Australia's National
Science Agency

OBSERVING WITH BIGCAT

Quick Start Guide

V 2.1, December 2025

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Contents

1 Before you start

1. make sure you have VNC access (see info box below)
2. Schedule file prepared and deployed (which should store it on skull ~/sched)

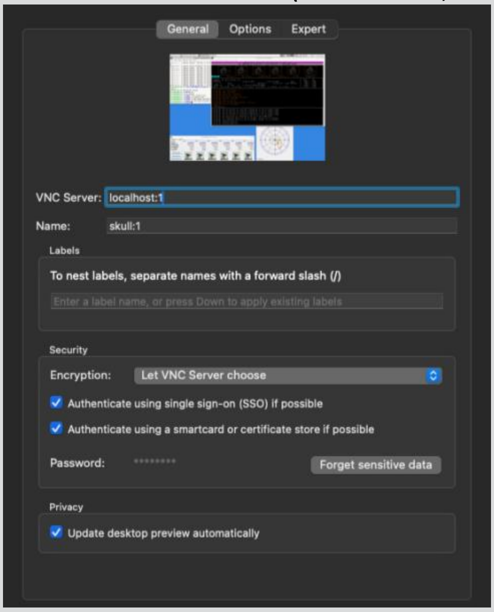
   → if you have a schedule from the pre-8GHz era, update it with the new frequencies and re-deploy it!
3. Log into the ATCA observing portal and check-in / announce your plans (https://ca-ops.atnf.csiro.au/jPORTAL/login)
4. familiarize yourself with the key differences to CABB observations listed below
5. All the good information in the ATCA users guide is still valid, **except the bits for CABB** : https://www.narrabri.atnf.csiro.au/observing/users_guide/html/atug.html .

Access the VNC

Accessing the Telescope for remote observations remains largely unchanged to before.

Please read through the instructions here: https://www.narrabri.atnf.csiro.au/observing/rem_obs.html

The only difference is that now skull is used instead of xbones.

- IF you are outside the CSIRO VPN, open the SSH tunnel via venice, using your ATNF Linux credentials to access it:
  ssh your_username@venice.atnf.csiro.au -L 5901:skull.atnf.csiro.au:5901
- Sometimes a SSH tunnel is even needed when inside the VPN, depending of the network zone you are in
- use your preferred VNC client to connect to skull (localhost:1, as you connected via venice)
-


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2 Key differences to CABB

While the experienced ATCA observer will find their way around BIGCAT quickly, there are a few differences. Some of them are currently in development and will be available soon (e.g. VIS), while others are not necessary anymore or have disappeared completely.

Here is a list of differences between observing with BIGCAT and CABB that are relevant:

Here are the key differences a user familiar with CABB will experience when using BIGCAT:

- Client based CAOBS – you can kill the client or run your own. As long as the server is ticking over, it does not matter what happens to the CAOBS client window
- No CACOR GUI, the correlator(s) is (are) controlled via terminal(s).
- No delay and amplitude calibration by the user. The user may do a phase calibration to check phases are stable and aligned. But at this stage we recommend that users do not calibrate. The delay and amplitude calibrations are system inherent and regularly maintained by observatory staff.
- There are four IFs, with two GHz each. To see how they cover the receiver bands and how they can be positioned, see here.
- Currently there is no assistance. We are working on this; please be patient We recommend users keep an eye on SSPD to assess the data quality.

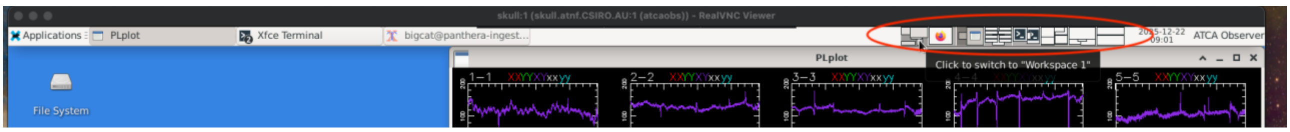
3 Step by step guide

Before continuing from here, please log into the Skull VNC (see the info box above regarding VNC access).

3.1 Finding your way around the different VNC desktops

Once you accessed the Skull VNC, you will find that there are 8 virtual desktop windows.

