

LAT-MD-00046-04

02 Feb 01

Memorandum of Agreement

between

**Stanford University - Stanford Linear Accelerator Center
(SU-SLAC),**

**Santa Cruz Institute of Particle Physics, University of California
at Santa Cruz (UCSC/SCIPP),**

**The Japan GLAST Collaboration (JGC): Hiroshima University,
Institute for Space and Astronautical Science, and RIKEN**

Regarding

Japanese Participation

in

The Large Area Telescope (LAT)

on

The Gamma-ray Large Area Space Telescope (GLAST) Mission

1. Introduction

The purpose of this Memorandum of Agreement (MoA) is to establish the management policy and areas of responsibility for Japanese participation in the definition, development, integration, and operation of the Large Area Telescope (LAT) instrument on the Gamma-ray Large Area Space Telescope (GLAST) Mission. This MoA is pursuant to implementation of the GLAST LAT Flight Proposal entitled "GLAST Large Area Telescope Flight Investigation: A Particle-Astrophysics Partnership to Explore the High-Energy Universe", selected by NASA on February 28, 2000.

The Gamma-ray Large Area Space Telescope (GLAST) is a high-energy gamma-ray mission to be launched in late 2005. The Large Area Telescope (LAT), primary instrument aboard GLAST, is being fabricated by a collaboration led by Peter Michelson (Stanford University). It is recognized by all of the parties to this agreement that the research conducted under this agreement is fundamental research, the results of which are expected to be placed in the public domain.

The GLAST LAT Instrument is subdivided in sub-systems, which allows a clear definition of responsibilities in design, fabrication, integration and test. The main subsystems are the following (with the participating institutions in parenthesis):

- Tracker [Stanford University-Stanford Linear Accelerator Center (SU-SLAC); University of California, Santa Cruz; Italian Institute for Nuclear Physics (INFN); and the Japan GLAST Collaboration (Japan)].
- Calorimeter [Naval Research Laboratory (NRL), CEA/DSM/DAPNIA and IN2P3 (France), and Royal Institute of Technology (Sweden)].
- Anti-Coincidence Detector [Goddard Space Flight Center (GSFC)].

In addition, system engineering functions are being carried out by SU-SLAC. This MoA covers work on the GLAST Instrument Tracker.

2. Parties and Their Representation

The parties concerned include:

- a) The institutions responsible for the research teams taking part in the GLAST LAT instrument and forming the Collaboration, hereinafter collectively referred to as the Collaborating Institutions. The Japanese institutions involved in the GLAST Tracker are referred to as the Japan GLAST Collaboration (JGC). The JGC includes Hiroshima University, Institute of Space and Astronautical Science, and RIKEN. The U.S. institutions involved in the GLAST LAT Tracker are the Santa Cruz Institute of Particle Physics, University of California at Santa Cruz (UCSC/SCIPP), and the Stanford Linear Accelerator Center (SU-SLAC).

- b) SU-SLAC, operated by Stanford University (hereinafter Stanford), under contract DE-AC03-76SF00515 with the U.S. Department of Energy (DOE), is the responsible Party accountable to the U.S. Department of Energy (DOE) for the program execution. Stanford University is responsible for the appropriate expenditure of U.S. Government funds.
- c) The U.S. Government funding agencies: the Department of Energy (DOE) and the National Aeronautics and Space Administration (NASA).
- d) The Japanese funding agencies providing support to Japanese institutions collaborating in the GLAST LAT instrument.
- e) UCSC/SCIPP, the lead institution responsible for management of the LAT Tracker subsystem by direction of Peter F. Michelson, the Instrument Principal Investigator (IPI).

In the present Memorandum the parties considered (hereinafter, the Parties) are SU-SLAC, represented by the SLAC Director, the Japan GLAST Collaboration, currently represented by Professor Tuneyoshi Kamae (Hiroshima University) for the Japanese funding agencies – Ministry of Education, Culture, Science and Technology, and UCSC/SCIPP, represented by its director. Peter F. Michelson of Stanford University, as Instrument Principal Investigator, has overall responsibility for the investigation. The Parties to this MoA also recognize the participation of the INFN (Italy). The INFN participation will be ratified under a separate MoA.

