Lessons – Learned?

Frank Briggs, ANU
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)
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
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
Solar observations
Drift scan survey:
Few arcmin angular resolution

~30 degrees
ISS

International Space Station
Steve Ord

128T Correlator Verification 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
BEING EARLY, FLEXIBLE AND PRESENT IN PROJECT DESIGN, PROCUREMENT AND DELIVERY

Lessons for the SKA from the MWA

COLLABORATION BETWEEN RESEARCH INSTITUTES AND INDUSTRY

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

BY MWA PROJECT MANAGER - Tom Booler - February 2013

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
Aspiring to learn:

- Lessons

- 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