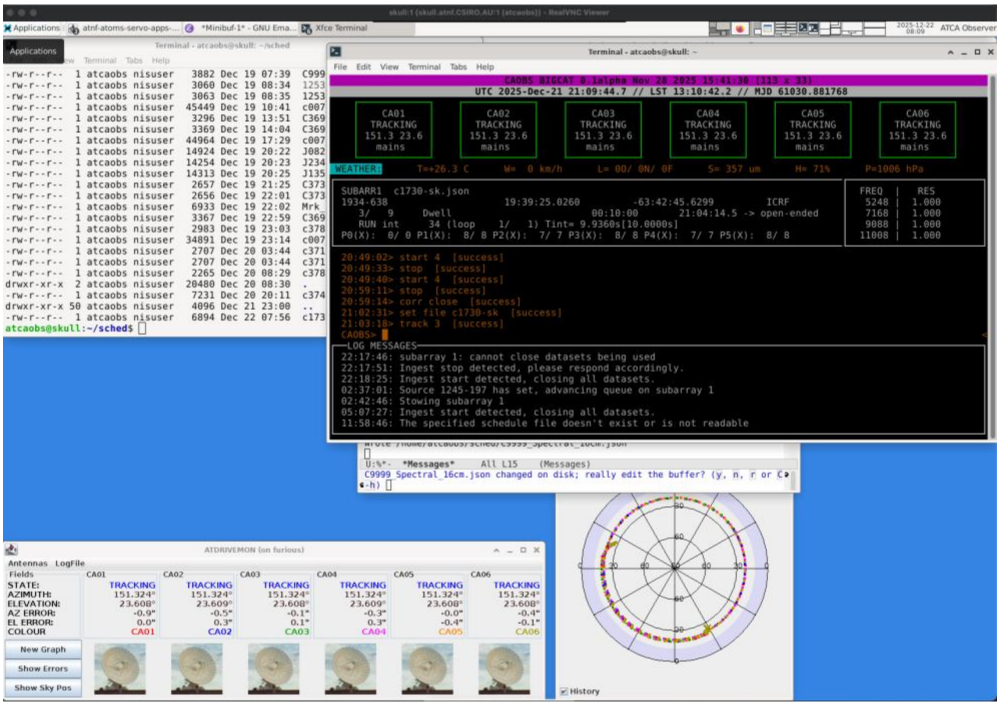
You can jump between them on the right side of the top menu bar:



As an observer, you generally only need to check desktop 1-6

3.1.1 Virtual Desktop Window 1: CAOBS and ATDRIVEMON

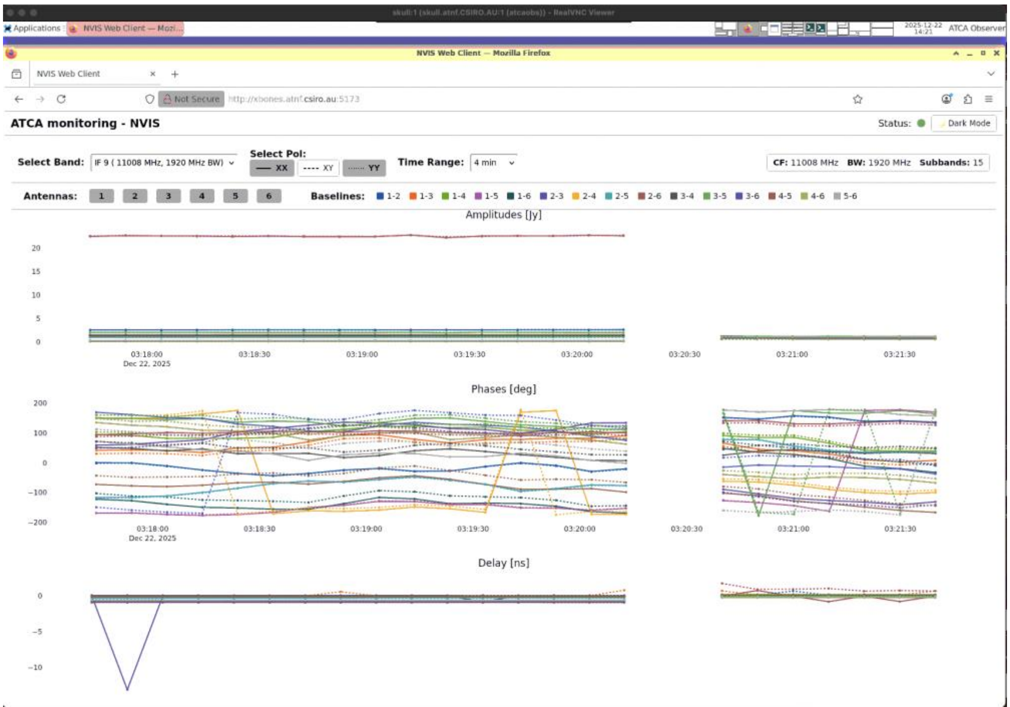
On the first desktop you will find CAOBS, ATDRIVEMON and some terminals:



This is where you control the array and load files and so on. Like in the old days with CABB. There is no ASSISTANCE yet. It is still being re-implemented into the new environment. But CAOBS has a lot of additional information and options. VIS has moved to a web – based implementation. (See section 3.1.2 and 3.2 below.)

