



SIRTF

Space InfraRed Telescope Facility

(*SIRTF*)

Legacy Science Projects

Call for Proposals – Version 2 (Final)

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California Institute of Technology
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<http://sirtf.caltech.edu/>



JPL

Table of Contents

0	CHANGES FROM VERSION 1	1
1	INTRODUCTION	3
2	MISSION OVERVIEW.....	4
2.1	TELESCOPE	4
2.2	ORBIT / SKY VISIBILITY.....	4
2.3	SCIENCE PAYLOAD	5
2.4	OBSERVING MODES / AOTs	6
2.5	SCIENCE OPERATIONS	6
3	THE SIRTf LEGACY SCIENCE PROGRAM.....	7
3.1	FUNDAMENTAL PRINCIPLES.....	7
3.2	OBSERVING TIME AVAILABLE.....	7
3.3	LONG-TERM OBSERVING PROJECTS	8
3.4	USE OF SECOND-GENERATION AOTs.....	8
3.5	SECOND-LOOK OBSERVATIONS	8
3.6	TARGETS OF OPPORTUNITY	8
3.7	USE OF ANCILLARY DATA.....	9
3.8	POST-PIPELINE DATA PROCESSING.....	9
3.9	PROJECT STAGES	10
3.10	WHO MAY SUBMIT.....	10
3.11	FUNDING SUPPORT	10
3.12	EDUCATION AND PUBLIC OUTREACH	11
4	PROJECT ACTIVITIES AND SCHEDULES.....	12
4.1	STAGE ONE.....	12
4.2	STAGE TWO	13
4.3	STAGE THREE	13
4.4	PROGRESS REVIEWS	14
4.5	LEGACY SCIENCE INTERFACES	14
4.6	SSC SUPPORT.....	15
4.7	SSC DATA PRODUCTS	15
5	PROPOSAL PLANNING	17
5.1	TECHNICAL DOCUMENTATION.....	17
5.2	SCIENCE USER TOOLS.....	18
5.3	GTO OBSERVATIONS	18
5.4	SIRTf HELPDESK AND FAQs.....	18
6	PROPOSAL SUBMISSION.....	19
6.1	SCIENCE PLAN	19
6.1.1	<i>Scientific Justification</i>	19
6.1.2	<i>Technical Implementation Plan</i>	20
6.1.3	<i>Astronomical Observation Requests (AORs)</i>	20
6.1.4	<i>Request for NOAO Observing Time (optional)</i>	21
6.2	DATA PROCESSING AND ANALYSIS PLAN	21
6.3	PROJECT SCHEDULE.....	22
6.4	MANAGEMENT PLAN	22
6.5	COST PLAN	23
6.6	SUBMISSION OF PROPOSALS.....	26

7	PROPOSAL EVALUATION AND SELECTION	28
7.1	PROPOSAL CONFIDENTIALITY	28
7.2	TECHNICAL EVALUATION	28
7.3	MANAGEMENT EVALUATION	28
7.4	SCIENTIFIC REVIEW	29
7.5	EVALUATION CRITERIA	29
7.6	SELECTION PROCEDURE AND SCHEDULE	31
8	INFORMATION CONTACTS.....	31
	APPENDIX A: SIRTf SCIENCE SCHEDULE	32
	APPENDIX B: REQUEST FOR USE OF NOAO FACILITIES	33
	APPENDIX C: SIRTf FIRST-LOOK SURVEY.....	34
	APPENDIX D: ACRONYMS AND ABBREVIATIONS	35

The SIRTf Science Center (SSC) is operated by the California Institute of Technology, under contracts with the National Aeronautics and Space Administration (NASA).

0 Changes From Version 1

This section provides a summary of the *substantive* changes between the current Version 2 of the SIRTf Legacy Science *Call for Proposals* (CP) and Version 1 that was issued by the SIRTf Science Center on April 28, 2000. No attempt is made to itemize minor changes in wording within the current document, which represents the final version of the CP. A summary of the documents needed to plan and submit a SIRTf Legacy Science proposal is provided in §5.1.

- **SSC Pipeline Data Products**

The level of definition of SSC pipeline data products has evolved since Version 1 of the CP was issued, and additional information about these products is now available in the companion *SIRTf Observer's Manual (SOM)*, Version 2. The SIRTf science payload is being completed and delivered for integration into the cryo-telescope assembly, and knowledge about the SSC pipeline data products (§4.7) continues to evolve. For details on these data products, investigators are urged to study the following sections of the SOM: §6.3.2 (IRAC), §7.3.2 (IRS), and §8.3.2 (MIPS). Note that these are conservative descriptions of the SSC pipeline data products; that is, the SSC is promising only what it can confidently judge to be feasible. Investigators should assume that they may have to develop any desired capabilities and/or functions that are not explicitly stated in the data product descriptions in order to achieve the scientific goals of their proposed project.

While the data product descriptions in the cited sections of the SOM reflect the increased maturity of knowledge about the science instruments and their resultant data, they do not yet represent the “final word” for purposes of the Legacy Science CP. Additional information about the scope of SSC data products will be made available online in the ‘Proposal Kit’ section of the SIRTf public Web site through July 31, 2000. At that point, these data product descriptions will be considered final, and investigators can plan their post-pipeline development activities and needed resources accordingly.

- **SIRTf Observing Policies**

Modifications have been made to the *SIRTf Observing Policies*, a companion document to this CP. Policy #1 refers to special overhead burdens assessed to programs requiring rapid instrument changes and to Solar System observations requiring a late ephemeris change. Policy #5 refers to special overhead burdens assessed to programs requiring observations of medium- and/or high-impact Targets of Opportunity. The current estimates of these assessed burdens are documented in a memo available online in the ‘Proposal Kit’ section of the SIRTf public Web site.

The definition for duplicate observation candidates in Policy #2 has been modified. Finally, Policy #6 has been modified to define and describe generic moving targets.

- **Request for Use of NOAO Facilities (optional)**

Investigators seeking use of National Optical Astronomy Observatories (NOAO) facilities as part of a SIRTf Legacy Science project do *not* need to complete any NOAO-specific online forms. Investigators should specify all of the necessary information within the *two-page* technical justification and description of proposed NOAO observations (see §6.1.4 and Appendix B). These data should include the requested telescope(s) and instrument(s), the number of nights requested, the desired astronomical sky conditions (bright, gray, dark, darkest), and both the optimal and acceptable months for scheduling the proposed observations.

- **Online Budget Forms**

Eligible proposers (§3.11) seeking funding support must include a properly endorsed cost plan (§6.5), including the pre-formatted budget forms available online at <http://acquisition.jpl.nasa.gov/crei/sirtf.htm> . A cost plan should include separate itemized budgets for: (i) the total duration of the project; (ii) the first 12 months of the project; and (iii) the first three months of the project.

1 Introduction

The *Space InfraRed Telescope Facility (SIRTF)* is the fourth and final element in NASA's family of Great Observatories and represents an important scientific and technical bridge to NASA's Astronomical Search for Origins Program. The Observatory consists of a cryogenically-cooled 0.85-meter telescope and three science instruments capable of performing imaging and spectroscopy in the 3 to 180 micron range ($\lambda_{\text{center}} = 3.6 - 160 \mu\text{m}$). The Observatory will be launched from NASA's Kennedy Space Center into an Earth-trailing heliocentric orbit in December 2001. While the SIRTF cryogenic lifetime requirement is 2.5 years, current estimates indicate that achieving a goal of a 5-year cryogenic mission lifetime is possible.

This *Call for Proposals (CP)* solicits participation in the SIRTF Legacy Science Program. Approved Legacy Science projects will permit scientists to conduct coherent, large-scale science investigations with original SIRTF observations. *Projects should be designed so that the observational data will have wide utility to the broader scientific community.* To enhance the scientific legacy of SIRTF and to enable timely follow-on investigations with SIRTF and with other observatories, all Legacy Science observational data will enter the public domain immediately upon pipeline-processing and verification by the SIRTF Science Center (SSC). It is anticipated that the vast majority of the SIRTF Legacy Science observations will be completed within one year of launch. The SIRTF Legacy Science Program will comprise approximately half of the observing time available during the first year of the SIRTF science mission.

The SSC is issuing this final version of the Legacy Science CP (Version 2) at this time. *Proposals should be submitted in response to the contents of this document, and to the June 30, 2000 versions of the supporting documentation (§5.1). Principal Investigators of proposed Legacy Science projects should submit an electronic Letter of Intent, including an abstract and lists of Co-Investigators and institutional affiliations, to the SIRTF HelpDesk (sirtf@ipac.caltech.edu) by July 31, 2000. Proposals must be submitted to the SSC by 5:00 p.m. (Pacific Daylight Time), September 15, 2000.*

Proposed investigations that do *not* meet the fundamental principles of the Legacy Science Program (§3.1) are ineligible for consideration, and should be submitted in response to subsequent General Observer *Calls for Proposals*. [The nominal schedule of observing Cycles and solicitations is listed in Appendix A.]

Proposers of SIRTF Legacy Science projects are urged to read the companion *SIRTF Observer's Manual (SOM)* to understand the technical capabilities of SIRTF. Investigators should read the entire *Call for Proposals* and the *SIRTF Observing Policies* in order to understand the procedures and policies for preparing and submitting Legacy Science proposals. These documents are available online in the 'Proposal Kit' section of the SIRTF public Web site (<http://sirtf.caltech.edu/>) and are the governing documents in the event that inconsistencies are found with other information on the SIRTF public Web site, unless explicitly stated otherwise.

SIRTF is managed for the National Aeronautics and Space Administration (NASA) by the Jet Propulsion Laboratory (JPL), California Institute of Technology. All aspects of science operations, including the issuance of this *Call for Proposals* and the selection of approved investigations, are managed by the SIRTF Science Center, California Institute of Technology.

2 Mission Overview

This section briefly summarizes the scientific capabilities of SIRTf. The reader is urged to consult the companion document, the *SIRTf Observer's Manual (SOM)*, for complete technical details of the Observatory, including the science instruments. The SOM is available in various electronic formats on the SIRTf public Web site (<http://sirtf.caltech.edu/>).

2.1 Telescope

The SIRTf telescope is of Cassegrain design, with beryllium optics, and will be cooled to < 5.5 K. The Observatory offers pointing accuracy of better than 1.4 arcsec (1σ radial rms), and pointing stability of 0.3 arcsec (1σ over 200 sec). An angular resolution of ~ 1.5 arcsec is achieved at the diffraction limit of 6.5 microns. The typical field-of-view is ~ 5 arcmin square for imaging. SIRTf is capable of achieving tracking rates of ~ 1 arcsec/sec for fast-moving (*e.g.*, Solar System) targets.

