# ATUC Parkes Update

Jimi Green | 13th April 2021



# Summary of Latest Developments

- New agreement with Intuitive Machines for lunar lander tracking
- UWL use now >95% of the available time
- Parkes has new drive control ‘DICE’ board (with special thanks to Bob Kaletsch)
- CryoPAF moving ahead with construction
- UWH funding proposal made
- High-frequency receivers (MARS, 13MM) enabled with DHAGU/MEDUSA
- CS-Studio to replace Glish (OPERFCC), also MARS/13MM monitor/control
- "Alerta" notification system for critical alerts (i.e., MEDUSA, Euryale) developing

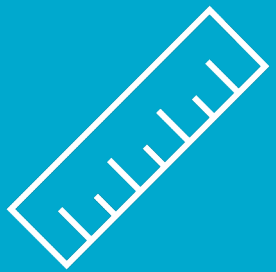
# Maintenance Activities

## March 2021 Shutdown

- 2 weeks: for the replacement of drive control ‘Ben’s Box’ with ‘Bob’s Box’ or Drives Interface Control Enclosure (DICE), plus also CryoPAF power considerations
- DICE remedial work done 22nd March following drive issue (~2 days lost) but improved result

## April 2021 Shutdown

- Just started this shutdown (9th April)
- Cryo pipe work in preparation for CryoPAF
- Potential Roach board removal for rack space (today)



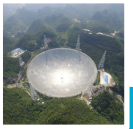
## August 2021 Shutdown

- Possible on-dish engineering fit out and testing of CryoPAF
- Possible Breakthrough Listen Multibeam oriented backend removal (SNAP boards)

# Contracted Time (capped at <50% of available)

## Breakthrough Listen

- Galactic plane survey completed
- Masters student has analysed pulsar data
- Detected commensal FRB
- Undertaken UWL observations
- Potential work on flare stars
- *Asteroid (514107) 2015 $BZ_{509}$ Price et al. 2019*
- *Fast Radio Burst with frequency-dependent polarization Price et al. 2019*
- *Wide-bandwidth digital instrumentation for the CSIRO Parkes 64-m telescope Price et al. 2018*
- Current contract concludes following 2021APRIL semester (850hrs during semester plus ~300hrs makeup subsequent)
- Discussions for extension



## FAST/NAOC

- To date, have confirmed 28 of FAST's 157 pulsar candidates (106 of which are visible from Parkes).
- 26 of the confirmed pulsars are now the subject of a long term timing and deep-study campaign.
- UWL used for ~15 confirmations so far, primary receiver used for time
- First major science paper published (for first 11 pulsars)
- Current contract at ~200hrs per semester

## Intuitive Machines

- New agreement, initially for tracking Nova-C lander
- Part of NASA's Commercial Lunar Payload Services (CLPS) initiative, Intuitive Machines is a provider and supplier of space products and services
- ~100hrs in 2021OCT semester, with potential for similar allocation on annual basis
- Scheduling subject to launch window, currently forecast for November 2021
- John Sarkissian Co-Learnium coming up with more details

# Tracking Proposal Time

| | 2018 OCT | 2019 APR | 2019 OCT | 2020 APR | 2020 OCT | 2021 APR (935 hrs maint) |
|---|---|---|---|---|---|---|
| Contract | BL+FAST+NASA (1535hrs) | BL+FAST (1472hrs) | BL+FAST (1307hrs) | BL+FAST (1055hrs) | BL+FAST (994hrs) | BL+FAST (1001hrs) |
| Other | (213hrs UWL[1]) | (87hrs UWL[1]) | (153hrs UWL[1]) | (137hrs UWL[1]) | (86hrs UWL[1]) | (119hrs UWL[1]) |
| # Proposals[2] | 36 (2750hrs) | 35 (2180hrs) | 33 (1902 hrs) | 50 (3133 hrs) | 51 (3021 hrs) | 45 (2352 hrs) |
| Cutoff grade | 3.4 | 3.0 | 3.0 | 3.6 | 3.8 | 3.6 |
| Projects 90-100% | 20* | 21 | 22 | 26 | 22 | 25 |
| Projects 40-90% | 7 | 8 | 3 | 10 | 10 | 4 |
| Projects <40% | 4 | 0 | 2 | 4 | 3 | 1 |
| Projects 0% | 5 | 2 | 5 | 8 | 10 | 10 |
| NAPAs | 2 | 2 | 2 | 2 | 6 | 4 |
| Student PI success | 69% | 100% | 71% | 67% | N/A (anonymized) | N/A (anonymized) |

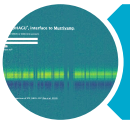
[1]This is P960 and P737 project time, plus TOS testing time from 2020OCT onwards
[2]This doesn't include P960, P737, PX500/501, BL

