32T Test Plan –
All Sky Map Repeatability (5B)

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1 Introduction

An "All Sky Map" in this context is taken to imply the full FOV of the instrument. For the MWA the FOV is a function of frequency. This task requires the formation, at three different pointing positions, of a full FOV image at three different frequencies across the MWA bandpass. This is to be repeated at least once per pointing. This demonstrates the basic stability of both the tile and the imaging pipeline. No integration across frequency or time is implied or will be performed. This plan is responsive to requirement #5b contained in the memo "MWA 32-T Objectives and Quality Assurance Evaluation Criteria", dated 4 September 2009 (46-03001.99).

2 References

This task requires pointing and frequency flexibility, the RTS and Monitor and Control interface will have to operate to a level that permits the communication of pointing parameters. The M&C and RTS interface is currently under development.

The imaging task for 32T is similar to that of 512T. However we *do not* have to apply a wide field polarimetric calibration to the same degree as required by 512T. The 32T imaging pipeline will be outlined in a publication currently in preparation.

3 Measurement Description

The task required is to *produce an all-sky map at 3 pointings and 3 frequencies.* The measurement required is that the noise statistics of the maps are as predicted from system temperature and array considerations.

As the instrument response is a strong function of Hour Angle (HA), due to aperture synthesis considerations, it is considered that the experiment repetition take place at a consistent HA. As the sun and moon do not move at sidereal rate it is necessary to conduct all experiments in a single observing run, separated by no more than a few days.

3.1 Frequency Resolution

No frequency resolution is required, no integration across frequency is implied. An image from a single 40kHz channel would suffice for each pointing.

3.2 Time Resolution

As this is a demonstration of basic imaging capability no integration in time will be attempted and a single 8 second cadence will be generated.

However the experiment should be *repeated* at the same hour angles and at an interval of not more than a few days to ensure consistent instrument response.

3.3 Instrumental Polarization

The basic imaging task will not convert the image from instrumental polarization.

3.4 Wide-field Correction

As no integration of images is implied no wide field correction will be performed.

4 Resources Required

4.1 Staffing

Imaging is an entirely automated task within the Real-time system. This system is intended to operate without intervention. In reality it is reasonable to assume that the RTS will have to be managed initially by one or more of the RTS development team and that a number of man-hours will be allotted to the installation and testing of the RTS system.

4.2 Hardware

To demonstrate the RTS imaging capabilities we depend upon the successful operation of the complete array

- Operational tiles and beamformers, receivers
- Operational correlator
- Operational Real-time computer with sufficient capability to perform the task.
- Monitor and Control system – must at least provide RTS with pointing parameters.

4.3 Software

Operational RTS
Operational Monitor and Control system with frequency and pointing control capability.
Basic status communication between M&C and RTS

4.4 Execution Time and Constraints

In principle two sessions at the same local time on consecutive days, 3 X 8 seconds in length are required to meet this goal.

5 Success Criteria

Success of task 5A and consistency of image properties and calibration solutions between epochs are necessary and sufficient conditions.

Revision History

Rev Ltr	Date	Author	Description
01	2009-09-27	SMO	First draft at 5b.
02	2009-09-28	SMO	Some minor corrections
03	2010-01-06	RFG	Formatting