Proposal planning and observing

✤ Ruta Kale
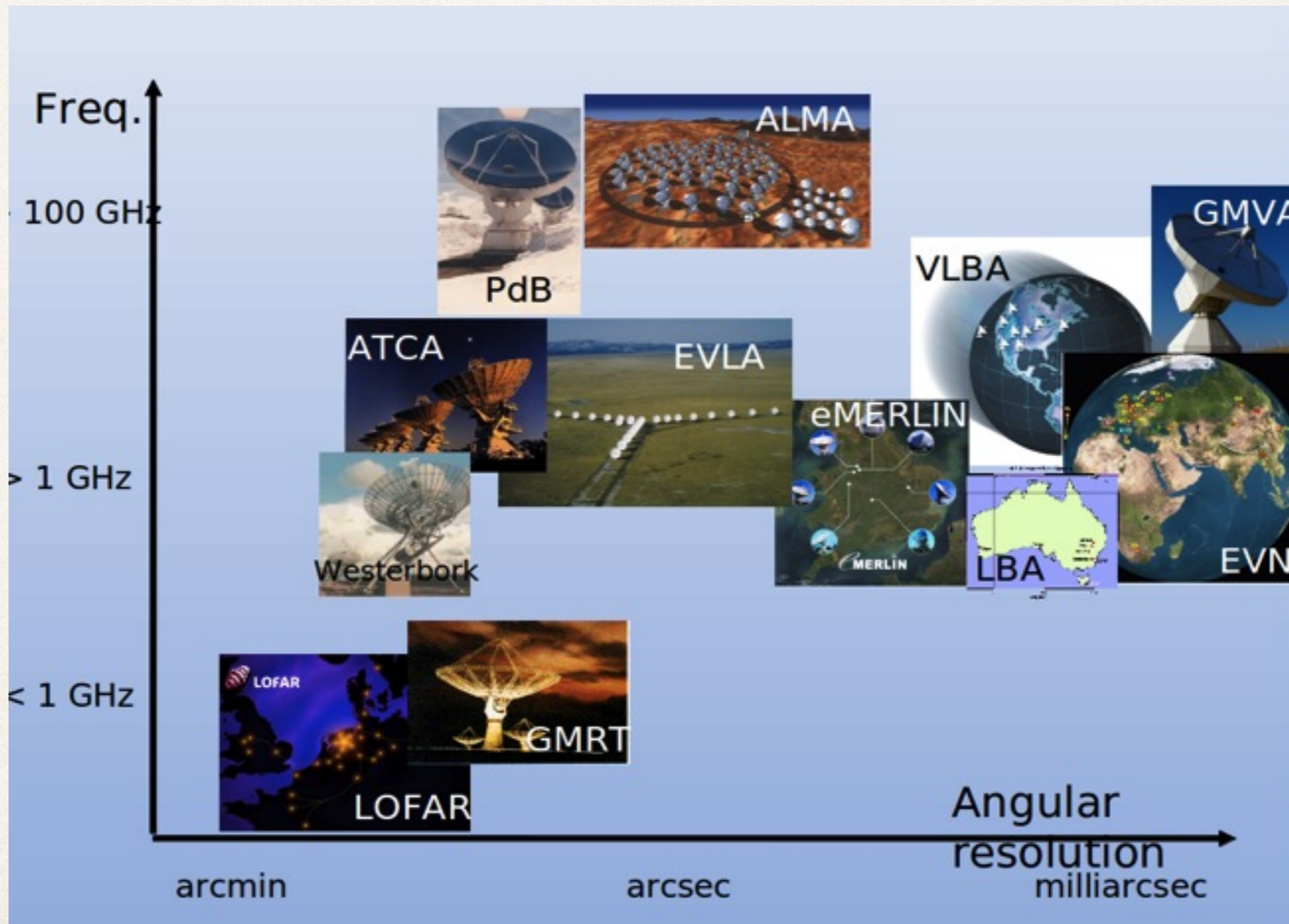
✤ NCRA-TIFR

Why a Proposal?

✤ To test a scientific hypothesis

✤ Telescopes like the GMRT are open to the worldwide scientific community

✤ Compete for observing time

✤ Proposal writing skills are essential for funding

Telescopes & Frequencies

T. Savolainen

Proposal Submission

✤ GMRT Time Allocation Committee (GTAC) invites proposals for 2 Cycles (April to September and October to March).

✤ **Deadlines** 15 January and 15 July

✤ Proposals must be submitted online via NCRA Archive & Proposal System, NAPS

✤ Proposals must be submitted by the Principal Investigator (PI)

✤ Co-Investigators (Co-Is) need to be registered users

✤ All proposals processed by GTAC with external refereeing and inputs from the GMRT Observatory on technical issues

NCRA Archive and Proposal System

User ID

Password

Login

Create Account

Reset Password

Help on creating proposal

GMRT Online Archive search is available here. User's can use their current credentials to login archive.
GMRT Coversheets finder tool is available here.