2.2 Orbit / Sky Visibility

SIRTf will be launched on a Delta 7920-H rocket into an Earth-trailing heliocentric orbit, and will drift away from Earth at a rate of about 0.1 AU per year. The launch is scheduled for December 2001. The orbit choice will place the Observatory in a benign thermal environment, and substantially reduce the projection of the Sun-Earth-Moon avoidance zones on the sky, yielding high astronomical observing efficiencies.

The instantaneous viewing zone for SIRTf is bounded by two constraints. First, the Observatory cannot point within 80 degrees of the Sun, for reasons of thermal control. Second, the Observatory cannot point more than 120 degrees from the Sun, in order to maintain sufficient illumination of the power-generating solar panels.

The Observatory's instantaneous visibility region is a 40-degree wide annulus, extending from 80° to 120° in solar elongation, and encompassing all ecliptic latitudes. About one-third of the entire sky is accessible to SIRTf at any given time. The amount of time that any particular target is visible to SIRTf is a function of ecliptic latitude (β). Objects with $|\beta| > 80^\circ$ are located within the Continuous Viewing Zone, and those with $60^\circ < |\beta| < 80^\circ$ are annually visible to SIRTf in one continuous ~ 7 -month time interval. Targets with $|\beta| < 60^\circ$ are observable twice per year in ~ 40 -day windows.

2.3 Science Payload

The SIRTf science payload consists of three instruments, cryogenically cooled with liquid helium to ~1.5 K. *Only one of the instruments can be operated at a time*, and instrument campaigns of 3-10 days duration will be the norm.

The **InfraRed Array Camera (IRAC)** provides simultaneous 5.12 arcmin square images in four channels ($\lambda/\Delta\lambda \sim 4$) centered at 3.6 μm (Band 1), 4.5 μm (Band 2), 5.8 μm (Band 3) and 8.0 μm (Band 4). The 256 x 256 focal-plane arrays use Indium Antimonide (InSb) detectors for the two short-wavelength bands, and Arsenic-doped Silicon (Si:As) impurity-band conductors (IBC) for the two longer wavelengths. The pixel size for each detector array is 1.2 arcsec. Two adjacent fields of view (FOV) are simultaneously imaged in pairs using dichroic beamsplitters, with Bands 1 and 3 comprising one FOV, and Bands 2 and 4 the other. The camera has an internal calibration subsystem that consists of a shutter mechanism that can close the aperture to block external light, and calibration lamps that can be used to track the system responsivity. The Principal Investigator for IRAC is Giovanni G. Fazio, Smithsonian Astrophysical Observatory, Harvard-Smithsonian Center for Astrophysics.

The **InfraRed Spectrograph (IRS)** provides spectroscopic capabilities with low- and moderate-spectral resolutions from wavelengths of 5.3 to 40 microns. The IRS is composed of four separate modules, with two of the modules providing low spectral resolution ($\lambda/\Delta\lambda = 62\text{-}124$) from 5.3 μm to 40 μm , and two other modules providing high spectral resolution ($\lambda/\Delta\lambda = 600$) from 10 μm to 37 μm . Each module has its own entrance slit in the focal plane, and the IRS has no moving parts. The low-resolution modules employ long-slit designs that allow both spectral and one-dimensional spatial data to be acquired simultaneously on the same detector array. The high-resolution modules use a cross-dispersed echelle design to provide both spectral and limited spatial measurements on the same detector array.

An internal “peak-up” array can be used to locate and position sources on the spectrograph slits to better than the blind pointing accuracy of the Observatory. The peak-up array has 1.8 arcsec square pixels, and offers two filters covering 13-18.5 μm and 18.5-26 μm , each with a 1 arcmin x 1.2 arcmin FOV. The IRS instrument utilizes two types of 128x128 IBC arrays: Arsenic-doped Silicon (Si:As) at the shorter wavelengths, and Antimony-doped Silicon (Si:Sb) at the longer wavelengths. The Principal Investigator for IRS is James R. Houck, Cornell University.

The **Multiband Imaging Photometer for SIRTf (MIPS)** provides imaging and photometric capabilities in three broad bands centered at 24, 70, and 160 microns. In addition, the MIPS is capable of measuring low-resolution ($\lambda/\Delta\lambda = 15\text{-}25$) spectral energy distributions (SED) between 55 μm and 96 μm . The instrument uses three types of detector arrays: an Arsenic-doped Silicon (Si:As) 128 x 128 IBC array at 24 μm , an unstressed Gallium-doped Germanium (Ge:Ga) 32 x 32 array at 70 μm for imaging/photometry and for measurements of SED, and a stressed Ge:Ga 2 x 20 array at 160 μm . The MIPS will sample the telescope’s Airy disk with pixels smaller than the Nyquist limit. The FOVs are about 5.2 and 5.3 arcmin square at 24 μm and 70 μm respectively, and 0.5 arcmin x 5.3 arcmin at 160 μm . The MIPS utilizes an internal scan mirror to facilitate efficient mapping of large areas and which enables total power measurements for absolute sky brightness measurements. The MIPS Principal Investigator is George Rieke, Steward Observatory, University of Arizona.

Additional technical details about each of the science instruments are provided in Chapters 6 through 8 of the SOM.

2.4 Observing Modes / AOTs

SIRTF observations will be conducted with seven distinct observing modes. Users will completely specify their observations through the use of Astronomical Observation Templates (AOTs), one for each observing mode. The selection of observational parameters will be through an electronic form, called the “AOT Front-End.” This form is accessed and prepared through a menu-driven, graphical user interface known as the SIRTF Planning Observations Tool (SPOT). These forms offer the user a limited set of control parameters. An AOT with target information and user-specified parameters “filled in” becomes an Astronomical Observation Request (AOR). The seven SIRTF observing modes/AOTs are listed below. Details about these observing modes and the available choice of AOT parameters are provided in the online SOM.

Four of the seven observing modes will be commissioned during In-Orbit Checkout (IOC), and their corresponding AOTs will be available for scheduling and observations shortly thereafter. These *first-generation* AOTs are:

- IRAC Mapping/Photometry
- MIPS Photometry/Super-Resolution Imaging
- IRS Staring-Mode Spectroscopy
- MIPS Freeze-Frame Scan Mapping.

These AOTs are available in the current version of SPOT.

Three *second-generation* observing modes will be commissioned no later than eleven months after launch, and their corresponding AOTs will be available to the General Observer community in time for Cycle-2 observations (see Appendix A for nominal schedule):

- IRS Spectral Mapping
- MIPS Spectral Energy Distribution
- MIPS Total Power Measurement.

Observations utilizing the second-generation observing modes can be included as part of a Legacy Science project. The impact of the deferred commissioning of these AOTs on proposed Legacy Science projects is discussed in §3.4.

2.5 Science Operations

Flight operations for SIRTF will be conducted by an integrated team of personnel from the Jet Propulsion Laboratory (JPL) and from the SIRTF Science Center (SSC). All science operations activities will be based at the SSC, on the campus of the California Institute of Technology, Pasadena. The SSC will solicit observational and archival research investigations through *Calls for Proposals*, will organize science and technical reviews of proposals, select the approved investigations (based on recommendations from a panel of science experts), and administer supporting funds. In addition, the SSC will schedule all science observations (including calibrations), conduct pipeline processing of all SIRTF data, develop and maintain software tools for higher-level analysis tasks, and create an electronically-accessible science data archive.

3 The SIRTf Legacy Science Program

The SIRTf Legacy Science Program will comprise a small number of large-scale, scientifically motivated observing projects to be executed early in the mission. The Program is open to all scientific areas of research, and is open to all scientists worldwide on a competitive basis.

3.1 *Fundamental Principles*

The Legacy Science Program is motivated by a desire to enable major science observing projects early in the SIRTf mission, with the goal of creating a substantial and coherent database of archived observations that can be utilized by subsequent SIRTf researchers. Legacy Science projects are distinguished from General Observer investigations by the following fundamental principles:

- (i) They must be *large and coherent science projects*, not reproducible by any reasonable number or combination of smaller General Observer investigations;
- (ii) They must be projects that are of *general and lasting importance* to the broad astronomical community and whose SIRTf data should yield a *substantial and coherent database*; and
- (iii) *All raw and pipeline-processed data enter the public domain immediately upon SSC verification*, thereby enabling timely and effective opportunities for follow-on observations and for archival research, with both SIRTf and other observatories.

Proposed investigations that do ***not*** meet these principles should be submitted in response to subsequent General Observer *Calls for Proposals* (the nominal schedule of observing Cycles and solicitations is listed in Appendix A). Any proposals submitted in response to this solicitation and judged by the SSC Director not to be in compliance with the fundamental principles governing the Legacy Science Program will be not be considered for review, and the Principal Investigator will be notified of the disqualification.

3.2 *Observing Time Available*

A likely attribute of Legacy Science projects is that they may involve many hundreds of hours of SIRTf observing time. It is anticipated that up to 3000 hours (in total) of SIRTf observing time will be made available for the Legacy Science Program. The vast majority of this time will be allocated during the first year of the mission. In the case of exceptionally strong recommendations by the Legacy Science Time Allocation Committee (TAC), the SSC Director will consider allocating an additional number of hours (not to exceed 1000) during the first and second years of the mission. Such a recommendation will be considered in the broader context of its impact on the nominal General Observer Program.

The number of approved projects is anticipated to be in single digits. The SSC Director will rely on the Legacy Science TAC for expert advice on an appropriate number of projects to be selected, constrained only by the amount of observing time and supporting funds available.

3.3 Long-Term Observing Projects

Observations taken as part of the Legacy Science Program will, for the most part, be executed within the first year of the SIRTf mission. Investigations requiring long temporal baselines, but small amounts of total observing time, could be a component of a Legacy Science project. In general, long-term observing projects are appropriate for General Observer investigations, and require clear and specific justification as a component of a Legacy Science project.

3.4 Use of Second-Generation AOTs

The current *Call for Proposals* (and its earlier draft version) constitutes the sole solicitation for Legacy Science projects. Therefore, investigators proposing to utilize any of the second-generation observing modes must include requests for such observations in their proposal.

To estimate the total time required to execute an observation with second-generation observing modes, the user should consult the information provided in the Science User Tools (SUT) package (§5.2) within the online ‘Proposal Kit’ on the SIRTf public Web site. Note that approved observations using the second-generation observing modes will be executed as soon as practical after those modes have been commissioned by the SSC (§2.4); that is, early in the second year of the SIRTf science mission.

