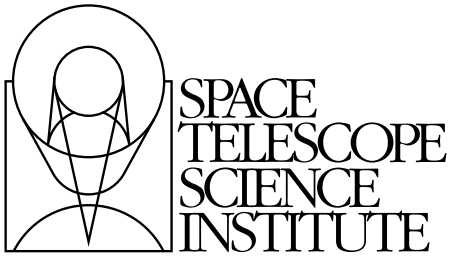
Multi-Cycle Call for Proposals
August, 2009

Multi-Cycle Treasury Programs: Call for Proposals

Policies, Procedures & Phase I Proposal Instructions



Space Telescope Science Institute
3700 San Martin Drive
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help@stsci.edu

Operated by the Association of Universities for Research in Astronomy, Inc., for the National Aeronautics and Space Administration

Call for Proposals

We invite scientists to participate in proposing for Multi-Cycle Treasury programs using the Hubble Space Telescope (HST). The telescope and its instruments were built under the auspices of the National Aeronautics and Space Administration (NASA) and the European Space Agency (ESA). Management of HST's scientific program is carried out by the Space Telescope Science Institute (STScI). Up to 750 orbits per cycle, starting in Cycle 18, will be available for MCT Programs. The intent is to provide astronomers with the opportunity to tackle key scientific questions that cannot be fully addressed through the standard time allocation process.

- Non-binding Notice of intent deadline: **Friday August 7 2009, 8:00 pm EST**
- Phase I Deadline: **Wednesday November 18 2009, 8:00 pm EST**

Where to Get Help

- Read this document, the Cycle 17 Call for Proposals and the HST Primer (see Section 1.4)
- STScI has created a roadmap as a guide to Phase I submission at http://apst.stsci.edu/apt/external/help/roadmap1.html
- Visit STScI's Web Site at http://www.stsci.edu/
- Contact the STSCI Help Desk. Either send e-mail to help@stsci.edu or call 1-800-544-8125; from outside the United States and Canada, call [1] 410-338-1082.

Who's Responsible

The STScI Science Policies Group (SPG), within the Science Mission Office (SMO), is responsible for the HST science program selection process. The Head of the Science Mission Office is Neill Reid. SPG staff includes astronomers Claus Leitherer (Head), Daniel Apai, Bob Williams, Technical Manager Brett Blacker, and Administrative Assistant Darlene Spencer.

The MCT Call for Proposals was edited by I. Neill Reid, based in part on versions from previous cycles, and with text and assistance from many different individuals at STScI.

We invite scientists to proposing for Multi-Cycle Treasury programs the Hubble Space Telescope (HST). The telescope and its instruments were

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built under the auspices of the National Aeronautics and Space Administration (NASA) and the European Space Agency (ESA).

Table of Contents

CHAPTER 1:

General Information

In this chapter . . .

1.1 About this Document

Three documents are of primary relevance for Multi-Cycle Treasury (MCT) Program proposers: this Call for Proposals, the Cycle 17 Call for Proposals and the HST Primer. The Cycle 17 Call for Proposals discusses general policies and procedures, and explains how to submit a Phase I proposal; this Call for Proposals highlights requirements that are specific to the MCTP call. The HST Primer provides a basic introduction to the technical aspects of HST and its instruments, and explains how to calculate the appropriate number of orbits for your Phase I observing time request. All three documents are available in both HTML and PDF format.

1.2 Important Features of MCT Programs

- The MCT Program provides an opportunity for the HST community to address high impact scientific questions that **require** observations on a scale that **cannot** be accommodated within the standard time allocation process.

- MCT Programs will **not** be offered on an annual basis. A future call is possible, depending on the response from the community to this call, and the future health of HST. However, this may be the **only** call for proposals of this type.
- The following instruments are available for Multi-Cycle Treasury Programs: Wide Field Camera 3 (WFC3), the Cosmic Origins Spectrograph (COS), the Advanced Camera for Surveys Wide Field Channel (ACS/WFC) and Solar Blind Channel (ACS/SBC), the Space Telescope Imaging Spectrograph (STIS), and the Fine Guidance Sensors (FGS).
- Up to 500 orbits of GO Time and 250 orbits of Director's Discretionary Time will be available for MCT Programs in Cycles 18 and 19. The TAC wil have the option of allocating additional orbits in Cycle 20 if they regard the science as sufficiently compelling. Proposers may explicitly request time in future cycles, if scientifically justified.
- MCT Programs must require at least 450 orbits, and can exceed 1,000 orbits.
- MCT Programs will only be scheduled as GO programs. Proposers may not apply for Pure Parallel, Survey or Snapshot MCT Programs. Proposers will be given the opportunity to submit associated Theory or Archive proposals as part of the Cycle 19 Call for Proposals.
- Proposers may request Target-of-Opportunity (TOO) observations as part of their MCT Program (Section 4.1.2), but the number of TOO opportunities across all accepted programs will be limited to no more than 10 per cycle.
- Proposers may not request observing time on other NASA satellites or NOAO as part of their MCT Program.
- MCT Programs will be allocated by a dedicated Time Allocation Committee which will meet in early January 2010, with the results announced a few weeks later. The MCT TAC has the option of recommending that none of the proposals should be awarded time.
- Education/Public Outreach (E/PO) proposals associated with MCT programs should be submitted as part of the Cycle 18 process, and meet the Cycle 18 deadline for those programs.

