



# PARKES

## ATUC Status Update

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CSIRO ASTRONOMY AND SPACE SCIENCE  
[www.csiro.au](http://www.csiro.au)



# Overview

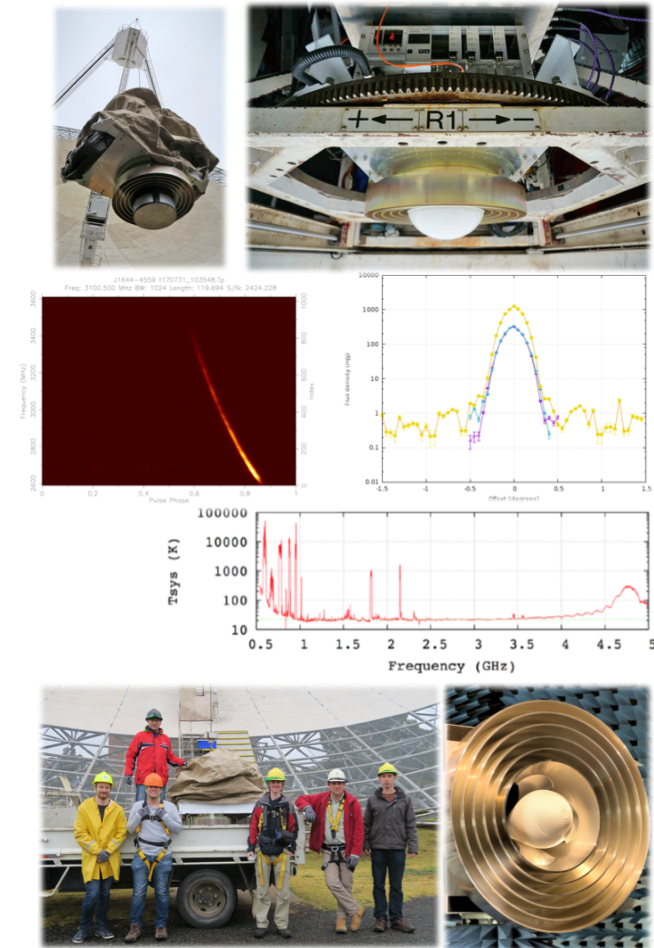
- Front-ends
- Back-ends
- Breakthrough Listen
- FAST Collaboration
- User Support
- PULSE@Parkes -> OPTIMUS on PRIME