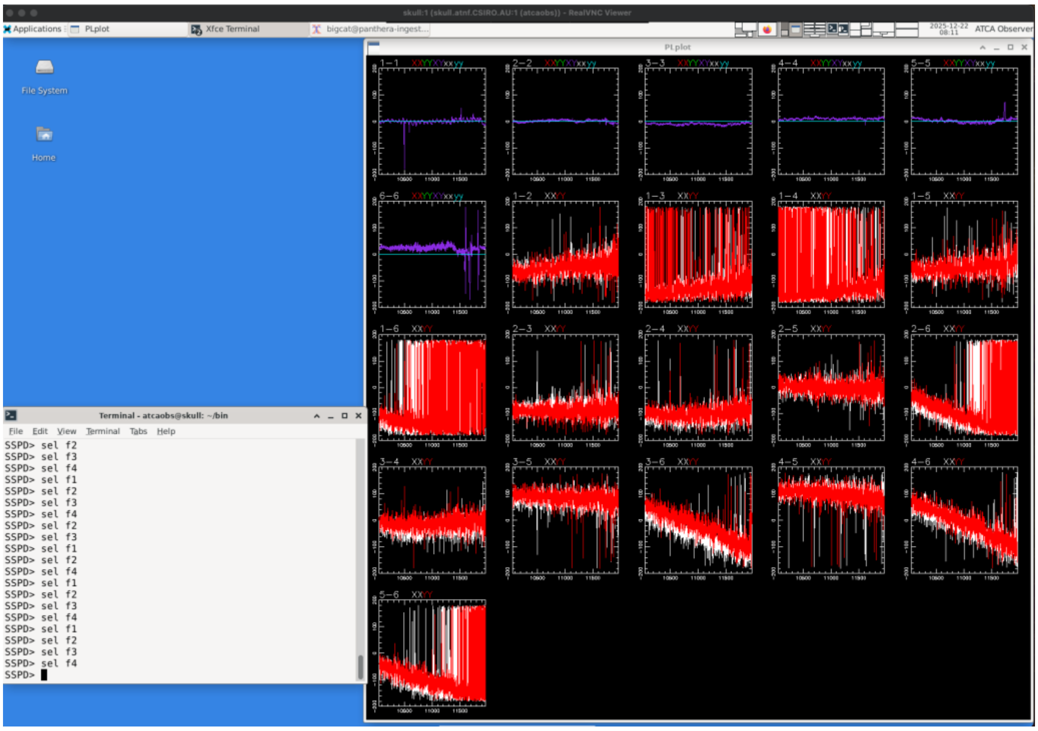
3.1.2 Virtual Desktop Window 2: NVIS

On the second virtual desktop you will find a browser window connected with NVIS:



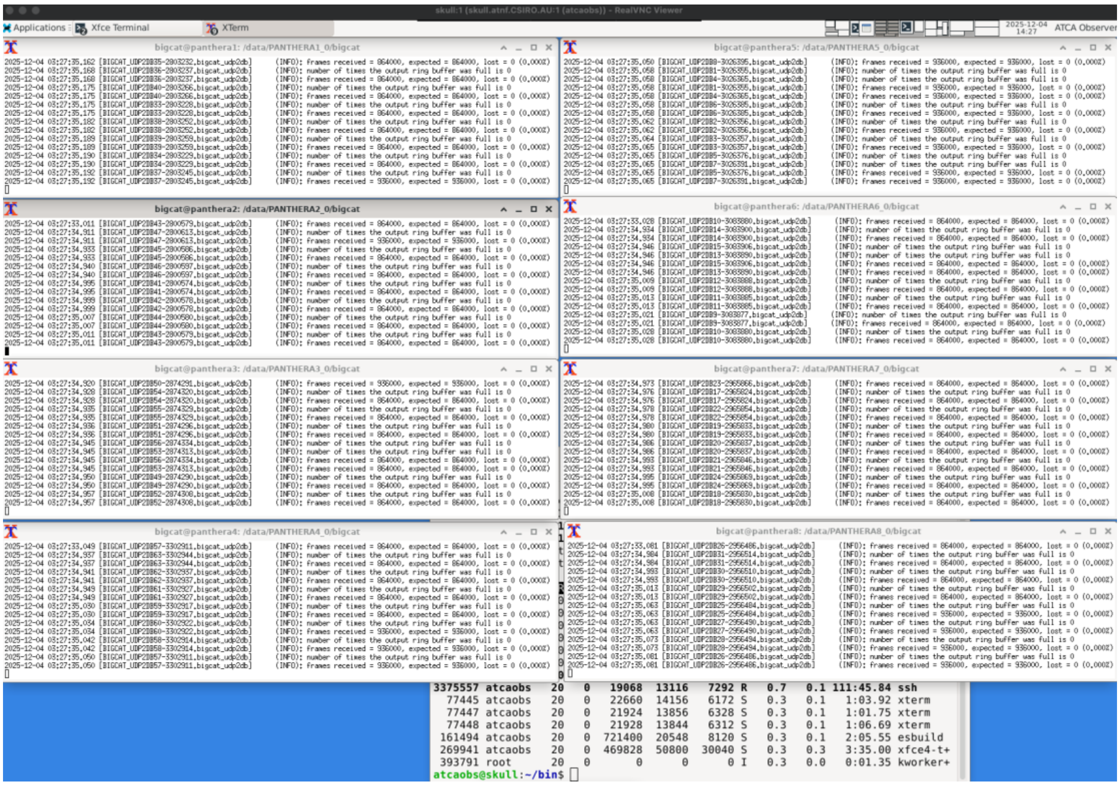
3.1.3 Virtual Desktop Window 3: SSPD

On the third virtual desktop you will find SSPD with the plots and a terminal to control it:



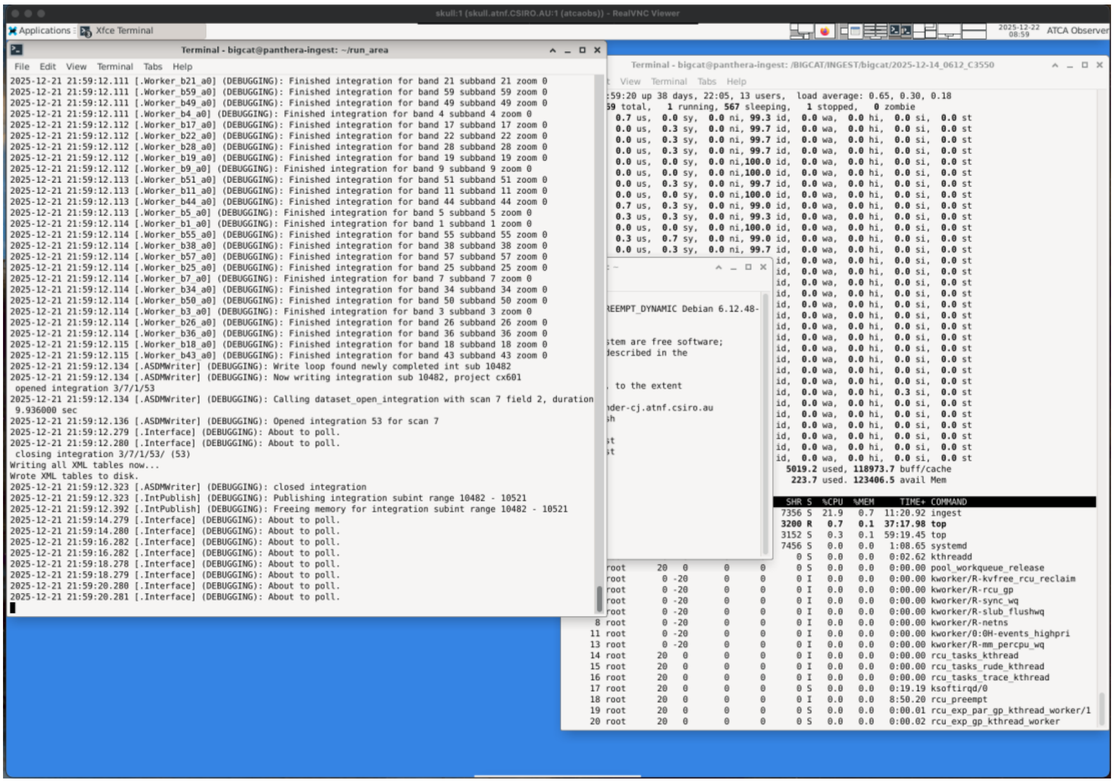
3.1.4 Virtual Desktop Window 4: Correlators

On the third virtual desktop to the right, you have the eight terminals controlling the correlators running on four different GPU servers.



