LAT-MD-00609-02

20 May 2002

Memorandum of Agreement

Between

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

Naval Research Laboratory (NRL),

and

Centre National de la Recherche Scientifique / Institut National de Physique Nucléaire et de Physique des Particules (CNRS/IN2P3)

Regarding

IN2P3 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 participation of the Centre National de la Recherche Scientifique/Institut National de Physique Nucléaire et de Physique des Particules (CNRS/IN2P3) 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.

GLAST is a NASA high-energy gamma-ray mission to be launched in March 2006. The Large Area Telescope (LAT), the primary instrument aboard GLAST, is being fabricated by a collaboration led by Peter F. 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 LAT instrument is subdivided into subsystems, 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), UC Santa Cruz (UCSC), Italian Institute for Nuclear Physics (INFN) and Hiroshima University (Japan)).
- Calorimeter (Naval Research Laboratory (NRL), Commissariat a l'Energie Atomique/Direction des Sciences de la Matiére (CEA/DSM/DAPNIA, France), CNRS/IN2P3 (France), Royal Institute of Technology (Sweden), and SU-SLAC)
- Anti-Coincidence Detector (Goddard Space Flight Center (GSFC))
- LAT Electronics (SU-SLAC, SU-HEPL, NRL, UCSC, and CEA/DSM/DAPNIA)

Instrument system engineering functions are being carried out by SU-SLAC.

This MoA covers work on the LAT Instrument Calorimeter Subsystem by IN2P3. The calorimeter development is a collaboration among the Naval Research Laboratory (NRL), Commissariat à l'Energie Atomique / Département d'Astrophysique, de physique des Particules, de physique Nucléaire et de l'Instrumentation Associée (hereafter CEA/DSM/DAPNIA), Centre National de la Recherche Scientifique / Institut National de Physique Nucléaire et de Physique des Particules (hereafter, CNRS/IN2P3) in France, the Royal Institute of Technology (KTH) and Stockholm University in Stockholm, Sweden, and Stanford University-Stanford Linear Accelerator Center (SU-SLAC).

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.*

b) The French institutions involved in the GLAST LAT: Commissariat à l'Energie Atomique / Direction des Sciences de la Matière / Département d'Astrophysique, de physique des Particules, de physique Nucléaire et de l'Instrumentation Associée (CEA/DSM/DAPNIA) and Centre National de la Recherche Scientifique / Institut National de Physique Nucléaire et de Physique des Particules (CNRS/IN2P3) representing the three following laboratories: Laboratoire Leprince-Ringuet (LLR) of Ecole Polytechnique, PCC of Collège de France and CENBG of Université de Bordeaux.

c) SU-SLAC, operated by Stanford University (hereinafter Stanford), under contract DE-AC03-76SF00515 with the U.S. Department of Energy (DOE), responsible for management and integration of the LAT instrument. SU-SLAC is the responsible party accountable to the U.S. Department of Energy for the program execution. Stanford University is responsible for the appropriate expenditure of U.S. Government funds.

d) NRL, the lead institution for the LAT Calorimeter subsystem, with overall responsibility for the Calorimeter Subsystem. NRL's responsibility to NASA is identified, with management oversight and concurrence from P.F. Michelson, in NASA DPR S-15633-Y.

e) The U.S. Government funding agencies: the Department of Energy (DOE) and the National Aeronautics and Space Administration (NASA).

f) The French funding agencies providing support to French institutions collaborating in the GLAST LAT instrument.

In the present Memorandum the parties considered (hereafter, the Parties) are SU-SLAC, represented by the SLAC Director, the NRL, represented by the Superintendent of the Space Science Division, and CNRS/IN2P3, represented by its director. Peter F. Michelson of Stanford University, as Instrument Principal Investigator (IPI), has overall responsibility for the investigation. W. Neil Johnson of NRL, Calorimeter Subsystem Manager, has overall responsibility for the Calorimeter Subsystem of the GLAST LAT instrument.