3.5 Second-Look Observations

In some cases essential, predictable and pre-planned re-visits to objects and/or fields may be appropriate as part of a Legacy Science project where these observations will greatly benefit the project database. These *Second-Look Observations* (SLOs) must be clearly justified as an integral part of a coherent investigation and result in a dataset responsive to the fundamental principles of the Legacy Science Program (§3.1). Plans for such SLOs must be fully described in the original proposal. The description should include the rationale and procedure for selecting sources to be re-observed, as well as the specific AORs to be used and their key parameters.

Such re-visits should not be used to follow up, at will, interesting results uncovered in data acquired for the Legacy Science project. Such “follow-up” observations should be proposed as part of a General Observer investigation.

Additional details and limitations pertaining to SLOs can be found in *SIRTf Observing Policies* 3 and 7. All SLO data collected as part of a Legacy Science project enter the public archive immediately upon SSC processing and verification.

3.6 Targets of Opportunity

Targets of Opportunity (ToO) are transient phenomena whose timing is unpredictable. They include objects that can be specifically identified before the onset of such phenomena (*e.g.*, recurrent novae, variable stars) and predictable phenomena that can be expected, although whose precise timing cannot be specified *a priori* (*e.g.*, newly discovered comets, novae, supernovae, gamma-ray bursts).

Because ToOs are unpredictable and because of operational limitations in the first year of the SIRTf mission, observations of ToOs cannot produce a substantial database early in SIRTf's lifetime. Therefore, *Target of Opportunity observations will not be permitted as part of a Legacy Science project.* Requests for observations of these known objects should be submitted in response to a subsequent General Observer (GO) *Call for Proposals*. Observations of completely unanticipated phenomena can be requested through Director's Discretionary Time (DDT) procedures. Additional information about the GO and DDT programs is available on the SIRTf public Web site.

3.7 Use of Ancillary Data

Given the nature and scope of the SIRTf Legacy Science Program, ancillary data from ground-based and/or space-borne observatories could be a legitimate part of a Legacy Science project. ***While there is no requirement to utilize ancillary data,*** proposing investigators may include the collection, processing and analysis of such data as part of an integrated Legacy Science proposal. Up to ten percent of the Legacy Science funding support annually can be directed towards activities related to the collection and reduction of necessary ancillary observational data.

Through a collaborative agreement with SIRTf, the National Optical Astronomy Observatories (NOAO) will provide ground-based telescope resources to enhance the science return from the SIRTf Legacy Science Program. The NOAO will commit up to ten percent of its telescope resources (excluding the Gemini Telescopes) to support SIRTf Legacy Science projects for two years, starting with the Spring 2001 semester. Legacy Science investigators seeking to request observing time on eligible NOAO telescopes ***must*** include their ground-based observations within the proposal. Additional information pertaining to the SIRTf/NOAO collaboration appears in Appendix B and in §6.1.4. NOAO data obtained through this opportunity are expected to abide by the spirit of the SIRTf Legacy Science Program; that is, the NOAO data should enter the public domain as rapidly as possible. Investigators using ancillary data other than that collected on NOAO telescopes as part of a SIRTf Legacy Science project are encouraged to provide the ancillary data to the community in the same spirit and to describe their plans for public release in the proposal.

Modeling and simulations are generally considered to be natural components of the analysis and interpretation of research investigations. Investigators may include the development, processing and analysis of these products within their proposed Legacy Science project, to the extent that they are an integral part of the project. These activities, if relevant, should comprise a minor component of the total Legacy Science project.

3.8 Post-Pipeline Data Processing

SIRTf Legacy Science projects will likely require data processing beyond the SSC pipeline-processed data to enable investigators to extract the scientific results from their observations. Because of the importance of the SIRTf Legacy Science Program in motivating and enabling SIRTf follow-on observations through subsequent General Observer investigations, the Legacy Science teams have an obligation to make available the products of such data processing efforts to the astronomical community in a timely manner. It is expected that intermediate and final versions of significant post-pipeline data processing efforts (*e.g.*, catalogs, atlases, large-scale image mosaics) developed by Legacy Science teams will be delivered to the SSC for entry into the SIRTf public archive.

In formulating plans for the development of post-pipeline data products, investigators should understand the nature and scope of SSC pipeline-processed data products for each of the SIRTf observing modes (§4.7).

3.9 Project Stages

It is anticipated that Legacy Science projects will be multi-year research investigations, with the total duration commensurate with the scope and level of activities proposed. Legacy Science project activities will be implemented in three stages. Stage One extends through the completion of In-Orbit Checkout and is focused on observation planning and development of post-pipeline data processing capabilities. Stage Two will normally extend for about two years, and is devoted primarily to collection of SIRTf data, refinement of observational strategies, final development and execution of post-pipeline data processing, delivery of post-pipeline data products to the SSC, and the initial extraction of scientific results from the observations. Stage Three may extend for an additional year, during which teams will produce more extensive scientific results from the project.

Investigators should consult the guidelines in §§4.1-4.3 to understand the activities and responsibilities of Legacy Science teams during each stage, and limitations on the duration of each stage. *Successful completion of the proposed activities in any given stage is a prerequisite for proceeding to the next stage.*

Proposers should define the duration of the Legacy Science investigation, and (if eligible) include an itemized funding request for the entire project duration. Funding will be allocated annually, and may be re-negotiated by the SSC and the Principal Investigator in response to actual progress and/or events. Moreover, continued funding will be based on periodic assessments of progress by the SSC (§4.4).

In the event that on-orbit Observatory performance varies significantly from pre-launch predictions (*e.g.*, achieving a 5-year cryogenic mission), the entire Legacy Science Program is subject to modification, and all observing time awards may be renegotiated. The SSC Director, with the approval of NASA, will take into account the scientific priority and feasibility of each project if renegotiations are required.

3.10 Who May Submit

The SIRTf Legacy Science Program is open to scientists of any nationality or affiliation. Each proposal must identify a single individual who will serve as Principal Investigator (PI), and list all Co-Investigators who will be involved in the project. The PI will be responsible for the scientific and administrative conduct of the project, and will be the formal contact for all communications with the SSC.

3.11 Funding Support

It is anticipated that funds will be made available for the direct support of the SIRTf Legacy Science Program for eligible U.S.-based scientists, contingent on the availability of NASA funds. Investigators seeking financial support for Legacy Science projects must submit endorsed cost plans as part of their proposal submission (§6.5). The SSC can provide funding support for U.S.-based Legacy Science teams, and U.S.-based investigators participating in foreign-led projects. The funding is intended to provide the support necessary for the teams to execute the tasks listed in §§4.1-4.3.

The SSC intends to offer up to approximately \$20 million (in total) to approved investigators in direct support of the SIRTf Legacy Science Program, contingent upon achieving the goal of a ~5-year cryogenic lifetime. The initial allocation of funds will occur in December 2000, one year prior to the nominal launch date. For the 14-month duration of Stage One, the SSC will provide up to a total of \$2.5 million for the support of *all* approved Legacy Science teams. During the totality of Stages Two and Three, the SSC is planning to offer a total of up to approximately \$17.5 million in funding support for *all* of the teams.

Legacy Science (Principal or Co-) Investigators affiliated with U.S.-based institutions, regardless of nationality, are eligible for funding support. Investigators may be affiliated with universities, industry, NASA Centers, federally funded research and development centers, national laboratories, other non-profit institutes, or military facilities. As part of the management plan to be included in the proposal (§6.4), the Principal Investigator must explicitly indicate whether all project funding should be issued through a single contract to the PI home institution, or whether separate contracts should be established with the Co-Investigator institutions.

The SSC cannot award funds to investigators affiliated with non-U.S. institutions. Therefore, projects with a significant contribution by foreign participants must include a credible statement of financial support from the relevant institutions and/or national funding agencies at the time of proposal submission. This statement should be in the form of a signed letter by an authorized official, and should include a specific commitment of resources in the event that the project is selected as part of the SIRTf Legacy Science Program.

If a Principal or Co-Investigator is awarded funds for a Legacy Science project involving non-U.S. Co-Investigators, no funding may flow through the U.S. investigator to the non-U.S. Co-Investigators.

All SIRTf Legacy Science project funding will be administered through the SSC Office of Community Support. Awards to universities, other non-profit research institutions, and for-profit organizations, will be offered through simplified cost-reimbursable contracts (designed for basic research) issued by the Jet Propulsion Laboratory, California Institute of Technology. Awards to employees of Federal institutions (including NASA Centers and military laboratories) will be issued directly by NASA. In all cases, however, the point-of-contact for programmatic information pertaining to awards resides with the SSC Office of Community Support.

3.12 Education and Public Outreach

The NASA Office of Space Science (OSS) has developed a comprehensive approach for making education at all levels (with a particular emphasis on pre-college education) and the enhancement of public understanding of space science integral parts of all of its missions and programs. Principal Investigators responding to solicitations sponsored by NASA/OSS are strongly encouraged to engage in Education and Public Outreach (EPO) activities.

The SSC will offer an opportunity for SIRTf Legacy Science investigators, following their selection, to submit an EPO proposal in conjunction with their approved projects. Proposed EPO activities should have some degree of intellectual linkage with the objectives of the parent Legacy Science project, and should be leveraged into the general SIRTf EPO activities and content being developed at the SSC. The SSC will offer up to approximately \$250,000 over the total duration of the Legacy Science Program in support of proposed EPO activities. Details about the SIRTf Legacy Science EPO Program solicitation will be made available upon selection of the approved teams in November 2000.

4 Project Activities and Schedules

The Legacy Science Program offers an unprecedented combination of SIRTf observing time and funding support. In recognition of this opportunity, researchers selected for Legacy Science projects are expected to plan and execute projects of fundamental and long-lasting scientific importance. Moreover, the SIRTf data collected and processed as part of a Legacy Science project must be of general importance to the broader scientific community, and should yield a substantial and coherent database. Legacy Science projects are generally expected to include the design, development and delivery of post-pipeline (“higher-level”) data products and/or software analysis tools to the SSC for verification, documentation, and entry into the public archives. It is the intention of the SSC to work with the successful Legacy Science teams to assure success in completing their projects.

Approved Legacy Science teams will be funded starting in December 2000, twelve months prior to the nominal SIRTf launch date. These teams will implement a multi-year investigation, and receive incremental funding as they proceed through the three stages of the Legacy Science Program described in the subsequent sub-sections. *To proceed from one stage to the next, approved Legacy Science teams must demonstrate satisfactory progress in executing the tasks associated with each stage.* Moreover, teams should demonstrate progress periodically within Stage Two to receive continued support. The SSC will assist the teams during the course of their investigations as needed, and will conduct periodic assessments of progress. The total duration of a project should be commensurate with the scope and level of activities proposed, and consistent with the guidelines in §§4.1-4.3.