1.3 General Guidelines for Proposal Preparation

Proposers should read the guidelines given in Section 1.3 of the Cycle 17 Call for Proposals. In addition, they should consider the following suggestions:

- Explain why your science program cannot be undertaken as a Large or Treasury Program as part of the standard time allocation process.
- Describe the broad impact of the proposed program on astronomical research.

1.4 Resources, Documentation and Tools

1.4.1 MCT Program Announcement Page

The MCT Program Announcement Page (http://www.stsci.edu/institute/org/spd/mctp.html/) provides links to information and documentation that will be useful to you in preparing your proposal. This page will also provide updates on instrument performance, any late-breaking updates on the Phase I process, and answers to frequently asked questions.

1.4.2 Phase I Roadmap

The MCT Phase I Proposal Roadmap is a high level step-by-step guide to writing a Phase I Proposal. Links to the appropriate sections of various documents are given for each step.

1.4.3 Other Resources

Section 1.4 of the Cycle 17 Call for Proposals provides a description of other resources, including the HST Primer, Instrument Handbooks and the Astronomer's Proposal Tool.

1.5 STScI Help Desk

If this Call for Proposals and the materials references above do not answer your question, or if you have trouble accessing or printing Web Documents, then contact the STScI Help Desk. You can do this by either sending an e-mail to help@stsci.edu, or by calling 1-800-544-8125 ([1] 410 338 1082 from outside the USA or Canada).

1.6 Organization of this Document

The structure of this document follows the Cycle 17 Call for Proposals. Where appropriate, we refer to the Cycle 17 Call for detailed information on relevant policies or procedures.

1.6.1 Policies, Procedures and General Information

Chapter 2 summarizes the policies regarding proposal submission. Chapter 3 describes the types of proposals that can be submitted. Chapter 4 describes the types of observations that are possible with HST; it includes discussions of special requirements. Chapter 5 addresses policies regarding data rights and duplications. Chapter 6 describes procedures and criteria for proposal evaluation and selection.

1.6.2 Preparing and Submitting Your Proposal

Chapter 7 outlines the steps to follow when preparing and submitting a Phase I proposal. A proposal consists of a completed APT proposal form and an attached PDF file. Chapter 8 describes the items that must be filled out in the APT proposal form; this information is also available from the context-sensitive 'Help' in APT. Chapter 9 describes the items that must be addressed in the attached PDF file.

1.6.3 Information Pertaining to Accepted Proposals

Chapter 10 provides information on the implementation and scheduling process for accepted proposals. Chapter 11 describes Education/Public Outreach (E/PO) proposals. Chapter 12 provides information on budgets, grants and funding policies.

1.6.4 Appendix

Appendix A provides a variety of additional information, including contact information, lists of scientific keywords that can be used in proposals, a glossary of acronyms and abbreviations and a list of internet links used in the document.

The Call for Proposals is available electronically only in HTML and PDF formats. The HTML version is optimized for on-line browsing, and contains many links to related or more detailed information, both within the document itself and in other STScI documents. You are therefore

encouraged to use the HTML version electronically. Nonetheless, some people may prefer to read a hardcopy, and with this in mind, the PDF version was optimized for printing.

CHAPTER 2:

Proposal Submission Policies

In this chapter . . .

2.1 The Proposal Process: Phase I and Phase II

STScI manages the review of HST proposals. The MCT review will be carried out in three phases.

In Phase I, proposers submit a scientific justification and observation summary for peer review. The MCT Telescope Allocation Committee (MCTTAC) will rank the submitted programs, and present the ranked list to the STScI Director. This Call for Proposals focuses on Phase I policies and procedures. Separate documentation is available for Phase II.

In Phase II, investigators with approved Phase I proposals must provide complete details of the observations in their proposed observing program. This allows STScI to conduct a technical feasibility review, and to schedule and obtain the actual observations. Programs are not approved fully until after submission of an acceptable Phase II program.

In addition to this, eligible Phase II investigators who request funding must submit detailed budgets (see Chapter 12).

2.2 Deadlines

The MCT Program has the following deadline:

- Non-binding Notice of Intent: **Friday August 7 2009, 8:00 pm EST**
- Phase I proposals: **Wednesday November 18 2009, 8:00 pm EST**
- Education/Public Outreach (E/PO) proposals associated with MCT programs should be submitted as part of the Cycle 18 process, and meet the Cycle 18 deadline for those programs.

