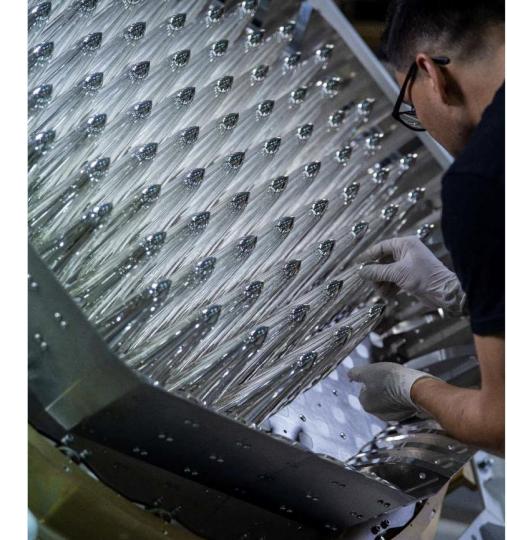


# ATUC: Session 3 Upcoming Instrumentation

ATUC meeting 9 April 2025



Australia's National Science Agency



### Management of ATNF Projects

Mark Bowen

# ATNF Program – Project Portfolio Management

#### **ATNF Project Management**

- The new ATNF structure enables a change in the way ATNF projects are managed
- ATNF projects will be managed as a 'portfolio' by the ATNF Leadership Team
- Integration and visibility of: Software and Computing + Operations + Science project delivery
- Coordination between ATNF Program Director, 'Heads of ...', and 'Chiefs ...'
- S&A Project Review Board (PRB) reporting focussed on issues that require input from S&A leadership
- Goal is to assist Project Leaders in managing their projects:
  - 1. Improved coordination between ATNF projects
  - 2. Regular meetings of the leadership of ATNF projects as a group (i.e. PL, PS, PM, PE)
  - 3. Focus on management of issues, exceptions, relative priorities within ATNF rather than progress reporting (i.e. what do you need)
  - 4. Reporting overhead minimised fit for purpose
- Common framework for management of the portfolio of ATNF projects
- Guidelines flexible enough to accommodate different types of projects



#### Implementation

- Timeline for implementation under development Stage 1 in place for next PRB (October)
- DRAFT plan preparing for discussion with Project Leadership

#### **PRB Reporting – Project Portfolio Showcase**

- ATNF Program Showcase based on Enterprise Project Management Office (EPMO) – Program reporting template
- Individual projects may present at the S&A PRB if there is a specific need (e.g. showcase a major result, etc.)
- Work-in-Progress PRB asked for feedback on content





#### **ATNF Project Management Plan**

- Framework and guidelines for management of the portfolio of ATNF projects
- Plan currently a skeleton with major headings defined
- Plan based on CSIRO EPMO template
- Plan developed and implemented in stages:
  - 1. Initial priority Project management, risk management
  - 2. System engineering, configuration management

#### **Communications Plan**

- Project management related meetings cadence, scope, etc.
- DRAFT plan preparing for discussion with Project Leadership

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### ATNF Project Portfolio Showcase

- PRB reporting focussed on issues that require S&A leadership input
- Proposed as the primary means of reporting to the S&A PRB
- Based on an EPMO Program Report
- Snapshot of the portfolio of active ATNF projects
  - Based on individual project dashboards
  - Summary of the status of each project
  - Successes and issues/concerns
  - Visibility of the timelines of the portfolio of projects
  - Risks and impact of changes
  - Specific requests for feedback from the S&A PRB
- Work-in-progress report will be refined based on feedback





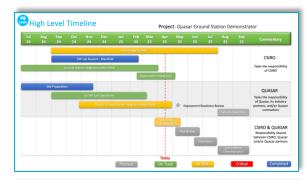
#### ATNF Portfolio Review Board/Committee (TBD)

- Project reports based on the existing EPMO 'project dashboard'
- Reviews all ATNF projects (i.e. progress, schedule, finance, issues, etc.)
- Small-scale R&D projects reviewed/discussed (TBD)
- Meets every 3 months (TBC)

