

**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  
February 15, 1999**

This Attachment to the Memorandum of Understanding LIGO-M950025-00-M covers the role of the Australian Consortium for Interferometric Gravitational Astronomy (ACIGA) as a Charter Member of the LIGO Scientific Collaboration (LSC) and as a member of the Advanced Detector Configurations Development Group (ADCDG). The period of performance for the activities in this Attachment is from February 15, 1999 to August 15, 1999. This period may be modified by agreement to a revision of this Attachment.

1. LIGO Scientific Collaboration - The LIGO Scientific Collaboration will be organized as a separate organization from the LIGO Laboratory. It will include scientists from the LIGO Laboratory, and those from collaborating institutions, and will have 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 will commence on March 1, 1997 and will end following the first full meeting of the Collaboration at which the Collaboration Council will assume its role. We expect that this transition will occur within six months. Membership in the Collaboration during this charter period will be initiated by proposal to the LIGO Laboratory Directorate.

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 noted below, under provision 8, ACIGA as a Collaborating Institution in the LIGO Scientific Collaboration (LSC) and in the Advanced Detector Configurations Development Group (ADCDG).

4. Advanced Detector Configurations Development Group - The Advanced Detector Configurations Development Group (ADCDG) will be 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 submit a complete report on its activities every six months, by e-mail, to the Collaboration Council and to the LIGO Laboratory Director, supply an updated List of Collaborators (Attachment Z), and a plan of activities for the next six months. This report should be submitted one month before the updated attachment will take effect.
6. Term of Membership - Membership will be renewed every six months upon evidence of satisfactory performance of agreed upon duties.
7. Intellectual Property Rights - The rights to intellectual property developed under this Attachment will be subject to the National Science Foundation Grant Policy as indicated in Section 730, Intellectual Property.
8. Development of a control system for resonant sideband extraction with power recycling has continued over the previous six months to Feb. 15, 1999. The current system under investigation has several potential benefits:
  - a. Provides a near orthogonal control system for all degrees of freedom.
  - b. Allows complete tuning of the signal mirror, facilitating the full range of signal responses from broad band RSE to narrow band signal recycling.
  - c. Minimises the need for transmissive optical elements on the high power input beam.

During the next six months, February 15, 1999 to August 15, 1999, this control system will be implemented on a bench top interferometer currently under construction at the ANU. We plan to build up a full prototype capable of testing all error signals, cross coupling terms and total interferometer stability. Moreover, we will use this bench top interferometer to study lock acquisition techniques once we have finalised the optimum control configuration.

Approved:

Barry Barish

Barry Barish  
LIGO Laboratory Director

John Sandeman

John Sandeman  
ACIGA Principal Investigator

5/5/99

Date

12/6/99

Date