

**Attachment Number A to the
Memorandum of Understanding (LIGO-M950037-00-M)
between the
University of Colorado
and the
Laser Interferometer Gravitational Wave Observatory (LIGO) Laboratory
August 15, 1997**

This Attachment to the Memorandum of Understanding LIGO-L950037-00-M covers the role of the University of Colorado as a Charter Member of the LIGO Scientific Collaboration (LSC) and a member of the LIGO I Development Group (L1DG). The period of performance for the activities in this Attachment is from August 15, 1997 to February 15, 1998. 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 University of Colorado and the LIGO Laboratory concerning the activities noted below, under provision 8, of the University of Colorado as a Collaborating Institution in the LIGO Scientific Collaboration (LSC) and in the LIGO I Development Group (L1DG).

4. **LIGO I Development Group** - The LIGO I Development Group will be the scientific collaboration for implementing and exploiting the initial LIGO detector and physics through the initial science data run. Only groups who establish a specific Attachment approved by the LIGO Laboratory, which defines a sufficient contribution and participation in LIGO I development, implementation or data analysis will be part of this initial LIGO data run and science. Participation in future data runs and science that follow LIGO I will be possible for other groups, with guidelines to be determined by the LIGO Scientific Collaboration. It is anticipated that LIGO I data will only be made available through formal collaboration within the LIGO I Development Group during the first two years following its collection.

The general guideline for institutional membership in the LIGO I Development Group is that the contribution per collaborator of any new group to the design, construction, and implementation of the initial LIGO detector and to the first data run be comparable to that of the LIGO Laboratory scientists.

5. **Report of Progress** - The University of Colorado will provide a summary report of progress, monthly, by e-mail to the Collaboration Council and to the LIGO Laboratory Director. The University of Colorado will submit a complete report on its activities every six months, supply an updated List of Collaborators, 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. **During the period August 15, 1997 - February 15, 1998, Joseph Giaime, of the JILA Gravity Group (JILAGG) will work on the initial LIGO seismic isolation system. Joseph Giaime will keep JILAGG informed about LIGO1 activities and will make use of its expertise in precision measurement methods. He will do the following:**
 - a.) Continue tests at Caltech with Fred Raab and Mike Fine to set limits on the creep and creak of the Hytec-designed constrained -layer damped springs. Some of the instrumentation for this will be designed, constructed, and initially tested at JILA.
 - b.) Participate in Hytec's assembly and testing of the first article isolation system in Los Alamos, in anticipation of helping to carry out the installation and initial testing of these systems at the site(s).
 - c.) Supervise a JILA summer student in constructing an instrumented cantilever of similar composite structure to the new LIGO coil springs. This will be used to test for thermal effects, stress limits, and delamination effects of the material interfaces used in the coil springs.
 - d.) Continue to participate in the review team for the SEI first article fabrication readiness, and

the mini-design/fab. readiness review.

e. Begin studies of a system that uses the fine actuator of the SEI support assembly in the end (and mid) stations to track the micro-seismic motion at the corner station, based on signals from the long-period seismometers. This task will begin with control system modeling.

LIGO will pay the travel and material expenses (though not salaries) necessary to carry out this LIGO1 work.

Approved:

Barry Barish
Barry Barish
LIGO Laboratory Director

James E. Faller
James E. Faller
JILAGG Principal Investigator

Aug 15, 1997
Date

Aug 19, 1997
Date