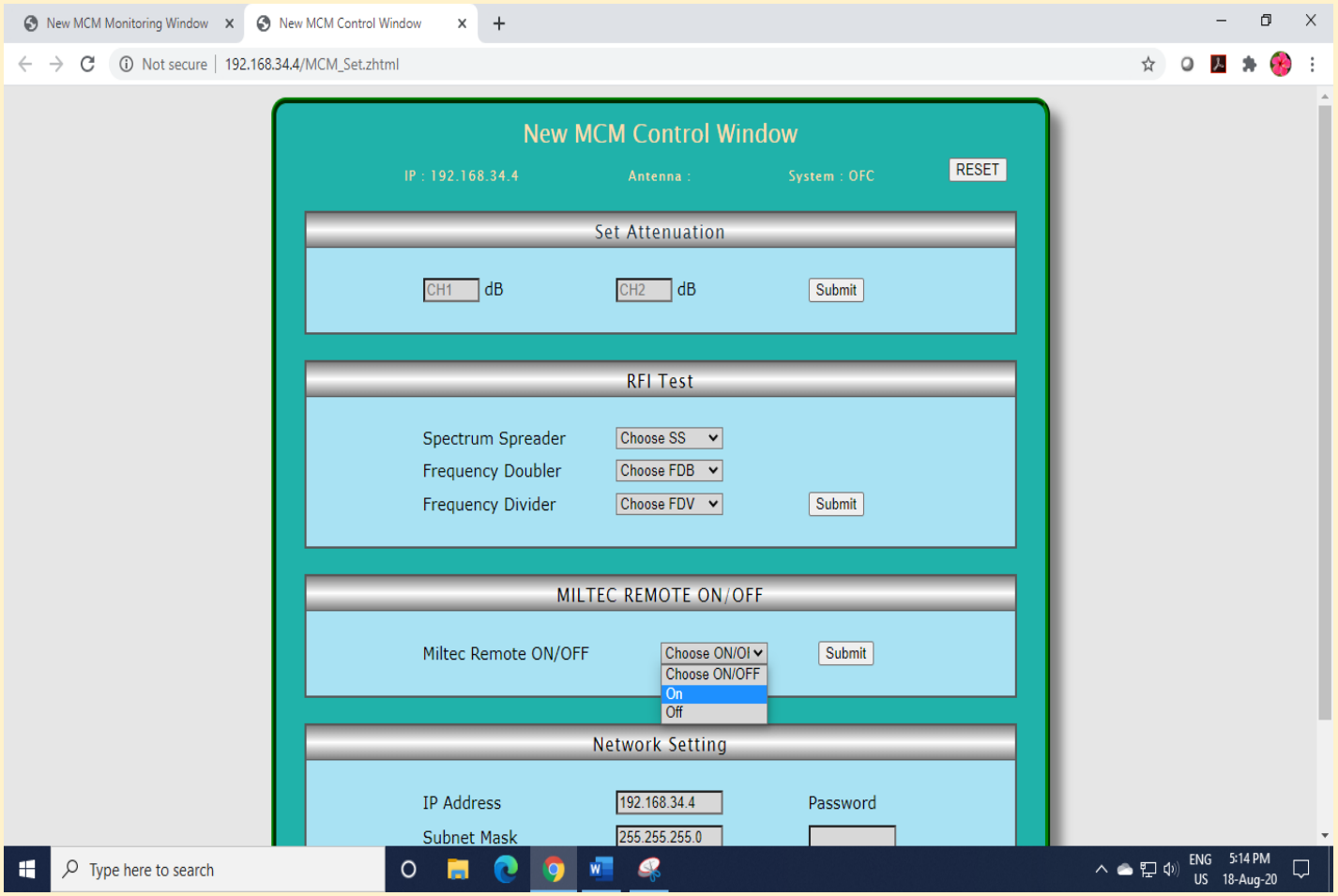
For C03 antenna , Open 192.168.34.4 IP in browser.It will show you below New MCM Monitoring Window page.