4.1 Stage One

Stage One begins when approved teams are initially funded in December 2000, and extends through the end of the 60-day In-Orbit Checkout period. Under the nominal schedule, IOC would be completed by February 2002, and the duration of Stage One is therefore 14 months. During this period, Legacy Science teams will revise their proposed observing plans, as necessary, in response to recommendations made by the TAC and the observing time allocated by the SSC Director. The teams must submit these revisions to the observing plans (*i.e.*, positions and descriptions for all targets and/or fields to be observed) to the SSC by March 1, 2001. The teams must also deliver the detailed specifications of their observations to the SSC by July 2001. [Legacy Science proposals do not need to include a full set of completed AORs at the time of proposal submission; see §6.1.3.]

During Stage One, the teams will also begin to develop their project-specific post-pipeline data processing, if proposed. Finally, the teams will utilize this period to prepare for the analysis of Legacy Science data and (if proposed) begin to collect ancillary data to support their Legacy Science project. These ancillary data may involve other space-borne or ground-based observatories. Researchers may also begin planning for complementary modeling and/or simulations in support of their Legacy Science investigation, if proposed.

4.2 Stage Two

Stage Two begins with SIRTf's science operations phase, and extends for a period commensurate with the scope and level of activities proposed. The precise duration of this stage will depend on the nature and scheduling of the proposed observations and on the data processing activities associated with the project. The majority of Legacy Science projects will be executed in the first year of the SIRTf mission, and the duration of Stage Two for such projects cannot exceed two years after the launch of SIRTf. For the exceptional projects with a significant amount of second-year observations, either as a result of using second-generation observing modes or from second-look observations, the duration of Stage Two may extend for up to an additional year. This third year would be devoted primarily to producing post-pipeline data products based upon observational data taken during the second year of the SIRTf mission.

During Stage Two, the teams will collect their SIRTf observational data and verify the soundness of the proposed observing strategy. This analysis will be accomplished using pipeline data products produced by the SSC (and tools developed by the teams and/or the SSC) and products derived from observations taken as part of their Legacy Science project early in the science mission (§6.3) and/or the SIRTf First-Look Survey (see Appendix C). The teams will also apply the algorithms and analysis tools developed by them and/or the SSC to the pipeline-processed data delivered to them by the SSC. If necessary, the teams will modify their observing strategies and data analysis plans, algorithms and/or analysis tools in response to on-orbit performance data. The teams will completely specify any observations utilizing the second-generation observing modes via submission of appropriate AORs. Furthermore, the teams will plan any second-look observations (§3.5) that may be part of their approved project.

Legacy Science teams will deliver any post-pipeline data products and/or software analysis tools to the SSC for dissemination in the public domain. Intermediate versions of these products shall be delivered to the SSC approximately every six months after the start of the science mission. Final data products and/or analysis tools shall be delivered to the SSC by the conclusion of Stage Two, accompanied by explanatory documentation. Products based on data from first-generation observing modes shall be delivered to the SSC within two years of launch, with intermediate products delivered in time to affect planning for GO Cycle 2. [See Appendix A for nominal science schedule.] Products based on significant amounts of data from second-generation observing modes (or from other observations, if executed in the second year of the SIRTf mission) shall be delivered to the SSC within a year of data acquisition. These data products shall be delivered to the SSC no later than three years after launch, with intermediate products delivered in time to affect planning for GO Cycle 3.

Post-pipeline data products developed by the Legacy Science teams and delivered to the SSC shall enter the public archive immediately upon SSC verification. The SSC will also verify any software analysis tools delivered by teams and plan for its release into the public domain, if assessed by the SSC to be of utility to the general user community.

The teams will also start to extract scientific results from their data during Stage Two.

4.3 Stage Three

Stage Three may extend for an additional one year, and is contingent on the successful completion of Stage Two. During Stage Three, the teams will continue to extract and publish scientific results based upon their Legacy Science data.

4.4 Progress Reviews

In order to maximize the likelihood of success for each Legacy Science project, the SSC will conduct reviews at key points during the duration of each project. These reviews will assess the progress being made by the teams, identify any problems that arise, and identify remedial actions (as necessary). In general, these reviews will be held separately for each project.

The first Legacy Science Progress Review will occur about eight months into Stage One, in August 2001 (tentative date). At this review, each team will be expected to have finished the detailed specification of their observations through completion and delivery of AORs to the SSC. Furthermore, the team will describe their post-pipeline data processing plans (if proposed), and their development of analysis algorithms and/or software tools (if proposed). Teams shall demonstrate satisfactory completion of these Legacy Science project milestones at this review, or shortly thereafter, before proceeding to Stage Two of the project.

The second Progress Review will occur during Stage Two, approximately six months after the launch of SIRTf, or three months after commissioning of the relevant observing modes is completed (§2.4). At this review, each team must validate their observing strategy, based on the analysis of early data taken as part of their Legacy Science project. Each team should also demonstrate progress towards their proposed higher-level data processing tasks, in the form of prototype analysis software.

In addition to these Progress Reviews, teams shall regularly inform the SSC of progress towards their milestones during the intervening periods. For each project that has proposed post-pipeline product development, the SSC shall also assess the team's progress when receiving intermediate data products and/or software tools on a semi-annual basis (§4.2).

A final Progress Review will take place at the end of Stage Two, on a schedule that will be unique to each Legacy Science team. At this review, each team must deliver the final version of their committed post-pipeline processed data products (and explanatory documentation) to the SSC for verification and archiving. If the teams proposed to deliver higher-level data analysis software tools, the final versions of these products (and explanatory documentation) must also be delivered to the SSC by the conclusion of Stage Two.

4.5 Legacy Science Interfaces

An important factor in the success of the SIRTf Legacy Science Program will be the mutually beneficial exchange of scientific and technical information among the Legacy Science teams, the SIRTf Science Center, and the SIRTf Instrument Teams. To establish and sustain these intellectual interfaces, the SSC will establish a Legacy Science Working Group (LSWG). This group will be formed at the time of the post-selection workshop in January 2001 at the SSC.

The purpose of the LSWG is to provide a forum to promote the exchange of scientific and technical information that will improve the effectiveness of all SIRTf science investigations. More specifically, the LSWG will:

- Facilitate cross-team intellectual exchanges and refinement of observing strategies and programs.
- Promote the common adoption of data reduction and analysis tools *when it makes sense to do so*.

- Facilitate exchanges with Instrument Team experts and other Guaranteed Time Observers, in pursuit of greater efficiencies and effectiveness for all SIRTf observing programs.

It is recognized that the LSWG will resemble an “executive committee,” where common topics are addressed at a reasonably high level of discussion. Most of the detailed exchanges of technical information will be accomplished in smaller forums that meet on a more frequent basis (and whose shared attribute might be common use of a SIRTf observing mode).

During the course of the Legacy Science Program, teams are encouraged to establish on-site residency (for at least one team member) at the SSC for extended periods, particularly during times where frequent interaction with the SSC staff would be beneficial.

Proposers should include the costs of supporting all necessary interfaces with the SSC when preparing a cost plan (§6.5).

4.6 SSC Support

Each Legacy Science team will have an SSC scientist designated to serve as their scientific and technical liaison at an average support level of about a day per week. This contact scientist will keep the team informed of significant developments affecting their projects, and will convey their needs and requirements to the SSC. The SSC contact scientist will provide expert scientific and technical advice to the team, if requested, and generally assist the project.

4.7 SSC Data Products

It is anticipated that most Legacy Science projects will include “higher-level” data processing (*i.e.*, beyond the SSC pipelines) as part of their investigation for the benefit of their own research and of the broader science community. For scientific reasons and for resource planning, it is important that investigators understand the nature of data products produced by automated pipeline processing at the SSC.

Raw data (engineering and science) are received at the ground tracking stations via telemetry and forwarded to the SIRTf Flight Operations Center at the Jet Propulsion Laboratory in Pasadena. The Flight Operations System at JPL receives telemetry packets from the SIRTf spacecraft and repackages it into FITS files containing sensor data, expressed in DN (data number) units. Instrument engineering and housekeeping data are also transferred to the SSC from the Flight Operations System. The archived raw data will represent rationally organized, time-ordered data and will include associated Observatory pointing data and calibration observations.

Basic Calibrated Data (BCD) are two-dimensional images in FITS format, and correspond to individual “data collection events” within an observation. An image will be flux and/or wavelength (if appropriate) calibrated, and surface brightness measurements will be expressed in physical units. In addition, flat-fielding and cosmetic restoration (*e.g.*, cosmic-ray removal) algorithms will be applied to the BCD. Spatial ‘world’ coordinates will be derived from Observatory pointing information only. The BCD represent the most reliable product achievable through automated processing.

Browse Quality Data (BQD) are FITS-format data products corresponding to an entire SIRTf observation, and result from the combination of BCD images. Examples of BQD include the assembly of maps and dithered images into spatially coincident images, and the matching of images in overlap regions to a statistically significant level.

The descriptions of SSC data products will depend on the science instrument and observing mode/AOT. Note that the level of definition of SSC pipeline data products has evolved since Version 1 of the CP was issued. The SIRTf science payload is being completed and delivered for integration into the cryo-telescope assembly, and knowledge about the SSC pipeline data products continues to evolve. For the present best information on the pipeline-dependent data products, investigators are urged to study the following sections of the *SIRTf Observer's Manual (SOM)*:

- IRAC SOM §6.3.2
- IRS SOM §7.3.2
- MIPS SOM §8.3.2.

These sections of the SOM contain conservative descriptions of the SSC pipeline data products; that is, the SSC is promising only what it can confidently judge to be feasible, given the constraints on schedule and funding. Investigators should assume that they may have to develop any desired capabilities and/or functions that are not explicitly stated in the data product descriptions in order to achieve the scientific goals of their proposed project.

While the data product descriptions in the cited SOM sections reflect the increased maturity of knowledge about the science instruments and their resultant data, they do not yet represent the “final word” for purposes of the Legacy Science CP. Additional information about the scope of SSC data products will be made available online in the ‘Proposal Kit’ section of the SIRTf public Web site through July 31, 2000. At that point, these data product descriptions will be considered final, and investigators can plan their post-pipeline development activities and needed resources accordingly.

The SSC will provide routine calibrations for each of the observing modes. These data enter the SIRTf public archive immediately upon processing and verification. The investigator may propose to undertake special calibrations, although the required observing time must be explicitly requested in the proposal. For Legacy Science projects, these special calibration data will also enter the public archive immediately upon processing and verification.