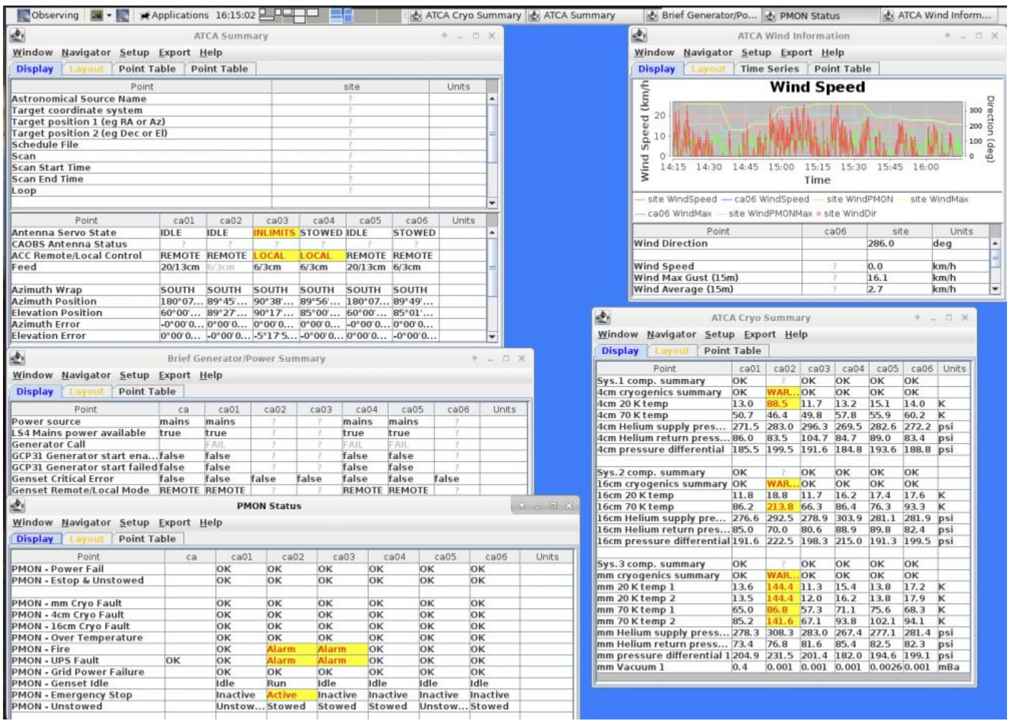
3.1.5 Virtual Desktop Window 5: Ingest

On the fourth virtual desktop you will find Ingest, which writes the data from the correlators to file. Check that it is moving along and has not stopped.



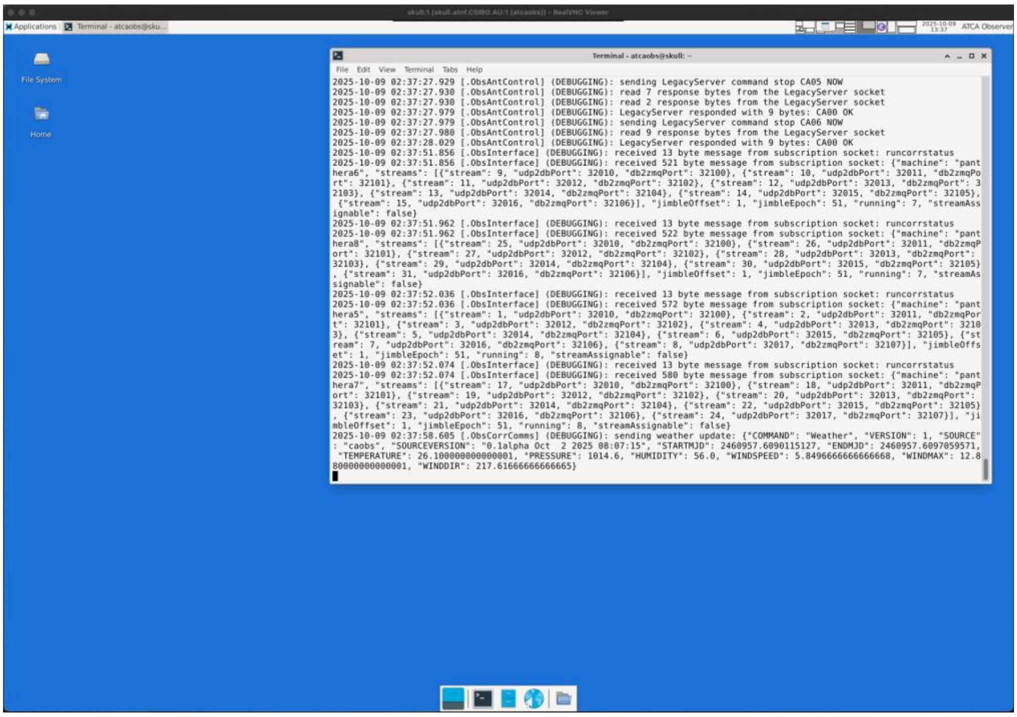
3.1.6 Virtual Desktop Window 6: Monica

On this desktop you have different GUI Windows with various monitoring points. Here you keep an eye on the weather, generators, cryogenics, or anything you want to monitor on the array.



3.1.7 Virtual Desktop Window 7: CAOBS Server (OEs only!)

On this desktop one can find the CAOBS server terminal. Do not interact with this one, unless you know what you are doing. To stop it: CTRL C, to restart: up arrow, or: caobs_server -C