The deadlines remain to be determined for:

- *Phase II Observing Programs*
- *Budgets for Funding*

The deadline for these submissions, which will be announced in the notification letter to proposers with approved programs, is likely to be in June 2010.

2.3 Who May Submit

Please consult Section 2.3 of the Cycle 17 Call for Proposals for details on who may submit in response to this call.

2.4 Institutional Endorsement

STScI does not require the signature of an Authorizing Official (AO) on GO/AR proposals in Phase I. However, some institutions do require AO approval of all submitted proposals. It is the responsibility of each PI to follow all applicable institutional policies concerning the submission of proposals.

2.5 Funding

Subject to availability of funds from NASA, STScI will provide financial support for U.S. PIs and CoIs of approved MCT programs. Budgets are not due in Phase I, but are required in Phase II from successful proposers.

Details of the STScI Funding Policies (including the definition of the term 'U.S. Investigators') are outlined in Chapter 12.

ESA does not fund HST research programs. Therefore, successful ESA member-state proposers should seek any necessary resources from their respective home institutions or national funding agencies. ESA observers do, however, have access to the data-analysis facilities and technical support of the staff of the ST-ECF (see Section A.1.2), in addition to those of STScI.

2.6 Proposal Confidentiality

Proposals submitted to STScI will be kept confidential to the extent allowed by the review process described in Chapter 6. For accepted proposals, the scientific justification section of the proposal remains confidential, but other sections become publicly accessible, including PI and CoI names, project titles, abstracts, description of observations, special scheduling requirements, and details of all targets and exposures. Phase II programs submitted for approved proposals become publicly accessible in their entirety.

CHAPTER 3:

Proposal Categories

In this chapter . . .

3.1 Overview

MCT Programs may only be submitted as General Observer (GO) programs. An opportunity to submit associated Theory or Archive programs will be provided as part of the Cycle 19 Call for Proposals.

3.2 MCT GO Proposals

GO proposals are submitted for observing time counted in terms of HST orbits. Chapter 6 of the HST Primer describes how the required number of orbits can be calculated for a particular set of observations.

Starting in Cycle 11, the opportunities for large-scale research with HST were enhanced with the introduction of the Hubble Treasury Program. This allows proposals for enhanced datasets that are of lasting value to the broader astronomical community. With a few exceptions, individual Treasury Programs have been allocated between 100 and 200 orbits. The present call provides an opportunity to expand the scale of these programs, and tackle key scientific questions that would otherwise remain inaccessible to HST.

A Multi-Cycle Treasury Program is defined by the following characteristics:

- **The project must offer the potential of solving a key, high-impact scientific question or questions that cannot be addressed through the standard HST time allocation process.**
- MCT Programs may enable a broad variety of compelling scientific investigations; however, they may also focus exclusively on one specific issue or parameter.
- Enhanced data products are desirable to add value to the data. Examples are reduced images, object catalogs, or collaborative observations on other facilities (for which funding can be provided). Funding for the proposed data products will depend on their timely availability, as negotiated with the STScI Director. They should be delivered to STScI in suitable digital formats for further dissemination via the HST Data Archive or related channels.
- Data taken under the MCT Program will have no proprietary period.

MCT GO proposals must request at least 450 orbits. Approximately 500 GO orbits per cycle, starting in Cycle 18, will be available for MCT Programs. These orbits will be deducted from the orbits currently allocated to Large and Treasury Programs. In addition, up to 250 orbits per cycle of Director's Discretionary Time may be offered. Due to their size, MCT Programs are likely to be scheduled over more than one cycle; however, MCT Programs may also specify the distribution of observations by cycle if that is required by the scientific goals.

STScI resources may be made available to approved MCT Programs by decision of the STScI Director. In particular, some programs may require substantial pipeline processing of their data to generate the final products. Examples are large mosaics for surveys, or co-additions of many exposures in deep fields.

STScI will conduct annual progress reviews of MCT Programs, to ensure that adequate progress is being made to achieve the goals of the project. Ongoing funding is contingent on the results of such reviews. For Programs above a certain cost threshold, STScI may require successful proposers to use professional project management personnel to aid the scientific team in such areas as planning, scheduling, budgeting, cost-control, and reporting.

The 'Scientific Justification' section of the proposal (see Section 9.1) should highlight the relevance and scientific impact of the proposed observations. The 'Programmatic Impact' section should describe the importance of the proposed observations in the broad context of current physics and astronomy. This section should also include a description of any additional scientific investigations that will be enabled by the final data products, and their importance to the astronomical community. The 'Description of the Observations' section of the proposal (see Section 9.3) should not only describe the proposed observations and plans for data analysis, but should also describe the data products that will be made

available to STScI and the community, the method of dissemination, and a realistic time line.