The IN2P3 Program Manager, Henri Videau of IN2P3/LLR, is responsible for all decision-making and authority with regard to management of technical, cost, and schedule issues concerning the LAT activities that are carried out by IN2P3. The IN2P3/LLR Project Manager, Oscar Ferreira, is responsible for day-to-day decision-making and authority concerning LAT calorimeter development activities carried out by IN2P3.

NRL is responsible for managing the development of the calorimeter subsystem, including Calorimeter design, fabrications, test, and calibration. NRL is responsible for the delivery of the Calorimeter Modules to SU-SLAC. The Swedish groups are responsible for the procurement and acceptance testing of the CsI crystals for the

calorimeter subsystem. CEA/DSM/DAPNIA is responsible for the Crystal Detector Elements (CDE) of the calorimeter subsystem.

The responsibilities of IN2P3 are listed in section 8.4 of this MoA.

3. Scope of This Memorandum of Agreement

This MoA ratifies the GLAST LAT Flight Proposal and establishes the basic working agreement among SU-SLAC, NRL, and CNRS/IN2P3 (France), regarding IN2P3 participation in the GLAST LAT Project, in particular in 1) the definition, development, fabrication, and integration of the GLAST LAT Calorimeter Subsystem; 2) calibration of the LAT calorimeter and the LAT instrument; and 3) subsequent mission operations and data analysis activities for the GLAST mission. This MoA establishes the understanding between the signatories and is not a contract.

It is acknowledged by the Parties that an International Agreement between the National Aeronautics and Space Administration (NASA) and the Centre National d'Etudes Spatiales (CNES) shall define the overall participation of all French institutions in the GLAST mission. This MoA shall not supersede the International Agreement between NASA and CNES. Reference is also made in this MoA to the role of KTH (Sweden) and CEA/DSM/DAPNIA (France). The roles and responsibilities of KTH, Stockholm University in Stockholm, Sweden, and CEA/DSM/DAPNIA in the LAT Project shall be ratified under separate MoAs with those parties, NRL, and SU-SLAC. Those agreements and this agreement shall be made available to all of the parties concerned.

4. Authority

Work on GLAST at SU-SLAC is authorized under DOE Project Number KA050102-EQU01CC and NASA Contract NAS 5-00147. NASA DPR S-15633-Y with NASA/GSFC provides NRL authority for performance of work on GLAST as part of the overall program led by Peter F. Michelson at Stanford University.

5. Schedule

The Collaborating Institutions shall prepare and maintain schedules for activities under their respective control. To ensure that such activities are coordinated with other elements of the project schedule, these schedules are subject to review and approval by the appropriate Subsystem Manager and the Instrument Project Manager (IPM), and are included in the LAT master schedule. All entities shall use all reasonable means to adhere to such approved schedules and shall report progress periodically. The Calorimeter Subsystem Manager, the IN2P3 Program Manager, and the IPM shall be immediately informed of any departure from the schedule.

6. Funding

NASA/GSFC will fund Stanford University and the Naval Research Laboratory for the LAT program incrementally at varying intervals. SU-SLAC will also receive funding from the Department of Energy at varying intervals. The Centre National d'Etudes Spatiales (CNES) will endorse responsibility for French participation with an

International Agreement between CNES and NASA. CEA/DSM/DAPNIA and CNRS/IN2P3 will each be funded partly by CNES and partly by their own budgets. The Swedish institutions will be funded by the Wallenberg Foundation and the Swedish Research Councils. The funding will cover primarily technical and management staff, and external activities, such as industrial contracts, equipment, and travel.

7. International Exchange of Information and Materials

The development, fabrication, and operation of the 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.

All exports of U.S. technical information and materials related to this MoA by the U.S. Naval Research Laboratory will be handled by the Naval Research Laboratory through its Security Office using procedures approved by the Navy International Programs Office.

