

Effelsberg Tutorial 2

Electric Boogaloo

Overview

1. Before the Observation

- a. Is the source detectable?
- b. Setting up the observation step by step

2. During the Observation

- a. PFP
- b. Loading the schedule/objects
- c. Checking if everything is ok

~~3. After the observation~~

- ~~a. Where is my data?~~
- ~~b. How to reduce my data?~~



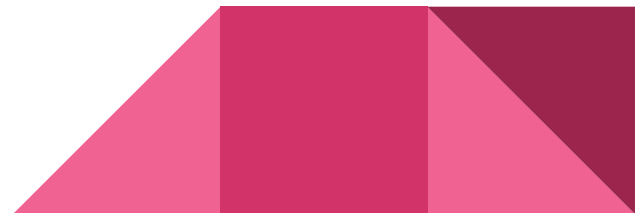
First presentation

Find more info here:

https://fpra.mpifr-bonn.mpg.de/doku.php?id=talksposters:2025_tutorials:effelsberg_tutorial_2025

Repo with some example schedules:

https://github.com/Jellymancer/Observing_With_Effelsberg



2. Before the observation

During the proposal

- Is my source detectable with effelsberg?
 - Is it flux high enough?
 - Is it up on the sky?

$$S_{min} = S_{1400} = \alpha\beta \frac{T_{sys}}{G\sqrt{(n_p\Delta ft_i)}} \left(\frac{W}{P-W} \right)$$

$$\alpha = SNR = S_{1400} \frac{G}{T_{sys}} \sqrt{(2\Delta ft_i)}$$

Is my source on the sky?

Use astropy or pyriset (or be old school)

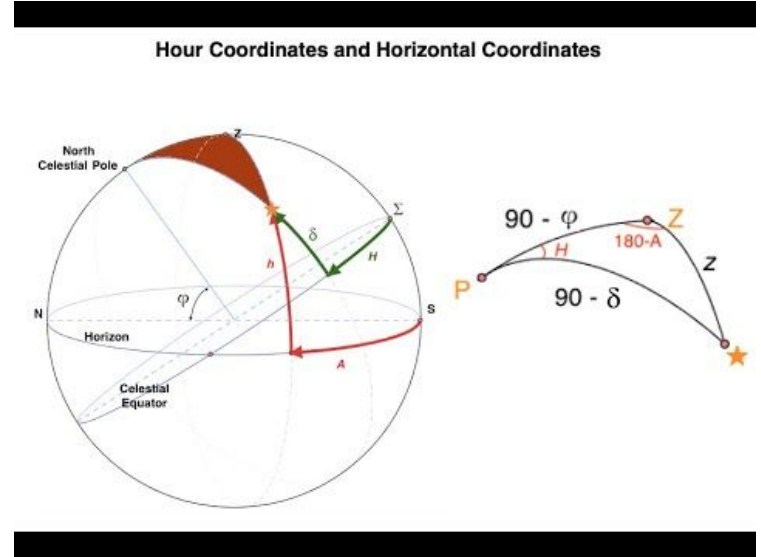
Calculation of the local horizontal coordinates:

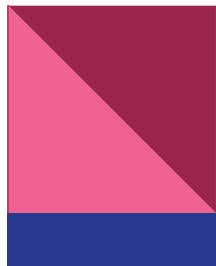
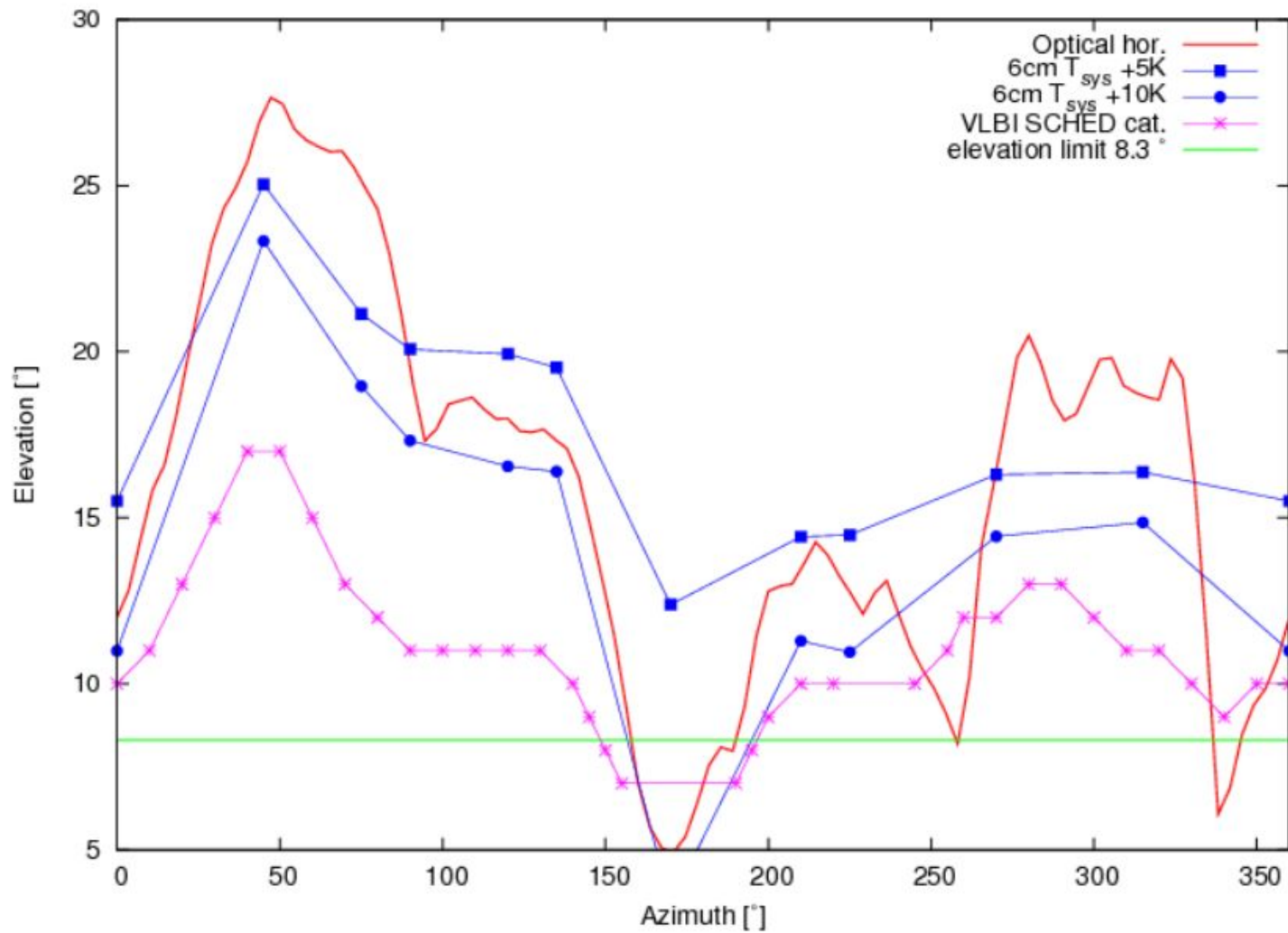
$$\tan A = \frac{\sin H}{\cos H \sin \varphi - \tan \delta \cos \varphi} \quad (13.5)$$

$$\sin h = \sin \varphi \sin \delta + \cos \varphi \cos \delta \cos H \quad (13.6)$$

If one wishes to reckon the azimuth from the North instead of the South, add 180° to the value of A given by formula (13.5).

Remember that the true horizon is not flat!






Making a schedule

Why make a schedule? - It automates the telescope operation.

Can I avoid making one? - Yes! However, be aware that it's hard to control everything manually (EDD commands)

I use pyriseset3: <https://gitlab1.mpifr-bonn.mpg.de/jjawor/pyriseset3>

For this session, we are doing pulsar timing observations with:

- B2021+51 - Test pulsar
 - 3C048 - Flux Cal
 - J0613-0200
- 

1. Order sources

(optional) Create a txt schedule for use in pyriset3 and check if your sources are visible. Order them to minimize slew time.

Decide if you need polarization and flux calibration.

Check the repo for examples:

https://github.com/Jellymancer/Observing_With_Effelsberg



2. EDD: Set your mode (backend + receiver)

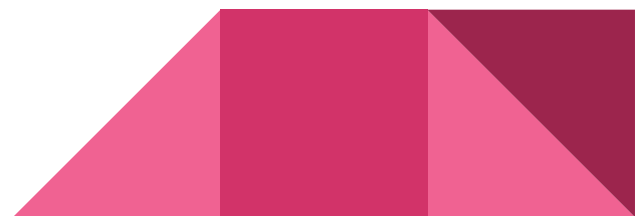
```
FE:P210mm ; EDD_PULSAR_TIMING ; Init 1
```

Use the P210
receiver

Use the EDD pulsar timing
pipeline.