3.1.8 Digitiser Utils [DO NOT TOUCH - OBSERVATORY STAFF ONLY]

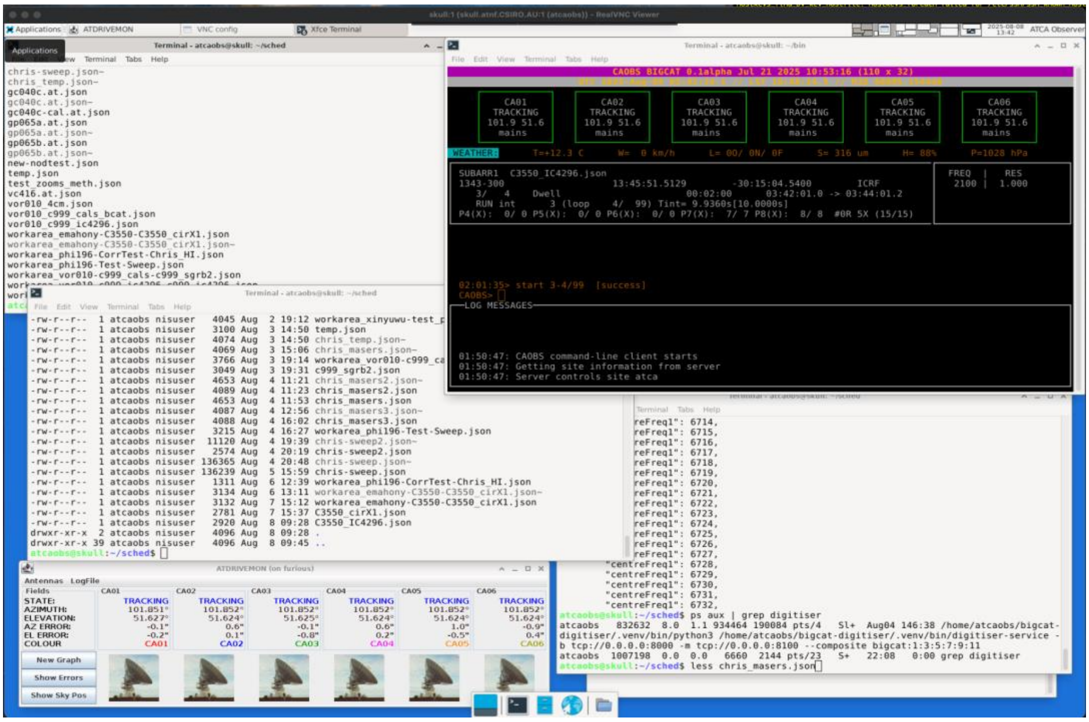
Utilities for the control of the BIGCAT digitisers. Do not touch this one, unless authorised to do so

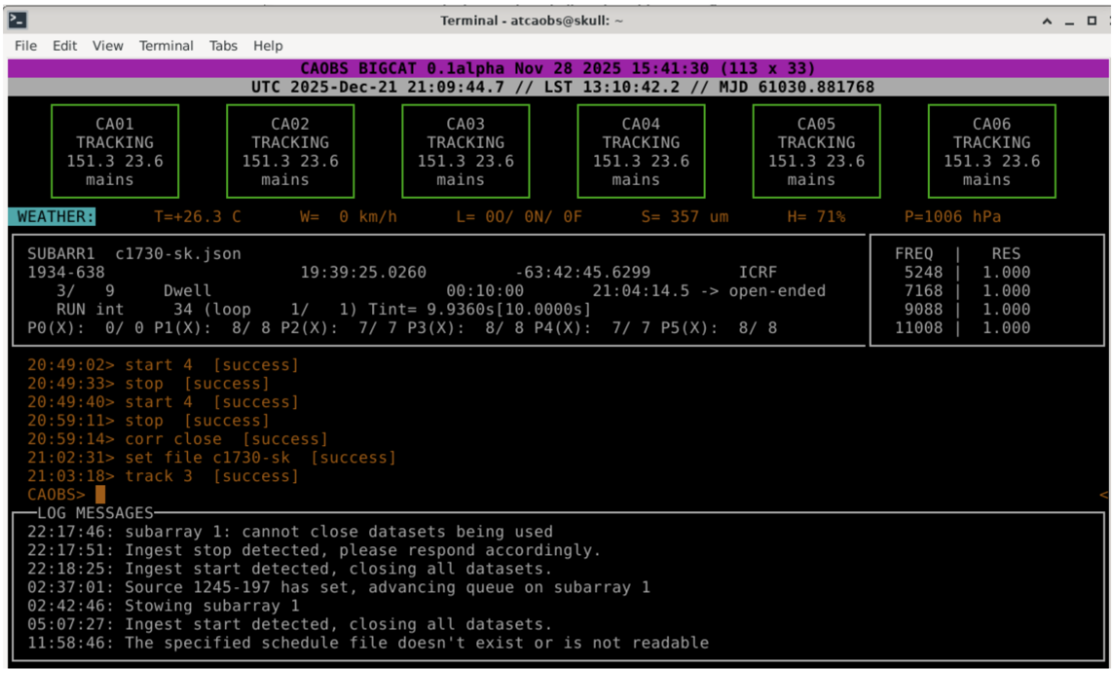
3.2 NVIS – the web-based replacement of VIS

NVIS is the replacement of VIS. In the top bar you can select the IF, Pol, as well as time range.

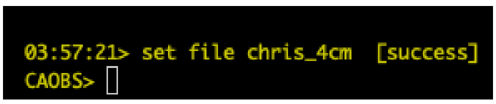
3.3 Step by Step Guide

1.) log into the skull VNC and find the CAOBS client on the first virtual desktop:





2.) load your schedule file in CAOBS. → CAOBS will confirm with [success] if the file has been loaded correctly:



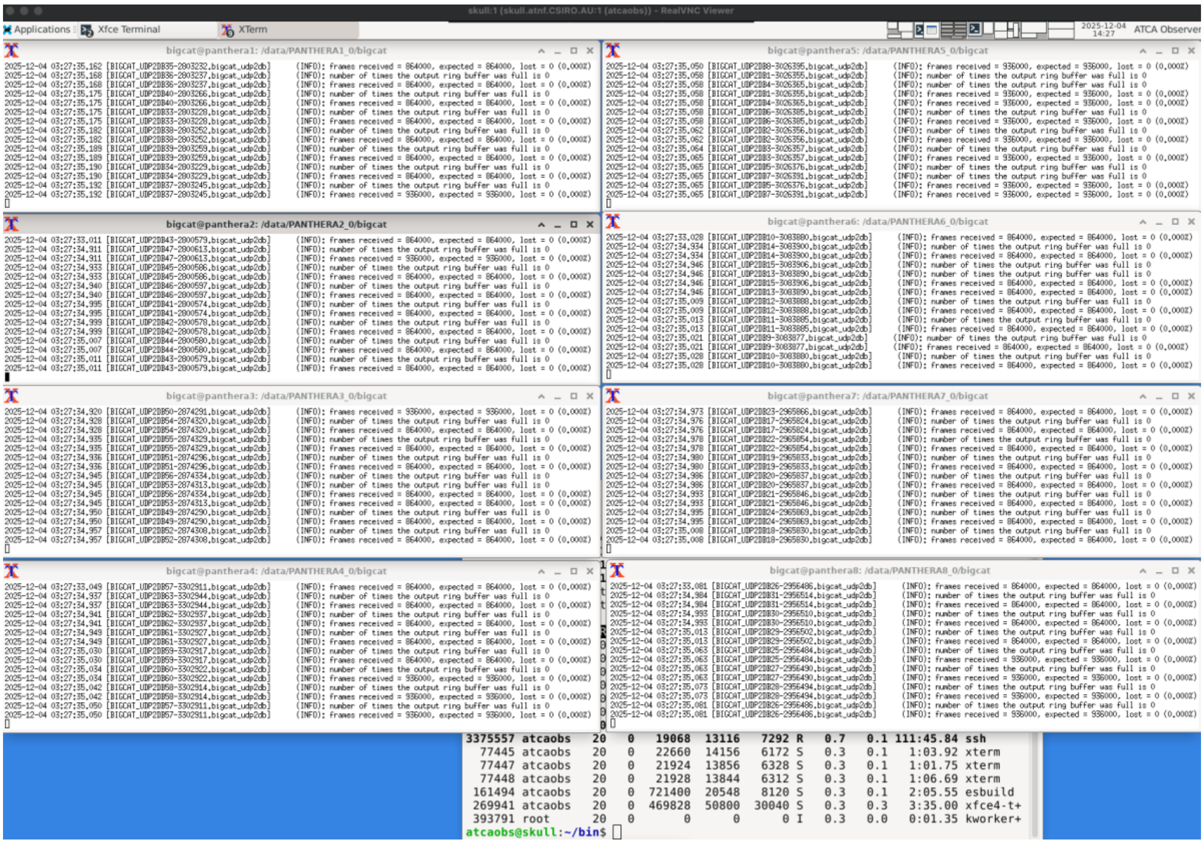
If loading your file in CAOBS fails

If loading your schedule file in CAOBS fails, open a terminal on skull and check that your prepared schedule file is in the correct folder location on skull, which is ~/sched.

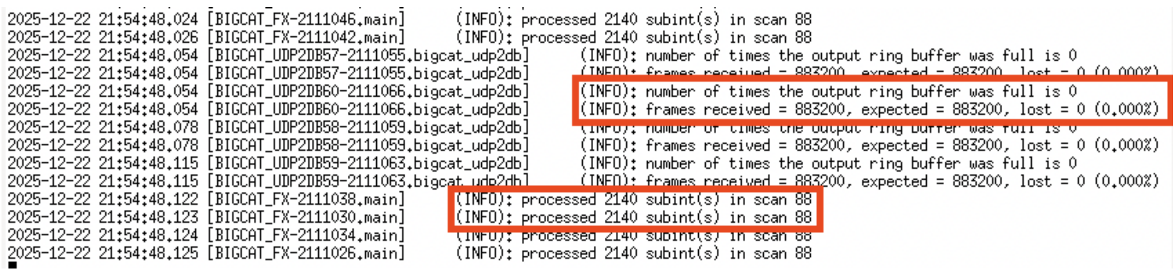
If it is not there, copy it manually or ask observatory staff for help.

Make sure you have updated and re-deployed your pre-8GHz schedule with the new frequencies

3.) On the third virtual desktop, check that the terminals with the 8 correlators running on Panthera 1 to 8 are all ticking over:



The thing to look out for is that all 8 processes indicate that there is no packet loss and that subints re being processed:



What to do if ingest or one / all of the correlator(s) is / are not running

- If ingest is not running, start it by typing ingest in the terminal (or just up-arrow)
- Note that CAOBS will issue a warning in the LOG Messages if Ingest has stopped

```
20:59:14> corr close  [success]
21:02:31> set file c1730-sk  [success]
21:03:18> track 3  [success]
21:14:13> stop  [success]
21:14:23> cor stop  [success]
21:14:30> cor close  [success]
21:15:37> track 3  [success]
CAOBS>
LOG MESSAGES
22:17:51: Ingest stop detected, please respond accordingly.
22:18:25: Ingest start detected, closing all datasets.
02:37:01: Source 1245-197 has set, advancing queue on subarray 1
02:42:46: Stowing subarray 1
05:07:27: Ingest start detected, closing all datasets.
11:58:46: The specified schedule file doesn't exist or is not readable
21:15:09: Ingest start detected, closing all datasets.
```

