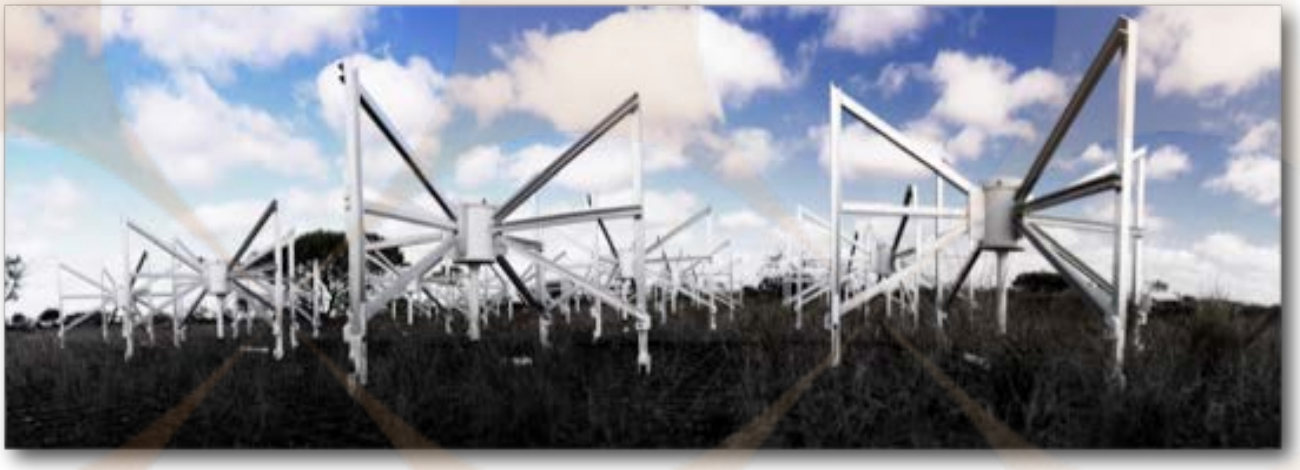
MWA
MURCHISON
WIDEFIELD
ARRAY

Gurlgamarnu

Lessons – Learned?



Frank Briggs, ANU

GOVERNMENT OF WESTERN AUSTRALIA
CSIRO
THE UNIVERSITY OF MELBOURNE
UNIVERSITY OF TASMANIA
Curtin University
HAYSTACK OBSERVATORY
THE UNIVERSITY OF WESTERN AUSTRALIA
Australian Government
ANU THE AUSTRALIAN NATIONAL UNIVERSITY
THE UNIVERSITY OF SYDNEY
MKI
CfA
VICTORIA UNIVERSITY OF WELLINGTON
SWINBURNE UNIVERSITY OF TECHNOLOGY

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ARRAY

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Design Goal: explore a region of parameter space for optimum sensitivity to EoR signal (70-300MHz, 30MHz BW)

- Large N / Small D – instantaneous u-v coverage
- Compact Array for surface brightness sensitivity & simplicity of ionospheric corrections (also cheap)

MWA
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WIDEFIELD
ARRAY

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Design Goal: explore region of parameter space for optimum sensitivity to EoR signal

Solar/Heliospheric, Transients (slow & fast), Galactic/Extragalactic, Space Debris Tracking

