




Transient Science Forum

MWA-LFD Melbourne Meeting

2006.12.16 rjc





Organization

- Initially all under the rubric of ASM
- Broadened in order to serve interests of transient community
- With Miguel Morales, issued short document suggesting a more comprehensive transient science program

Techniques

- 5 different software analysis methods
- Each consists of algorithms, code, and observing strategies
- Of the 5 techniques, only the ASM is at present directly funded

All Sky Monitor

- Continuous monitoring of all data flowing from widefield correlator
- In version 1, images of primary tile beam field compared to GSM for statistically significant changes
- Later, full sky will be examined, albeit at reduced sensitivity, and integration period will shorten from 8s to 0.5 s.
- **Data source:** images within beam, visibilities for regions outside tile beam. Freq. and pointing direction not under ASM control.



Beamformer Light Curve

- High resolution time series formed at selected locations on the sky, using the voltage beamformer.
- **Data source:** program sources chosen by investigators, with specified frequency band and duration.

Imager Light Curver

- Light curves to be formed and analyzed on data coming from the imager
- Pixel-by-pixel analysis
- Frequency integration span TBD
- Different analyses from ASM, e.g. search for periodicity; also statistics differ for a targeted search
- **Data source:** Program sources or fields toward which the array is pointed, at specified frequency



Short Term Synoptic Survey

- Program of periodic observations a la LSST
- Whole accessible sky over full frequency range (80-300 MHz)
- ~1500 pointings x f ranges
- Timescale TBD (but of order days)
- Integration time TBD, but short (~secs)
- Limited cleaning of images
- **Data source:** Programmed scan of whole sky, for $\delta < 30^\circ$ in 7 frequency bands



Long Term Synoptic Survey

- Similar to STSS, but less frequent with deeper integrations
- Images well-calibrated and cleaned
- Timescale TBD (~ months)
- Integration time TBD (~minutes)
- **Data source:** Programmed scan of whole sky for $\delta < 30^\circ$ in 7 frequency bands

Analysis Flow

- Analysis packages (A, B, I, S1, S2)
- Event Handler -- clearing house for detected events. Decides which collaborations to notify (after classification?)
- Science Collaborations -- teams and software, organized around groupings of science topics

Science Topics	A	B	I	S1	S2
Blind Transient Search	X				
Periodic Survey				X	X
Pulsars		X			
Radio supernovae	X			X	X
LIGO events	X				
GRB prompt emission	X				
GRB afterglows	X			X	X
X-ray binaries	X		X		
Pulsar giant pulses	X	X			
Local gas giants	X	X	X		
Extrasolar planets	X	X	X		
Flare stars		X	X		
Scintillation events		X	X		
Microlensing events		X		X	X
Burpers		X			
RRAT's		X			