Folds your data using a
local ephemeris and
outputs a folded archive

Dunno.



2. EDD commands

EDD commands: Decide on your time resolution, no. of channels, zapped channels (only for live view), and a variety of other things.

Check this repo for the commands:

https://gitlab.mpcdf.mpg.de/mpifr-bdg/edd_provisioning_effelsberg

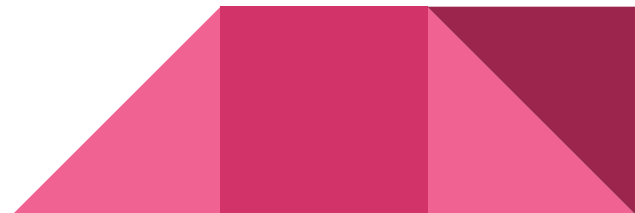
```
SENDTO EDD JSON MEASUREMENTPREPARE
```

```
{"search1":{"active":1,"npol":1,"cdd_dm":58,"filterbank_nchannels":512,"tsamp":0.0000512},"timing1":{"active":1,"nbins":1024,"nchannels":512},"baseband1":{"active":0}}
```

3. OBSNIP commands

OBSNIP commands are used for steering the telescope and setting the observation length.

```
B0355+54 ; CoordinateSystem Equatorial ; Equinox J2000 ; ObjectLongitude 03h  
58m 53.7s ; ObjectLatitude 54d 13' 13.8" ; LatOff 0.0 ; LonOff 0.0 ; SCANTime  
120 ; PMODE Search
```



FE:P217mm ; EDD_PULSAR_EPTA

B2021+51_R ; CoordinateSystem Equatorial ; Equinox J2000 ; ObjectLongitude 20h 22m 50.00s ; ObjectLatitude +51d 54' 50.00" ; LatOff 0.5 ; LonOff 0.0 ; PMODE CalFE ; SCANTime 120

B2021+51 ; CoordinateSystem Equatorial ; Equinox J2000 ; ObjectLongitude 20h 22m 50.00s ; ObjectLatitude +51d 54' 50.00" ; LatOff 0.0 ; LonOff 0.0 ; PMODE Search ; SCANTime 180

3C048_N_R ; CoordinateSystem Equatorial ; Equinox J2000 ; ObjectLongitude 01h 37m 41.00s ; ObjectLatitude +33d 09' 35.00" ; LatOff 1.0 ; LonOff 0.0 ; PMODE CalFE ; SCANTime 120

3C048_O_R ; CoordinateSystem Equatorial ; Equinox J2000 ; ObjectLongitude 01h 37m 41.00s ; ObjectLatitude +33d 09' 35.00" ; LatOff 0.0 ; LonOff 0.0 ; PMODE CalFE ;

...

Upload the schedule

Upload the schedule to the Scripts directory:

- a. Ask the operator for the obseff password
- b. `$ scp <your schedule> obseff@observer8:/home/obseff/pulsar/Scripts/`
- c. Check if the schedule is there (usefull for... uhh. borrowing other people's schedules)
`$ ssh obseff@observer8`
`$ cd /home/obseff/pulsar/Scripts/`
`$ ls <your schedule>`



Establish a VNC

1. Download a VNC viewer

(<https://www.realvnc.com/en/connect/download/viewer/>)

2. Ask the operator for the VNC password

3. Forward ports for VNC connection:

```
$ ssh -XfNL 5931:observer8:5931 username@portal.mpifr-bonn.mpg.de
```

```
$ ssh -XfNL 5921:observer8:5921 username@portal.mpifr-bonn.mpg.de
```

```
$ ssh -XfNL 3000:eddinfra0:3000 username@portal.mpifr-bonn.mpg.de
```