CNRS/IN2P3 will assure compliance with all applicable French laws and regulations concerning the import and export of technical information & materials related to this MoA.

8. Management and Technical Direction

8.1 Project Structure

The LAT program, as accepted by NASA, draws upon the resources of the consortium institutes to create a working group for the program. It is not intended that an autonomous project group be created, nor that the institutes relinquish control over their personnel. The main bodies of the organization are:

8.1.1 Instrument Principal Investigator, Peter F. Michelson

The Instrument Principal Investigator (IPI) is the ultimate authority within the LAT team for all decisions concerning the instrument development and 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, fabrication, testing, and delivery of the instrument to NASA for subsequent integration with the GLAST spacecraft and launch. These persons, co-located at SLAC, form the leadership of the LAT Instrument Project Office (IPO) at SU-SLAC. The subsystems each have a subsystem manager, each responsible for the design and fabrication of the particular subsystem.

8.1.2 Calorimeter Subsystem Management

The Calorimeter Subsystem Manager is responsible for the design, fabrication, and testing of the LAT calorimeter subsystem. By delegation and authority of the Calorimeter Subsystem Manager, the Calorimeter Project Manager at NRL is responsible

for the technical management of the NRL effort. The Calorimeter Subsystem Manager reports to the IPM.

8.1.3 IN2P3 Program Management

With concurrence of the appropriate management of the participating Parties, the IN2P3 Program Manager is responsible for all decision-making and authority with regard to management of technical, cost, and schedule issues for the design, fabrication, and testing in the areas specified in Section 8.4 of this MoA for which IN2P3 institutions have responsibility. Day-to-day management of technical, cost, and schedule matters at IN2P3/LLR is delegated to the IN2P3/LLR Project Manager, Oscar Ferreira. For matters concerning the LAT calorimeter development by IN2P3, the IN2P3 Program Manager and the IN2P3/LLR Project Manager report to the Calorimeter Subsystem Manager. The IN2P3 Program Manager is responsible for overall matters concerning programmatic issues (e.g. overall scope of funding and human resources) and for coordinating and representing the interests of all IN2P3 scientists with respect to national funding agencies and the LAT collaboration.

8.1.4 The Senior Scientist Advisory Committee

The Senior Scientist Advisory Committee (SSAC) is the body that advises the IPI on matters that concern the general and scientific policies of the collaboration. The SSAC is formed by senior members from the collaborating institutions, with an elected Chairperson. The Calorimeter Subsystem Manager and an IN2P3 scientist are members of the SSAC.

8.1.5 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. The IN2P3/LLR Project Manager is a member of the IDT as well as the key technical scientists from NRL, CEA/DSM/DAPNIA, and IN2P3 involved in the instrument development. Members of the IDT are obliged to attend IDT meetings as part of their responsibilities. Meetings of the IDT are open to the Collaboration.

8.2 General Guidelines

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 that document.

8.2.1 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 the LAT for the collaboration shall be made accessible to all the collaborating institutions in a timely fashion to provide all equal opportunity to contribute to the analysis.

All members of the collaboration are entitled to be involved in the analysis and publication of data obtained by the collaboration in the course of the scientific program, according to the Collaboration Publication Policy.

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

Subject to the Freedom of Information Act (5 U.S.C. 552), decisions on disclosure of information to the public regarding projects and programs referenced in this MoA shall be made by the IPI following consultation with the other parties' representatives. It is the general 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 IPI. The IPI will inform, and where appropriate, obtain the approval of the funding agencies representatives.

The publication of results obtained with the LAT Instrument by the collaboration will follow the procedure described in the "GLAST LAT Collaboration Publication Policy" document of the collaboration.

The publication or other release of technical data and results from the LAT are subject to the international exchange of information restrictions described in section 7.

