

**Attachment Number D to the**  
**Memorandum of Understanding (LIGO-M950025-00-M)**  
**between the**  
**Australian Consortium for Interferometric Gravitational Astronomy**  
**(ACIGA)**  
**and the**  
**Laser Interferometer Gravitational Wave Observatory (LIGO) Laboratory**  
**August 15, 2004**

This Attachment to the Memorandum of Understanding LIGO-M950025-00-M covers the role of Australian Consortium for Interferometric Gravitational Astronomy (ACIGA) as a Charter Member of the LIGO Scientific Collaboration (LSC) and a member of the Advanced Detector Configurations Development Group (ADCDG). The period of performance for the activities in this Attachment is from August 15, 2004 to February 15, 2005. This period may be modified by agreement to a revision of this Attachment.

1. LIGO Scientific Collaboration - The LIGO Scientific Collaboration is organized as a separate organization from the LIGO Laboratory. It includes scientists from the LIGO Laboratory, and those from collaborating institutions, and has its own leadership and governance. The Collaboration will ensure equal scientific opportunity for individual participants and institutions. It will organize the research, publications, and all other scientific activities. The Collaboration will report to the Laboratory Directorate for final approval of its research program, technical work, observational physics publications, and talks announcing new observations and physics results. This will be done through regular reports to the Directorate and its PAC.
2. Charter Membership - An initial period for formation of the Charter group of institutions in the LIGO Scientific Collaboration commenced on March 1, 1997 and ended following the first full meeting of the Collaboration at which the Collaboration Council assumed its role.

Following the charter period proposals will be evaluated through the Collaboration Council. With Collaboration approval, an MOU with the LIGO Laboratory, including Attachments defining specific work, will be required for any participating institutions.

3. This document is an agreement between the Australian Consortium for Interferometric Gravitational Astronomy (ACIGA) and the LIGO Laboratory concerning the activities of ACIGA as a Collaborating Institution in the LIGO Scientific Collaboration (LSC) and in the Advanced Detector Configurations Development Group (ADCDG), and as indicated in Item No. 8.

4. Advanced Detector Configurations Development Group - The Advanced Detector Configurations Development Group (ADCDG) is the scientific collaboration for defining and developing entirely new advanced interferometers. It is expected that this development group will pursue research in dual recycling, resonant sideband extraction, Sagnac interferometers, systems with non-transmitting optics and other advanced configurations. A specific Attachment will define the roles and responsibilities of groups in this development group. Members of this group will normally be authors on publications reporting the work of the group and will normally be eligible to participate in data runs and science beyond the LIGO I data run.
5. Report of Progress - ACIGA will provide a status report on its activities in support of LIGO every six months. The report will consist of: a) a summary status on research by topic as indicated Item No. 8 including progress against the milestones if any, significant accomplishments such as new insights/discoveries or publications, issues of concern if any, and an indication of invested time, b) updated List of Collaborators, and c) a plan of activities for the succeeding six-monthly period. The report will be due one month before the close of the period of performance under the Attachment in question.

The coordinates of ACIGA members are included in the Attachment Z to the Memorandum of Understanding LIGO-M950025-00-M.

6. Term of Membership - The Membership will be renewed every six months upon evidence of satisfactory performance of agreed upon duties.
7. In order to preserve the intellectual property rights of ACIGA and Caltech, the ACIGA Principal Investigator will inform Caltech at once of any inventions coming from joint actions, which might lead to intellectual property rights.
8. During the period August 15, 2004 to February 15, 2005, the ACIGA research group will pursue the following tasks as a contribution to LIGO development:
  - a) Bench top investigation of a Variable Reflectivity Mirror (VRM): Commence preliminary experiment— VRM with no arm cavities.
  - b) Output Modecleaner: Begin analysis of OMC requirements in the presence of a VRM.
  - c) Squeezing:
    1. Demonstrate the generation of squeezing in the audio gravitational wave detection band.
    2. Investigate techniques to lock the squeeze angle without introducing noise.
9. During the period August 15, 2004 to February 15, 2005, the LIGO Laboratory will share, as requested and appropriate, LIGO data of relevance to the planned research in Item No. 8.
10. The research effort pursuant to this Attachment D will be coordinated by David McClelland and David Shoemaker on behalf of ACIGA and the LIGO Laboratory, respectively.

11. Resource Sharing: The LIGO Laboratory will contribute resources including allocation of appropriate scientific and engineering personnel, research facilities and funding in support of the effort in Item No. 8, as indicated below.

a) Accommodations for ACIGA investigators while on LIGO research assignment at Caltech, and/or at LIGO sites.

b) Funding to cover subsistence and international travel expenses for ACIGA investigators while on LIGO research and/or LSC assignment at Caltech, and/or LIGO sites. Specific funding arrangements will be as agreed on a case-by-cased basis.

Approved:

*Barry C. Barish* 2004.10.25  
10:31:33 -07'00'

---

Barry Barish  
LIGO Laboratory Director

*David McClelland* 2004/11/08

---

David McClelland  
ACIGA Principal Investigator