

## Confidential report to AAL regarding the MWA Project Review of 2009 April 16 at Curtin University

### *Review panel*

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Dr David De Boer (CSIRO)  
Prof Ron Ekers (CSIRO)  
Dr George Hau<sup>†</sup> (secretary, AAL)  
Mr Mark McAuley<sup>†</sup> (AAL)  
Dr Vernon Pankonin\*<sup>†</sup> (NSF)  
Prof Elaine Sadler\* (University of Sydney)  
Prof Linda Sparke<sup>†</sup> (NSF)  
Prof Lister Staveley-Smith (chair, UWA)

\*Video/Telecon  
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### *MWA personnel*

Mr Wayne Arcus (project manager)  
Prof Frank Briggs (project engineer)  
Prof Lincoln Greenhill\* (Project scientist)  
Prof Jim Moran\* (Board chair)  
Prof Steven Tingay (project manager)  
Prof Rachel Webster (LIEF CI)  
Prof Alan Whitney (project director)

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## 1. Introduction

This review is the second stage of the AAL-commissioned review of the MWA project. This stage of the review was conducted by the above panel at Curtin University on 2009 April 16, and was preceded by a couple of preparatory telecons, and was followed by email discussion. The review panel was set up by AAL as an *ad hoc* committee in lieu of the Australian National Radio Astronomy Committee which CSIRO and DIISR have so far been unable to constitute. Dr George Hau (AAL) took detailed notes of the April 16 discussion. The review panel report consists of section 2, which is a report against the terms of reference, as documented in Appendix A, and is written in a manner that AAL could release to the project if it wishes. Section 3 is the panel's confidential assessment of the path MWA needs to follow to maximize its chances of success and contains some sensitive information.

In producing this report, panel members were again asked to update their conflicts of interest which are listed in Appendix B.

## 2. Report against Terms of Reference

### 2.1 Recommendation on the technical feasibility of the revised project plan.

The panel judges the February 17 project plan to be a technically competent plan and to represent a significant step forward for the MWA project. The new project management has produced a credible document, and should be congratulated. The coherence and competence of the new management team was confirmed in the interviews. **Nevertheless, the panel was unconvinced that the full 512T array was possible with the existing budget, and was unconvinced that 512T could be delivered by mid-2010.** This judgement was based on a number of factors which include: (a) a 1-month delay in a number of 32T milestones; (b) a lack of sufficient detail or time resolution in the spend profile and the overall project budget; (c) a significant number of risk areas such as calibration, correlator and systems integration; (d) a budget contingency less than 1%, compared with the 25% or more probably necessary for such a project.

Although 512T appeared unrealistic to the panel, even with the benefit of NCRIS and NSF supplemental funding, it is the panel's assessment that many Australian science and strategic interests can in fact be met with a de-scoped array with a size of 256T or above. **The panel recommends funding for Phase 2 (128T) be released and, subject to satisfactory milestone performance, progression to 256T, or greater.** The panel suggests that one of the early milestones is a more detailed project plan than currently available. The panel encourages the MWA project to seek further funding from elsewhere so it can pursue the high-profile EOR science which would not be possible with smaller arrays such as 256T. However we note that other excellent science can already be done with <512T and we also note that observations made with the smaller arrays will be important steps towards the ultimate EOR goal since they will greatly increase our understanding of the array, its calibration and the foregrounds.

### 2.2 Recommendations on the appropriateness of the project milestones, with emphasis on the technical requirements to be met by 32T.

32T technical requirements have been agreed on during the earlier stage of this review. The panel discussed verification of 32T functionality with the project team, and was satisfied with the response. Overall 512T milestones were not presented in a form that is suitable for monitoring of project progress by AAL. **Prior to the release of funding, we recommend that AAL again requests the project team produce a set of clear and appropriate 3-monthly milestones which cover 32T verification tests and phase 2+ development.**

### 2.3 Recommendations as to what user policies and data access arrangements need to be in place to ensure that Australian astronomers have open access to MWA as required under NCRIS guidelines.

Discussions between the panel, the MWA Board and the NSF established that no fundamental differences existed between parties about satisfactory access by Australian astronomers to the MWA instrument and to MWA data, although detailed questions such as length of proprietary access to key project databases

remain. **We recommend that AAL accept the MWA Board's proposal to formulate a telescope and data access policy for its consideration by mid-2009.** The panel was fairly comfortable that open access of a form compatible with NCRIS guidelines could be provided by the MWA project, without the expense of becoming a 'gold-plated' national facility. However, a clearly formulated policy laid out in advance is essential. We note that plans for an Australian data archive are immature and currently unfunded. **The panel therefore suggests that AAL encourage the MWA project to explore the possibility of a combined ASKAP+MWA image archive for national and international users,** and to explore the deployment of Australian software resources into the NSF-funded EOR archive to ensure the appropriate level of Australian partnership in key EOR science. We note that there may be other members of the Australian science community (e.g. ionospheric physicists) for whom MWA data access should also be provided. Regarding the possibility of ongoing development and expansion of MWA, the operations plan must provide for sufficient science time at each stage to allow a useful science and technical return for users.

#### **2.4 An overall assessment on the appropriateness and value-for-money of AAL's investment with respect to the scientific and strategic potential of the revised project, and the value of the final array as a national facility.**

**The panel feels that an NCRIS investment of \$4.6M would represent good scientific and strategic value for the Australian community.** It seems apparent that even a de-scoped MWA project has the potential to put Australian and partner astronomers in a leadership position in low-frequency radio astronomy, particularly in the areas of science and algorithmic development which are key to advancing the SKA concept. It further strengthens collaborative SKA research with the US and India.