5 Proposal Planning

Before submitting a Legacy Science proposal, it is important that investigators consult technical documentation about the capabilities and sensitivities of the science instrument(s) that will be used to obtain SIRTf data. Proposals must include credible estimates of required observing time. The SIRTf Planning Observations Tool (SPOT; for the first-generation observing modes) and other online resources within the Science User Tools (SUT) package (for the second-generation observing modes) are provided for this purpose. Where necessary, proposers should discuss their requirements with appropriate SSC experts before submitting their proposals. To ascertain the most appropriate source for technical information at the SSC, please contact the SIRTf HelpDesk (sirtf@ipac.caltech.edu). The following subsections describe the various sources of information that are available to SIRTf investigators.

5.1 Technical Documentation

The only documents needed to plan, prepare and submit a SIRTf Legacy Science proposal are:

- *SIRTf Call for Proposals (CP): Legacy Science Projects*, version 2 (June 30, 2000)
- *SIRTf Observer's Manual (SOM)*, version 2.0 (June 30, 2000)
- *SIRTf Planning Observations Tool (SPOT) User's Guide*, version 1.1 (June 30, 2000)
- *SIRTf Observing Policies*, version 2.0 (June 30, 2000)
- *SIRTf Reserved Observations Catalog (ROC)*, version 1.0 (June 30, 2000).

The *Call for Proposals* is the present document. The SOM provides technical information about the SIRTf Observatory, including the three science instruments. It also includes information on planning, editing, and submitting Astronomical Observation Requests (AORs). In planning and preparing AORs, proposers will also find the *SPOT User's Guide* to be useful. The *SIRTf Observing Policies* describe the rules and processes governing duplicate observations, the declaration and modification of AORs, and other policies governing SIRTf observations. The first version of the *Reserved Observations Catalog* includes project abstracts and an itemized list of declared Guaranteed Time Observations and the SIRTf First-Look Survey observations.

The above documents are available within the 'Proposal Kit' section of the SIRTf public Web site (<http://sirtf.caltech.edu/>) and are the governing documents in the event that inconsistencies are found with other information on the SIRTf Web site.

Proposers are urged to rely on the electronic versions of these documents. A small number of paper copies of the first four documents listed above will be printed and made available to investigators upon request through the SIRTf HelpDesk (sirtf@ipac.caltech.edu). The reader is urged to regularly consult the SIRTf public Web site for the latest news, technical information and performance updates. The *Frequently Asked Questions (FAQ)* sections of the site, organized by topic, will be updated regularly with new questions and answers.

5.2 *Science User Tools*

A variety of Science User Tools (SUT) are available in the ‘Proposal Kit’ section of the SIRTf public Web site (<http://sirtf.caltech.edu/>). These user tools are designed to assist observers in planning and specifying their SIRTf observations.

The primary software tool for calculating SIRTf observing times and for specifying detailed observations through the Astronomical Observation Template (AOT) “front-ends” is the SIRTf Planning Observations Tool (SPOT). This core tool features a graphical user interface, and is downloaded to a local machine before executing. [The reader should consult the online *SPOT User’s Guide* to understand the hardware/software requirements necessary for local installation.] SPOT permits the user to specify targets, exposure times, instrument modes, and observing constraints for proposed SIRTf observations. It also provides information about the total observing time charged to observations, and any scheduling limitations imposed by the requested observations.

The SUT package provides information about estimating sky backgrounds and deriving SIRTf sensitivities. It also includes information useful in planning observations of Solar System targets. Finally, the SUT provides links to commonly used astronomical archives and databases.

5.3 *GTO Observations*

The SIRTf Guaranteed Time Observation (GTO) program results from a 1983 *NASA Announcement of Opportunity* and competitive selection of instrument teams and the SIRTf science team. For the first 2.5 years of SIRTf’s prime mission, 20 percent of observing time will be allocated to the GTO program. The GTO project abstracts and itemized observations are included in version 1.0 of the *SIRTf Reserved Observations Catalog (ROC)*, which supports this CP and is available online at the SIRTf public Web site.

It is the responsibility of Legacy Science investigators to avoid requesting observations that duplicate approved GTO (and First-Look Survey observations) listed in the ROC, whose contents will be ‘frozen’ through the selection process for Legacy Science projects. The *SIRTf Observing Policies* document, also available online, contains useful information describing duplicate observation candidates.

5.4 *SIRTf HelpDesk and FAQs*

The SSC anticipates that the user community will pose additional questions of a scientific, technical, programmatic, or financial nature. These questions should be submitted electronically to the SIRTf HelpDesk (sirtf@ipac.caltech.edu). The SSC is committed to answering all questions as rapidly as feasible, and (in general) within two business days from the receipt of a query.

Moreover, questions/answers deemed by the SSC to be of interest to the broader community will be archived as a Frequently Asked Question (FAQ) on the SIRTf public Web site. These FAQs will be updated at least weekly through the deadline for proposal submission, with more timely updates posted, as necessary.

6 Proposal Submission

Investigators intending to propose a SIRTF Legacy Science project, whether U.S.-based or otherwise, should submit an electronic *Letter of Intent (LoI)* to the SSC by July 31, 2000. The LoI must include the name(s) and affiliation(s) of the Principal Investigator and all Co-Investigators, a project title, and a brief (~1-2 paragraph) description of the proposed science project. The LoI should be submitted to the SIRTF HelpDesk (sirtf@ipac.caltech.edu). Following receipt of the LoI, the SSC will issue instructions to each Principal Investigator on the mechanical details pertaining to the proposal submission process.

Proposals must be submitted to the SSC as electronic files via Web-based forms after July 31 and prior to the deadline of 5:00 p.m. (PDT), September 15, 2000 (§6.6). Proposals received after the deadline will not be considered. Each proposal will be comprised of a Proposal File (in PDF or PostScript format) and an AOR File produced by SPOT (in ASCII text format). An optional Supplementary File (in ASCII text format) may be used to provide lengthy target lists.

Proposals cannot exceed 25 single-sided pages (12-point font and one-inch margins), including figures, tables, and references. This page limit excludes the Web-based cover pages, material(s) necessary to propose for optional ancillary NOAO observations (§6.1.4), a one-page summary vitae and list of key publications for the Principal Investigator and for each Co-Investigator (§6.4), and the budget narrative and budget forms for submitting cost plans (§6.5). A summary checklist of necessary files, and the additional materials not subject to the 25-page limit, is provided in §6.6.

The contents of a proposal are outlined in subsequent sub-sections, accompanied by *guidelines* for section page limits. No preprints or reprints should accompany the proposal.

6.1 Science Plan

The science plan shall include a scientific justification, a technical implementation plan, a representative sample of AORs, and (optional) a request for supporting NOAO ground-based observations. The science plan and its underlying rationale should be readily comprehensible to broad-based scientists, and should comprise approximately 15 pages of the proposal.

6.1.1 Scientific Justification

Proposals must include a compelling science justification and describe the general importance of the proposed project to the astronomical sciences. The justification should address why the SIRTF capabilities are uniquely important in advancing knowledge in the proposed area of research. The plan must also include a clear rationale for the project's inclusion in the SIRTF Legacy Science Program, and describe how its observational data will contribute to maximizing the overall scientific return of SIRTF. The proposal should indicate how the project will facilitate subsequent SIRTF investigations, either observational or interpretive, and how the pipeline-processed and publicly archived project data will support research investigations beyond the immediate scientific goals of the project.

The science plan must include a justifiable and reasonably accurate request for SIRTF observing time for each observing mode, for each portion of the project (if relevant), for second-look observations (if any), and for the total amount of requested observing time. The observing time requests must be based on the time estimators available in the online SIRTF Planning Observations Tool (SPOT, for the first-generation

AOTs) and other online documentation within the Science User Tools (SUT, for the second-generation AOTs).

Investigators must also indicate whether ancillary data collection and/or reduction are a part of their proposed project. If so, the proposal should describe the nature and status of the ground-based or space-borne ancillary data collection and/or analysis. If the ancillary data are not yet analyzed, the proposal must describe the schedule and plans for the analysis of those data. The proposal should describe the extent to which these ancillary data will be made available to the general science community in a useful form and in a timely manner.

Investigators should also describe the extent to which any proposed data modeling and/or simulations will increase the overall scientific value of the project. If relevant, the proposal should describe the schedule and plans for the development of such modeling/simulation data. The proposal should also indicate the extent to which any relevant modeling/simulations data will be made available to the general science community in a useful form and in a timely manner.

6.1.2 Technical Implementation Plan

Proposals must include a clear and complete statement of observing goals, and a technical description of the planned observations. Observational data should be collected in a manner that yields coherent databases, thereby maximizing the scientific utility of the Legacy Science project data to the broader astronomical community.

The technical implementation plan must provide an unambiguous description of all targets and/or fields to be observed. In the case of imaging observations, the technical details should include quantitative descriptions of the required sky position(s), sensitivity/depth, wavelength(s), and coverage strategy (including redundancies). For spectroscopic observations, the proposal must include a list of targets, wavelength coverage, required sensitivities, positional accuracy needed, and the strategies by which targets will be acquired. For projects conducting photometric measurements, the proposal must include a list of targets, wavelength coverage, the photometric accuracy needed, and any special SIRTf calibration requirements. For other types of observations, similar levels of technical details should be specified. In all cases, the target list for SIRTf observations must be adequately justified and explained.

The proposal must also provide evidence that the proposed observations have been designed to efficiently yield useful and reliable scientific data, and describe how the observing strategy will be modified against variances in on-orbit Observatory performance from pre-launch predictions. Moreover, any dependencies on the SIRTf launch date must be clearly identified.

The technical plan should describe the means by which investigators will efficiently analyze SSC pipeline-processed data in order to validate or modify the proposed observing strategy once the on-orbit Observatory performance is characterized. It should also indicate how the pipeline-processed data contribute towards achieving the stated scientific goals of the project, and the extent to which post-pipeline data product development must be performed by the proposers (§6.2).

6.1.3 Astronomical Observation Requests (AORs)

In recognition of the potentially large amounts of observing time that might be requested, Legacy Science proposers do not need to submit complete lists of Astronomical Observation Requests (AORs) as part of

their proposal. Instead, investigators must provide positions, descriptions and names (if appropriate) for all targets and/or fields to be observed, and a representative sample of AORs. These illustrative AORs must be generated by SPOT, which will produce an output ASCII file. This text file then accompanies the submitted proposal (§6.6).

Representative and illustrative AORs should be provided for each observing mode being requested as part of the project. These AORs should span the full range of selectable observational parameters needed to carry out the requested observations. The proposal must describe the process by which the total SIRTf observing time request was derived from the representative AORs. [Approved investigators will be given until July 2001 to completely specify their observations through completion and submission of AORs.]

