

Attachment Number A to the
Memorandum of Understanding (LIGO-M990001-00-M)
between the
University of Texas at Brownsville Relativity Group (UTBRG)
and the
Laser Interferometer Gravitational Wave Observatory (LIGO) Laboratory
February 15, 2000

This Attachment A to the Memorandum of Understanding LIGO-M990001-00-M covers the role of UTBRG as a Charter Member of the LIGO Scientific Collaboration (LSC) and a member of the LIGO I Development Group (LIDG). The period of performance for the activities in this Attachment is from February 15, 2000 to August 15, 2000. This period may be modified by agreement to a revision of this Attachment.

1. LIGO Scientific Collaboration - The LIGO Scientific Collaboration (Collaboration) is organized as a separate organization from the LIGO Laboratory. It includes scientists from the LIGO Laboratory, and those from collaborating institutions, and has 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 semi-annual 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 commenced on March 1, 1997 and ended following the first full meeting of the Collaboration at which the Collaboration Council assumed its role.

Following the charter period, proposals will be evaluated and approved, as appropriate, through the Collaboration Council. 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 Texas at Brownsville Relativity Group (UTBRG) and the LIGO Laboratory concerning the activities of UTBRG as a Collaborating Institution in the LIGO Scientific Collaboration (LSC) and in the LIGO I Development Group (LIDG), and as indicated in the Items No. 8 and no. 9 below.
4. LIGO I Development Group - The LIGO I Development Group is 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 Labo-

ratory, 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 - UTBRG will provide a status report on its activities in support of LIGO every six months. The report will consist of: a) a summary status on research by topic as indicated Items No. 8 and No. 9 below 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, b) updated List of Collaborators, and c) a plan of activities for the succeeding six-monthly period. The report will be due one month before the close of the period of performance under the Attachment in question.
6. Term of Membership - The Membership will be renewed every six months upon evidence of satisfactory performance of agreed upon duties.

The coordinates of UTBRG members are included in the Attachment Z to the Memorandum of Understanding LIGO-M990001-00-M.

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. LLAL Software Conventions - It is necessary that any delivered code conforms to the LLAL style as laid out in the LLAL specification T990030. This includes: 1) coding style, headers, etc.; 2) use of function calls, etc.; 3) organization of software in the directory structures indicated in the document; 4) inclusion of test codes and validation tests to enable users to verify successful installation of implementation; and 5) documentation and users manuals (html or pdf) to enable users to understand and adopt code.
9. During the period February 15, 2000 to August 15, 2000, the agreed upon work plan and commitments for UTBRG are as follows:

The UTBRG consists of Professors Mario Diaz and Joseph Romano, and possibly three or four undergraduate students. J. Romano is the primary party to this agreement with the LIGO project. During the next six month period, UTBRG's LIGO-related research will focus primarily on issues related to the detection of a stochastic background of gravitational radiation. This research will be conducted by J. Romano and M. Diaz in union with members of the LIGO Science Collaboration (LSC) from the University of Wisconsin-Milwaukee, Penn

State, Cornell University, and the Albert Einstein Institute in Potsdam, Germany.

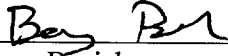
a) J. Romano and Lee S. Finn (of Penn State) will complete and submit for publication two papers on data analysis algorithms for stochastic gravitational wave searches. This project is part of the DCSA and ASIS subgroup plans to define statistical tests for detecting a stochastic background of gravitational radiation. The science component of the two papers is complete and drafts of both papers have already been written.

b) J. Romano will continue to develop and write code for the Data Conditioning component of the LIGO Data Analysis system. In particular, J. Romano is responsible for implementing the Summary Statistics Engine. This project is under the direction of the LIGO Laboratory (Albert Lazzarini, Ken Blackburn, and Ed Maros). Also participating are L.S. Finn (from Penn State), and Philip Carlton and Susan Scott (from Australian National University).

c. J. Romano and M. Diaz will continue to write code for the stochastic background section of the LIGO/LSC Numerical Algorithms Library. Within the ASIS subgroup of the LSC, UT Brownsville has been assigned as the lead group for implementing the standard cross-correlation statistic. Eanna Flanagan and Steven Drasco (from Cornell University), Alberto Vecchio (from the Albert Einstein Institute in Potsdam, Germany), and C. Ungarelli (from Portsmouth, UK) are helping out with this project.

10. During the period February 15, 2000 to August 15, 2000, the LIGO Laboratory will provide access to the 40-meter data from the November 94 Data Run for simulations, as necessary and as agreed.
11. The research effort pursuant to this Attachment A will be coordinated by J. Romano and Albert Lazzarini on behalf of UTBRG and the LIGO Laboratory respectively.
12. 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. 9, as indicated below. These resources will be in addition to the coordination effort and data to be made available per Item No. 10 above.
 - a) Accommodations for UTBRG investigators while on LIGO research assignment at Caltech, and /or LIGO sites.

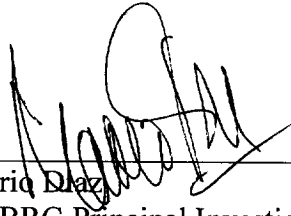
Approved:



Barry Barish
LIGO Laboratory Director

3-6-00

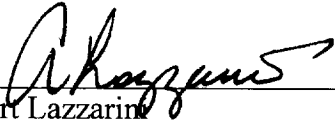
Date



Mario Diaz
UTBRG Principal Investigator

3-9-00

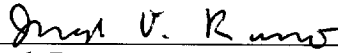
Date



Albert Lazzarini
LIGO Staff

28 FEB 2000

Date



Joseph Romano
UTBRG Principal Investigator

3/9/00

Date