3. Purpose of the Collaboration

The purpose of the collaboration is to design, fabricate, and operate an instrument aboard the GLAST mission to study, with adequate efficiency and precision, gamma rays from space to enable the accomplishment of the proposed science program. The collaboration will undertake to carry out the science program, which is described in the flight proposal response to the NASA AO for the GLAST mission. Its primary goal is to accomplish a comprehensive study of the gamma ray sky. This wide range program provides an excellent opportunity to search for new phenomena.

4. Purpose of the Memorandum of Agreement

The purpose of this document is to define the responsibilities between the signatories to this agreement during the instrument fabrication program established by the collaboration and for the instrument integration to be conducted on the SLAC site. It further sets out the organizational, managerial, and financial guidelines as well as technical committees, to be followed by the collaboration members. Copies of all Memoranda of Agreement (MoA) shall be made available to the funding agencies participating in the collaboration. This MoA establishes the understanding between the signatories and is not a contract.

5. Participants of the Collaboration

The institutions, countries, and funding agencies involved in the collaboration as of the date of this agreement are listed in Annex 1 (“List of the Institutions Collaborating in GLAST LAT Tracking Subsystem and Duly Authorized Liaison Representatives”) with the names of the duly authorized liaison persons.

6. Organization of the Collaboration

The organization of the collaboration is described in detail in the management section (Vol 2) of the GLAST LAT proposal submitted by Stanford University in response to NASA AO 99-OSS-03. The main bodies of the organization are:

6.1 Instrument Principal Investigator Peter Michelson

The IPI is responsible for all scientific, technical, organizational and financial affairs of the collaboration. The management of the instrument project is led by the IPI, the Instrument Project Manager (IPM), and the Instrument Technical Manager (ITM). The IPM reports to the IPI and is responsible, by delegation from the IPI, for the day-to-day management of the instrument design, construction, testing, and delivery of the instrument to NASA. The subsystems will each have a subsystem manager. Among the subsystem managers, the Tracker Subsystem Manger is responsible for the construction of the GLAST LAT Tracker.

6.2 The Senior Scientist Advisory Committee

The Senior Scientist Advisory Committee (SSAC) is the body that advises the IPI on matters, which concern the general and scientific policies of the collaboration. The SSAC is formed by senior members of the collaborating institutions with an elected Chairperson. The SSAC membership reflects the level of commitment of the participating institutions.

6.3 The Instrument Design Team

The technical coordination of the LAT instrument development is the responsibility of the ITM. The Instrument Design Team, chaired by the ITM, is the forum i) for exchange of information between all instrument subsystems, ii) to identify and discuss issues related to the instrument design with the objective of maintaining a coordinated design and, iii) to resolve issues, by consensus or by referral to the IPO for action. The IDT, through the ITM, reports to the IPM. The membership of the IDT includes all subsystem managers and key system engineering personnel. Tuneyoshi Kamae is the ITM. Members of the IDT are obliged to attend IDT meetings as part of their responsibilities. Meetings of the IDT are open to the Collaboration.

7. International Finance Committee

The International Finance Committee, chaired by the Associate Director of SLAC for Research, will meet periodically to review the status of commitments of all partners (U.S. and foreign) in the

GLAST LAT Project. The committee membership will be representatives of all funding agencies involved in the GLAST LAT Project. The IPI is an ex-officio member of the International Finance Committee. The IPI and IPM will attend committee meetings.

8. General Conditions

The general guidelines for access to the LAT scientific data and the rights to publication of the data have been established by NASA, the DOE, and the GLAST Facilities Science Team. This MoA ratifies those guidelines.

The general terms of the Agreement between SLAC and the collaborating institutions are described in the document "General Conditions for Experiments at SLAC". By signing this MoA, the parties signify their consent with the conditions defined in this document.