8.2.2 Cross-waiver of Liability

The Parties to this agreement agree that a comprehensive cross-waiver of liability between the Parties to this agreement and their related entities will further the objectives of the GLAST LAT Project. The cross-waiver of liability shall be broadly construed to achieve this objective.

Each party to this agreement agrees to a cross-waiver of liability pursuant to which each party waives all claims against the other party, a related entity of the other party, or an employee of a related entity of the other party, for actions under this agreement. In addition, each party to this agreement shall extend the cross-waiver of liability to its own related entities.

8.3 Key Personnel

The key personnel mentioned in section 2 assume primary responsibilities for fulfilling of the tasks covered by this MoA. These include the IN2P3 Program Manager, the IN2P3/LLR Project Manager, calorimeter management personnel at NRL, and IPO personnel at SU-SLAC.

In addition, key IN2P3 personnel include Gilles Bogaert as IN2P3/LLR Project Scientist, reporting to the IN2P3 Program Manager. It is anticipated that additional key personnel shall be identified as the project definition progresses. The commitment of key personnel in the MoA requires that their expertise and continuity of direction will be available during development and subsequent problem resolution for the LAT instrument. They will be held available to the project by their institutions throughout the duration of the GLAST project to the extent this is within the power of the institutions. Each party and its key personnel shall be responsible for providing the resources necessary for solving problems, should they arise in the course of fulfilling their tasks.

8.4 Statement of Work

Under this MoA, IN2P3 shall carry out design, fabrication, testing and delivery of work elements listed below. IN2P3 technical responsibilities include the mechanical design and qualification of the calorimeter mechanical structural system. IN2P3 shall participate in the integration of the CsI crystals into the engineering model structural support. IN2P3 will also participate, with NRL, on the calorimeter and instrument-level simulation and software efforts as well as calibration of the calorimeter and the instrument, development of ground-support equipment (GSE) including software and data analysis. IN2P3 scientists are also members of the instrument science team and will contribute to science data analysis and software development. All such work shall be carried out in accordance with applicable IPO-controlled project documents.

The IN2P3 Institutions' responsibilities in the LAT Program are described in the following sub-sections (whose titles are extracted directly from the applicable subsystem WBS), and specified in more detail in the Calorimeter Implementation Plan.

8.4.1 System Engineering

The IN2P3 management team shall be responsible for system engineering support for the IN2P3 components of the GLAST LAT calorimeter subsystem. This includes the development of requirements and specifications in collaboration with NRL and others for the Calorimeter. Responsibilities also include management and tracking of resources and margins, and system verification.

NRL is responsible for the overall Calorimeter system engineering. IN2P3 shall support the overall system engineering activities with efficient and timely exchange of technical details, schedules, processes and plans with NRL and CEA/DSM/DAPNIA.

8.4.2 Performance Assurance

The IN2P3 management team shall be responsible for the reliability and quality assurance of the mechanical structure components of the GLAST LAT calorimeter in cooperation

with NRL and the IPO at SU-SLAC, in accord with the Mission Assurance Requirements document from the GLAST Project Office at NASA and the IPO-controlled LAT Performance Assurance Implementation Plan.

8.4.3 CAL Mechanical Structure Design

NRL and IN2P3/LLR shall share responsibility for the definition, specification and engineering design of the CAL structure. LLR shall deliver mechanical and thermal design documentation, computer models, test plans and procedures and test data to NRL for approval.

8.4.4 Design Optimization and Scientific Performance Simulations

NRL and all French Institutes shall collaboratively develop simulations of the performance of the Calorimeter subsystem for the purpose of optimizing design details.

8.4.5 CAL Mechanical Structures

IN2P3 shall fabricate and deliver to NRL 19 mechanical structures consisting of one engineering model and 18 flight models. Of the 18 flight models, one will be used in CAL module qualification testing and the others represent the sixteen flight models and a flight spare module. IN2P3 shall fabricate additional models as necessary to study and qualify the mechanical structure. IN2P3 shall define and provide fixtures and tooling necessary for the assembly of the CAL engineering model. IN2P3 shall perform acceptance testing of the calorimeter mechanical structures and shall pack and ship acceptable units to NRL.