CHAPTER 4:

Observation Types and Special Requirements

In this chapter. . .

4.1 Primary Observations

Primary observations are those observations that determine the telescope pointing and orientation. MCT programs will be scheduled as primary. Primary observations can use a variety of special requirements and observation types, as described in the following subsections and in the Cycle 17 Call for Proposals. There is also the opportunity for coordinated parallel observations, described in Section 4.2, which are simultaneous observations with instruments other than the primary instrument.

4.1.1 Continuous Viewing Zone (CVZ) Observations

Most targets are geometrically occulted in part of every HST orbit. However, this is not true for targets that lie close to the orbital poles. This gives rise to so-called Continuous Viewing Zones (CVZ) in two declination bands near +/– 61.5 degrees. Targets in those bands may be viewed without occultations at some time during the 56-day precessional cycle of the HST orbit. The number and duration of CVZ passages depend

on the telescope orbit and target position, and may differ significantly from cycle to cycle. Predictions of CVZ opportunities are currently not available beyond Cycle 17. Consequently, while proposers should specify where they can take advantage of CVZ opportunities, they should not take those opportunities into account in constructing the Phase I proposal.

The restrictions on using the CVZ outlined in Section 4.1.1 of the Cycle 17 Call for Proposals also apply to MCT Proposals.

4.1.2 Target-of-Opportunity (TOO) Observations

A target for HST observations is called a 'Target-of-Opportunity' (TOO) if the observations are linked to the occurrence of an event that may occur at an unknown time. TOO targets include objects that can be identified in advance but which undergo unpredictable changes (e.g., specific dwarf novae), as well as objects that can only be identified in advance as a class (e.g., novae, supernovae, gamma ray bursts, newly discovered comets, etc.). TOO proposals must present a detailed plan for the observations that are to be performed if the triggering event occurs.

The turn-around time for a TOO observation is defined as the time between an observer's request for TOO activation and the execution of the observations. There are three types of TOO:

- Standard TOOs require a turnaround time exceeding 2 weeks.
- Rapid TOOs require a turnaround time of 2-5 days; scheduling these requires considerable resources, and there are restrictions on the number permitted within each cycle (6 were permitted for Cycle 17).
- Ultra-rapid TOOs require less than 2 days turn-around time, and therefore require interrupting the HST observing schedule. They incur an additional penalty of 15 orbits to reflect the true cost in observing time. The number of ultra-rapid TOOs is limited to 1-2 per cycle.

MCT proposals may include TOO observations as part of their observing proposals, but the number of opportunities will be limited to 4/cycle for standard TOOs, 2/cycle for rapid TOOs and 1/cycle for ultra-rapid TOOs.

The restrictions on TOO programs outlined in Section 4.1.2 of the Cycle 17 Call for Proposals also apply to MCT Proposals.

4.1.3 Special Restrictions on Observations with COS, the STIS/MAMA and ACS/SBC

The restrictions outlined in Section 4.1.3 of the Cycle 17 Call for Proposals also apply to MCT Proposals.

4.1.4 Solar System targets

The restrictions on observing Solar System targets outlined in Section 4.1.4 of the Cycle 17 Call for Proposals also apply to MCT Proposals.

4.1.5 Observations of Targets that have not yet been discovered or identified

The restrictions outlined in Section 4.1.5 of the Cycle 17 Call for Proposals also apply to MCT Proposals.

4.1.6 Time-Critical Observations

The restrictions outlined in Section 4.1.6 of the Cycle 17 Call for Proposals also apply to MCT Proposals.

4.1.7 Real-Time Interactions

Real-time interactions will not be allowed in MCT Proposals.

4.1.8 Dithering strategies with ACS and WFC

The recommendations and restrictions outlined in Section 4.1.8 of the Cycle 17 Call for Proposals also apply to MCT Proposals.

4.2 Parallel Observations

Since the scientific instruments are located at fixed positions in the telescope focal plane, it is possible to increase the productivity of HST by observing simultaneously with one or more instruments in addition to the prime instrument. Those additional observations are called parallel observations.

Since each instrument samples a different portion of the HST focal plane (see Figure 2 of the HST Primer), an instrument used in parallel mode will normally be pointing at a “random” area of sky several minutes of arc away from the primary target. Thus parallel observations are usually of a survey nature. However, many HST targets lie within extended objects such as star clusters or galaxies, making it possible to conduct parallel observations of nearby portions of, or even specific targets within, these objects.

Depending on whether a parallel observation is related to any specific primary observation, it is defined either as a coordinated parallel or pure parallel. Coordinated Parallel Observations are observations related to a particular primary observation in the same proposal. Pure Parallel

Observations are unrelated to any particular primary observation (i.e., the primary observation is in another program). **Pure Parallel Programs are not eligible for submission as MCT Programs and should be submitted in response to the Cycle 18 Call for Proposals.** Investigators interested in proposing for parallels must consult the Parallel Observations User Information Report, which provides further details on how coordinated and pure parallels are defined, implemented and scheduled.