www.mwatelescope.org

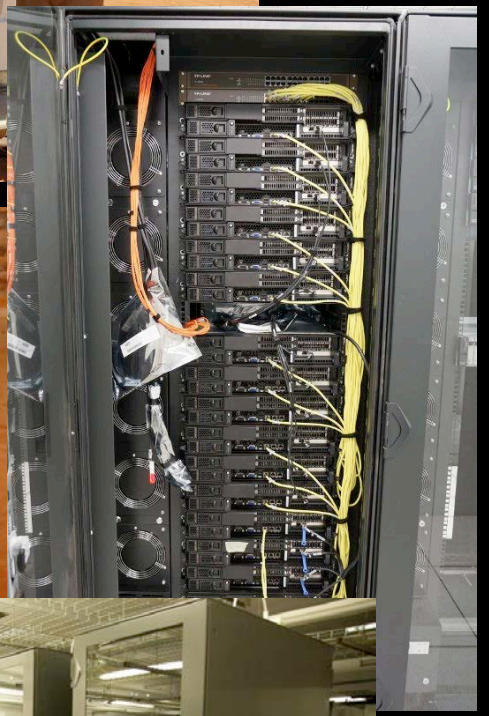
Follow project progress at:
www.facebook.com/Murchison.Widefield.Array