6.1.4 Request for NOAO Observing Time (optional)

Investigators requesting observing time on eligible NOAO telescopes for the acquisition of ancillary data in support of a SIRTf Legacy Science project *must* include their ground-based program in the proposal. The justification for NOAO observing time should be included in the science plan (§6.1.1). Two additional pages, not subject to the overall 25-page proposal limit, may be devoted to a technical justification/description of the proposed NOAO observations. Within this technical plan, investigators should specify the requested telescope(s) and instrument(s), the number of nights requested, the desired astronomical sky conditions (bright, gray, dark, darkest), and both the optimal and acceptable months for scheduling the proposed observations.

Additional information pertaining to the SIRTf/NOAO collaboration appears in Appendix B. Additional information about NOAO facilities is available online at <http://www.noao.edu/>.

6.2 Data Processing and Analysis Plan

Each proposal must include approximately five pages of detailed plans describing how the investigators will accomplish their scientific goals, starting from the raw or pipeline-processed SIRTf data and (if appropriate) the ancillary data and or modeling/simulation results. If any special assumptions are made about the quality of the SSC-provided data, and are not consistent with the descriptions of SSC data products in the instrument chapters of the *SIRTf Observer's Manual*, these assumptions must be identified and explained. For each observing mode used, the plan should specify the data products required for the investigation, and a statement on whether the SSC products alone are adequate for addressing the scientific goals of the project.

If post-pipeline data processing and analysis are required, the proposal must describe the nature of these higher-level data products that will be developed by the proposing investigators. The proposal should clearly indicate the extent to which any developed post-pipeline data products are useful for scientific purposes beyond the immediate scientific goals of the project. The proposal must also describe the nature of the intermediate and final data products that will be delivered to the SSC, and the schedule by which these products will be delivered (§4.2). The proposal should also provide information about the needed algorithms and software analysis tools, whether these capabilities already exist or need to be developed as part of the project, and the scope of work required to develop and document the post-pipeline data products. The proposal must also describe the nature of the intermediate and final data analysis tools (if any) that will be delivered to the SSC, and the schedule by which the software tools will be delivered.

If ancillary data are part of the proposed investigation and these data are not already available in a suitable form for analysis, proposers must describe the processing and reduction plans for these data, and the scope of work necessary to reach the science goals of the Legacy Science project. The proposers must also state whether/how the ancillary data will be made publicly available, and the schedule for doing so.

If modeling/simulation data are part of the proposed investigation and these data are not already available in a suitable form for analysis, proposers must describe the processing and reduction plans for these data, and the scope of work necessary to reach the science goals of the Legacy Science project. The proposers must also state whether/how these data will be made publicly available, and the schedule for doing so.

6.3 Project Schedule

Proposers must include an itemized schedule of activities through each stage of the project (see §4). This schedule should be approximately two pages in length. Investigators should submit a schedule that is commensurate with the nominal Legacy Science Program schedule, as listed in Appendix A.

In planning activities and developing a schedule, investigators can make the following assumptions. First, the SSC will commit to providing Legacy Science teams with a representative sample of data from their project (on the order of one percent) within about three months of the launch of SIRTf. These data will allow investigators to verify the soundness of the proposed observing strategy, in light of the actual on-orbit performance of the Observatory. Second, the SSC will provide additional calibrated Legacy Science data to each team as soon as feasible (and no later than six months after launch).

For projects where the development of post-pipeline data products and/or software analysis tools are proposed, investigators should plan on the delivery of intermediate products to the SSC approximately every six months (§4.2). In general, the first delivery of intermediate products to the SSC should occur no later than one year after launch. Final versions of these products, and supporting documentation, must be delivered to the SSC by the conclusion of Stage Two.

6.4 Management Plan

Each Legacy Science proposal must include a realistic and credible management plan, approximately three pages in length, describing how the Principal Investigator will manage the scientific, technical and financial aspects of the project. This plan should indicate the major tasks being proposed, and include a clear statement of data products and/or analysis tools to be delivered to the SSC (and the accompanying delivery schedule), if applicable. The plan must also address how the proposing team will be organized, and describe how the project activities will be distributed and tracked among participating investigators/institutions. Relevant resources and capabilities available at the participating institutions should be described. The proposal must identify the roles and responsibilities of the Co-Investigators, the related experiences and demonstrated competence of the Co-Investigators, and describe realistic staffing plans that the team proposes to undertake.

The management plan must describe how the project will establish and maintain strong interfaces with the SSC. These interfaces should create an effective communications channel for the exchange of technical information about relevant aspects of data collection, processing, and analysis. Furthermore, the interface(s) should provide the SSC with insight into the project's progress. Investigators are encouraged, but not required, to establish residency at the SSC during important and/or intensive periods of their project.

In the event that supporting funds are being requested, the management plan must also include a credible financial management plan and a properly endorsed cost plan (§6.5). The management plan should include information about the extent to which non-SIRTF resources are being provided. A financial management plan should indicate whether all project funds are to be issued through the Principal Investigator's home institution, or whether separate contracts are to be issued to Co-Investigators. In the latter case, each Co-Investigator must submit an institutionally endorsed cost plan to the SSC, postmarked by the proposal deadline (§6.6).

For proposals with a significant foreign component, whether the PI is U.S.-based or not, a credible statement of financial support from the foreign home institution(s) and/or national funding agencies must accompany the proposal. This statement should be in the form of a signed letter by an authorized official, and should include a specific commitment of resources in the event that the project is selected as part of the SIRTF Legacy Science Program.

6.5 Cost Plan

Eligible investigators seeking funding support must include a properly endorsed cost plan as part of the proposal. The request for funds is expected to be commensurate with the scope and level of activities being proposed, and should be proportionally less in Stage Three than in Stage Two. The cost plan will include budget forms and a supplementary budget narrative (neither of which is subject to the overall proposal page limit). Funding support, if sought, should be requested for the entire duration of the project. The initial period of funding will cover Stage One only; that is, the 14 months between December 2000 and the nominal start of SIRTF science operations. Subsequent funding will be issued on a conditional basis, contingent on the teams demonstrating satisfactory progress during Stages One and Two of the Legacy Science Program (see §3.11 for funding guidelines, and §4 for information about the Stages of a Legacy Science project). Budgets will typically be reviewed, and perhaps renegotiated, on an annual basis by the SSC in response to on-orbit realities.

The plan should include a request for total project funds itemized by major categories, with supporting justifications provided in a supplementary budget narrative. The plan should also clearly delineate the itemized funding requested for the first 12 months of Stage One, beginning in December 2000. Within the latter budget, investigators should also specify the budget requested for the first three months of the project (through March 1, 2001). This latter item will expedite the processing of a 'start-up contract,' which can be implemented rapidly after the approved projects are selected and announced.

Support may be requested for the planning, acquisition, processing, analysis, and publication of SIRTF Legacy Science project data, for the development of post-pipeline processing tools and data products, for the acquisition and analysis of ancillary data, and for related costs. Such costs should be segregated in the proposal and identified separately. Up to ten percent of the Legacy Science funding support annually can be directed towards activities related to the collection and reduction of necessary ancillary observational data.

Cost information should be submitted on pre-formatted forms available online at <http://acquisition.jpl.nasa.gov/crei/sirtf.htm>.

The reimbursable costs are governed by applicable Federal Acquisition Regulations (available online at <http://www.arnet.gov/far/>), and proposers are urged to consult the financial office of their home institution for guidance.

The cost plan should include the elements listed below. Details that cannot be accommodated within the standard budget forms should be included in a supplementary budget narrative (not subject to the overall proposal page limit).

- ***Salaries and Wages***

Direct labor costs for eligible project investigators should be included and itemized. SIRTF funds may not be used to pay more than a person's full-time salary or to pay more than an individual's hourly wage rate. An investigator may not normally be reimbursed for consulting or other work in addition to a regular full-time institutional salary covering the same period of employment. For faculty members in academic institutions, SIRTF funding will normally be limited to no more than two months of summer salary support. Exceptions for released time during the academic year (e.g., "buying back" teaching time) may be permitted, but such costs must be fully justified in the proposal and the compensation requested must be reasonable and consistent with each employee's regular full-time salary or rate of compensation. Released time for project investigators working in non-academic institutions may be proposed, provided the compensation requested is reasonable and consistent with each employee's regular full-time salary or rate of compensation.

It is assumed that most scientists will be affiliated with, and apply to the SSC through, institutions that will make substantial support available for project activities (e.g., computer facilities, collaboration with other scientists, students, or research assistants).

- ***Research Assistance***

Direct labor costs for graduate students, post-doctoral associates, data aides, and secretarial and technical support for the analysis of SIRTF Legacy Science project data should be included and itemized. For post-doctoral associates and other professionals, each position should be listed with the number of months, percentage of time that will be spent on the project, and rate of pay (hourly, monthly, or annual). For graduate students and secretarial, clerical, and technical staff, only the total number of persons and the total amount of salaries per year in each category are required. All such salaries must be in accordance with the standard policies of the institution assuming responsibility for the project.

- ***Fringe Benefits***

If an institution's usual accounting practices provide that its contributions to employee "benefits" (Social Security, retirement, etc.) be treated as direct costs, SIRTF funds may be requested for all applicable fringe benefits. In this case, proposers must break out the associated costs and list them as a separate cost component within the direct labor element.

- ***Publication Costs***

Reasonable costs for publication of research results obtained from SIRTF Legacy Science projects should be included as a component of "Other Direct Costs."

- ***Travel***
Itemized transportation and subsistence costs for project personnel to plan, obtain, analyze, and disseminate direct results of a SIRTf Legacy Science project should be included. Proposers should include origin/destination, number of travelers, number of trips, and costs associated with each, and include this information as a component of "Other Direct Costs."
- ***Computer Services***
The itemized costs of computer time and software for the analysis of SIRTf Legacy Science project data should be included. Details of the services and software that will be used must be fully described and justified in the proposal, and included as a component of "Other Direct Costs."
- ***Equipment***
Itemized equipment costs, including computers or related hardware, should be included and accompanied by a detailed justification in the budget narrative. In general, the title to approved equipment purchased for \$5,000 or less will be vested with the Contractor. The title to equipment costing in excess of \$5,000 will be vested with the U.S. Government, unless JPL and/or NASA indicate otherwise in writing. In either case, if the proposer seeks title to the equipment, it must be noted in their cost narrative.
- ***Materials and Supplies***
The itemized costs of materials and supplies directly related to the SIRTf Legacy Science project should be included, provided such costs are not already reimbursed through indirect costs, or some other means. These costs should be included as a component of "Other Direct Costs."
- ***Funds to Support Collection/Analysis of Ancillary Observational Data***
Funding for the collection and/or analysis of ancillary observational data should be included and itemized, to the extent that the data are an integral part of the SIRTf Legacy Science project (see §3.7). A description and justification of the planned observations must be provided in the Budget Narrative submitted as part of the proposal. Up to ten percent of the annual Legacy Science funds can be directed towards activities related to the use of ancillary observational data.
- ***Indirect Costs (IDCs)***
Indirect costs may be proposed, provided that the IDC rate used in the budget is based on a Negotiation Agreement with the Federal Government, or its designated agent.