Step 2: Click on the button "Click Here to set New MCM".

Step 3: After clicking on this button below New MCM Control window Page will open.



Step 4: Select ON Command from Drop Down Menu to Remotely ON Miltec Machine.



Step 5: Click on the Submit button.

12.8 All Miltech PCs Power ON-OFF

Following Shell Script is available to to power on and off Antenna Base Miltech PCs through ofcsnt Rabbit-Card.

Step 1: login to CMC machine.

> ssh -X cmcuser@192.168.70.2

Step 2: Run the script to Miltech PC ON

> ~/bin/PCON.sh

Step 3: Run the script to Miltech PC OFF

> ~/bin/PCOFF.sh

**** Start LMC Software if not Running :-**

cmcuser@cmsserver(192.168.70.2):/opt/tangoworkspace/ControlNode/Utility/launch.sh

**** Stop LMC Software if not Running :-**

cmcuser@cmsserver(192.168.70.2):/opt/tangoworkspace/ControlNode/Utility/gui.sh

12.9 if GWB ACQ getting Kill in (multi-subarray)

Sometimes acq-kill problems occur, although this problem is associated with allowed I/O budget, and modifications to multi-subarray functionality.

Before starting Multi sub array observation issue copy ms cmd.

> ***observer@shivneri:/>/home/observer/bin/copy_ms2_sw.pl***

to Restore back :-

> ***observer@shivneri:/>more /home/observer/bin/restore_def_sw.pl***

12.10 If only GWB Halted

If only GWB o gets halted (or only one correlator halted) then initialize only one correlator, and re-associate the project code of "BOTH" and issue a fresh halt command.

12.11 Power fail and LMCs allocation and deallocation

Many times LMCs goes and come back, antenna allocation/deallocation to the AGN node (Operator Workstation) happens automatically, but this reallocation happens only when data acquisition scan isstopped. Therefore, whenever LMCs go and come back due to power-failure, please re-allocate that antenna manually whenever datascan gets stopped.

12.12 AGN hung Problem

Whenever, suddenly antenna based PC is not communicating (i.e. LMC is down) due to the electrical power failure or network problem, an audio alarm will be raised about "<Antenna> LMC down". Around this time, you will notice that the GUI is running very slowly, or got stuck (in this case, you can not login to the other GUI.

Restart the AGN by typing 'restartagn <1-5>' in the linux commad-terminal

Step 1: login to CMC machine.

> *ssh -X cmcuser@192.168.70.2*

Step 2: Restart the AGN

>restartagn 1

or

> restartagn 2

Note :

1. Above command will restart the given AGN<1-5>, it takes ~1 min to restart. After that login to the GUI to verify everything is ok or not.

2. You do not need to restart the correlator, only re-start the observing script if it was running previously.

12.13 Authorisation error

If GSB/GWB gives authorisation error, just re-allocate ownership again to the given 'Operator station <id>' from the master-control by using 'manage_pool'.

12.14 Cmcserver / GUI slow

'cmc' is slow due to 'mysqld' process taking continuously more cpu time, then kill OLD/stale GUI processes ('mainwindow.py').