128T Construction phase complete

INFRASTRUCTURE

INSTRUMENT

DATA PROCESSING



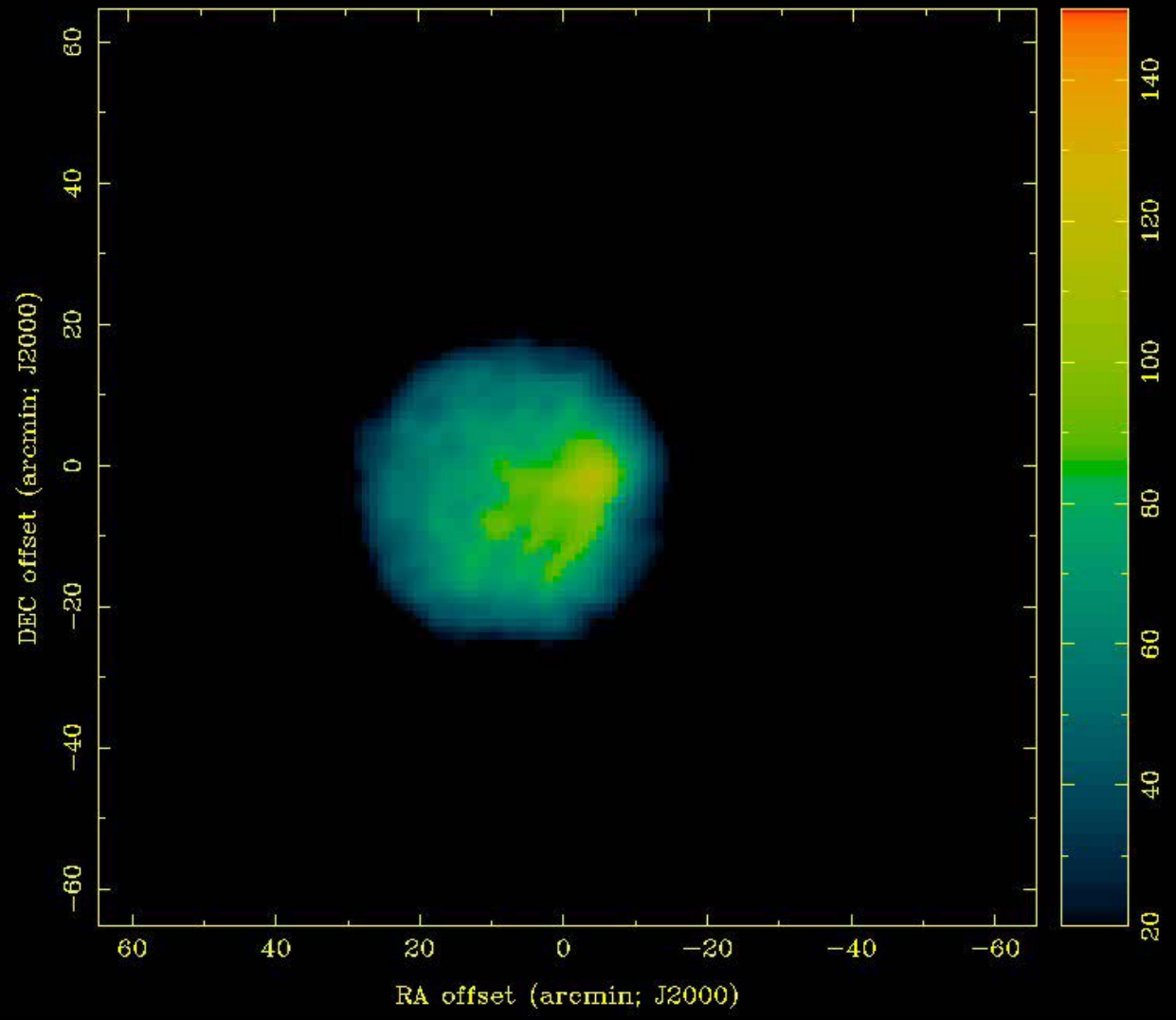
Engineering/Science Commissioning

Practical completion:	November/December 2012
Commissioning commenced:	August/September 2012
Early operations:	Mid 2013 (holding!)