Parallel observations are rarely permitted to interfere significantly with primary observations; this restriction applies both to concurrent and subsequent observations. Specifically,

- A parallel observation cannot dictate how the primary observation will be structured (e.g. it cannot cause the adjustment of primary exposures).
- Parallel observations will not be made if the stored command capacity or data volume limits would be exceeded.
- Coordinated Parallel observations may include orientation or timing constraints as requested and justified in the accepted HST Phase I proposal.

4.2.1 Coordinated Parallel Observations

Coordinated Parallel Observations must be marked in the "Observation Summary" section of the proposal (see Section8.16 of the Cycle 17 Call for Proposals).

Coordinated Parallels use one or more instruments, in addition to and simultaneously with the prime instrument in the same proposal, e.g., to observe several adjacent targets or regions within an extended object. Proposals that include Coordinated Parallel Observations should provide a scientific justification for and description of the parallel observations. It should be clearly indicated whether the parallel observations are essential to the interpretation of the primary observations or the science program as a whole, or whether they address partly or completely unrelated issues. The parallel observations are subject to scientific review, and can be rejected even if the primary observations are approved.

Proposers are generally not allowed to add Coordinated Parallel Observations in Phase II that were not explicitly included and approved in Phase I.

4.2.2 Pure Parallel Observations

Pure Parallel Programs are not eligible for submission as MCT Programs and should be submitted in response to the Cycle 18 Call for Proposals.

4.2.3 Restrictions and Limitations on Parallel Observations

The restrictions and limitations on the use of parallel observations that are outlined in Section 4.2.3 of the Cycle 17 Call for Proposals also apply to MCT Proposals.

4.3 Special Calibration Observations

The requirements for Special Calibration Observations that are outlined in Section 4.3 of the Cycle 17 Call for Proposals also apply to MCT Proposals. In particular, if special calibration observations are required, the orbits to support those observations must be included in the total request for observing time.

CHAPTER 5:

Data Rights and Duplications

In this chapter . . .

5.1 Data Rights

Data taken for Multi-Cycle Treasury Programs will have no proprietary period.

5.2 Policies and Procedures Regarding Duplications

The policies and procedures regarding duplications outlined in Section 5.2 of the Cycle 17 Call for Proposals also apply to MCT Programs.

CHAPTER 6:

MCT Proposal Selection Procedures

In this chapter . . .

6.1 Evaluation of MCT Proposals

HST Programs are selected through competitive peer review. Scientists from the international astronomical community evaluate all submitted proposals, using a well-defined set of criteria (see Section 6.2). They rank the proposals and offer their recommendations to the STScI Director. Based on these recommendations, the STScI Director makes the final allocation of observing time.

The Phase I proposals will be ranked by the MCT Time Allocation Committee, which will consist of 7 to 9 members and the MCT TAC Chair. The scientists will be selected on the basis of broad expertise; however, proposers must bear in the mind that the majority of the reviewers will not be experts in their specific field, and the MCT proposals should be written accordingly. The members of the MCT TAC will not be PIs or Co-Is on any MCT proposal.

The MCT TAC will rank the proposals on the basis of the selection criteria outlined in Section 6.2. They will be asked to consider two key criteria:

- Does the proposal offer the potential of answering a key, high-impact scientific question or questions?
- Can the science goals **only** be achieved as part of a multi-cycle treasury program, rather than through the standard TAC process?

The MCT TAC has the option of recommending that none of the proposals be granted time.

The MCT TAC will make final recommendations to the STScI Director.

6.2 Selection Criteria

Evaluations of MCT Proposals will be based on the following criteria:

- **The scientific merit of the project and its potential contribution to the advancement of scientific knowledge. In particular, the program must be deemed to address a key, high-impact scientific question or questions that cannot be tackled through the standard TAC proces**s.
- **The proposed program's importance to physics and astronomy in general. This must be described explicitly in the 'Programmatic Impact' section of the proposal (see Section 9.2)**. The proposer should additionally describe how the observational program will advance research in areas defined within "The NASA 2006 Strategic Plan" and/or "The Science Plan for NASA's Science Mission Directorate (2007-2016)" (both available at http://nasascience.nasa.gov/about-us/science-strategy), or "The US Space Exploration Policy" (http://www.nasa.gov/exploration).
- The extent to which the expertise of the proposers is sufficient to assure a thorough analysis of the data. The proposal **must** include a management plan, describing the roles of each member of the consortium, and how the scientific goals will be achieved.
- A demonstration of how the results will be made available to the astronomical community in the form of scientific or technical publications in a timely manner, and a clear plan for disseminating associated data products to the community.
- The identification of ancillary scientific investigations that may be enabled by the data products.