>cmcuser@cmsserver:~$ /home/cmcuser/bin/kill_allGUI.sh

13.Annexure

A.Command File Templates

a) Single Sub-array TGC Command file

```
#!/usr/bin/python
# import required libraries for TGC
# Do not remove following line
# For single subar observation default subar is 0

from tgcall import *

# user code starts here
# Any valid python syntax can be used
import time

# addlist
add_user_catalog('/home/cmcuser/prjcode_src_list.csv','type1')
use_catalog('prjcode_src_list','type1')
```

```
# Define correlator to use for observation
backend_correlator = 'BOTH' # For GSB+GWB.


# psource_added
psource_added = list()


# Loop
while True:
    # source : 3C286
    target = '3C286'
    load_source(target)
    print(target)
    track_array(0,1)# First argument is subar_id and second argument is for outer and inner track, for outer it is 1 and for inner it is 0
    track_array(0,1)
    if target in psource_added:
        pass
    else:
        addpsource(target,backend_correlator)
        psource_added.append(target)
    set_source(backend_correlator,0,target)
    gotosrc(0,maxtime=300) # maxtime is in seconds
    start_proj (backend_correlator,0) # Strtndas
    time.sleep(300) # recording time
    stop_proj (backend_correlator,0) # Stpndas


    # source : 1459+716
    target = '1459+716'
    load_source(target)
    print(target)
    track_array(0)
    track_array(0)
```

```
        if target in psource_added:
                pass
        else:
                addpsource(target,backend_correlator)
                psource_added.append(target)
        addpsource(target,backend_correlator)
        set_source(backend_correlator,0,target)
        gotosrc(0,maxtime=300) # maxtime is in seconds
        start_proj (backend_correlator,0) # Strtndas
        time.sleep(1800) # recording time
        stop_proj (backend_correlator,0)  # Stpndas
```

b) Muli Sub-array TGC Command file

```
#!/usr/bin/python
# import required libraries for TGC
# Do not remove following line
from tgcall import *
import time

# user code starts here
# Any valid python code can be used
# addlist
add_user_catalog('/data1/gtac/cmd/prjcode/prjcode_src_list.csv','type1')
use_catalog('prjcode_src_list','type1')

# 0 suba array will always have all antenna
subar0 = 0
subar1 = 1
subar2 = 2
subar4 = 4

# define backend_correlator correlator
```

```
backend_correlator = 'BOTH' #  BOTH/GWB/GSB


# psource_added
psource_added = list()
# Outer track / inner track
#  track_bit = 1       // 1 for  outer track
# track_bit = 0        // 0 for inner track
 track_bit = 1
# Target source 1
target = '3C147' # source name
load_source(target)
print(target)
track_array(subar0,track_bit)
# for tracking one can use common subar i.e. suba array 0
gotosrc(0,maxtime=300) # maxtime is maximum time for time out in seconds
if target in psource_added:
    pass
else:
    addpsource(target,backend_correlator)
    psource_added.append(target)
set_source(backend_correlator,subar2,target)#backend_correlator=BOTH/GSB/GWB
set_source(backend_correlator,subar4,target)#backend_correlator=BOTH/GSB/GWB


# start interferometer scan for subar 2
start_proj (backend_correlator,subar2) #  subar2 is id
# start interferometer scan for subar 4
start_proj (backend_correlator,subar4) # subar4 id
time.sleep(60) # record time in seconds
# stop interferometer scan for subar 2
stop_proj (backend_correlator,subar2)
# stop interferometer scan for subar 4
```

```
stop_proj (backend_correlator,subar4)


# Target source 2
target = '3C48' # source name
load_source(target)
print(target)
track_array(subar0,track_bit) # for tracking one can use common subar i.e. suba array 0
track_array(subar0,track_bit)
gotosrc(0,maxtime=300) # maxtime is maximum time for time out in seconds
if target in psource_added:
    pass
else:
    addpsource(target,backend_correlator)
    psource_added.append(target)
set_source(backend_correlator,subar2,target)#backend_correlator= BOTH/GSB/GWB
set_source(backend_correlator,subar4,target)#backend_correlator= BOTH/GSB/GWB
# start interferometer scan for subar 2
start_proj (backend_correlator,subar2) #  subar2 is id
# start interferometer scan for subar 4
start_proj (backend_correlator,subar4) # subar4 id
# pulsar command can be added here
time.sleep(60) # record time in seconds
# pulsar command can be added here
# stop interferometer scan for subar 2
stop_proj (backend_correlator,subar2)
# stop interferometer scan for subar 4
stop_proj (backend_correlator,subar4)
```