8.4.6 Calorimeter Integration, Test and Calibration

NRL and French Institutes, including IN2P3, will collaborate on developing Calorimeter test and calibration procedures. IN2P3 will be involved in integration, test and calibration activities, including beam tests at SU-SLAC or other sites. IN2P3/CENBG shall lead calibrations of an engineering model calorimeter module in electron, proton and heavy ion beams.

8.4.7 Instrument Integration and Test

IN2P3 will actively participate in the integration, testing and calibration of the LAT instrument at SU-SLAC or other designated sites.

8.4.8 Science Analysis Software

IN2P3 will collaborate with other members of the LAT Collaboration on the development of requirements for scientific analysis of LAT flight data and the development of algorithms and software for generating high-level science data products to implement the LAT Collaboration's science program as specified in the LAT Flight Proposal, particularly with regard to analysis of AGNs and SNRs. IN2P3 institutes will contribute to Software Infrastructure. Documentation will be provided for all software code developed. A French mirror site for LAT data shall be maintained and coordinated with the LAT Instrument Operations Center (IOC) activities.

8.4.9 Mission Operations

All members of the collaboration will collaborate on the planning of the scientific program for the LAT Flight Investigation, in accordance with the GLAST LAT flight proposal. IN2P3 scientists will be involved from the beginning in the major scientific investigations to be done with data from the LAT. SU-SLAC, NRL and the participating French institutions agree to have the level of responsibility of the participating institutions in the science activities commensurate, as much as possible, to the level of their commitment.

8.5 Deliverable Items and Schedule

The list of deliverable items and schedule for the Calorimeter shall be maintained as part of the Calorimeter Implementation Plan, developed collaboratively with the French project management, and approved and maintained by the Calorimeter Subsystem Manager.

For reference, current scheduled dates for LAT PDR, CDR, and launch are:

- LAT PDR: January 7-10, 2002
- LAT Delta-PDR/Baseline Review: July 30 – August 1, 2002
- LAT CDR: April, 2003
- LAT CAL CDR: December 2002 (TBR)
- Launch: September 2006

Table 1 lists deliverable items and estimated delivery dates in five categories:

- hardware;
- design, documentation, and programmatic support;
- software;
- LAT integration and test support;
- LAT calibration support.

The dates in the table are only representative of the actual program schedule. The actual delivery dates are negotiated with all parties and maintained in the project schedule controlled by the LAT project office.

Table 1. IN2P3 Deliverables

Deliverable	First Delivery	Last Delivery
1. Hardware		
1.1 Mechanical Structures		
1.1.1 Verification Model (design description, test procedures, test reports)	Feb 01	Jun 01
1.1.2 Verification Model 2 (design description, test procedures, test reports)	Jan 02	May 02
1.1.3 Engineering Model (hardware and design data)	Jul 02	
1.1.4 Flight Units (18 units, including Qualification Unit)	CDR + 1 month	CDR + 10 months
1.2 Ground Support Equipment <TBR>		
1.2.1 EM Module assembly fixtures and tooling	Jul 02	
2. Design, Documentation, and Programmatic Support includes component and subsystem development plans, specifications, and schedules; design, analysis, and interface data as needed; acceptance and performance test reports; integration and test procedures as needed; handling and maintenance procedures as needed; hardware schematics, design data, and drawings for all delivered hardware and GSE; Verification Plan; Reliability, Quality Assurance, and Parts Assurance Plan	As needed during program and specified in the relevant Implementation Plan	
3. CAL Integration and Test Support		
3.1 EM Integration and Test Support	Jul 02	
3.2 EM Beam Test plan and coordination of CAL team support	Feb 03	
3.3 Flight model Integration and Test Support	CDR + 1 month	
4. Software 4.1 Simulation software and analyses 4.2 Science analysis software	on-going	
5. LAT Integration and Test Support	Apr 04	Sept 05
6. LAT Calibration Support	Apr 04	Sep 04