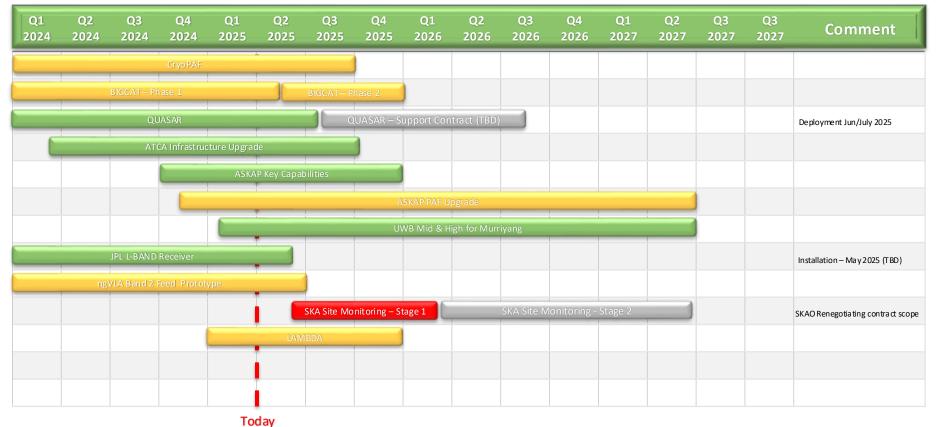
#### S&A Project Review Board (TBC)

- Approves/endorses S&A project proposals and significant changes
- Sets relative priority of RU projects/portfolio (e.g. to resolve manpower conflicts – across programs)
- Meets every 6 months (March and October)

