



LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY
RECORD OF DECISION/AGREEMENT (RODA)

Document	LIGO-M 040136-00 -Y	
Date:	22 April 2004	
Title:	RODA: Memorandum of Understanding (MOU) between the US and ACIGA groups for the AdL Gingin High Power Testing Program	
To the Attention of:	Stan Whitcomb, Barry Barish, Dennis Coyne... <i>etc.</i>	
cc:	aligo_aos, aligo_sys	
From/ signatories:	Name/Title:	David Shoemaker Signature: _____
	Name/Title:	Carol Wilkinson Signature: _____
	Name/Title:	David Ottaway (AOS/Gingin poc) Signature: _____
	Name/Title:	Phil Willems (AOS Leader) Signature: _____
	Name/Title:	David Blair Signature: _____
	Name/Title:	David McClelland Signature: _____
	Name/Title:	David Reitze (IO Leader) Signature: _____
	Name/Title:	 Signature: _____
System(s) affected:	<input type="checkbox"/> Initial LIGO <input checked="" type="checkbox"/> Advanced LIGO <input type="checkbox"/> Other: _____	
Nature/Scope:	<input type="checkbox"/> Design Decision <input type="checkbox"/> Requirements Decision <input checked="" type="checkbox"/> Work Scope Decision <input checked="" type="checkbox"/> Working Agreement between Groups <input checked="" type="checkbox"/> Other Memorandum of Understanding (MOU)	
Subsystem(s) affected	<input checked="" type="checkbox"/> Relevant Subsystem(s)/Component(s): AOS, active thermal compensation system (TCS)	
Primary Contacts	Group or Affiliation and Contact David Ottaway	

Reference Documents:	<p>(1) Memorandum of Understanding between ACIGA and LIGO, is this relevant?</p> <p>(2) G. Sanders, Letter to David McClelland About LIGO Laboratory Supports the ACIGA Proposal of the Construction of a High Power, Gravitational Wave Interferometer Test Facility, LIGO-L000099-00-M, 5/5/2000</p> <p>(3) B. Barish, Funding for Gingin or Australian International Gravitational Research Centre, LIGO-L020055-00-M, 3/27/2002</p> <p>(4) J. Munch, ACIGA Status Report: Gingin High Power Test Facility - LSC Meeting, March 15 - 18th, Livingston, LA, LIGO-G040067-00-Z http://www.ligo.caltech.edu/docs/G/G040067-00.pdf</p> <p>Is there a better reference for the Gingin HPTF experiment plan?</p> <p>(5) Advanced LIGO: Context and Overview (Proposal to the NSF), LIGO-M030023-00, http://www.ligo.caltech.edu/docs/M/M030023-00/M030023-00.pdf The Gingin HPTF is mentioned on pg. 53, 82, 110</p> <p>(6) ACIGA Proposal or Plan for Gingin High Power Testing , LIGO -#pending does something like this exist?</p> <p>(7) AdL Baseline Schedule, LIGO-M020121-F?</p>
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DECISION/AGREEMENT STATEMENT:

The ACIGA group are supporting the Advanced LIGO development with a high power test using their Gingin facility. The LIGO Lab has committed to support this high power test at Gingin (L000099-00). At the time of the commitment, the support was estimated to be in the form of optics. Since that time, the Gingin oversight committee has steered the experimental plan to one that is more likely to benefit the advanced LIGO program. The result is that LIGO is supplying fewer SMALLER? optics but is also supplying some custom small suspensions (similar in design to the initial LIGO small optics suspensions). The purpose of this MOU is to document the current commitments between ACIGA and the LIGO Lab with regard to the Gingin High Power Test.

The test objectives of the Gingin High Power Test Facility (HPTF) program for LIGO is as follows:

- 1) Verification of predicted wavefront distortion: To date there has been very little experimental verification of the thermo-elastic deformation predictions. The Gingin tests will provide this much needed experimental verification.
- 2) Demonstration of high power laser technology: ACIGA will integrate the UFL developed high power modulators and isolators into the Gingin facility for test and evaluation.
- 3) Development and demonstration of wavefront sensors: ACIGA intends to develop a Hartmann type wavefront sensor that can provide an independent measure of wavefront distortion without interfering with the main optical cavity.
- 4) Demonstration of thermal compensation: ACIGA will demonstrate thermal compensation with a ring heater and compensation plate.
- 5) Test of the controls and dynamics of a power-recycled, Fabry-Perot cavity with high power: ACIGA will study the optical spring effects on cavity stability using LIGO-like suspensions.

The Gingin HPTF program is a staged experiment. A report, or series of reports, on ACIGA's findings will be provided to LIGO as they become available. The expected completion is by the end of 2005.

In support of the Gingin HPTF program, the LIGO Lab agrees to provide the following:

- 1) Sapphire optics: 2 sapphire optics (polished and coated) with dimensions as follows:
end test mass: 150 mm dia x 100 mm thick, in October, 2003
input test mass: 100 mm dia. x 50 mm thick, in October, 2003
Radius of curvature and coatings per ACIGA specification.
- 2) Fused silica optics: a recycling mirror, with dimensions TBD, in 3/2005
- 3) Suspensions: 3 LIGO Small Optic Suspensions (SOS) intended for use as follows:
end test mass, delivered in October, 2003
input test mass, delivered in October, 2003
recycling mirror, to be delivered in 3/2005
- 4) 3 analog SOS suspension controllers, in October, 2003
- 5) A single, high power Electro-Optic Modulator (EOM) and driver and a single, high power, Faraday Isolator (FI) will be provided by the University of Florida (UFL, a LIGO Science Collaboration member). The expected date for delivery to Gingin is 9/2004.
- 6) LIGO Lab and the UFL together will provide personnel support at Gingin at a level of approximately 2 person months per year for 2004 and 2005.

The LIGO Lab is not providing the following items (which were at one time, discussed as potentially part of the overall test plan):

- 1) (scaled) thermal compensation system (TCS): The ACIGA proposed thermal compensation system is sufficient for test purposes.
- 2) optics, suspensions and suspension controllers for a mode cleaner