8.6 Technical Management, Reporting, and Reviews

Calorimeter Subsystem and component development plans will be generated by the element lead (see Statement of Work, section 8.4), and submitted to NRL by the IN2P3 project manager for review and approval. These plans will be compatible with the overall Calorimeter Implementation Plan, and will address the entire development cycle, from design through fabrication, and integration and test. Detailed schedules will be included in these plans and will be utilized to monitor the technical performance.

Technical work will be monitored via the following activities:

- Instrument Project Office (IPO) level
  - Quarterly joint NASA/DOE Reviews
  - Quarterly reports to the GLAST Project Office (GSFC) and all funding agencies
  - Weekly reports to IDT
  - IDT meetings
  - Subsystem peer reviews

- Calorimeter Internal
  - Monthly Progress Reviews (in person or teleconference)
  - Weekly reports (to be merged with the other organizations' reports and forwarded to IPO)
  - Routine telephone/video conferences as needed

The IPO shall submit quarterly reports to NASA and DOE showing accomplishments, plans for the next period, problems and concerns, disposition of action items, schedule events, staffing changes, contract actions, and financial/schedule status and performance. Subsystem managers shall provide this information to the IPO. In that activity, NRL shall report on the calorimeter subsystem. The IN2P3 Program Manager shall be responsible for submission of reports on the calorimeter subsystem activities to NRL showing accomplishments during the past period, plans for the next period, problems and concerns, and other items as needed such as the disposition of action items, schedule events, staffing changes, contract actions, and schedule performance. NRL shall require the same reports from its contractors. NRL shall assemble these reports with its own input into a LAT calorimeter subsystem report. NRL may add a summary of questions and actions items. NRL keeps track of all action items and attaches to the monthly report a list of all items together with their status of disposition. NRL shall also provide informal weekly reports to the IPO, including inputs from the Collaborating Institutions.

The monthly Calorimeter Reviews will be informal reviews chaired by the Calorimeter Subsystem Manager and with participation of all organizations involved, addressing programmatic, design status, action items, issues, and schedule.

9. International Finance Committee

The International Finance Committee, chaired by the Associate Director of SLAC for Research, will meet as needed to review the status of commitments of all partners (U.S. and foreign) in the GLAST LAT Project. The committee membership will be representative 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.

10. Final Provisions

10.1 Modifications and Formal Amendments

The IPO will settle and duly announce to MoA parties any modification or addition to the instrument and its development plan which affects the terms of the MoA. Major modifications shall be approved as formal amendments to the MoA and, consequently, be accepted and signed by the representatives of the funding agencies.

10.2 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 Dean of Research of Stanford University, the Director of SLAC, the Director of Research at NRL, and the representative(s) of the appropriate funding agency(ies) for joint resolution.

11. Effective Date

This Memorandum of Agreement shall become effective upon the later date of the effective date of the International Agreement between NASA and CNES concerning GLAST and the later date of signature of the parties to this MoA. It shall remain in effect until October 1, 2010.

12. Approvals

SU-SLAC

Jonathan Dorfan, Director, SLAC — Date: July 25, 2002

NRL

Herbert Gursky, Space Science Division Superintendent — Date: 12 Jul 02

IN2P3

Jean-Jacques Aubert, Director, IN2P3 — Date:

LAT Team:

Peter F. Michelson, LAT IPI — Date: 7/21/02

W. N. Johnson, Calorimeter Subsystem Mgr — Date: 6/27/02

Henri Videau, IN2P3 Program Manager — Date: June 5 2002

Oscar Ferreira, IN2P3/LLR Project Manager — Date: June 5th 2002