B. Antenna IP and Antenna IP Phone

Antenna Name	Host Name	LMC IP Address	Antenna Name	IP Phone Number
C00	c00	192.168.31.2	7	
C01	c01	192.168.32.2	6	
C02	c02	192.168.33.2	5	
C03	c03	192.168.34.2	1	
C04	c04	192.168.35.2	3	
C05	c05	192.168.36.2	19	
C06	c06	192.168.37.2	20	
C08	c08	192.168.38.2	24	
C09	c09	192.168.39.2	4	
C10	c10	192.168.40.2	12	
C11	c11	192.168.41.2	9	
C12	c12	192.168.42.2	2	
C13	c13	192.168.43.2	11	
C14	c14	192.168.44.2	10	
E02	e02	192.168.45.2	17	
E03	e03	192.168.46.2	18	
E04	e04	192.168.47.2	21	
E05	e05	192.168.48.2	22	
E06	e06	192.168.49.2	23	
S01	s01	192.168.50.2	26	
S02	s02	192.168.51.2	27	
S03	s03	192.168.52.2	28	
S04	s04	192.168.53.2	29	
S06	s06	192.168.54.2	30	
W01	w01	192.168.55.2	8	

W02	w02	192.168.56.2	12	
W03	w03	192.168.57.2	14	
W04	w04	192.168.58.2	15	
W05	w05	192.168.59.2	16	
W06	w06	192.168.60.2	25	

14. API List

Sr. No.	Name of API the Package (Method)	Help	Example
1.	set_local_mode	To Put lmcs to local mode	❖ set_local_mode 'gsb' ❖ set_local_mode('cant') ❖ set_local_mode(0) ❖ set_local_mode('c01,c02')
2.	set_remote_mode	To Put lmcs to local mode	❖ set_remote_mode 'gsb' ❖ set_remote_mode('cant') ❖ set_remote_mode(0) ❖ set_remote_mode('c01,c02')
3.	start_node	To Start Antenna(LMC)	❖ start_node('gsb') ❖ start_node('c01')
4.	restart_node	To restart antenna(LMC)	❖ restart_node('gsb') ❖ restart_node('c01')
5.	stop_node	To Stop Antenna(LMC)	❖ stop_node('gsb') ❖ stop_node('c01')
6.	halt_node	Halt normal / emergency LMC	❖ halt_node('gsb',mode='normal / emergency') ❖ halt_node('c01',mode='normal / emergency ') ❖ halt_node('agn1',mode='normal/emergency')

7.	lmc	To get lmc obj	❖ lmc('C01')
8.	launch_script	To launch script	❖ launch_script 'scriptpath'
9.	get_state	To get state of the host device server	❖ get_state 'agn1'
10	execute_command	To forward command for further processing	execute_command('C00','setLocal')
11	get_node_child		
12	list_global_variable		
13	resume_script		
14	get_value		
15	status_script		
16	set_global_variable		
17	subscribe_to_attribute		
18	get_device_name		
19	get_mode		
20	schedule		
21	validate_script		
22	pause_script		
23	stop_script		
24	get_lst		
25	connect_to_host		
26	set_value		

27	set_host_ds_state'		
28	open_script		
29	connect_to_script_host		
30	command_scheduler'		
31	get_time		
32	'auth': ['switch_user', 'login', 'logout']		