4. Connect to the VNC



3. During the observation

PFP

PFP = Pointing-Focusing-Pointing

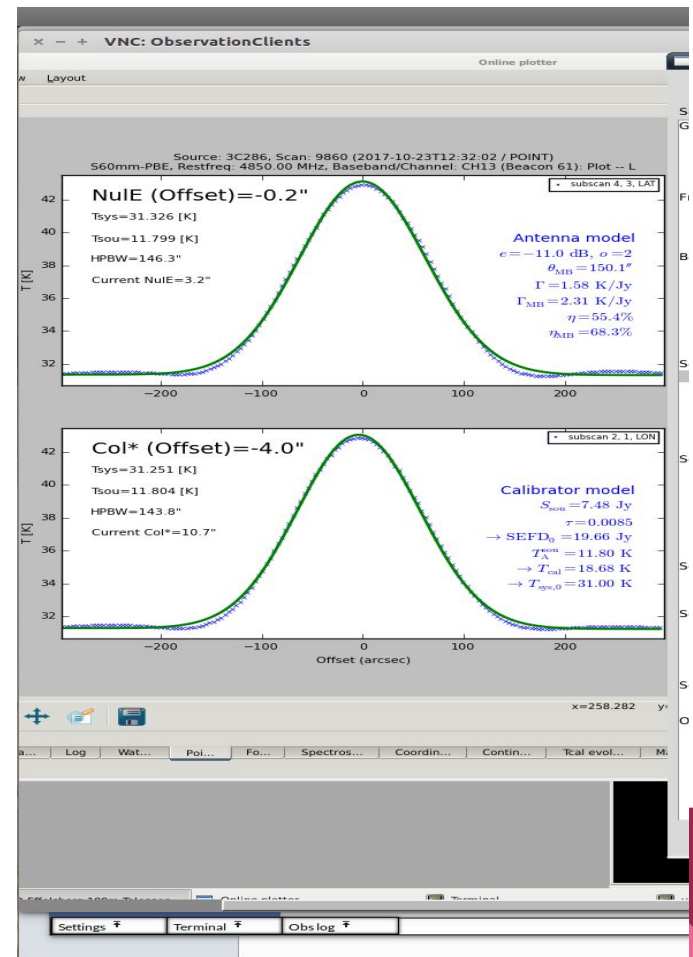
This test allows us create a pointing model.

This is used to ensure that the telescope:

- Points to the correct spot on the sky
- Correctly tracks the source on the sky

The operator can do this for you. Just ask!

Always start with a PFP



Upload the schedule

1. Your schedule needs to be in this directory:
`/home/obseff/pulsar/Scripts/my_schedule.sch`
2. Go to the ptracking tab
3. Set `@my_schedule.sch` as the ObjectName
4. Load to telescope queue

The screenshot displays the MPIR Effelsberg 100m Telescope Control (FW) interface. The main window is titled "PTracking (UserQueue)". The "ObjectName" field is highlighted with a red box and contains the text "@jiwoongtest.sch". Other fields include "ObjectLongitude", "ObjectLatitude", "LonOff", "Offset_In", "CoordinateSystem", "Equinox", "PMODE", "TimeSYS", "StartTime", "SkipTime", "SCANTime", and "INSTCFG". A green button labeled "Load to telescope queue" is visible at the bottom of the main panel. The left sidebar shows a tree view with "Ptracking" selected. The bottom status bar shows a log with timestamps and messages: "2021-07-09T20:50:49 CONTROL:START:Telescope on position", "2021-07-09T20:50:53 CONTROL:MEASURE:Telescope starts measuring", and "2021-07-09T20:52:00 CONTROL:ABORT:User aborts observation".

Grafana Dashboard

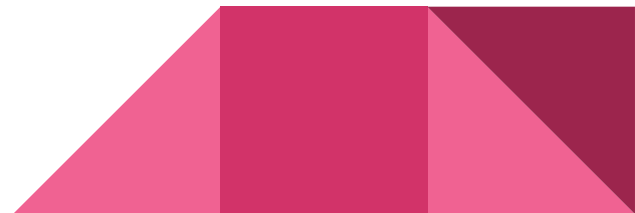
Use this to track the progress of the observation

1. Port forward:

```
$ ssh -XfNL 3000:eddinfra0:3000 username@portal.mpifr-bonn.mpg.de
```

2. Connect via your browser

```
http://localhost:3000
```



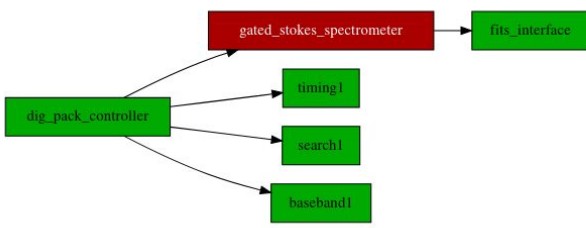
provision_name provison_descriptions/P217_PULSAR.yml