| <ol> <li>Walson and stranding of majority of majo</li></ol> | Project on a Page Report                |                                     |                                         | port              | Project: Quasar Ground Station Demonstrator                        |                                                                                                                                      |  |  |  |
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| Instruction         Composition of distributions trading of updates         Composition of                                                                                                                                                                                                                                                                                                                                                                                   | Co                                      | ncept 🔪 Plan 🔪 Deliver              | · > ·                                   | Cose              | Project SRO:                                                       | Project Lead: Mark Bowen                                                                                                             |  |  |  |
| Mit Mark Instrument         Mark IN         Mark IN <th>atus</th> <th>Deliverable</th> <th></th> <th></th> <th></th> <th></th>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | atus                                    | Deliverable                         |                                         |                   |                                                                    |                                                                                                                                      |  |  |  |
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| Mit Conference on the state of control on the state of                              | •                                       | M1.7 Array Feed Package Complete    | Sep 2022                                | Apr 2023          |                                                                    | <ul> <li>Deployment to Torrumbarry and the full capability</li> </ul>                                                                |  |  |  |
| 10         Processing strength enging endingenessing strength engingenessing strength engingen                                      | *                                       | M1.8 CryoPAF Beamformer Mods        | AL& CryceAF Beamformer Mods Oct 2022 Ma |                   | Active Issue(s)                                                    | · Tasks required to make the system deployable that wer                                                                              |  |  |  |
| No. 2019         Mathematication strengthment         Sub-2016         S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | •                                       | M2.1. WEM Production Complete       | Dec 2022                                | Dec 2022 Apr 2023 |                                                                    | delayed until after the TAP Lab (Nov/Dec 2024) are nov<br>underway.                                                                  |  |  |  |
| W1 James and programs         Me1201         A 49100         astity is provide tag ten set of mournes           W1 James and programs Complex         Me1201         astity is provide tag ten set of mournes         astity is provide tag ten set of mournes           W1 James and programs Complex         Me1201         So 2014         astity is provide tag ten set of mournes           W1 James and programs Complex         Me1201         So 2014         astity is provide tag ten set of mournes                                                                                                                                                                                                                                                                                                                                                                                                                                               | ~                                       |                                     | Jan 2023                                | Sep 2023          | to affect the project.                                             | Project Update                                                                                                                       |  |  |  |
| W124         Applications         More 2019         Springer         The support and the stranger dimension gravement in the stranger dimension gravere                                                                 | ٣                                       |                                     | Feb 2023                                | Aug 2023          | ability to provide bug fixes and firmware                          | Quasar successfully completed Cohort 4 of the US Space<br>Systems Command, Space Domain Awareness Tools and                          |  |  |  |
| Pit ND MC Construction         442033         349203                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ۳.                                      | N2.4 Array Integration Complete     | Mar 2023                                | Sep 2023          | <ul> <li>The scope and timing of technology transfer</li> </ul>    |                                                                                                                                      |  |  |  |
| W1 All productions in the interpretation of the product of the interpretation of the product of the pro                             |                                         | M3 MVP Construction                 | Apr 2023                                | Sep 2023          |                                                                    | updates and network transition) are well advanced                                                                                    |  |  |  |
| PM MAR Mannah you hongman         Jun 2013 Sign 2013         Sign 2013         Mannah you hongman         Jun 2013 Sign 2013         Mannah you hongman         Jun 2013 Sign 201         Mannah you hongman         Jun 2014 Sign 2014         Jun 2014 Sign 2014 Sign 2014         Jun 2014 Sign 2014 Sign 2014         Jun 2014 Sign 2014 Sign 2014 Sign 2014         Jun 2014 Sign 2014 Sign 2014 Sign 2014         Jun 2014 Sign 2014           | *                                       | M3.1 System Laboratory Integration  | May 2023                                | Mar 2024          |                                                                    |                                                                                                                                      |  |  |  |
| Vi Monte Resembles                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | r.                                      | M4 MW Assembly and Integration      | Jun 2023                                | Sep 2023          |                                                                    | <ul> <li>System firmware and software updates in March 2025.</li> </ul>                                                              |  |  |  |
| Mo Deplement to Tomumberry Jun 2025     Minimitighter mean any equipment failure will     More the present mean any equipment failure will     protentially delay deplement.     Complete presentations for deplement to for undex     Complete presentations for deplement to Tomumber     Minimitighter will be addressed on the second sec           | -                                       | MS System Demonstration - Marsfield | Mar 2025                                | Apr 2025          | is minimal, minor issues have potential to delay                   | <ul> <li>Transition off the CSIRD network to a deployment real<br/>output, a full remote control and monitoring exclusion</li> </ul> |  |  |  |
| M7 System Demonstration – Torrumbarry 3ad 2025     Emerging – Quasar may seek to delay     WC during Mercline 2025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ş.                                      | M6 Deployment to Torrumbarry        | Jun 2025                                |                   | <ul> <li>Minimal spares mean any equipment failure will</li> </ul> | on the Quasar network in April 2025.                                                                                                 |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 5 M7 System Demonstration - Torrumbarry |                                     | Jul 2025                                |                   |                                                                    | <ul> <li>Complete preparations for deployment to Torrumbarry</li> </ul>                                                              |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ۹.                                      | M8 MVP Review and Project Close     |                                         |                   |                                                                    | VIC during May/Jun 2025.                                                                                                             |  |  |  |



### ATNF Program – Project Portfolio Timelines



Planned



At Risk





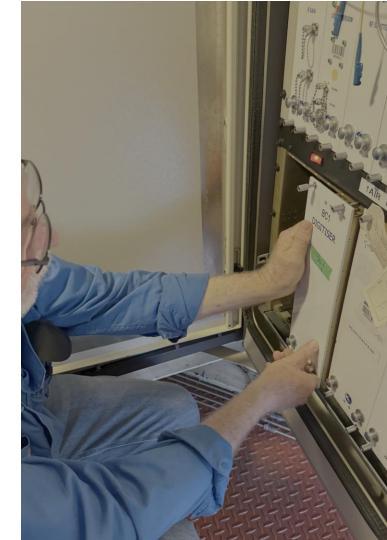
### Status of the BIGCAT project - Chris Phillips