The proposers must also address the following questions:

- **Why is this program not suitable for submission as a standard Cycle 18 Large or Treasury Proposal? Specifically, what science goals are beyond the reach of a standard proposal, but can be achieved with an MCT program?**
- What is the rationale for selecting the type and number of targets?
- Why are the unique capabilities of HST required to achieve the science goals of the program? Evidence should be provided that the project cannot be accomplished with a reasonable use of ground-based telescopes (irrespective of their accessibility to the proposer).
- Is there evidence that the project has already been pursued to the limits of ground-based and/or other space-based techniques?
- What are the demands made on HST and STScI resources, including the requested number of orbits or targets, and the efficiency with which telescope time will be used?
- Is the project technically feasible and what is the likelihood of success? Quantitative estimates of the expected results and the needed accuracy of the data must be provided.

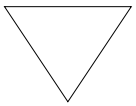
CHAPTER 7:

Guidelines and Checklist for Phase I Proposal Preparation

In this chapter . . .

7.1 General Guidelines

7.1.1 Deadline



The deadline for proposal submission is Wednesday 18 November 2009, 8:00 pm EST.

Please submit well before the deadline if possible, to avoid possible last-minute hardware or overloading problems, or network delays/outages.

Proposers should use the Cycle 17 version of the APT.

Questions about policies and technical issues should be addressed to the STScI Help Desk (see Section 1.5) well before the deadline. While we

attempt to answer all questions as rapidly as possible, we cannot guarantee a speedy response in the last week before the deadline.

7.1.2 Phase I Proposal Format

MCT proposals must be submitted electronically. A java-based software tool, APT (the Astronomer's Proposal Tool) is the interface for all Phase I and Phase II proposal submissions for HST.

A Phase I proposal consists of two parts:

- a completed APT proposal form (see Chapter 8); and
- an attached PDF file (see Chapter 9).

Both are submitted to STScI directly from within APT. Note that Student Principal Investigators should also arrange for a certification letter to be sent by their faculty advisor (see Section 2.3).

Please study Chapters 7, 8 and 9 carefully. Please do so well before the submission deadline, to give the STScI Help Desk (see Section 1.5) ample time to answer any questions that you may have about the procedures.

7.1.3 Page Limits for PDF Attachment

There are page limits on the size of your PDF attachment. For MCT proposals, the Scientific Justification (Section 9.1) and Programmatic Impact (Section 9.2) must not exceed 11 pages, and the total page limit for the PDF file is 17 pages.

In relation to these limits, please note the following:

- Proposals that exceed the page limits will be penalized in the review process; pages beyond the specified limits will be removed and will not be available to reviewers.
- Figures and tables must appear after the text of the Science Justification. There are no limits on the numbers of figures, tables and references in the PDF attachment. However, the total page limit must be obeyed.
- Your PDF attachment must be prepared with a font size of 12pt. Do not change the format of any of the templates that are provided by STScI.

7.2 Proposal Preparation Checklist

The Cycle 17 Proposal Preparation Checklist (Section 7.2 in the Cycle 17 Call for proposals) is also appropriate for MCT Proposals, with two qualifications:

- In Step 4, proposers should download the proposal templates from the MCT Program Announcement Web Page rather than the Cycle 17 Announcement Web Page.
- In Step 6, proposers can also consult the MCT Program Announcement Web Page for instructions on creating the pdf attachment.

CHAPTER 8:

Filling Out the APT Proposal Form

In this chapter . . .

As described in Chapter 7, a Phase I proposal consists of a completed APT proposal form and an attached PDF file. The present chapter describes the items that must be filled out in the APT proposal form; this information is also available from the context-sensitive help in APT. Note that not every item described here needs to be filled out for MCT proposals. APT will automatically let you know which items need to be filled out, depending on which proposal type you choose. Chapter 9 describes the items that must be addressed in the attached PDF.

8.1 Title

The title of your proposal should be informative, and must not exceed 2 printed lines. Please use mixed case instead of all caps.

8.2 Abstract

Please write a concise abstract describing the proposed investigation, including the main science goals and the justification for requesting observations or funding from HST. The abstract must be written in standard ASCII and should be no longer than 20 lines of 72 characters of text.

8.3 Proposal Phase

This should be set to 'PHASE I'. See Section 2.1 for a description of the different phases in the HST proposal process.

8.4 Category

All MCT Programs must be submitted as GO (General Observer) Proposal

8.5 Cycle

For MCT Proposals, enter "18".

8.6 Requested Resources: Primary and Parallel Orbits

Enter the total number of orbits requested for primary observations and the total orbits requested for Coordinated or Pure Parallel observations. Only whole orbits can be requested, and only whole orbits will be allocated. Successful MCT programs will be allocated time over several cycles; however, please enter the total number of orbits requested in the boxes for 'This Cycle'. If the scientific program requires a particular distribution of

orbits from cycle to cycle, the details should be given in the "Description of Observations" (Section 9.3).

