

# National Centre for Radio Astrophysics

# Technical Report On Miltec Machine Remote ON/OFF facility

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### Abbreviations:

TGC	Tango based GMRT Control and Monitoring system
TANGO	Taco based Next Generation Objects
LMC	Local Monitoring and Control
МСМ	Monitoring and Control Module
GMRT	Giant Metrewave Radio Telescope

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#### 1) Abstract

A new Tango based GMRT Control and monitor system (TGC) used improved hardware and software components, which is responsible for controlling the antennas and the electronics associated with it in addition to monitoring the parameters and the system performance. This Miltec based LMC machine installed at all 30 antennae. During Electric power failure, Miltec PC got shutdown and will not start at some antennae even after power restored. To power On Miltec machines need to visit antenna base and manually power On the machines. It was wastage of fuel, time and manpower. So we required one web base tool to power ON Miltec based LMC machine remotely to reduce downtime.

#### 2) Introduction

TGC based Control & Monitor system used new powerful hardware such as Miltec based LMC machine, L2 / L3 Ethernet network switches and Rabbit (RCM 4300) based high speed microprocessor.







(C)

(a)



**(b)** 

(a) Rabbit MCM card (b) Network Switch (c) Miltec Machine

To power ON Miltec machine remotely telemetry team suggested web based solutions. For that we have used existing antenna base OFCSNT Rabbit MCM card to give On/Off command to Miltec machine. Mr. Charudutta Kanade added one On/Off function in existing OFCSNT Rabbit dynamic C code. For that he has modified main.c, define.c and zhtml files. We have tested this new code at lab test setup and initially added this facility at C03 antenna base. We observed C03 antenna for a week and tested remote On/Off facility frequently by giving command through web page to check code robustness. But we noticed that after power glitch/failure web page will not load on browser (Rabbit Hang problem). We identified problem and as per the suggestion given by Mr. Charudatta Kanade and Mr. Raju Uprade, we added patch code of this On/Off function in newly OFCSNT rabbit dynamic C code. Then we have initially uploaded bin file of new patch code at 10 antennae and observed it's functionality. This new patch code was working fine at all this 10 antennae without any problem even after power glitch or failure. So, we uploaded bin file of this new OFCSNT patch code at all 30 antennae using remote firmware update web page as explained in section 4.

#### 3) Hardware Connection details

At antenna base *OFCSNT* Rabbit MCM card is used to control and monitor OFC and Sentinel system parameters. We used this rabbit control port two pins *(D06 and D07)* to give On/Off command to LMC machine. This control port pin is connected to On/Off switch circuitry of LMC machine through USB cables as shown in below *Fig 3.1* 



Fig 3.1) Hardware connection Block diagram



Fig 3.2) Detailed hardware connection (Miltec – Rabbit)

#### 4) Software details

In existing *OFCSNT* Rabbit dynamic C code *Mr. Charudutta Kanade* added one Miltec On/Off loop in *main.c* file and also added remote On/Off tab in existing zhtml web page file. To upload this modified code bin file on each antenna (Rabbit MCM card) required to assign IP address, Gateway, Net mask and Server address in *define.c* file.

Example for **C10** antenna *define.c* file network setting,

#define MY\_IP\_ADDR "192.168.40.4" // OFC Rabbit MCM IP
#define MY\_GATEWAY "192.168.40.1"
#define MY\_NET\_MASK "255.255.255.0"
#define OFC\_SERVER\_ADDR "192.168.40.2" // OFC server address
#define OFC\_SERVER\_PORT "3002"

Bin file generated through dynamic c software need to be uploaded on each antenna using remote firmware update web page as shown in below *Fig 4.1* 

Firmware Co	ntrol Window × + 😑 🛛 🧕
$\leftrightarrow$ > C $\textcircled{a}$	0 🔏 192.168.40.4/fw/upload.zhtml ···· 🗵 🏠 🔍 Search 👱 💷 🗧
ſ	Remote Firmware Update (v1.0)
	Current Firmware: Miltec ON/OFF v1.02 Date: 00-00-0000 Time: 00:00:00
	Last FW Uploaded: Miltec ON/OFF v1.02 Date: 00-00-0000 Time: 00:00:00
	Upload New Firmware: Browse No file selected. Upload
	Upload Status
	Ready to upload
Ľ	Designed @ Telemetry Lab - GMRT

### Fig 4.1) Web page for Remote firmware update

To upload new firmware bin file click on Browse button. Go to the directory where bin file of new firmware is placed. Select it and click on Upload button. Then click on Install button to install this firmware.