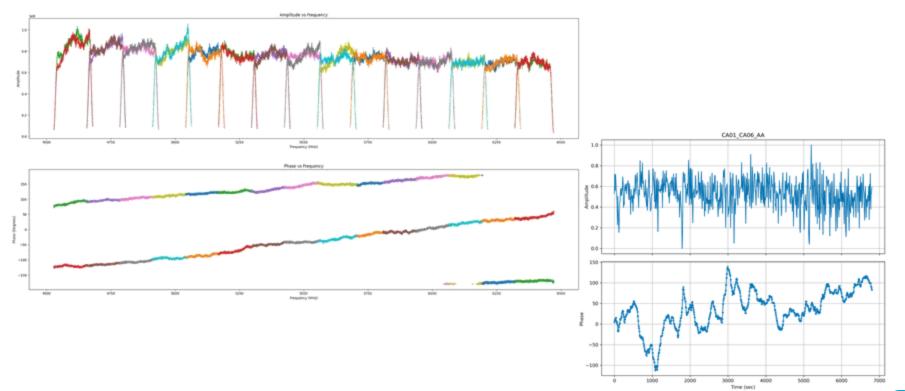


# Commissioning Started!!

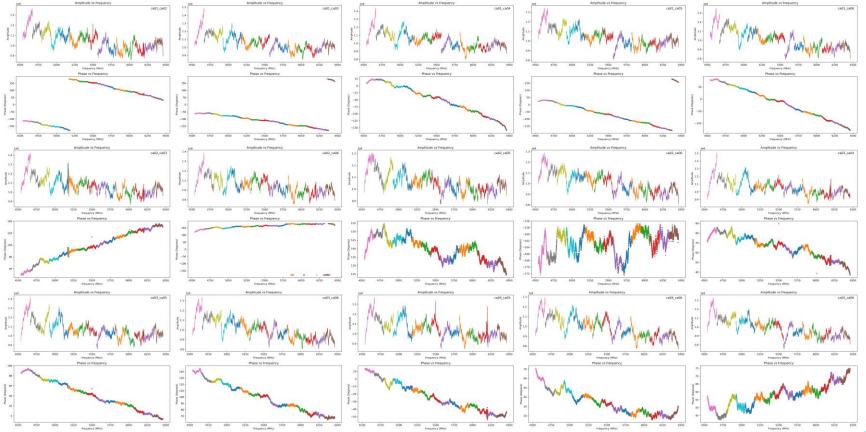
- Jimble digitisers installed in all 6 antenna (28 March)
  - Fringes obtained from all 6 ants on same day
- Engineering commissioning underway
- 1x2 GHz dual pol, using CABB conversion
  - 1x2 GHz CABB IF remaining for comparison
  - Can run in parallel, but single source
- Will transition to 2x2 GHz BIGCAT over next few weeks
- Already identified 2 subtle phase problems with CABB IF (not BIGCAT hardware)