8.7 Proprietary Period

All observations taken for MCT Programs must have zero proprietary time.

8.8 Scientific Category

Specify one Scientific Category from the list given in Section 8.8 of the Cycle 17 Call for Proposals. Please adhere to our definitions of these categories. If you find that your proposal fits into several categories, then please select the one that you consider most appropriate.

8.9 Keywords

From the list of Scientific Keywords in the pull-down menu (see also Section A.2), please select appropriate ones that best describe the science goals of the proposal. Please give as many keywords as possible, but not more than five. You must give at least three.

8.10 Special Proposal Types

All MCT Proposals should be identified as Treasury programs.

8.11 Proposal PDF Attachment

List the location on your computer of the PDF file that is to be attached to your Phase I submission. This file should contain the items described in Chapter 9.

8.12 Principal Investigator(s)

Enter the name (last name first) and e-mail address of the PI or PIs of the proposal. Please use standard ASCII. There may be more than one PI per proposal, but one should be designated specifically as the formal contact PI for the proposal. Entering the first few letters (at least two) and pressing enter or tab will bring up a window containing a list of matches from our proposer database. Clicking on your entry will populate the APT form with the information. If you are not in the database, click on "New Entry" and enter the information. Choose the correct institutional affiliation. For U.S. PIs (see Section 12.2), the institutional affiliation is defined as the institution that will receive funding if the proposal is approved. If you are in the database, but the address information is incorrect, do not click on "New Entry." Instead, select your entry in the list and click on "OK." Your information will be entered into the form editor where you can update it. Please mark the appropriate box for PIs with an institutional affiliation in an ESA member country.

We will contact the proposer within 1-2 weeks of the submission deadline if we need to verify our understanding of the appropriate scheduling constraints. If a Co-Investigator is to serve as the contact for this verification, then the Contact Keyword box should be set accordingly. Only one person may be designated as the Contact.

8.13 Co-Investigators

Co-investigators (CoIs) can be added in APT as necessary in Phase I; once a program is approved (Phase II), a CoI can only be added with prior approval (see Section 10.2). By default, APT will provide one blank CoI template. Please add other CoIs or delete as necessary. There is a limit of 99 CoIs on any proposal. For each CoI, list the name and e-mail address. Choose the correct institutional affiliation. For U.S. CoIs (see Section 12.2), the institutional affiliation is defined as the institution that will receive funding if the proposal is approved.

Please mark the appropriate box for PIs with an institutional affiliation in an ESA member country. If a proposal has a non-U.S. PI and one or more U.S. CoIs, then you must mark the ‘Admin US PI’ box for one of the U.S. CoIs. This indicates which U.S. CoI will be the Administrative PI for overseeing the grant funding for U.S. investigators (see Chapter 12).

8.14 Datasets

This keyword will not appear for MCT GO Proposals.

8.15 Targets

Your proposal can include observations of fixed targets (i.e., all targets outside the solar system whose positions can be defined by specific celestial coordinates), generic targets (i.e., targets defined by certain general properties, rather than by specific coordinates), and solar-system targets (i.e., moving targets). Targets that have not yet been discovered or identified may generally be included only under special circumstances (see Section 4.1.5), and should be given generic target names.

MCT GO proposals need only include a representative subset of targets in the Phase I submission. The target list must be sufficient to enable the TAC to assess the scope of the entire program, and to allow a reliable technical assessment of the feasibility of the observations. For proposals with a large number of fixed targets, please note that there is a capability to ingest a comma-separated text file with the appropriate target information. See the APT Phase I Roadmap ("Fill in the Target Information") for details.

Please consult the Cycle 17 Call for Proposals for descriptions of the information required for Target Number (Section 8.15.1), Target Name (Section 8.15.2), Provisional Coordinates (Section 8.15.3), V-Magnitude (Section 8.15.4) and Other Fluxes (Section 8.15.5).

8.16 Observation Summary

The OS lists the main characteristics of the observations that you propose to obtain. For MCT Proposals you must include in the OS all the configurations, modes and spectral elements that you propose to use, but only a representative subset of the proposed targets need be included. Configurations that are not specified in the Phase I proposal, but are included in Phase II, may delay the program implementation, and may be disallowed. Note the following:

- Coordinated parallel observations must be included in the OS marked as such using the relevant special requirement flags (see the Cycle 17 Call for Proposals, Section 8.16.11).

- Target acquisition observations (see Section 5.2 of the HST Primer) need not be included in the OS, unless they are themselves used for scientific analysis.
- Normal calibration observations that are often or routinely taken (e.g., fringe flats) need not be included in the OS. However, the OS should include any special calibration exposures of internal sources or external targets (see Section 4.3). Special internal calibrations should be listed separately from external calibration exposures. When these special calibrations require additional orbits, that should be specified and the orbits included in the total allocation. The need for these calibrations should be justified in the 'Description of the Observations' (see Section 9.3).