Time Assignment Committee appointed by MWA Board

32 Tile sub-array Commissiong Observations

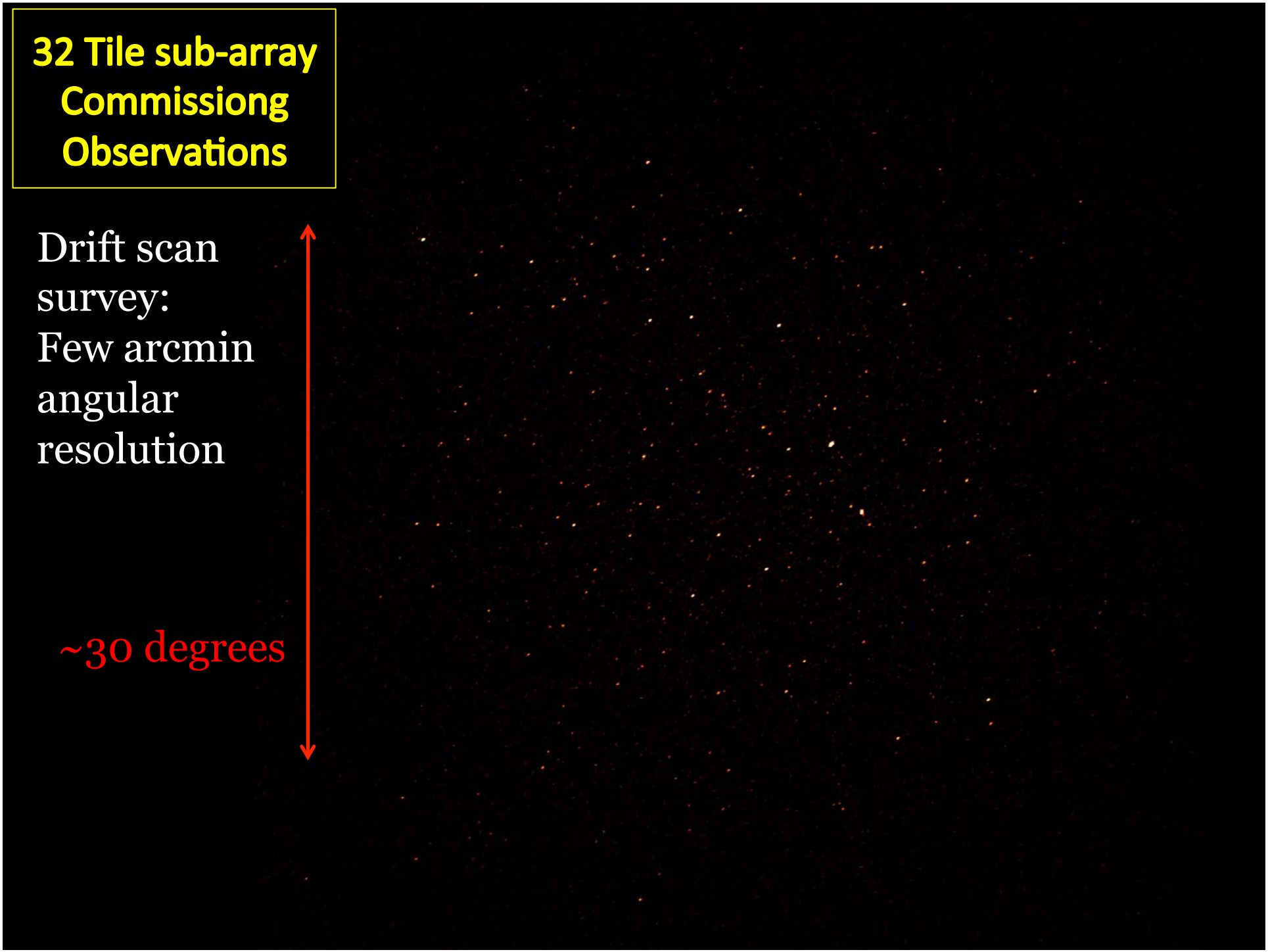