# Front-ends

## Ultra-wideband receivers

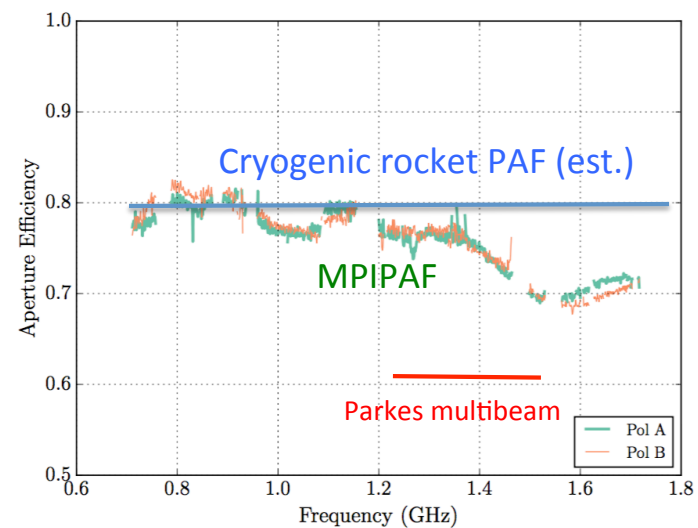
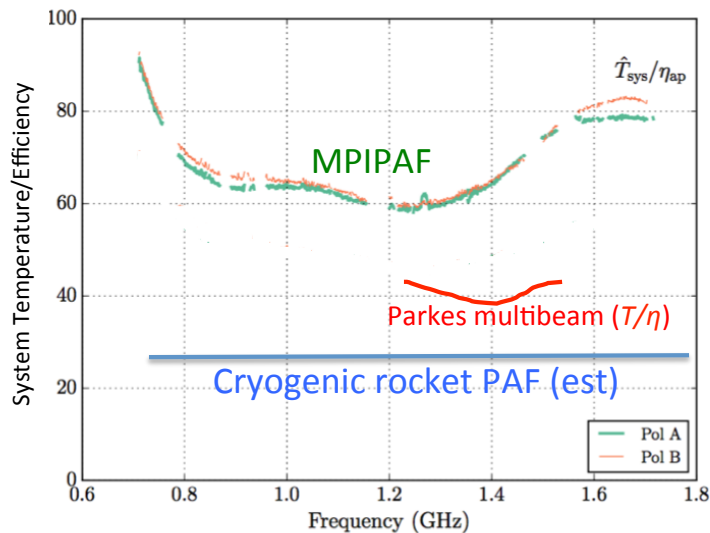
- Ultra-Wideband Low Frequency Single Pixel Feed
  - Quadridge structure with dielectric spear
  - 0.7—4.0 GHz,  $T_{\text{sys}} \sim 22\text{K}$ , SEFD  $\sim 35\text{ Jy}$
  - Partly funded through Australian Research Council LIEF grant
  - First light August 2017
  - Scheduled for installation OCTS17 semester
- Ultra-Wideband Mid/High Frequency Single Pixel Feed(s) in planning - one or two feeds to cover 4 GHz up to 25 GHz
- Wideband feeds share 'pan': focus cabin with 1 PAF + single pixel coverage 0.7  $\rightarrow$   $\sim 25\text{ GHz}$



# Front-ends

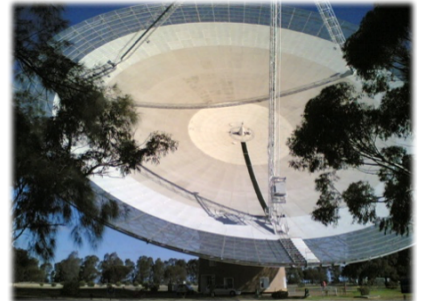
## Cryo-PAF

- Cryogenically cooled 'Rocket' Phased Array Feed (third generation CSIRO PAF)
- Prototype on dish testing (plus aperture tests) May 2016 - very encouraging for purpose built version
- 700MHz – 2GHz, 3 x MB field of view, sub-20K Tsys
- LIEF proposal submitted, decision expected any day now



# Back-ends

- HIPSR/BPSR capability now running on GPU cluster ('PKBE')
- UWB Digitiser prototype to be installed in November, to be used with existing 'legacy' receiver fleet for testing
- Breakthrough Listen installation



# Breakthrough Listen

## Set Up

- 5-year programme, multi-year investment for telescope time
- Officially began observing October/November 2016
- Observing blocks each day, stepping in time (Local Sidereal Time) through the week
- Dedicated backend managed by University of California, Berkeley
  - Initial test system installed Feb/Mar 2016
  - Single beam system installed Sept & Dec 2016
  - Multibeam system installed June 2017
- Open access to data planned
- Data to be stored at Pawsey, initial allocation (1PB) made, multibeam data first



**BREAKTHROUGH**  
LISTEN



# Breakthrough Listen

## Observations

- Pointed observations to date (nearby stars, Proxima B monitoring)
- Galactic plane survey (step and stare, ~15mins) to commence with Multibeam usage – early stages
- Commensal FRB searches proposed
  - Swinburne running BPSR simultaneously with Breakthrough multibeam observations
  - BPSR detection triggering ~20s of raw voltage data dump
  - Long term future potential for ring buffer for Berkeley to run during other observations for raw voltage capture