Current Status

ready

Messages

Current Configuration Graph



Data reduction pipe
visualization

Version of provision repository used by Master Controller

Master Controller Log

Provisioned EDD Components

- baseband1
- dig_pack_controller
- fits_interface
- gated_stokes_spectrometer
- search1
- TelescopeMeta
- timing1**

Dashboard
selection

Switch Hardware

Search

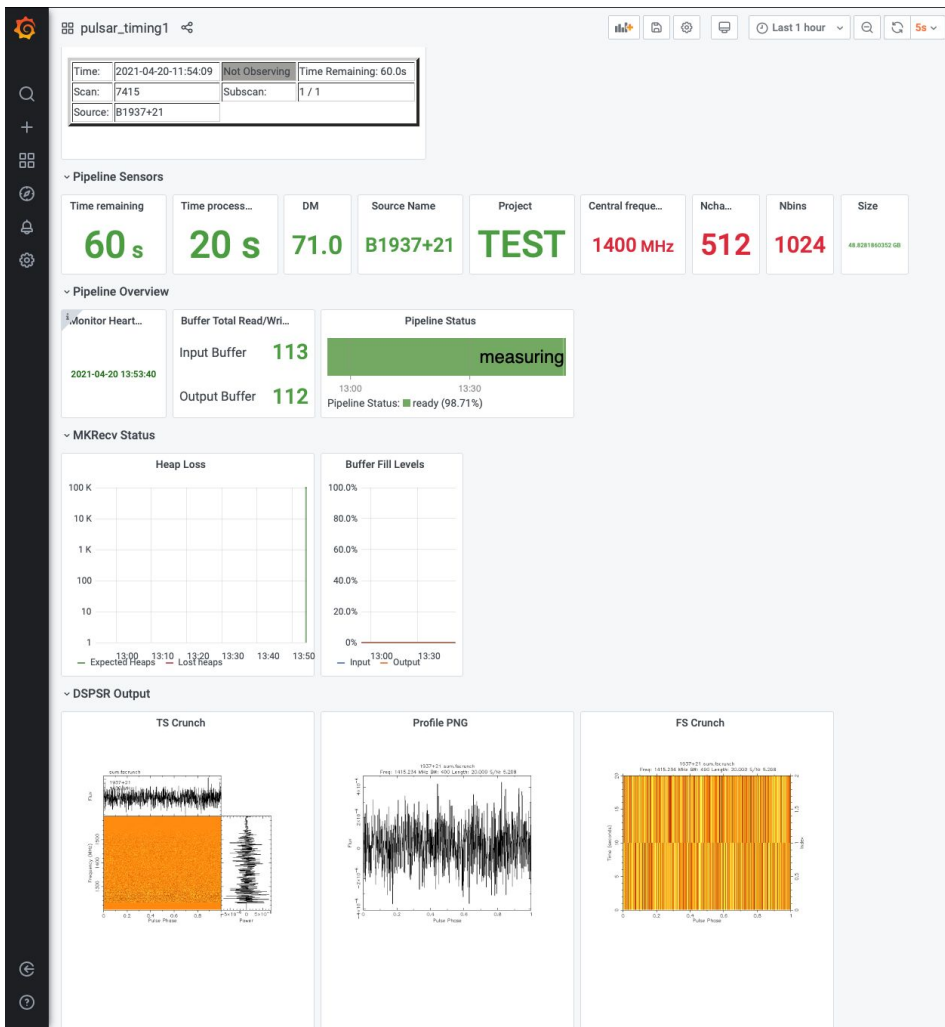
Switch Metrics

Grafana - Timing


General info

Pipeline processing logs. Heap losses indicate that you are leaking memory!

Live-Folding



Some tips

- Pilfer other peoples schedules from: `/home/obseff/pulsar/Scripts/`
 - Ask for help. There is no good written source for Effelsberg
 - Check the Eff wiki (and keep in mind that it's often wrong..)
<https://eff100mwiki.mpifr-bonn.mpg.de/doku.php?id=start>
 - Schedules are here:
<https://eff100mwiki.mpifr-bonn.mpg.de/doku.php?id=schedules>
 - Pyriset3: <https://gitlab1.mpifr-bonn.mpg.de/jjawor/pyriset3>
 - Always do PFP
 - Use the grafana dashboard to check if your obs is doing well
- 

Who to ask

Need professional help? - Ramesh

Problems with EDD? - Jason, Ewan

Issues with pyriset3/coastguard3? - Jędrzej

Other observers: Marlon, Pranav, Fazal, Kristen, Tim, Lucy,