6.6 *Submission of Proposals*

Legacy Science proposals should be consistent with the page and format guidelines listed throughout §6 and summarized below.

Proposals should be submitted to the SSC electronically, using a Web-based submission system that will be available after July 31 in the 'Proposal Kit' section of the SIRTf public Web Site. The Principal Investigator (PI) will provide a short proposal name and a password to enter the online system, which contains three electronic forms. The first will request contact information for the PI. A second will be devoted to a list of Co-Investigators, with analogous address information. The third form will request the proposal title, the project abstract, and the names of (up to) three electronic files to be submitted with the Web-based forms:

- (i) a Proposal File, in PDF or PostScript format,
- (ii) an AOR File produced by SPOT, in ASCII text format, and
- (iii) an optional Supplementary File that may be used for target lists that are too lengthy to be succinctly summarized within the body of the proposal.

Additional technical details pertaining to the electronic submission of proposals will be provided to Principal Investigators in response to the *Letter of Intent*, which should be sent electronically to the SSC HelpDesk (sirtf@ipac.caltech.edu) by July 31, 2000.

¶ **PROPOSAL FILE (PDF or PostScript format)**

Subject to 25-page limit (Single-sided, 12-point font, 1-inch margins)

- Science Plan (~ 15 pp.)
 - Scientific Justification
 - Technical Implementation Plan
 - References
- Data Processing & Analysis Plan (~ 5 pp.)
- Project Schedule (~ 2 pp.)
- Management Plan (~ 3 pp.)

Additional Material

- Request for NOAO/Legacy Science Observing Time (optional)
 - Technical Justification/Description (two-page limit)
- Cost Plan
 - Budget Forms (required)
 - Budget Narrative (optional)
- Summary Vitae & Publication Lists (required)
 - One page for the Principal Investigator and one page apiece for Co-Investigators

¶ **AOR FILE (ASCII text format, produced by SPOT)**

- Representative and Illustrative AORs

¶ **SUPPLEMENTARY FILE (Optional, ASCII text format)**

- Used for target lists that are too lengthy to be succinctly summarized within the body of the proposal

Electronic proposals can be submitted to the SSC after July 31 and must be submitted prior to the deadline of 5:00 p.m. (PDT), September 15, 2000.

The Principal Investigator should also submit five paper copies of an institutionally endorsed cost plan (if relevant) to the following address:

Legacy Science Program
SIRTF Science Center
California Institute of Technology
Mail Code 314-6
1200 East California Boulevard
Pasadena, CA 91125 USA.

Note that the evaluation and review of proposals will be based upon inputs received by the electronic submission deadline of 5:00 p.m. (PDT), September 15, 2000. Investigators unable to submit an electronic proposal should submit five paper copies of the proposal/cost plan to the above address *such that it is received at the SSC* by 5:00 p.m. (PDT), September 15, 2000.

Late proposals will not be eligible for consideration.

If the Principal Investigator elects to have Legacy Science funds disbursed directly to Co-Investigators, the home institution of each Co-Investigator must submit an institutionally endorsed cost plan for its portion of the project to the SSC, postmarked by the same date and time listed above.

7 Proposal Evaluation and Selection

Proposals satisfying the underlying principles of the SIRTf Legacy Science Program (§3.1) will be scientifically evaluated by a Time Allocation Committee (TAC). Technical and management evaluations will be conducted beforehand by the SIRTf Science Center (SSC), with the results forwarded to the TAC. Proposals not meeting the underlying principles of the SIRTf Legacy Science Program, as determined by the SSC Director, will not be eligible for review, and the Principal Investigator will be notified of the disqualification.

7.1 Proposal Confidentiality

Proposals submitted in response to this *Call for Proposals* will be kept confidential to the maximum extent possible, consistent with the review processes described below. However, the SSC will make the titles, investigator names, and abstracts from approved Legacy Science projects publicly accessible after the selections are announced. In addition, the target lists and AORs from the approved Legacy Science projects will be incorporated into future versions of the *SIRTf Reserved Observations Catalog*.

7.2 Technical Evaluation

The first step in the evaluation of a Legacy Science proposal will be a technical evaluation conducted by the SSC. This review is intended to verify that the proposed observations are feasible and that the observing time being requested is credible. In conducting the evaluation, the SSC will compare the proposed observations against those already approved and listed in the *SIRTf Reserved Observations Catalog* and will identify potential duplicate observations to bring to the attention of the TAC. Any technical or feasibility problems that become apparent will also be forwarded to the TAC. The SSC will not conduct any consultations with Principal Investigators to clarify technical matters prior to the TAC review.

Proposals seeking NOAO ancillary data as part of their project will have the ground-based observational component reviewed for technical feasibility by qualified NOAO staff members with no conflicts of interest.

7.3 Management Evaluation

The second step in the evaluation of a Legacy Science proposal will be a management evaluation conducted by the SSC. This review is intended to ascertain whether proposing investigators have reasonable plans for resource allocation and management, and whether the scope of effort is reasonable. Particular scrutiny will be applied to proposals with significant foreign participation, or with complex institutional partnerships. The goal of this review is to objectively assess the likelihood of success if the project is selected. Any management problems that become apparent will be brought to the attention of the TAC.

7.4 *Scientific Review*

The SSC will conduct a scientific review of Legacy Science proposals, through a TAC composed of broad-based and expert peer reviewers. The TAC will rank proposals based on the evaluation criteria listed in §7.5, and will forward recommendations to the SSC Director.

Before the TAC is convened, each proposal will be carefully evaluated by groups of peer reviewers, organized into topical panels. The recommendations of the topical science panels will be forwarded to the TAC, which will produce a consolidated list of recommendations.

The TAC will be composed of an overall Chair, the panel Chairs, one other member from each of the topical panels, and additional interdisciplinary scientists who were not members of the panels. The goal of the TAC will be to integrate the panel recommendations into a well-balanced SIRTf Legacy Science Program.

7.5 *Evaluation Criteria*

The science review panels and Time Allocation Committee will base their evaluations of SIRTf Legacy Science proposals on the criteria listed in this section. The numbered criteria are listed in descending order of importance. Lettered entries describe specific examples of how the evaluation criteria can be satisfied; not all of the examples may be relevant and/or appropriate for a given proposal.

- (1) The overall scientific merit of the proposed project, its contribution to maximizing the overall scientific return of SIRTf, and the uniqueness of the utilized SIRTf capabilities in advancing knowledge in the proposed area of research.**

- (2) The extent to which the project will facilitate subsequent SIRTf investigations, either observational or interpretive, and the extent to which the project data will support broader-based research by the scientific community.**
 - (a) The extent to which the collection of SIRTf data are designed to enable wide scientific utility of the resultant project database(s).*
 - (b) The value of the SSC pipeline-processed and publicly archived data in enabling subsequent SIRTf observations and/or the interpretation of SIRTf data.*
 - (c) The extent to which SSC pipeline-processed data and/or post-pipeline data products developed by the proposing team are useful for scientific purposes beyond the immediate scientific goals of the project.*
 - (d) The degree to which ancillary data used in the scientific analysis and interpretation of SIRTf data increases the overall scientific value of the project, and the extent to which these data are made available to the general science community in a useful form and in a timely manner.*
 - (e) The degree to which modeling and/or simulations used in the scientific analysis and interpretation of SIRTf data increases the overall scientific value of the project, and the extent to which these data are made available to the general science community in a useful form and in a timely manner.*

(3) The overall technical merit of the proposed project, and the likelihood of achieving its stated scientific goals in a timely manner.

- (a) Evidence that the proposed observations have been designed to efficiently yield useful and reliable scientific data. In particular, the degree to which the proposed SIRTf observing strategy is robust against variances in on-orbit Observatory performance from pre-launch predictions.*
- (b) Evidence of a credible plan to efficiently reduce and analyze pipeline-processed data in order to validate or modify the proposed observing strategy once the on-orbit Observatory performance is characterized, and to appropriately adjust pre-launch data processing and analysis plans based on actual on-orbit Observatory performance.*
- (c) Evidence of a credible plan to carry out the necessary data reduction and/or analysis in order to achieve the stated scientific goals of the project in a timely manner.*
- (d) Evidence of the proposing investigators' capabilities, related experiences, and unique facilities, techniques and other resources that will contribute to the project achieving its stated objectives.*
- (e) Evidence of experience among the proposing team that will support successful completion of a research investigation of this scope.*
- (f) The extent to which relevant ancillary data already exist, or are assured of being collected and processed in a timely manner, and can be utilized towards completing the project's scientific goals.*
- (g) The extent to which relevant modeling and/or simulation data already exist, or are assured of being collected and processed in a timely manner, and can be utilized towards completing the project's scientific goals.*

(4) The extent to which the project proposes to develop post-pipeline data products and/or software analysis tools that will enrich the overall scientific return from SIRTf.

- (a) The scientific value and utility of post-pipeline data products and/or analysis tools (developed as part of the project) to the completion of the project's scientific goals.*
- (b) The scientific value and utility of post-pipeline data products (developed as part of the project) to the broader community, and the timeliness with which the products (and explanatory documentation) are delivered to the SSC for public dissemination.*
- (c) The scientific value and utility of data reduction/analysis software tools (developed as part of the project) to the broader community, and the timeliness with which the tools (and explanatory documentation) are delivered to the SSC.*

(5) A realistic and credible plan that describes how the Principal Investigator will organize and manage the scientific, technical and financial aspects of the project.