✤ https://naps.ncra.tifr.res.in/naps/login

3 Components of a Proposal

1. **Cover sheet**: Title, Abstract, Affiliation, Collaborators, Targets & Observing time

2. **Scientific Justification**: Science case for your observations

3. **Technical Justification**: Details of time request, Bands, Exposure Time Calculator (ETC)

Proposal Components

✤ **Abstract**: Short summary of the science, time request and frequency(ies)

✤ **Scientific Justification**: **(1)** Introduction + **(2)** Previous work/Proposed targets + **(3)** How the science goals stated in the Introduction will be met

✤ **Introduction**: What is the big picture? What are the open questions? Why is the proposed science essential for answering the open questions?

✤ **(1)+(2)+(3):** Make it understandable to an undergraduate student or a non-expert. Make it quantitative. Include explanatory figures

✤ **Technical Feasibility**: Show that with the proposed time request, you will be able to achieve your science goals (detect features at **>5σ** level?)

Some more on Scientific Justification

✤ Highlight previous observations at radio and other wavelengths, to put things in perspective

✤ If data exist, explain why you need more observations

✤ Demonstrate by numbers/figures that existing data are inadequate

Archival Data Search

- GMRT Data Archive (https://naps.ncra.tifr.res.in/goa/data/search)

- TIFR GMRT Sky Survey, TGSS archive @150 MHz (http://tgssadr.strw.leidenuniv.nl)

- VLA NVSS archive @1.4 GHz, 45 arcsec (https://www.cv.nrao.edu/nvss/)

- VLA FIRST archive @1.4 GHz, 5 arcsec (https://www.cv.nrao.edu/first/)

- ATNF archive for ATCA @1-2 GHz, <9 arcsec (https://atoa.atnf.csiro.au)

GMRT Data Archive

Some more on Technical Justification

✤ Clear justification of Technical choices: Receiver frequencies, RFI considerations, special requests. Talk about Resolution

✤ Demonstrate that you will reach the required signal-to-noise ratio in the time requested. Note the expected r.m.s. noise. Talk about Sensitivity

✤ Include expected overheads (setup time, slew time, calibration time, position switching time etc.) in total time request

✤ Now, ETC. Attach ETC page to proposal.

✤ If non-standard setups or a very stringent scheduling is needed, then consult the GMRT observatory staff before submitting the proposal

✤ **COMPLETE** consistency between the Cover sheet and Technical justification

Submit your proposal online via NAPS

If your proposal does not get accepted

Incorporate the GTAC comments and submit again for the next cycle

If your proposal gets accepted

Preparing for your observations

http://www.ncra.tifr.res.in/ncra/gmrt/gmrt-users

Observing Help

Monitoring Tools

Observing Help & Monitoring Tools

home

For Astronomers	For Engineers
User Documents	**Antenna Systems**
GMRT Observer's Manual	Antenna Tracking Status (NEW)
System Parameters and Current Status	Antenna Tracking Status (OLD)
Manual for observations in beam-former mode	Ondisplay History
Polarisation observations with GMRT (V2)	Feed position status
Dual band multi-pointing with GMRT (V2)	Pointing Offsets
GMRT Software Backend Documents	Wind Monitoring Station
uGMRT upgrade status	Antenna Wind Status
	Temperature Status
Before Observations	Servo data
GTAC Schedule [NCRA] [GMRT]	Sentinel and Power Supply(OLD)
White Slot Request[NCRA] [GMRT]	Antenna Sentinel, Power Supply & Link
Command file Creater(GSB)	
Command file Creater (GWB)	**Analog Backend**
Line Observations Setup (GSB tune)	GAB Status, Band-Shapes, Temperature
Source(s) Rise and Set [NCRA] [GMRT]	IF Band-Shapes and Deflection data
GMRT Exposure Time Calculator	
Online RFI excision	**Digital Backend**
VLA Calibrator Search	GSB band-shapes, Fringe Status
Dual band multi-pointing coordinates	GSB Amp-Phs(rantsol), Amp-Phs(xtract)
Online Archive (GOA)	Temperature
During Observations	**Hydrogen Maser**
Antenna Tracking Status (NEW)	
Antenna Tracking Status (OLD)	**Gmon Tools, Logs**
Corr band shapes and Project State (GSB)	
Corr band shapes and Project State (GWB)	**Test Results, Callsheets and Schedules**
Gain-amplitude and Phase (rantsol)	Useful scripts
Visibility - amplitude and phase (xtract)	Recent Callsheets
Antenna Wind Status	GMRT Upgrade Status
Satellite passes	Results of Weekly PMQC tests
	GDDP, RFI status gray plots
After Observations	Antenna Beam Width Plots
LTA to FITS conversion:	Schedules and white slot request
AIPS help:	Satellite tools
RFI Counter Analysis Scripts:	
RFI Plots:	**Contact**
GDDP summary:	astrosupp@gmrt.ncra.tifr.res.in
	snk@gmrt.ncra.tifr.res.in
Contact	
gmrtoperations@ncra.tifr.res.in	
snk@gmrt.ncra.tifr.res.in	

