



**Attachment OPS to the
Memorandum of Understanding LIGO-M050315-00
between the Hobart & William Smith Colleges LIGO Group (HWSLG)
and the
Laser Interferometer Gravitational Wave Observatory (LIGO)
For The Period
August 15, 2007 - August 14, 2008**

This Attachment OPS to the Memorandum of Understanding LIGO-M050315-00 defines the role of the Hobart & William Smith Colleges LIGO Group (HWSLG) as a Member of the LIGO Scientific Collaboration (LSC) in the areas of detector commissioning, detector characterization, and operations support in the initial LIGO interferometers. The period of performance for the activities in this Attachment is from August 15, 2007 - August 14, 2008.

1. Collaboration

Together, the LIGO Laboratory and the LIGO Scientific Collaboration (LSC) are responsible for implementing and exploiting the initial LIGO detector through its science data runs. LSC groups are encouraged to contribute to the commissioning, characterization, and operation of the LIGO detectors, as members of working groups established by the LIGO Laboratory and the LSC.

2. Participation

During the period August 15, 2007 - August 14, 2008, the members of HWSLG will participate in the initial LIGO detector research program in the following areas:

a. Detector Commissioning

Not Applicable

b. Detector Characterization

I have written two DMT monitors, BicoViewer and BicoMon, that are used to detect bilinear processes, including upconversion noise, frequency noise, and phase noise. BicoViewer is a stand-alone, GUI-based, interactive monitor that lets the user look for bicoherence between data channels as evidence of a bilinear process. BicoMon performs the same calculation, but the calculation is performed in background on a set channel list.

These monitors are both still in the beta stage of development. That is an unfortunate state of affairs since during S5 the interferometer noise has been reduced

to a level where upconversion noise is visible. Because of my teaching obligations and thermal noise research, I have had no time in the past year to work on the monitors. And in their current state, the monitors are a little difficult to use.

I have been encouraged to hand off the development of this monitor to someone else in the collaboration. I am happy to have someone else complete these monitors; I would love to see BicoViewer become a useful diagnostic tool in understanding upconversion noise. However, although I get occasional inquiries about the monitor, I have had no volunteers to take over the development. I suspect that this is a project that I will have to eventually complete when other projects, such as the Enhanced LIGO Suspension Thermal Noise research, has ended.

Indeed, in the next few years as the thermal noise problems for Enhanced LIGO and Advanced LIGO are resolved, I would like to devote half of my research time to detector characterization. I find the work fun, interesting, and very useful. However, given the current deadlines for the thermal noise research, I don't expect that I will be able to reallocate much of my time during the next year.

Somewhat tangentially related, last year I ported the DMT to Mac OS X. However, when I did the port I inadvertently hardcoded the file paths into the libraries and executables. Thus it ran only on my machine (or any other machine with the same directory structure). I promised John Zweizig that I would fix this problem and would provide an OS X port of the DMT that could be generally installed. I have begun work on this project and should be able to complete it this fall.

c. Detector Operations

The HWSLG is pleased to continue to serve its share of science monitor shifts and any other proportioned obligations necessary to keep the detectors operating well. During S5 that obligation has been in the form of SciMon shifts. However after S5, during the likely upgrade to Enhanced LIGO, we expect that obligation will be in the form of assisting in the installation and commissioning work for the upgrade.

d. Other Contributions

Not Applicable

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 HWSLG group members while on LIGO research assignment at any LIGO Laboratory site.

Not Applicable

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

Not Applicable

4. Coordination and Reporting

HWSLG will perform research within the structures established by the LIGO Laboratory and the LSC where appropriate.

In particular, with reference to activities described above:

2a will be carried out in coordination with the LIGO Laboratory Commissioning Leader.

2b will be carried out within the Detector Characterization Working Group of the LSC.

2c will be carried out in coordination with the LHO or LLO Site Head.

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.

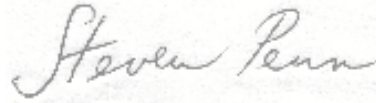
This Attachment will be updated at least annually with a plan of activities for the succeeding one-year period. These documents will be due one month before the close of the period of performance under this Attachment.

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



Steven Penn
**Principal Investigator(s)
HWSLG**



David Reitze
LSC Spokesperson