



I would like acknowledge
the Wiradjuri people as
the Traditional Owners of
the lands on which
Murriyang & CSIRO Parkes
Observatory are located.
I pay my respects to their
Elders past and present.





Ultra Wide- bandwidth Mid & High



Australia's National Science Agency

Jane Kaczmarek | ATUC | 10 April 2024



What we currently have:

Receiver	Freq. Range (GHz)	Bandwidth (MHz)	Tsys (K)	Regularly Installed?
UWL	0.7 – 4.2	3500	21	Yes
CryoPAF	0.7 – 1.8	~600	20	Yes*
Mars	8.1 – 8.5	1000	25	Yes*
13mm	16 – 26	1000	90	No
“Old Meth”	5.9 – 6.8	300	55	No^
AT Multiband	2.2 - 2.5 / 4.5 - 5.1 / 8.1 - 8.7	300 / 500 / 500	80/ 50 / 120	No^

*The CryoPAF receiver will supersede the installation of Mars once it is available

^These receivers are no longer offered without exceptional use cases



What we propose:

Receiver	Freq. Range (GHz)	Bandwidth (MHz)	Tsys (K)	Regularly Installed?
UWL	0.7 – 4.2	3,500	21	Yes
CryoPAF	0.7 – 1.8	~600	20	Yes
UWM-H	4.1 – 15.7 / 15.7 – 27.1	11,500	>25	Yes
Mars	8.1 – 8.5	1000	25	No
13mm	16 – 26	1000	90	No
“Old Meth”	5.9 – 6.8	300	55	No
AT Multiband	2.2 – 2.5 / 4.5 – 5.1 / 8.1 – 8.7	300 / 500 / 500	80 / 50 / 120	No



The Ultra Wide-bandwidth Mid & High (UWM-H)

Mid

4160 – 15680 MHz

High

15680 – 27072 MHz

- Two distinct receivers
- Will share the UWL platform & warm electronics
 - Removes all foreseeable receiver changes



Proposed Ultra Wide-bandwidth System

- Jimbles for the entire Ultra Wide package
 - UWL adjusted frequency of 704 - 4288 MHz
 - Oversampled filterbank for all receivers
- Digitised calibration signal
 - Can be completely removed from sky signal
 - Gain & phase calibration w/o pulsed signal
- GPU backend
- ST data available as digital or analogue
 - Non-commensal with astronomy modes

Low

704 – 4288 MHz

Mid

4160 – 15680 MHz

High

15680 – 27072 MHz

ST

< 32300 MHz



Key Science Areas:

**Got an idea?
Let me know!**

Time Domain	Spectral Line	LBA	Space	SKA-Mid
Stellar radio bursts *	ISM Chemistry	Astrometry	Bi-static radar *	“Zero-spacing” support
Neutron stars	Cosmic magnetism	Geodesy *	Spacecraft tracking	SKA-Mid / Murriyang VLBI
FRBs	Dark matter studies	Global participation*		
Murriyang-led Science		Increasing Broader ATNF Capabilities		

* Key science areas that are currently unavailable with the current receiver fleet and will be facilitated by the UWM-H.



Anticipated Timeline

- **Now:**
 - Preparing for Project Review Board
 - Revisiting & revamping science drivers
 - Defining software, hardware & backend requirements
- **2025**
 - Focused project effort beings
- **2027**
 - UWL will be in Marsfield for ~8-10 weeks
 - UWL/M-H installed at Murriyang





Thank you

Space & Astronomy

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Australia's National Science Agency