http://gmrt.ncra.tifr.res.in/~astrosupp/

Preparing the Command File

http://www.ncra.tifr.res.in/~secr-ops/cmd/cmd.html

Preparing the Command File

Observing Plan(command file):

A conservative estimate of 2 minutes overhead between two scans is included in the command file

Time Slot (IST): 22Mar2023 08:00 -- 11:00 (3h)

No	Command	Option	Source(target)	Time(min)	Time-line	Insert/Delete Command	
1	setup ▾	--	--	20	08:00 -- 08:20	Insert below	Delete this
2	flux_cal ▾	--	3Cxx	10	08:20 -- 08:32	Insert below	Delete this
3	phase_cal ▾	--	0837-xx	5	08:32 -- 08:39	Insert below	Delete this
4	loop_start ▾	3	{	0	08:39 -- 08:39	Insert below	Delete this
5	target ▾	--	NGCxx	30	--:-- -- --:--	Insert below	Delete this
6	phase_cal ▾	--	0837-xx	5	--:-- -- --:--	Insert below	Delete this
7	loop_stop ▾	--	}	0	10:36 -- 10:36	Insert below	Delete this
8	flux_cal ▾	--	3Cxx	10	10:36 -- 10:48	Insert below	Delete this

Special requirement or additional info (if any):

```
e.g
Observe target source if the phase cal is set and take flux
cal for 10 min at the end.

GSB parameters (if opted for GSB)
1.   GSB_BW (MHz) =  32 / 16 / 4 / 2 / 1 / 0.5
2.   GSB_CHAN (nos) =  512 / 256 / 128
3.   GSB_LTA (sec) =  16 / 8 / 4 / 2
4.   GSB_STOKES  =  Total_intensity / Full_Stokes
```

[Check and Download Setup]   [Reset]

Please email downloaded file to gmrtoperations@ncra.tifr.res.in
For any queries, please write to gmrtoperations@ncra.tifr.res.in

http://www.ncra.tifr.res.in/~secr-ops/cmd/cmd.html

Observing Strategy

✤ **Calibration Strategy**

  ✤ Amplitude calibrators, Bandpass calibrators

  ✤ Phase Calibrators

  ✤ Polarization Calibrators

✤ **Scheduling Constraints**

  ✤ Need quiet ionosphere, night observations (<610 MHz)

  ✤ Coordinated observations with other instruments (say ASTROSAT)

✤ Include in **Cover Sheet** of the proposal

Calibrators

✤ **Amplitude calibrators**, 3C48 (0137+331), 3C147 (0542+498) and 3C286 (or 1331+305) are used for both, amplitude and bandpass calibration

✤ **Phase calibrator** should be nearby, preferably within 15 degrees for 1.4 GHz and within 20 degrees at lower frequencies — Assumption being that sky conditions are the same for target & calibrator

✤ It should preferably be a point source, and 'P' type

✤   ▪   P : <3% amplitude closure errors expected. Great for calibration!

✤   ▪   S : 3-10% closure errors expected. Good for phase and gain (amplitude) calibration.

✤   ▪   W : 0-?% closure errors expected. Suitable for calibration of phases only.

✤   ▪   C : Confused source, probably not good to use for calibration.

✤   ▪   X : Do not use.

Searching for a Phase Calibrator

http://gmrt.ncra.tifr.res.in/~astrosupp/calib/vlacal.html

Rise, Transit and Set time of Source(s)

Rise, Transit and Set times for the source(s) at GMRT

Observing date: 29 August 2019   Elevation Limit (degree) : 17.0

Source	RA	Dec	Epoch
3C147	05h38m43.50s	+49d49'42.7"	1950.
3C48	01h37m41.30s	+33d09'35.13"	2000.
3C286	13h31m08.29s	+30d30'33.0"	2000.

Enter the source coordinates in to the box :

VLA Calibrators list

[Calculate]   [clear]   [back]

Important Notes:

- GMRT Latitude: **+19d06'(N)**, Longitune : **74d03'(E)**

- Elevation limit (Min) : **17.0deg**

- Sky covered by GMRT: **Declination +90d00' to -53d54'.**

- If source sets after midnight, please re-submit the querry using the next observing day to determine the set time.