Solar observations



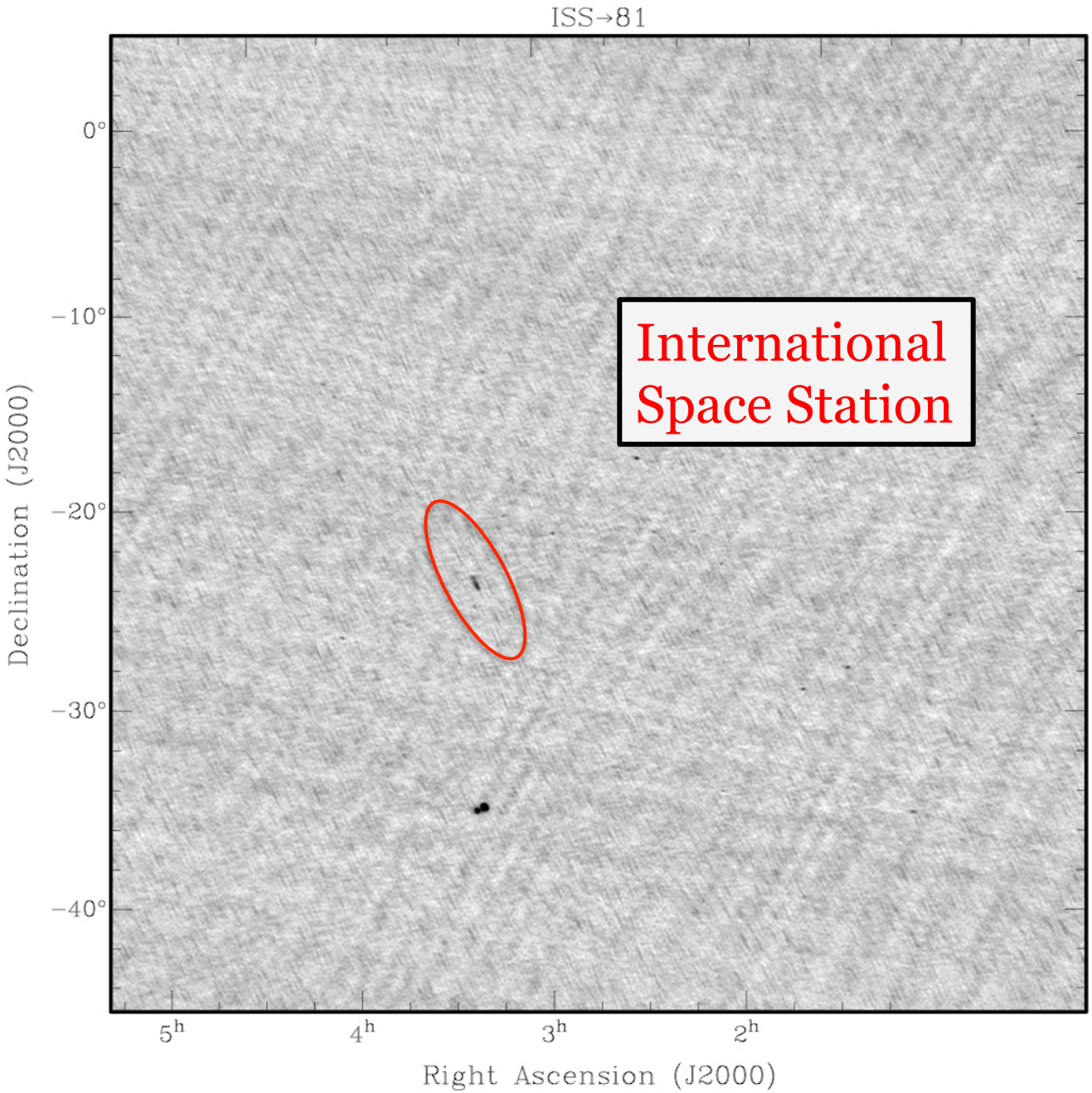
32 Tile sub-array Commissiong Observations