Data and Intellectual Properties

Each party shall be entitled to use for its own purposes any acquired knowledge, whether patentable or not, as well as any expertise developed during the manufacture of the components.

All data obtained from experimental runs shall be made accessible to all the collaborating institutions in a timely fashion to provide all equal opportunity to contribute to the analysis.

Members of the Collaboration are entitled to be involved in the analysis and publication of data obtained in the course of the experimental physics program.

All data, correction algorithms and parameters, detector system analysis software, and physics reactions and detector simulation programs shall be made available to the members of the Collaboration.

Subject to the Freedom of Information Act (5U.S.C.552), decisions on disclosure of information to the public regarding projects and programs referred in this MoA shall be made by the P.I. following consultation with the other party's representatives. It is the intent of the parties to this MoA to place research and results in the public domain.

Press releases and press conferences concerning the analysis of experimental data will require the prior approval of the P.I. The P.I. will inform, and where appropriate, obtain the approval of the funding agencies representatives.

The publication of results obtained with the GLAST Instrument will follow the procedure described in the publication policy document of the collaboration.

9. SLAC's Obligations

9.1 General Obligations

Being responsible for the construction of the instrument, SU-SLAC undertakes to keep the collaboration and the funding agencies informed of the timescale of GLAST fabrication and I&T.

SU-SLAC is also a member institution and agrees to meet the obligations resulting from this role as described in Appendix ("SLAC Responsibilities and Support for the GLAST Instrument as a Member of the Collaboration").

9.2 Specific Obligations

International Exchange of Information and Materials

The development, fabrication, and operation of the GLAST LAT investigation as defined by this agreement shall adhere to all applicable U.S. laws and regulations concerning the import and export of technical information and materials.

10. Collaborating Institutions' Obligations

10.1 General Obligations

The collaborating institutions will make available on the SLAC site, in working order for the proper integration and test of the GLAST Large Area Telescope Instrument, the part(s) of the instrument, which they have undertaken to supply.

The Instrument Project Manager (IPM) and the Sub-system managers shall prepare schedules for the project that will be reviewed by all parties concerned. They shall use all reasonable means to maintain such schedules, and the Sub-system Manager and the IPM shall be informed of any departure from them.

Each collaborating institution shall provide SLAC with a list of support equipment items that are intended for use on the SLAC site.

A collaborating institution shall be responsible for the transport of its equipment from its point of origin to the SLAC site, and testing the equipment on the SLAC site, unless otherwise agreed to by SLAC and the collaborating institution.

It is expected that a collaborating institution or group which supplies equipment will provide the necessary scientific and technical manpower support, as well as the relevant tools and spare parts to maintain that component in good working order.

11. Specific Agreements

11.1 Scope of Responsibility

Based on discussions between the GLAST IPO, the Tracker Subsystem Manager and members of the Japan GLAST Collaboration (JGC) regarding the division of effort, the JGC agrees to support engineering, manufacturing and testing efforts of the GLAST instrument in the following areas:

WBS 4.1.4.3.1	Silicon Strip Detectors
WBS 4.1.4.7	Instrument Integration & Test Support

Beyond these activities, Japanese scientists who are members of the JGC will play a significant role in the following areas:

WBS 4.1.D	Science Analysis Software
WBS TBD	Mission Operations and Science Data Analysis

11.2 Scientific and Technical Personnel

Hiroshima University is represented by Professor Tuneyoshi Kamae and Professor Takashi Ohsugi within the JGC. Professor Kamae is the representative of the Japanese institutions as a member of the SSAC. The Hiroshima University group presently includes Professor Ohsugi's research group with large scientific and technical staffs. Professor Tadayuki Takahashi represents the Institute for Space and Astronautical Sciences (ISAS) within the JGC. Professor Nobuyuki Kawai represents RIKEN within the JGC.

11.3 Statement of Work

Under this MoA, the JGC will carry out design, testing and fabrication in the project area listed above.

