

NATIONAL / INTERNATIONAL CONTEXT

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NATIONAL / INTERNATIONAL CONTEXT

**LIGO Project = Joint effort of scientists and engineers at Caltech and MIT,
funded by NSF.
Caltech has fiduciary responsibility.
MIT is supported under a subcontract from Caltech.**

MILESTONES

- 1979 NSF funds independent programs for laser interferometer R&D at Caltech and MIT.**
- 1983 First LIGO construction proposal.**
- 1984 Caltech / MIT MOU to establish joint project.
Management by Steering Committee (Thorne (chair), Drever, Weiss).**
- 1986 Cambridge, Mass. NSF Workshop requests new management.**
- 1987 Appointment of director.
Cancellation of FY89 construction start.
Selection of Fabry-Perot method.**
- 12/89 LIGO Construction Proposal to NSF.**
- 5/90 NSB approves LIGO Construction Proposal.**
- 10/91 Congress appropriates first construction funds.**
- 2/92 NSF selects LIGO sites.**
- 5/92 LIGO Cooperative Agreement signed by NSF and Caltech.**

NATIONAL / INTERNATIONAL CONTEXT

A. "NATIONAL" COLLABORATION

- **Stanford University (Prof. Byer): Nd-YAG laser development**
- **Syracuse University (Prof. Saulson): Thermal noise studies for advanced detectors**
- **Moscow University (Prof. Braginsky): Studies of low loss mechanical systems**
- **University of Colorado, Boulder (Profs. Bender and Faller): VLF (< 10 Hz) anti-vibration systems**
- **Caltech (Prof. Thorne): Theoretical studies, analytical support, source modeling, data analysis.**
- **We expect significant additional interest in e.g.,**

**detector development
data analysis**

as soon as LIGO will be recognized as a going concern.

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B. INTERNATIONAL COLLABORATION

1. Europe

GEO: Germany & United Kingdom

VIRGO: France & Italy

- **Plans for 2 European km-size facilities**
- **VIRGO fully funded**
- **GEO exploring possibly major collaborations with LIGO**
- **Past collaborative efforts hampered by large differences in technical readiness**
- **Joint technical developments under discussion with VIRGO (mirror fabrication)**

2. Japan

Major “enabling” effort underway

Future collaboration likely if sanctioned by U.S.

3. Australia

Plans for km-size facility

Collaboration under discussion

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C. TRANSITION TO USER FACILITY

PHASE A: 1 LIGO detector NSF oversight

Stage 1: LIGO team responsible to get detector to work!

Collaboration of outside users possible and welcome on selected tasks

Stage 2: LIGO has good data:

Collaborators on data analysis will be added

PHASE B: 2 or 3 detectors National User Committee

- **LIGO team (and collaborators) operate one detector in “gravitational-wave watch” mode**
- **2nd, 3rd detectors developed, installed, and operated by:
LIGO team and collaborators or independent outside users, with LIGO team providing logistics support and facility control**
- **Support of collaborative or independent data analysis efforts**

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D. UNIQUENESS OF LIGO OPERATIONS

- LIGO hardware activities most similar to accelerators
- LIGO operations most similar to astronomical telescope

but

- outside experimenters introduce equipment into LIGO vacuum system, requiring
 strong LIGO management to protect system and other interferometers
 from contamination and optical interference

LIGO PROJECT MILESTONES

- 70's** **Feasibility studies and early work on laser interferometer gravitational-wave detectors**
- 1979** **NSF funds Caltech and MIT for laser Interferometer R&D**
 - **Deslattes Committee (NSF) endorses interferometers**
- 1981-83** **Design studies for long baseline Interferometers**
- 12/83** • **Presentation to NSF Physics Advisory Committee**
 - **Presentation to Wilkinson Subpanel of National Academy of Sciences (NAS) Physics Survey Committee**
- 3/84** • **Presentation to National Science Board (NSB)**
 - NSB approves LIGO planning and feasibility studies***
- 1984-87** **Caltech / MIT / JPL design study for LIGO**
- 7/84** • **Presentation to President's Science Advisor**
- 11/84** **Caltech / MIT Memorandum of Understanding to establish joint project**
 - **Presentations to NSB and OMB**
- 1986** **International Society of General Relativity and Gravitation endorses LIGO**
 - NAS Physics Survey endorses LIGO**
- 11/86** • **NSF Cambridge Review Committee endorses LIGO**
- 2/88** • **NSF Review and Site Visit of LIGO project**
- 10/88** • **Presentation to NSF Physics Advisory Committee**
- 12/89** **LIGO Construction Proposal to NSF**
- 2/90** • **NSF Review and Site Visit of LIGO project**
- 5/90** ***NSB approves LIGO Construction Proposal***
- 1990** • **Presentations to NAS Astronomy Survey Committee**
- 10/90** • **Presentations to NSB**
- 3/91** • **Testimony before Congress**
- 10/91** • **Congress appropriates first construction funds**
- 2/92** • **NSB approves selected sites**
- 5/92** • **LIGO Cooperative Agreement signed by NSF and Caltech**
- 11/92** • **NSF Review and Site Visit of LIGO project**