Drift scan survey: Few arcmin angular resolution

~30 degrees



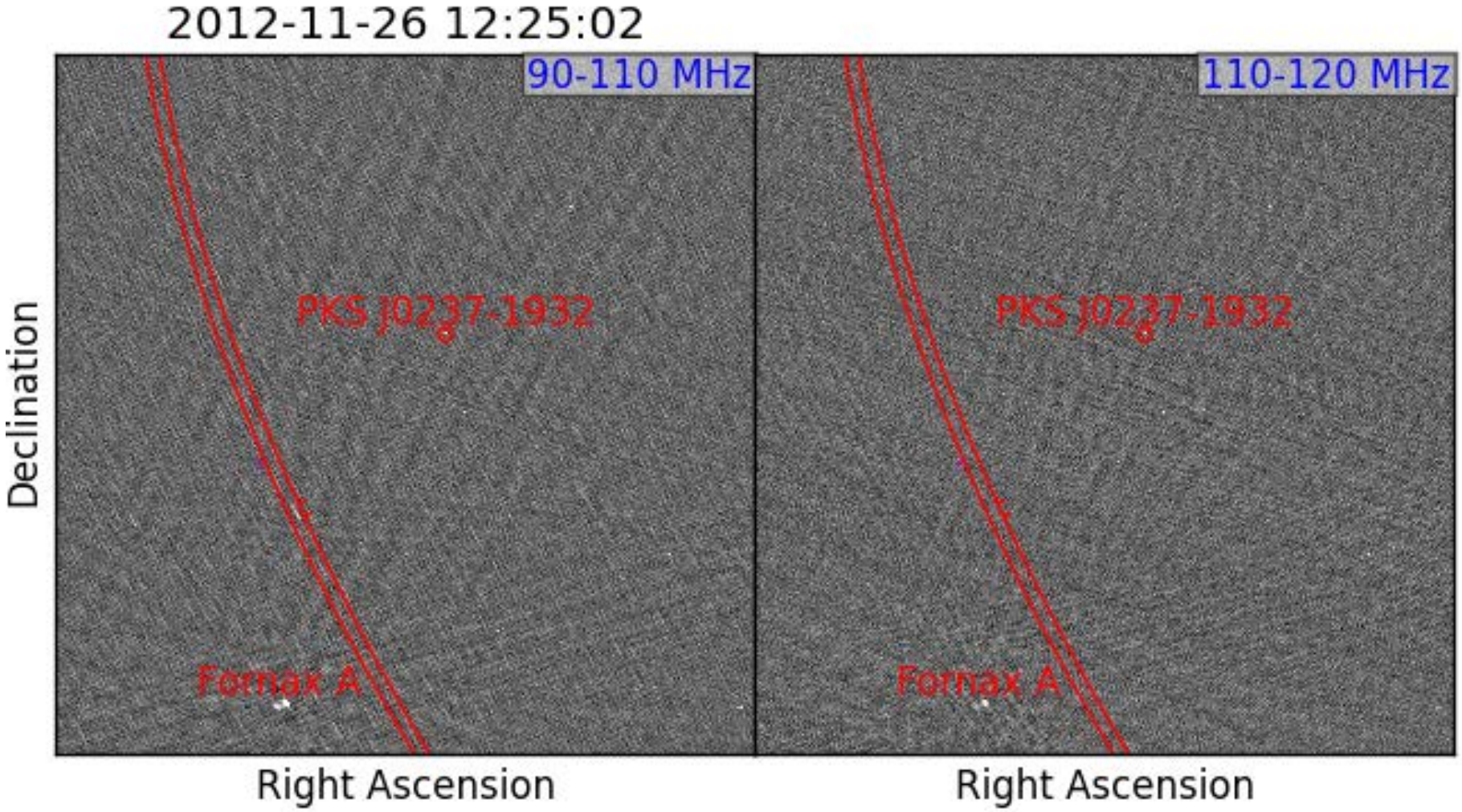
ISS


ISS→81
International Space Station
0°
−10°
−20°
−30°
−40°
Declination (J2000)
5h
4h
3h
2h
Right Ascension (J2000)