#### 5) Miltec Remote Switch On/Off Procedure

Steps mentioned in this section requires to switch On/Off Miltec machine through web page.

**a)** Open web browser in any PC connected to LAN.

**b)** Enter IP address of particular antenna Rabbit OFCSNT card.

For example C10 antenna IP address is : **192.168.40.4** 

• Once you open above IP in browser you will see the below web page of particular antenna (see *Fig 5.1*)

		Nev	v MCI	M Mor	nitorir	ıq Wir	ndow					
			54 MON	NITORII	NG CH	ANNEL	s	_	_	_	_	
01 02 03	04 05	06	07	08	09	10	11	12	13	14	15	16
1921 38 1496 -4.97 4.974 -2.72	1156 851 -0.93 0.68	828 0.803	1922 -4.97	35 4.990	1468 -2.58	1157 -0.93	622 1.890	1924 -4.98	32 5.006	1473 -2.60	1154 -0.92	853 0.671
17 18 19	20 21	22	23	24	25	26	27	28	29	30	31	32
0.824 0.824 0.824	0.834 0.80	8 0.834	0.818	0.834	0.834	0.845	0.803	0.813	0.808	0.834	0.824	0.834
33 34 35 832 828 830	36 37 828 828	38 821	39 830	40 825	41 826	42 827	43 828	44 827	45 828	46 830	47 826	48 828
0.782 0.803 0.792	0.803 0.80	0.840	0.792	0.818	0.813	0.808	0.803	0.808	0.803	0.792	0.813	0.803
<b>49 50 51</b> 784 44 43	96 979	983	984	98	772	827	831	967	840	827	830	224
1.035 4.943 4.948	4.668 0.00	5 -0.01	-0.02	4.657	1.098	0.808	0.787	0.068	0.739	0.808	0.792	3.992
			_	MCM S	TATUS		_	_	_	_	_	_
MCM Time	12:27:19	09	-04-2088		Clock I	Frequenc	ev	60 MF	iz			_
Spectrum Spreader	Normal (0-5)	MHZ) NO	rmal (55									
Disitel Mask				0.00012)	Clock	Divided	<b>.</b>					
Digital Wask	0000	00	00		CIUCK	Jivided I	зу	1				
		(	OFC CC	ONTROI	. PARAI	METER	S	_	_	_	_	_
CH1 Attenuation	2 dB				CH2 At	tenuatior	1	2 dB				
		OF	C MON	ITORI	NG PAR	AMETH	ERS					
Parameters	LAS	ER Tx1		LASE	R Tx2		LA	SER TX3		L	ASER TX	4
DC Power (-5v)	-4	97 V		-4.	97 V		-	4.98 V			NC	
RF Amp Voltage	4.9	74 V		4.9	90 V		5	.006 V			NC	
Bias Voltage 1	-0	93 V		-0.	93 V		-	0.92 V			NC	
Bias Voltage 2	-2	72 V		-2.	58 V		-	2.60 V			NC	
APC Voltage	0.0	81 V		1.8	90 V		0	.671 V			NC	
Bias Current	54.	11 mA		49.7	7 mA		51	.05 mA			NC	
Optical O/P Power	9.39	8 dBm		9.01	1 dBm		9.1	.21 dBm			NC	
Temp.	1	5.05		,	IC .			NC			NC	
		SE	NTINE	L SYST	EM PAF	RAMET	ERS	_	_	_	_	
State	NOT ОК				Тетр			22.24				
							_	_	_	_	_	