- If one or several of the correlators have stopped or are hanging, in CAOBS stop your observations, stop the correlator, and close the file. All eight correlator processes should exit cleanly and display a message that they wait for messages from CAOBS. If one or more of the correlators were not shutting down cleanly, you can ctrl-c in the affected window(s) and then restart by typing: start_correlator in the relevant /affected terminals.
- E.g.: to start the correlator on Panthera 5:

```
bigcat@panthera5:~$ start_correlator
```

- Each Panthera machine should have a correlator ticking over, **except when observing on 16cm - then only two correlators are used (with the output ending up in IF4)**.

4.) go back to CAOBS and tell it to track a source in your schedule:

```
04:36:45> track 1  [success]
CAOBS>
```

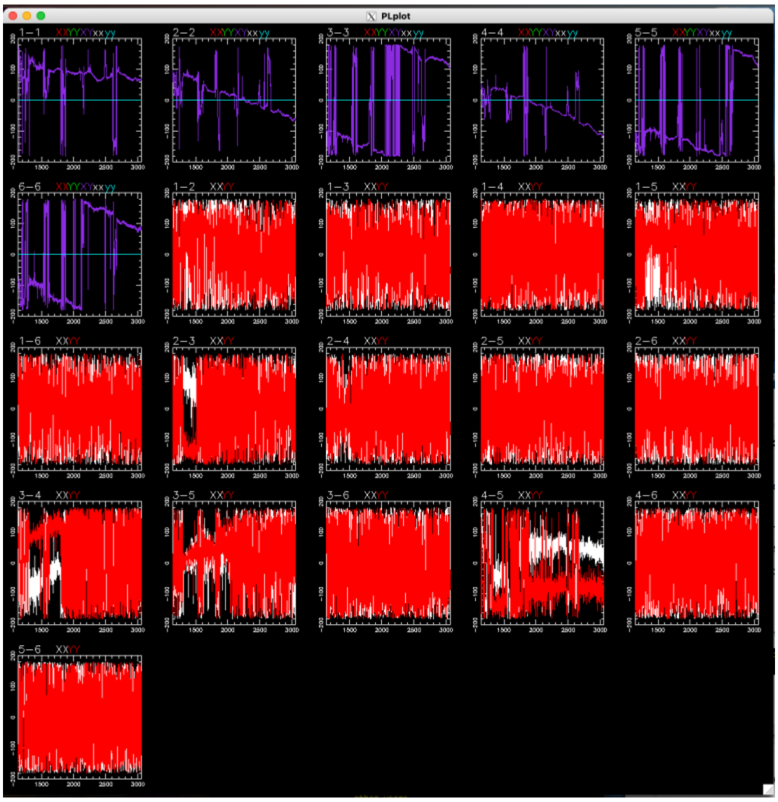
5.) On the Second virtual desktop check if sspd is running.

If SSPD is not running yet, you can start it from a terminal:

```
atcaobs@skull:~$ sspd -c localhost -s 1
```

If it is hanging (which happens after changing RX), type q in the SSPD terminal, and restart as per above.

Once on source and after a little while, the plot window will start updating like the old SPD in the CABB ear, just much faster:



SSPD

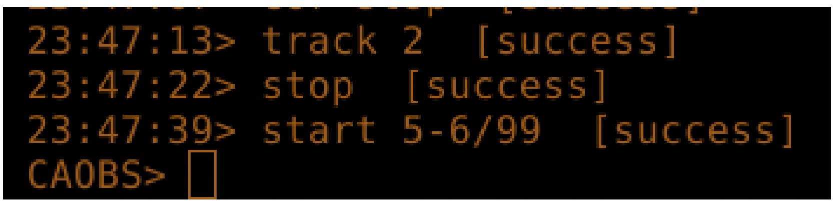
To change what you see, it is very similar to the old SPD

- check phases: SSPD> pha -200 200
- to check amplitudes: SSPD> am
- to change from f1 to fn: SSPD> sel fn, were n is 1-4

Please take note that when observing on **16cm**, it only uses one conversion base band (IF) 2GHz wide, which **ends up in IF4** of the correlator for technical reasons. So, you will not see anything meaningful in the other three IFs.

6.) Once you are content, that it all works, type stop in CAOBS, and then you can start your observations by typing:

CAOBS> start x-y/nn, where x is the first scan number, y is the last scan number and nn is the number of iterations.



Once started, go back to SSPD and check that it all looks good.

7.) Once finished, find the directory where the data was written to on Panthera Ingest:

cd into your directory, you can accessit by following the instructions here: https://www.narrabri.atnf.csiro.au/observing/bigcat/data_transfer.html

That is it…. ☺

Good luck with your observations.

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