ISS

FM Band

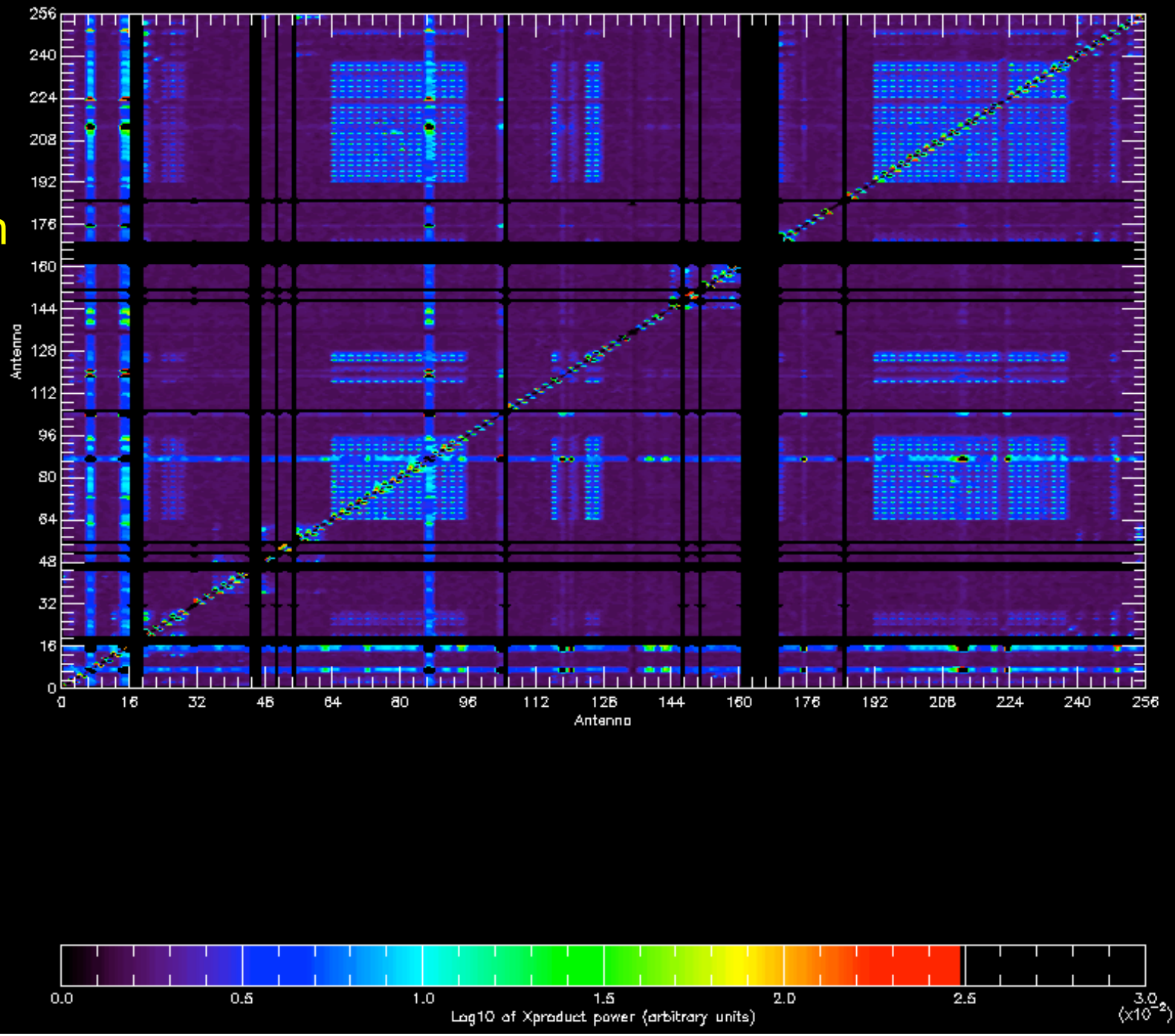
above FM Band



Steve Ord

128T Correlator Verfication on Sky+Sun

256x256



Lessons

- logistics of Science Requirements, design, prototyping, construction, commissioning,…

- now living with flaws and shortcomings...

Aspiring to learn:

- optimization of Tile size
  & Primary Beam size (and taper?)…
- need for long baselines?
- verification of calibration and impact on foreground removal

Curtin University

BEING EARLY, FLEXIBLE AND PRESENT IN PROJECT DESIGN, PROCUREMENT AND DELIVERY

Lessons for the SKA from the MWA

BY MWA PROJECT MANAGER - Tom Booler - February 2013

Curtin University

COLLABORATION BETWEEN RESEARCH INSTITUTES AND INDUSTRY

Lessons learned from the Murchison Widefield Array and applicability to the Square Kilometre Array

A CASE STUDY by Andy Farrant - January 2013

- Include infrastructure in early design phase,
  since it is a large fraction of cost… hence limits size of array
- Remote location => increased cost [infrastructure,…]
- Concentrate science, engineering, managerial, industrial resources geographically
- Experience in project management and project engineering is essential

Lessons

- ...

Aspiring to learn:

- optimization of Tile size
  & Primary Beam size (and taper?)…
- need for long baselines?
- verification of calibration and impact on foreground removal
- Refine beam shape and stability
- Observing modes: tracking, drift ‘n shift,
- Is Real-Time-System necessary feasible ?
  (flagging, calibration, iono-corr, time-scales,(1 s dump 8 sec calib loop), … “compression”)