**BREAKTHROUGH**  
LISTEN



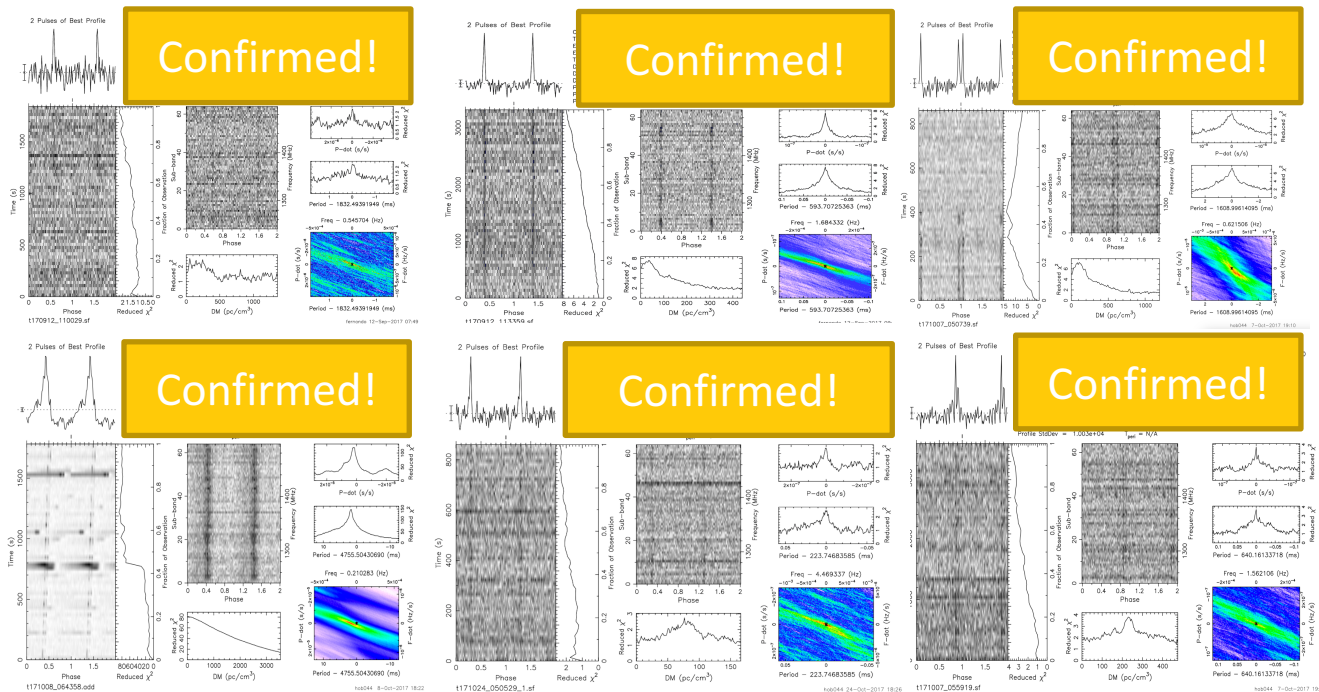
# FAST Collaboration

- Five-hundred-metre Aperture Spherical radio Telescope (FAST) saw it's first light in late 2016.
- May 2017, CSIRO engineers completed a 19-beam receiver system for FAST, a primary system for FAST survey projects, expected to be installed later this year
- Potential partnerships on wideband feeds
- FAST and Parkes teams working together to develop calibration methods and observing strategies to enable simultaneous pulsar & spectral line surveys
- Exploring in conjunction "Big Data" problems, with the pulsar data sets from Parkes and FAST, including:
  - archiving huge data volumes,
  - providing world-wide access to the data,
  - running processing pipelines in a Cloud environment
  - developing methods to ensure that the scientific results are reproducible.