# UWL/MEDUSA/SOFTWARE Update

For last 2 semesters UWL requested by >95% of proposals

There have been data flow issues (with DAP and ATOA) with improvements to DAP being explored

Data processing software being actively worked on (in particular for spectral line users)

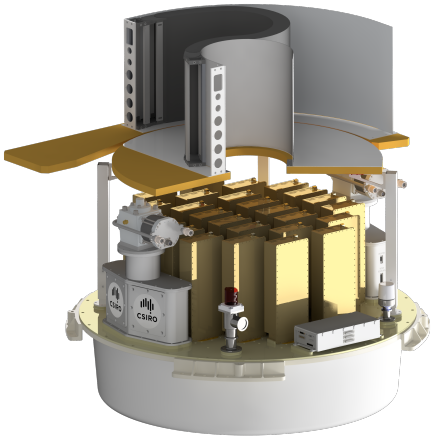


Project uptake of DHAGU control system has continued

New 'Alerta' system being developed to provide automated notifications of issues with MEDUSA and Euryale (plus monica points as well)

Various work on control interface including ability to feed MARS/13MM into MEDUSA, pointing with DHAGU/MEDUSA, and GLISH replacement.

# CryoPAF Timeline Update



| | |
|---|---|
| September 2020 | • Design review held |
| November 2020 | • Multibeam removal |
| April 2021 | • On-dish infrastructure installation (cryo), possible BPSR/HIPSR Roach board removal |
| Apr - Aug 2021 | • Science Commissioning Planning |
| August 2021 | • On dish (engineering) testing of prototype |
| April - May 2022 | • Commencement of science commissioning |

# Ultra-Wideband High LIEF Proposal

## Funding Proposal:

- Western Sydney University has led the proposal (Nick Tothill lead PI), submitted to ARC 31st March (for funding decision late 2021, early 2022)
- UTAS also collaborating (through Simon Ellingsen)
- Costing is ~$2m, 0.95m ARC LIEF, 1.05m CSIRO + Universities (inc in-kind)

## Science Case (action from last meeting):

- 3 main drivers
  - Very Long Baseline Interferometric (VLBI) astrometry
  - Cradle of Life through studies of interstellar medium physics and chemistry (simultaneous multi-transition molecular line studies), stellar bursts and searching for Techno-signatures (links to Breakthrough Listen)
  - Spacecraft tracking and bi-static radar (through collaboration with the Canberra Deep Space Communication Centre, CDSCC, and NASA's JPL)
- Also broader science noted (and the likely 'unknowns' that will be discovered)
- Thanks to those who contributed to the science case preparation
- If successful will plan on a workshop to outline use cases and requirements

# Recommended use of *'Murriyang'*

(action from last meeting – information added to https://www.atnf.csiro.au/research/publications/Acknowledgements.html)

Users of the Parkes radio telescope are requested to acknowledge the ATNF by including the text:

- *"The Parkes radio telescope is part of the Australia Telescope National Facility which is funded by the Australian Government for operation as a National Facility managed by CSIRO."*

and may also add

- *We acknowledge the Wiradjuri people as the Traditional Owners of the Observatory site.*

The Parkes 64-m telescope has received the Wiradjuri name *Murriyang*, and users may recognise this in their publications. This can be done with a statement like:

- "observations were made with the Parkes 64m "*Murriyang*" radio-telescope"
- "observations with the Parkes 64m radio-telescope (recently given the Indigenous Wiradjuri name "*Murriyang*")"
- "observations with the Parkes 64m radio-telescope also known as "*Murriyang*" in Wiradjuri".

## Murriyang

64m Parkes Radio Telescope

In the Wiradjuri Dreaming, Biyaami (Baiame) is a prominent creator spirit and is represented in the sky by the stars which also portray the Orion constellation. Murriyang represents the 'Skyworld' where Biyaami lives.

## Giyalung Guluman

18m decommissioned antenna

Meaning 'Smart Dish' this antenna had the ability to move along a railway track while observing, and when linked to the main 64-metre antenna became pivotal in early work that determined the size and brightness of radio sources in the sky. The antenna was originally assembled at the CSIRO Fleurs Radio Telescope site, Penrith NSW in 1960, was transported to Parkes in 1963 and became operational in 1965.

## Giyalung Miil

12m ASKAP testing antenna

Meaning 'Smart Eye' this telescope was commissioned in 2008 as a testbed for a special new type of receiver technology (phased array feed, PAF) used on CSIRO's Australian Square Kilometre Array Pathfinder (ASKAP) antennas. The PAF is able see different parts of the sky simultaneously making it a 'smart eye'.


Thanks!

**CSIRO Astronomy and Space Science**

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