- (a) Evidence of a proper understanding of the scope and cost of the project, a realistic plan for obtaining and allocating labor, a clear statement of data products and/or software tools to be delivered to the SSC (and the accompanying delivery schedule), and an itemized cost plan, if requesting funds.*
- (b) Evidence that work activities will be structured, coordinated and managed efficiently. This information should include a description of the organization of the team, including the roles and responsibilities of all Co-Investigators; a list of the major tasks to be undertaken by the team; the corresponding schedule of work activities, deliverable products and milestones; a realistic staffing plan/schedule; and (if appropriate) a description of how the work activities at participating institutions will be allocated and managed by the Principal Investigator.*

- (c) *Evidence that the project will establish and maintain the necessary strong interfaces with the SSC. This information should include:*
 - (i) A plan for effective technical communications channels with relevant teams and the SSC to keep all parties informed of new developments in, or the evolution of, instrument performance and/or data analysis techniques.
 - (ii) A plan for effective communication channels to keep the SSC informed of progress towards the project's stated scientific goals, and descriptions of mechanisms by which this will be accomplished (apart from the formal Progress Reviews).
- (d) *For projects with a significant foreign component, led by a U.S. Principal Investigator or otherwise, a credible statement of financial support from the appropriate foreign home institution(s) and/or national agencies.*

7.6 Selection Procedure and Schedule

The SSC Director will receive a report and recommendations from the TAC Chair, summarizing the scientific review and ranking of the proposals. Combined with information obtained from the technical and management reviews, the SSC Director will select the approved SIRTf Legacy Science projects. Based on current plans, the selections will be announced publicly in mid-November 2000.

Immediately following the selection announcement, the contractual office(s) working on behalf of the SSC Office of Community Support (JPL for most investigators, NASA for Federal employees) will contact the investigators' institutions and open fast-track negotiations to finalize the funding arrangements. It is anticipated that approved and eligible Legacy Science project investigators will begin their proposed work in December 2000.

8 Information Contacts

Questions about any aspect of SIRTf, including the Legacy Science Program, may be submitted electronically to the SIRTf HelpDesk at the SSC (sirtf@ipac.caltech.edu).

The SSC postal mailing address is:

*SIRTf Science Center
California Institute of Technology
Mail Stop 314-6
1200 East California Boulevard
Pasadena, CA 91125 USA.*

The SSC central telephone lines are:

*Phone: +1-626-395-8000
Fax: +1-626-568-0673.*

Readers are advised to consult the SIRTf public Web site (<http://sirtf.caltech.edu>) for updated contact information.

Appendix A: SIRTf Science Schedule

The monthly calendar of SIRTf events pertaining to the science user community appears below and is subject to change. In particular, the timing of the General Observer Cycles will be optimized for access to Legacy Science data products, once they are identified. The reader is advised to always consult the SIRTf public Web site (<http://sirtf.caltech.edu/>) for the most recent science schedule.

Month	Event
Jun 2000	LegSci CP (v.2) issued (6/30)
Jul 2000	LegSci Letters of Intent due (7/31)
Aug 2000	
Sep 2000	LegSci proposals due (9/15)
Oct 2000	LegSci TAC review (10/23 week)
Nov 2000	LegSci selections announced
Dec 2000	LegSci teams funded
Jan 2001	LegSci/SSC Workshop @ Pasadena; AAS @ San Diego
Feb 2001	
Mar 2001	LegSci teams submit revised targets/fields
Apr 2001	
May 2001	
Jun 2001	AAS @ Pasadena
Jul 2001	LegSci AORs due (7/2)
Aug 2001	LegSci Progress Review #1
Sep 2001	Revised GTO target lists due (9/3)
Oct 2001	Cycle-1 CP issued (10/1)
Nov 2001	
Dec 2001	SIRTf launch (12/1); IOC begins
Jan 2002	IOC continues
Feb 2002	IOC concludes; Instrument performances updated; First-Look Survey conducted
Mar 2002	
Apr 2002	Cycle-1 proposals due
May 2002	
Jun 2002	Science data archive opens; LegSci Progress Review #2; Cycle-1 TAC review
Jul 2002	Cycle-1 selections complete
Aug 2002	Cycle-1 observing starts
Sep 2002	
Oct 2002	
Nov 2002	Cycle-2 CP issued
Dec 2002	
Jan 2003	Cycle-2 proposals due
Feb 2003	
Mar 2003	Cycle-2 TAC review
Apr 2003	Cycle-2 selections complete
May 2003	
Jun 2003	Cycle-2 observing starts
Jul 2003	
Aug 2003	
Sep 2003	
Oct 2003	
Nov 2003	Cycle-3 CP issued
Dec 2003	Final data products from Legacy Science projects due (nominal)
Jan 2004	
Feb 2004	Cycle-3 proposals due

Appendix B: Request for Use of NOAO Facilities

The SIRTf Science Center (SSC), California Institute of Technology and the National Optical Astronomy Observatories (NOAO) have entered into an Agreement whereby NOAO will provide ground-based telescope resources for the collection of appropriate optical/near-infrared ancillary data as part of a SIRTf Legacy Science project. This collaboration is one specific implementation of using ground-based observational data (§3.7) to enhance the scientific utility of SIRTf Legacy Science data. The intention of the Agreement is to provide a dedicated option for scientists to propose broad-based investigations using both SIRTf and NOAO data within the guidelines of the Legacy Science Program. In this way, the Legacy Science Time Allocation Committee (TAC) can judge the entirety of proposed investigations, knowing that acceptance of the project entails all of the SIRTf and NOAO telescope observing time necessary to achieve the scientific goals of the Legacy Science project.

The NOAO ancillary data should complement the SIRTf Legacy Science data in a clear and predictable manner, rather than to enable follow-up observations of specific or unanticipated phenomena discovered in the SIRTf data. Because NOAO (like SIRTf) is a national resource, the ground-based data collected as part of this Agreement must abide by the same spirit as the SIRTf Legacy Science Program; that is, NOAO data should be released to the community rapidly.

The NOAO will make available up to ten percent of its telescope resources (excluding the NOAO controlled fraction of the Gemini Telescopes) to support SIRTf Legacy Science projects for a period of two years, starting with the spring 2001 semester. The time is available on NOAO-controlled telescopes, and will be spread uniformly through the terrestrial seasons and through the lunar phases. Requests for the conditional use of NOAO facilities *must* be submitted as part of the SIRTf Legacy Science proposal. No additional proposal needs to be submitted to NOAO under the terms of this Agreement. The SIRTf Legacy Science TAC will make recommendations on both the SIRTf and NOAO time allocations.

The justification for NOAO observing time and plans for releasing the data in a timely manner should be included in the science plan of the Legacy Science proposal (§6.1.1). Two additional pages, not subject to the overall 25-page proposal limit, may be devoted to a technical justification/description of the proposed NOAO observations. Within this technical plan, investigators should specify the requested telescope(s) and instrument(s), the number of nights requested, the desired astronomical sky conditions (bright, gray, dark, darkest), and both the optimal and acceptable months for scheduling the proposed observations.

Additional information about NOAO facilities is available online at <http://www.noao.edu/>.

Note that the use of NOAO ground-based telescopes is *not* required to submit a SIRTf Legacy Science proposal.

Appendix C: SIRTf First-Look Survey

The SIRTf First-Look Survey (FLS) is the inaugural Director's Discretionary Time (DDT) program and will utilize about 100 hours of observing time shortly after the completion of In-Orbit Checkout (IOC) activities. The FLS is intended to provide an early examination of the infrared sky at sensitivities ~100 times deeper than any previous all-sky infrared dataset. The SSC will conduct the FLS on behalf of the broader scientific community and will disseminate the data as soon as they are deemed reliable for scientific analysis. [All of the FLS data will be publicly available in time to support GO Cycle 2, and some data may be available in time to support GO Cycle 1.]

The primary purpose of the FLS is to provide an early and representative sample of reliable infrared data that will enable effective and efficient planning of SIRTf observing programs. In planning the FLS observations, the SSC has selected regions of the sky that are insensitive to the SIRTf launch date. More specifically, the FLS observations will be conducted within SIRTf's northern Constant Viewing Zone, near the North Ecliptic Pole. The SSC will process, validate and disseminate the FLS data to the science community as rapidly as possible, with the goal of having it in the public domain by the time that the online SIRTf science archive opens (four months after the start of science operations). Earlier releases of FLS data by the SSC are possible, depending on the on-orbit performance of the Observatory and on reasonably calibrated and robust pipeline data products.

The FLS observations follow the recommendations made by a group of external scientists who participated in a September 1999 Workshop hosted by the SSC. The FLS will be limited to imaging observations only, using both the IRAC and MIPS instruments aboard SIRTf. Moreover, the survey will characterize both high- and low-galactic latitude regions of the sky, and will assess the effects of foreground asteroids and zodiacal emissions.

The extragalactic component of the FLS will include a 5 square degree imaging survey within or near the SIRTf Continuous Viewing Zone. This survey will be conducted with the IRAC and MIPS instruments to a shallow depth of about 1 minute/pixel on the sky. Within this area, a MIPS/IRAC verification survey of 0.25 square degree or less, with 10 times longer integration times, will also be implemented.

A Galactic and Solar System component of the FLS will utilize IRAC and MIPS imaging to characterize the infrared cirrus, source counts and confusion in two strips at low Galactic latitudes, and in a region towards a molecular cloud. This component will also include characterization of the Ecliptic Plane, main-belt asteroids, and the Zodiacal Light for Solar System observers.

The details of the FLS fields/targets are available on the SIRTf public Web site. An itemized list of corresponding AORs is included in the *SIRTf Reserved Observations Catalog* (ROC), version 1. The ROC is available online within the 'Proposal Kit' section of the SIRTf public Web site.

Appendix D: Acronyms and Abbreviations

AOR	Astronomical Observation Request(s)
AOT	Astronomical Observation Template(s)
BCD	Basic Calibrated Data
BQD	Browse Quality Data
CP	Call for Proposals
DDT	Director's Discretionary Time
EPO	Education and Public Outreach
FAQ	Frequently Asked Questions(s)
FITS	Flexible Image Transport System
FLS	First-Look Survey
FOV	Field of View
GO	General Observer(s)
GTO	Guaranteed Time Observer(s)
IBC	Impurity-Band Conductors
IDC	Indirect Costs
IOC	In-Orbit Checkout
IRAC	InfraRed Array Camera
IRS	InfraRed Spectrograph
JPL	Jet Propulsion Laboratory
LoI	Letter of Intent
LSWG	Legacy Science Working Group
MIPS	Multiband Imaging Photometer for SIRTf
NASA	National Aeronautics and Space Administration
NOAO	National Optical Astronomy Observatories
OSS	Office of Space Science
PDF	Portable Document Format
PI	Principal Investigator
ROC	Reserved Observations Catalog
SED	Spectral Energy Distribution(s)
SIRTf	Space Infrared Telescope Facility
SLO	Second-Look Observation(s)
SOM	SIRTf Observer's Manual
SPOT	SIRTf Planning Observations Tool
SSC	SIRTf Science Center
SUT	Science User Tools
TAC	Time Allocation Committee
ToO	Target(s) of Opportunity