'beamapi': ['beam_stop',

'beam_stop_record',

'beam_setup',

'get_data',

'beam_finish',

'beam_start_record',

'beam_start',

'beam_init'],

'cmcapi': ['allocate_array',

'power_equalise',

'ensure_track',

'deallocate_operator_array',

'set_auto_mode',

'gotosrc',

'zero_phase',

'stop_track_array',

'track_array',

'grid_pointing',

'cmc',

'track_off',

'delete_array',

'set_manual_mode',

'abort_power_equalise',

'trkazoff',

'allocate_operator_array',

'list_alias',

'list_array',

'get_opr_array',

'get_sub_array',

'phase',

'create_array',

'trkdecoff',

'create_operator_array',

'trkeloff',

'define_group',

'list_opr_array',

'list_group',

'scan_pointing',

'delete_operator_array',

'addpsource',

'trkraoff',

'deallocate_array',

'set_alias'],

'corrapi': ['get_data',

'disassociate',

'associate',

'set_source',

'stop_proj',

'start_proj',

'corr_setup',

'generateHexNumber',

'halt_corr',

'set_frequency',

'generate_antenna_mask',

'set_source_agn',

'init_corr',

'del_proj',

'create_proj'],

'fecb': ['sel_febox',

'setrfswap',

'setwalshgrp',

'setngstate',

'fecb',

'setwalsh',

'set_cbterm',

'set_feterm',

'get_fecb_para',

'rfattn',

'sel_ufebox',

'set_ngoff',

'set_fecb_default',

'set_walsh',

'setrfsys',

'setcbterm',

'rfon',

'set_ngon',

'rfcm_sw',

'seturfsys',

'setrfngcal',

'setfeterm',

'set_rfswap',

'get_para'],

'gab': ['set_gab_mixer',

'set_gab_lpf',

'set_lpf',

'set_gab_lo',

'set_conf',

'set_gab_conf',

'set_gab_attn',

'set_lo',

'set_mixer',

'gab'],

'helper': ['get_db_configuration',

'check_grp',

'check_user_logged',

'hierarchy_check',

'get_secs',

'generate_device_name',

'get_instance',

'search_source',

'get_project_code',

'get_src_id',

'check_subnode',

'list_node_level',

'list_client_logged_user',

'list_node_commands',

'preprocess_subnode',

'preprocess',

'wait',

'list_node_logged_user',

'list_command_subnode_name',

'get_alias_node',

'get_node_from_opr',

'list_attributes',

'list_node_attributes',

'list_command_node_name',

'get_api_list',

'check_arg_count',

'list_ds_commands',

'get_node_from_array'],

'ofcsnt': ['ofcsnt', 'get_of_attn', 'get_attn', 'set_of_attn', 'set_attn'],

'services': ['status_service', 'stop_service', 'get_alarm', 'start_service'],

'servo': ['scanradec',

'trkdecoff',

'trkeloff',

'servo',

'trkraoff',

'trkazoff',

'scanazel',

'use_pointing',

'update_offset',

'brake',

'track_off',

'hold'],

'sigcon': ['walshpattern',

'setif',

'noisefreq',

'setrfnoise',

'srvrst',

'setofatten',

'rfcm_sw',

'sigcon',

'setsigcon',

'setilo',

'setifatten',

'walshfreq',

'walshpatern',

'set32dig',

'set64dig'],

'tune_receiver': ['command_formation',

'set_config_param',

'display_values',

'read_csv',

'set_tune_receiver',

'get_default_values',

'get_file_values',

'tune'],

'userproc': ['load_if_attn',

'get_suba_freq',

'sysCmd',

'get_prjcode',

'set_gab',

'load_ant_offset',

'au_bell',

'set_default_tpa',

'show_fps',

'srvrst',

'create_antmask',

'observe_source',

'set_bblo',

'strtndas',

'set_fecb',

'amvelev',

'load_gab_attn',

'start_corr',

'init_proj',

'stpndas'],

'utilities': ['modify_catalog_entity',

'rise_set',

'list_source',

'list_catalog',

'precess_coord',

'remove_catalog',

'load_source',

'add_sys_catalog',

'use_catalog',

'del_sys_catalog',

'add_catalog_entity',

'delete_catalog_entity',

'deletef_catalog',

'del_usr_catalog',

'list_source_details',

'list_catalog_in_use',

'add_user_catalog']}