



**Attachment OPT to the  
Memorandum of Understanding LIGO-M050280-00  
between the Australian Consortium for Interferometric Gravitational  
Astronomy (ACIGA)  
and the  
Laser Interferometer Gravitational Wave Observatory (LIGO)  
For The Period  
August 15, 2007 - August 14, 2008**

This Attachment OPT to the Memorandum of Understanding LIGO-M050280-00 defines the role of the Australian Consortium for Interferometric Gravitational Astronomy (ACIGA) as a Member of the LIGO Scientific Collaboration (LSC), and a member of the Optics Development Group (LDG). The period of performance for the activities in this Attachment is from August 15, 2007 - August 14, 2008.

## **1. Collaboration**

The Optics Development Group (ODG) is the scientific collaboration for defining and developing instruments in optics for use in advanced subsystems for the initial LIGO interferometers, or in entirely new advanced interferometers.

MOU Attachment OPT defines the roles and responsibilities of groups in this development group.

## **2. Participation**

During the period August 15, 2007 - August 14, 2008, the members of ACIGA will participate in ODG in the following areas:

a. Optics Characterization

*Not Applicable*

b. Other Contributions

HOPF (UWA, UA)

Model thermal lensing in presence of material anisotropy

Complete analysis of high power optical cavity with inhomogeneous test masses

Commence test 2a by turning the ITM around so that the substrate is now outside the cavity. This will allow greater power buildup for examination of coating losses and greater PI.

Measure negative  $dn/dT$  performance of quartz and investigate alternative materials such as heavy metal fluoride glass

Complete analysis of OAPO interaction in 80m cavity with internal substrate  
Design enhanced OAPO 3 mirror cavity  
Investigate possible optical spring measurements in Gingin cavities  
Test performance of high power optical cavity suspended from soft isolation stages  
Complete analysis of ring damper for various optical mode structures and test masses configurations

Hartmann Sensor (UA)

Assuming funding is available:

Temperature stabilize Hartmann sensor to ensure long term stability

Develop Hartmann sensor for test at LASTI in 1st Q of 2009.

Output Modecleaner (ANU)

ANU focus has shifted to the design and delivery of tip/tilt mirrors for use in the output optics beam path and elsewhere. 4 tip/tilt mirrors will be delivered to LIGO along with full drawings and specifications.

Suspension Point Interferometer (ANU)

study the need and options for a suspension point interferometer (or lock acquisition interferometer) for AdvLIGO

prepare a report on options and a conceptual design.

### **3. 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. 2, as indicated below.

- a. Research accommodations for ACIGA group members while on LIGO research assignment at any LIGO Laboratory site.

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- b. Access to LIGO data through established LSC channels in support of this work.

*Not Applicable*

### **4. Coordination and Reporting**

ACIGA will perform research within the structures established by the LIGO Laboratory and the LSC where appropriate. In particular, activities described in Item 2 will be carried out within the Optics Development Working Group of the LSC.

This includes keeping the Group leaders informed of activities and plans, reporting to the group at meetings and telecons, and through technical documents submitted to the LIGO Document Control Center.

In addition, an annual report will be submitted with the update to this Attachment, giving a summary status on research by topic as indicated in Item No. 2, 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.

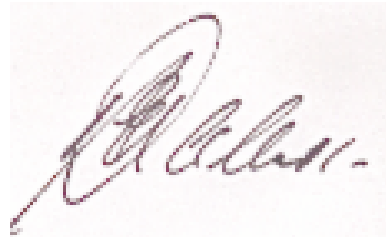
This Attachment will be updated at least annually with a plan of activities for the succeeding one-year period. These documents will be due one month before the close of the period of performance under this Attachment.

## 5. Computer Code

All computer code delivered to the LSC under this Attachment must be developed in consultation with the LSC Data Analysis Software Working Group (DASWG) and archived, documented and reviewed as determined by that group.



Jay Marx  
**LIGO Laboratory Director**



David Ernest McClelland  
**Principal Investigator(s)**  
**ACIGA**



David Reitze  
**LSC Spokesperson**