# FAST Collaboration

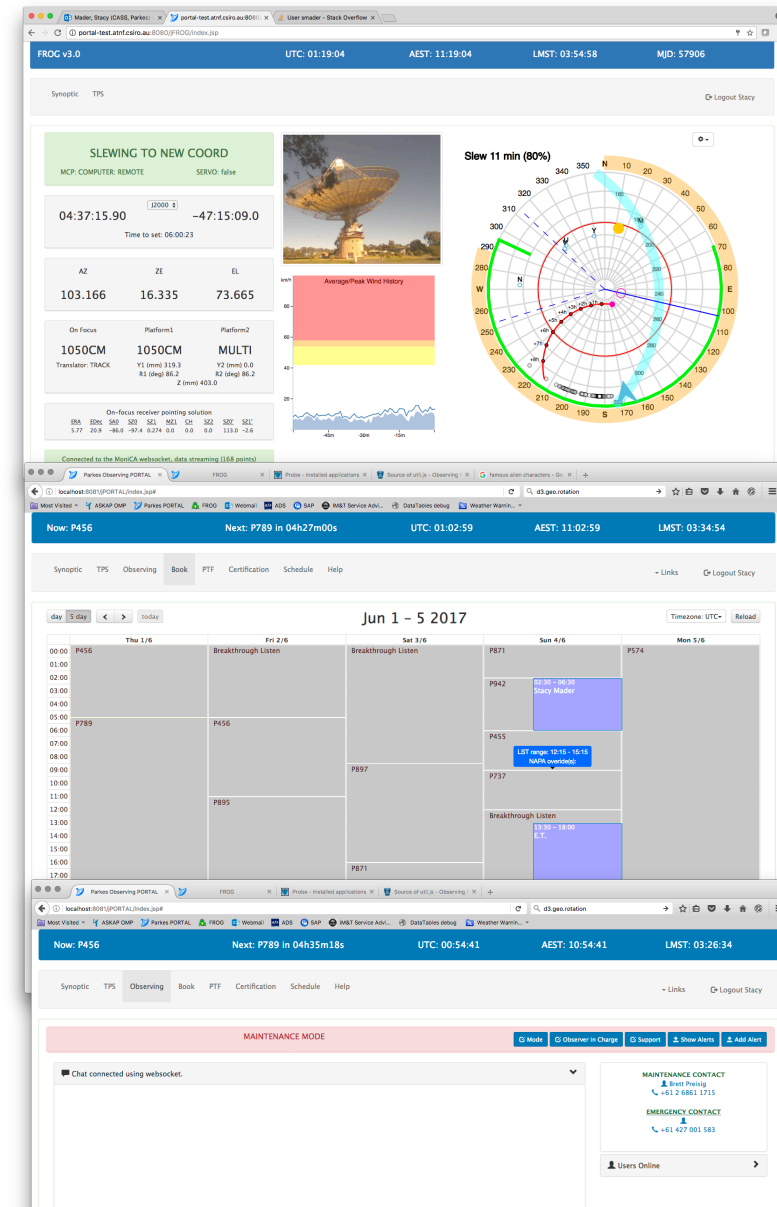
- FAST discovers pulsars, Parkes confirms (and can conduct long-term timing study)



- simultaneous Parkes/FAST observations will allow us to study the pulsar signal in unprecedented detail.
- negotiations underway for dedicated telescope time purchase.

# User Support/Software

- New Portal & FROG implemented at start of OCTS17 semester
  - Various features addressing previous feedback
- ‘Team Parkes’ established and looking into ways to contribute to user support
  - Had first meeting in June at Parkes
  - New starters: Andrew Cameron, Jane Kaczmarek + Simon Postdoc TBD
- Online videos and Face-2-Face training pages currently being developed
- New TOS (with block scheduling) under development for UWL



# PULSE@Parkes -> OPTIMUS on PRIME

- PULSE@Parkes programme
  - Pulsar focused, secondary-level education programme with real-time access to, and control of, Parkes Telescope
  - ~1500 high school students to date, ~130 schools, sessions across Australia, plus Canada, China, England, Japan, South Africa & Wales
- Undergraduate/postgraduate extension to the programme
  - **O**bserving with **P**arkes, **T**raining and **I**ntroduction, **M**odule for **U**niversity **STEM**: OPTIMUS
  - Successfully completed CSIRO's 'ON PRIME' development scheme
  - Undergraduate/postgraduate level training package including Parkes telescope time
  - Extending/varying science to include other aspects





# Thank you

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