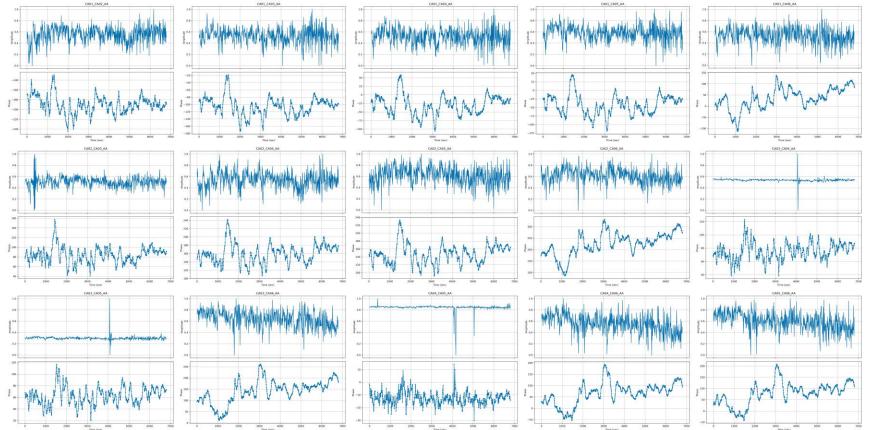
### Visibilities





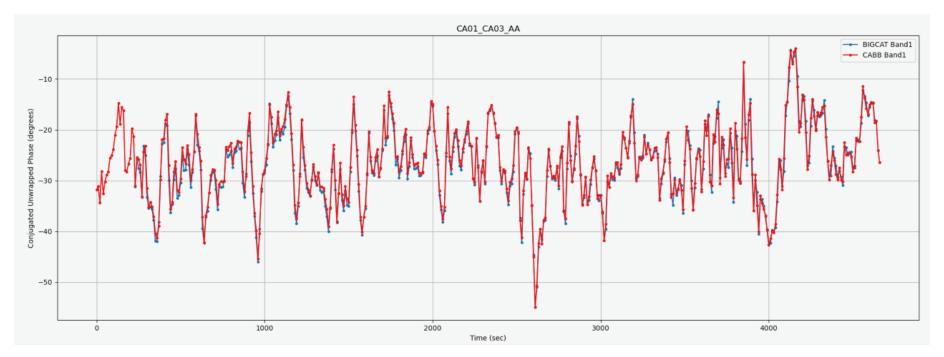








## **BIGCAT/CABB** Comparison





# **Rough Timelines**

- Engineering commissioning April'25
  - Finalising Zoombands, Tsys extraction, CASA import etc
    - Will have route to Miriad
  - Science commissioning May'25
    - Commissioning Team ready to start
  - Schedule observations starting June'25 if all goes well
    - Not hard deadline, may have gradual transition from science commissioning to schedule observations
  - Initially using CABB IF 2x2 GHz (start May'25)
  - 8 GHz BIGCAT IF installed ~ September
    - Conflicts with major shutdown



# Day Zero Features

- 4 GHz bandwidth
  - Flexible integration time
  - Frequency resolution up to 10's kHz over entire band\*\*
- Flexible zoom setups
  - Limited set of default setups, trivial to add more
- New caobs
  - New vis/spd equivalent
- New BIGCAT scheduler
- ASDM output
- CASDA archive
  - \*\* Subject to output data rate limits

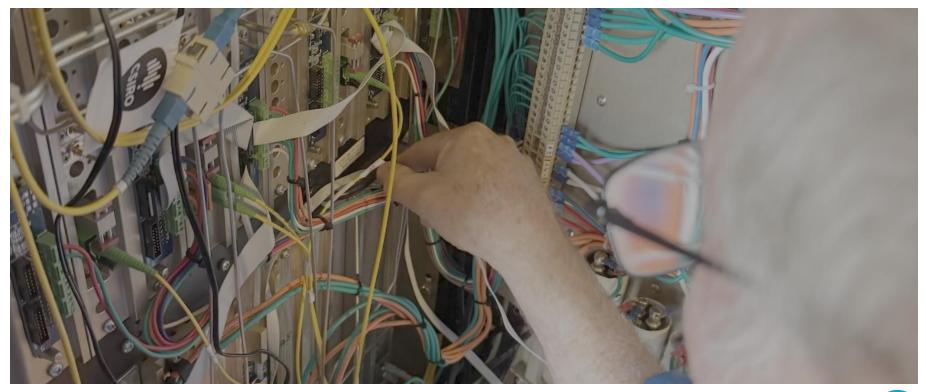


# Day Zero non-features

- No tied array voltage
  - Next priority after zoom bands fully commissioned
  - Single dish 128 MHz relatively easy to implement
- No subarrays
  - Basic support in place, needs extensive testing
- No Pulsar modes
- No SSA
  - Needs appropriate geometric model support
- All will be implemented over next 6 months. Expected to be ready by OCT25 semester



### Stay tuned for first image (post Easter)







### Status of the CryoPAF project Simon Johnston



### CryoPAF General Specifications

Frequency range of 700-1950 MHz in two bands: 700-1100 MHz and 1100-1950 MHz Processed bandwidth of 600 MHz

T<sub>sys</sub> < 20K, Tsys/eff ~ 30 K

Phased array feed with 98 dual linear polarized elements

Maximum of 72 beams (8 for pulsar timing and VLBI). FoV approx 1.5 sq deg @1.4 GHz Rotation allows tracking in parallactic angle