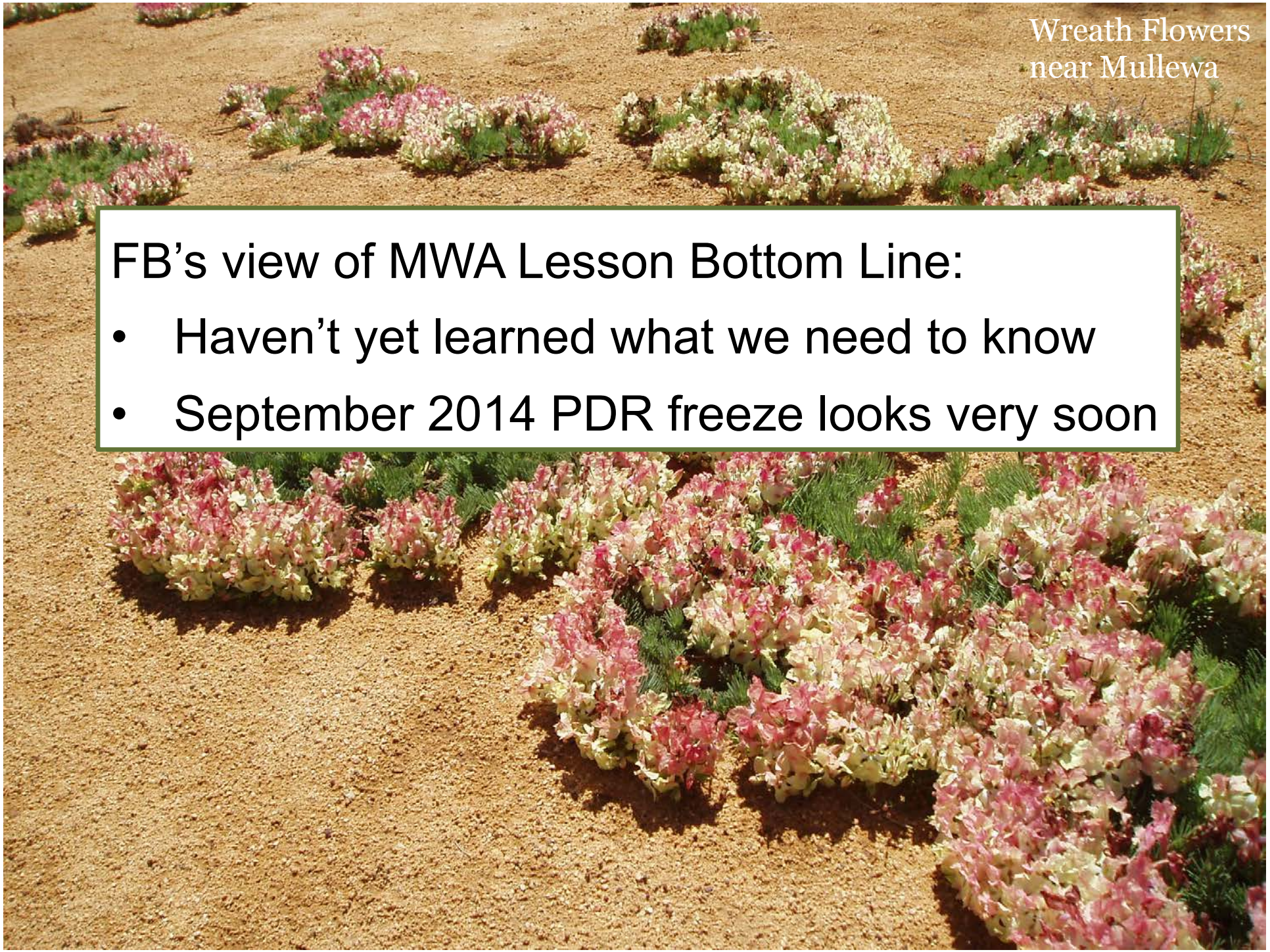
Lessons-2

Have learnt:

- we have built a telescope (lots of education), but
- more instantaneous bandwidth
- more bits/precision
- better digital filters
- more thought toward environmental packaging in the desert sun (infrastructure category)
- include students/postdocs early to build skilled, tight working groups
- MWA = a “Big Project” not a “little project”
- we needed more money

MWA hosts evaluation antennas

- MWA, under External Instruments Policy (with Peter Hall as MWA Individual Member PI).
- In collaboration with European partners
- Extended the MWA to include super tile (or mini station) of log periodic antennas for verification as part of MWA system.
- Compliant with MWA policies, MWA/CSIRO site license agreement, ILUA, EMC conditions etc.



FB's view of MWA Lesson Bottom Line:

- Haven't yet learned what we need to know
- September 2014 PDR freeze looks very soon