11.3.1 Silicon Strip Detectors (WBS 4.1.4.3.1)

Hiroshima University will be responsible for the design optimization of the silicon strip detectors (SSD) at Hamamatsu Photonics (Japan), a major supplier of GLAST SSD's.

The JGC will procure 5,000 of the silicon strip detectors (SSD) needed for the GLAST instrument.

Hiroshima University will be responsible for the GLAST instrument part of the Quality Acceptance (QA) and Quality Control (QC) functions at Hamamatsu Photonics, including detailed testing and irradiations.

11.3.2 Instrument Integration and Test (WBS 4.1.4.7)

The JGC will actively participate in the final instrument integration and test at SLAC and at GSFC/NASA or their designated site.

11.3.3 Science Analysis Software (WBS 4.1.D)

The JGC will work with other members of the LAT collaboration on development and testing of software needed for instrument operations and science data analysis.

11.3.4 Mission Operations and Science Data Analysis (WBS TBD)

The JGC will participate in the planning of the scientific program of the GLAST mission and will be involved from the beginning in the major scientific investigations to be done with data from the LAT. The JGC and SLAC agree to try to make the level of responsibility of participating institutions within the scientific working groups commensurate, to the degree possible, with their level of commitment to the mission.

12. Final Provisions

12.1 Modifications and Formal Amendments

The IPO will settle and duly announce to SU-SLAC any modifications or additions to the instrument which affects the terms of the MoA. Major modifications shall be approved as formal amendment to the MoA and, consequently, be accepted and signed by the representatives of the funding agencies.

12.2 Disagreement

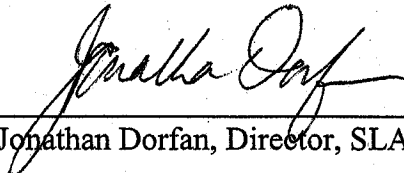
All questions relating to the interpretation or application of this MoA that arise during the period it is in force shall be settled by mutual agreement. Failure to reach agreement will be referred to the Director of SLAC and the representative of the appropriate funding agency for joint resolution.

13 Effective Date

This Memorandum of Agreement shall become effective upon the later date of signature of the parties. It shall remain in effect until October 1, 2010.


14 Approvals

The undersigned concur on the terms of this Memorandum of Agreement.



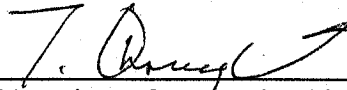
 Jonathan Dorfan, Director, SLAC

Date: Feb 17, 2001



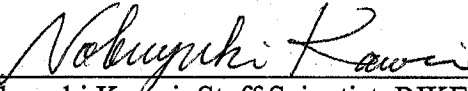
 Tuneyoshi Kamae, Japan GLAST Collaboration

Date: February 2, 2001



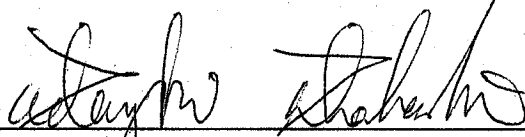
 Takashi Ohsugi, Professor, Hiroshima University

Date: February 8, 2001



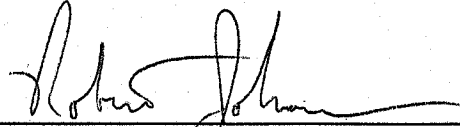
 Nobuyuki Kawai, Staff Scientist, RIKEN

Date: February 15, 2001



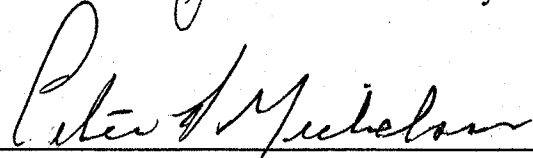
 Tadayuki Takahashi, Associate Professor, ISAS

Date: February 12 2001



 Robert Johnson, GLAST Tracker Subsystem Manager

Date: March 13 2001



 Peter Michelson, GLAST IPI

Date: February 2, 2001