### Fig 5.1) Monitoring web page of C10 antenna

**c)** Then click on set new new MCM button, it will show you below control web page window (see *Fig 5.2*).

← → C' û 0 🔏 192	.168.40.4/MCM_Set.zhtml 90%	🖾 🗘 🤇 Sea	rch	⊻ ∥\ ⊡	00	🐁 😼	<b>2</b> 0 i
	New MC	'M Control Windo	W				
		Antenna : S	ystem : OFC	RESET			
		at Attenuation					
	5	et Attenuation					
	CH1 dB	CH2 dB	Submit				
		RFI Test					
	Spectrum Spreader	Choose SS •					
	Frequency Doubler	Choose FDB •					
	Frequency Divider	Choose FDV •	Submit				
	MILTE	C REMOTE ON/OFF					
	Miltec Remote ON/OFF	Choose ON/OFF	Submit				
			Jubinit				
	N	etwork Setting					
	IP Address	192.168.40.4	Password				
	Gateway Address	192 168 40 1	Submit				
	Galeway Address	192.100.40.1	Submic				
	Designed	@ Telemetry Lab - GMRT					

Fig 5.2) Control web page of C10 antenna

- **d)** Select command from Miltec Remote On/Off tab to switch On Miltec machines. Then click on submit button.
- e) Now you can check the status of LMC machine using *ping* command or *ping\_LMC.py* script in terminal window.

Example (C10 LMC machine IP): *ping* 192.168.40.2

1	kur	bibha	veshb(	<pre>@tgc-6:~\$ ping</pre>	192.168.40	.2		
l	PIN	IG 192	.168.4	40.2 (192.168.4	40.2) 56(84)	) bytes	of data.	
1	64	bytes	from	192.168.40.2:	<pre>icmp_seq=1</pre>	ttl=62	time=0.258	ms
1	64	bytes	from	192.168.40.2:	<pre>icmp_seq=2</pre>	ttl=62	time=0.267	MS
l	64	bytes	from	192.168.40.2:	icmp_seq=3	ttl=62	time=0.298	MS
1	64	bytes	from	192.168.40.2:	icmp_seq=4	ttl=62	time=0.292	MS
1	64	bytes	from	192.168.40.2:	icmp_seq=5	ttl=62	time=0.331	MS
1	64	bytes	from	192.168.40.2:	icmp_seq=6	ttl=62	time=0.278	MS
1	64	bytes	from	192.168.40.2:	icmp_seq=7	ttl=62	time=0.367	MS
l	64	bytes	from	192.168.40.2:	icmp_seq=8	ttl=62	time=0.332	MS
- D. I.								



C00 192.168.31.2 active	
C01 192.168.32.2 active	
C02 192.168.33.2 active	
C03 192.168.34.2 inactive	
C04 192.168.35.2 active	
C05 192.168.36.2 active	
C06 192.168.37.2 active	
C08 192.168.38.2 active	
C09 192.168.39.2 active	active: LMC machine is ON
C10 192.168.40.2 active	inactive: LMC machine is OFF
C11 192.168.41.2 active	
C12 192.168.42.2 active	
C13 192.168.43.2 active	
C14 192.168.44.2 active	
E02 192.168.45.2 active	
E03 192.168.46.2 active	
E04 192.168.47.2 active	
E05 192.168.48.2 active	
E06 192.168.49.2 active	
S01 192.168.50.2 active	
S02 192.168.51.2 active	
S03 192.168.52.2 active	
S04 192.168.53.2 active	
S06 192.168.54.2 active	
W01 192.168.55.2 active	
W02 192.168.56.2 active	
W03 192.168.57.2 active	
W04 192.168.58.2 active	

#### Fig 5.4) LMC machine status of all 30 antennae

**Note:** Once ON command submitted through web page to LMC machine, it will take approximately ~ 30 sec to boot up.

#### 6) Conclusion

- Telemetry team has developed, tested, and installed the Remote On feature of Miltec machine using OFCSNT Rabbit card on all 30 antennae.
- This work reduce downtime.
- It saves manpower, fuel and time because, it avoid manual labour visit to particular antenna to power ON the Miltec machines.

#### 7) Future Work

• In future scope, we will develop a master web page through which we can give ON command to selected antenna at one time.