# The good, the less good and the future

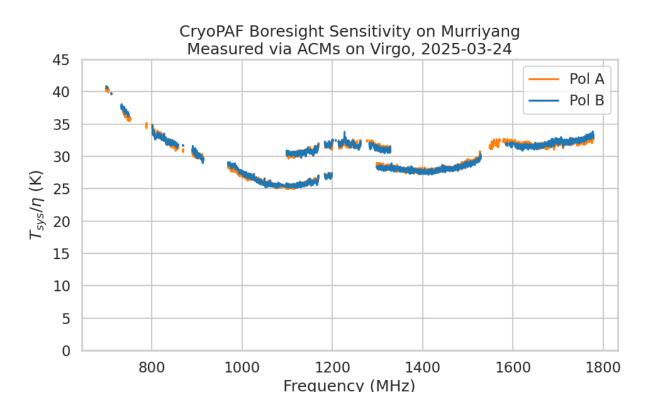
#### Good news

- On dish since February
- Excellent Tsys performance
- Science modes tested and working
  - Spectral line (zoom bands)
  - Search mode (high time res)
  - Pulsar-fold mode
- Full 72 beam data capture
- Progress with TOS/Garriwang

#### Less good news

- Cryogenic issues persist
- Only 230 MHz 576 MHz coming in July
- Jimble (A/D) issues remain
- Black belt operation/observing
- Real time transient detection mode not yet started
- SETI mode not yet complete
- No commissioning postdocs
- No Parkes System Scientist

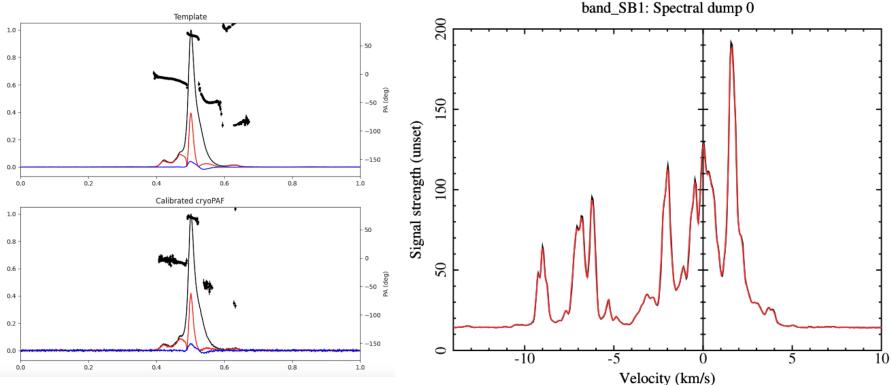
### First Results – on dish testing



Preliminary results across the band in 230 MHz chunks (with RFI removed).

Some artifacts but overall excellent performance and a bit below the spec of 30 K over much of the band.

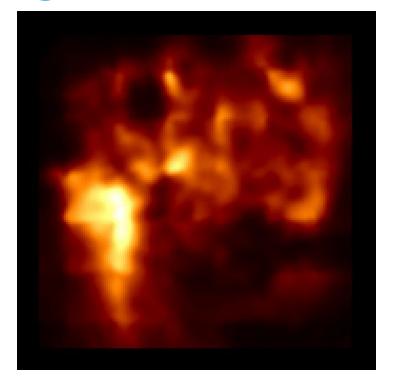




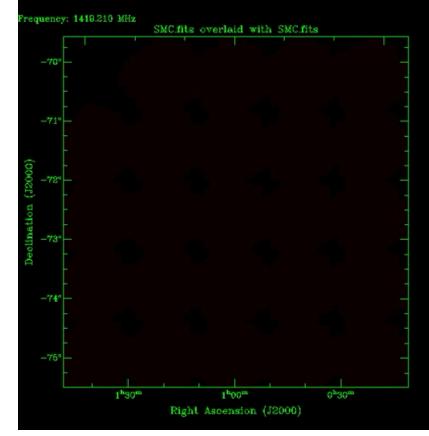
Polarization of the pulsar J0437-4715. Voltage/fold mode

OH maser spectrum with 140 Hz resolution.

## First Results – on dish testing



HI total intensity of the LMC, and movie of the SMC.



# The good, the less good and the future

#### Future

- The cryogenic issues remain a concern and solutions are being sought
- Work continues on :
  - Quantifying system performance
  - Fully shaking down the science modes
  - Making beam weights easier to compute / upload
  - System integration into TOS / Gariwang
  - Delivering meta-data to the user
  - Simplifying observing
  - Upgrading from 230 to 576 MHz bandwidth
- 1 April semester shared risk observing will start soon
- 1 October semester 600 MHz bandwidth, push button observing
- 2026 : real-time transient detection, user-driven modes, beam footprints etc