Rise,Transit and Set Timings for the Source(s) @ GMRT

Date : 23 Nov 2018, Elevation : 17.0 deg, IST=UTC+0530

Source	RA	Dec	Epoch	Rise(IST)	Transit(IST)	Set(IST)	Rise(LST)	Transit(LST)	Set(LST)	UpTime(Hrs)
3C286	13h31m08.2879s	+30d30'32.958"	2000.	04:34:04	09:57:24	15:20:44	08:07:47	13:32:00	18:56:13	10:48:25
OQ208	14h07m00.3944s	+28d27'14.690"	2000.	05:11:56	10:33:09	15:54:21	08:45:45	14:07:51	19:29:56	10:44:10
PG1501+106	15h04m01.201s	+10d26'16.15"	2000.	06:29:05	11:30:04	16:31:03	10:03:07	15:04:55	20:06:44	10:03:36
1445+099	14h45m16.465213s	+09d58'36.072440"	2000.	06:10:59	11:11:23	16:11:47	09:44:58	14:46:11	19:47:25	10:02:26
PG1426+015	14h29m06.588s	+01d17'06.48"	2000.	06:06:27	10:55:18	15:44:09	09:40:26	14:30:04	19:19:42	09:39:16
PG1448+273	14h51m08.763s	+27d09'26.92"	2000.	05:57:16	11:17:08	16:37:00	09:31:13	14:51:58	20:12:42	10:41:29
1513+236	15h13m40.185630s	+23d38'35.200460"	2000.	06:23:28	11:39:37	16:55:45	09:57:29	15:14:30	20:31:30	10:34:01
PG1404+226	14h06m21.883s	+22d23'46.22"	2000.	05:17:46	10:32:32	15:47:19	08:51:36	14:07:14	19:22:52	10:31:16
1330+251	13h30m37.6892s	+25d09'10.978"	2000.	04:39:11	09:56:55	15:14:38	08:12:55	13:31:31	18:50:07	10:37:12
PG1351+236	13h54m06.432s	+23d25'49.09"	2000.	05:04:25	10:20:19	15:36:12	08:38:13	13:54:59	19:11:44	10:33:30
PG1341+258	13h43m56.748s	+25d38'47.69"	2000.	04:51:55	10:10:11	15:28:26	08:25:41	13:44:49	19:03:57	10:38:15
PG1310-108	13h13m05.789s	-11d07'42.40"	2000.	05:10:38	09:39:32	14:08:25	08:44:27	13:14:05	17:43:43	08:59:15
1248-199	12h48m23.898197s	-19d59'18.587620"	2000.	05:04:08	09:14:54	13:25:40	08:37:56	12:49:23	17:00:51	08:22:54
PG1244+026	12h46m35.248s	+02d22'08.79"	2000.	04:22:43	09:13:04	14:03:25	07:56:24	12:47:33	17:38:41	09:42:17
1254+116	12h54m38.255601s	+11d41'05.895070"	2000.	04:18:36	09:21:04	14:23:33	07:52:16	12:55:35	17:58:53	10:06:36
PG1229+204	12h32m03.605s	+20d09'29.21"	2000.	03:46:15	08:58:33	14:10:52	07:19:50	12:33:00	17:46:09	10:26:18
PG1211+143	12h14m17.670s	+14d03'13.10"	2000.	03:35:32	08:40:51	13:46:10	07:09:06	12:15:15	17:21:24	10:12:18

http://www.ncra.tifr.res.in:8081/~secr-ops/obs_setup/rst.html

Email the completed command files to "gmrtoperations@ncra.tifr.res.in"

DDT Proposals

✤ Proposals that need data urgently (e.g., a gamma-ray burst followup) OR Proposals that want to carry out a Feasibility study before applying for a Large GMRT proposal using a special setup -

✤ Can request for Director's Discretionary Time (DDT)

✤ Submit a DDT proposal through NAPS, like a Regular proposal

ToO Proposals

✤ Target of Opportunity proposals: typically for transient sources that can burst anytime.

✤ Submitted at regular proposal calls – if observing time allotted then observations can take place whenever the source bursts during that observing cycle.

✤ Typically used for supernovae, GRBs, FRBs, GW sources etc.

Summary

✤ Science goal that needs radio observations is the starting point.

✤ Scientific justification and technical justification are the main components of the proposal.

✤ GMRT call for proposals is twice a year: 15th January and 15th July.

✤ Read the telescope documentation and use the available tools to prepare the proposal.

✤ Prepare well in time: For anything related to the GMRTtake help from NCRA astronomers well in advance if you need.