The OS consists of individual 'observation blocks', each containing several separate pieces of information.

All exposures of a given target made with a particular instrument may be summarized in a single observation block; observations of the same target with a second instrument (e.g. coordinated parallels) must be specified in a separate observation block.

Observation blocks are numbered sequentially in the APT Phase I proposal form. Each observation block should include up to 13 items. These items are listed and discussed in Sections 8.16.1 to 8.16.13 in the Cycle 17 Call for Proposals; those descriptions are valid for MCT Proposals with the exception of Pure Parallel Observations, which are not allowed.

CHAPTER 9:

Preparation of the PDF Attachment

In this chapter . . .

A Phase I proposal consists of a completed APT proposal form and an attached PDF file. The present chapter describes the items that must be addressed in the attached PDF file. As described in Section 7.2, template files are available in several popular word-processing environments for the creation of the PDF file. Chapter 8 describes the items that must be filled out in the APT proposal form. Note that you must use Adobe Acrobat version 5.0 or higher (or equivalent software) in order to properly view and print the PDF attachment in APT.

Your PDF Attachment must obey the page limits discussed in Section 7.1.3. Note that there is a limit on the total number of pages, as well as on the amount of text in the 'Scientific Justification' and 'Programmatic Impact' sections.

9.1 Scientific Justification

This section should present a balanced discussion of background information, the program's goals, its significance to astronomy in general, and its importance for the specific sub-field of astronomy that it addresses. The members of the MCT TAC will span a range of scientific expertise (see Section 6.1), so you should write this section for a general audience of scientists.

The following items should be included:

- The justification must address the utility to the astronomical community of the data products that will be generated by the program.
- Proposals using ACS/WFC, WFC3/UVIS or WFC3/IR for undithered imaging must explain why this strategy is required for the scientific objectives; dithering is required to eliminate hot pixels and other detector artefacts that may compromise the archival value of the data.
- ACS/SBC, COS and STIS/MAMA proposers must address the safety of their targets and fields with respect to the appropriate count rate limits of the photon-counting detectors (see Chapter 5 of the HST Primer and the COS, STIS or ACS Instrument Handbooks).

9.2 Programmatic Impact

This section should provide a brief description of the relevance of the proposed observations in the broad context of current physics and astronomy. The proposer must present a clear science goal or goals for the program, and describe the potential scientific impact of achieving those goals, including how the observational program will advance the particular research field. Specifically, the proposer must explain the increased scientific return, both quantitative and qualitative, in a scientific proposal of this scope as compared with a standard single-cycle Treasury program. Proposers must also describe how the science goals are affected if the program is only partially completed.

The proposer should also use this section to describe how the observational program will advance research in areas defined within "The NASA 2006 Strategic Plan" and/or "The Science Plan for NASA's Science Mission Directorate (2007-2016)" (available at http://nasascience.nasa.gov/about-us/science-strategy), or "The US Space Exploration Policy" (http://www.nasa.gov/exploration).

9.3 Description of Observations

This section of the PDF file should be used to provide a short description of the proposed observations. The description should explain the amount of exposure time and number of orbits requested (e.g., number of objects, examples of exposure-time calculations and orbit estimates for some typical observations). You should summarize your target acquisition strategies and durations where relevant. Identify potential CVZ objects in the target list.

Discuss and justify any non-standard calibration requirements (see Section 4.3). You should estimate the number of orbits required for these special calibrations, and include them in the OS (see Section 8.16).

The following items should also be included:

- Proposers must explain why the observing program cannot be proposed as a Large or Treasury Program in response to the Cycle 18 Call for Proposals.
- Programs that require a particular cadence of observations over several cycles should describe those temporal requirements.
- Proposers should discuss how they have designed their programs with regard to schedulability
  - Programs with timing constraints and timing relationships between observations should describe those constraints, including allowable flexibility.
  - Programs containing large blocks of orbits at constrained orientation angles, such as mosaics and surveys, should describe those constraints and allowable flexibility.
  - If a target visibility other than that recommended for Large Programs (see Table 6.1 of the Primer) is used, state the value used and explain why you used that value.

9.4 Special Requirements

List and justify any special scheduling requirements, including requests for:

- Target of Opportunity (TOO) observations. For TOO observations, estimate the probability of occurrence during Cycle 17, and state how soon HST must begin observing after the occurrence (see Section 4.1.2).
- CVZ observations (see Section Section 4.1.1).
- Time-critical observations (see Section 4.1.6).
- Early acquisition observations (see Section 5.2.1 of the HST Primer).
- Coordinated Parallel (CPAR) observations
- Target acquisitions that use the 'Re-use target offset' function (see Section 5.2.2 of the HST Primer).
- Scheduling of STIS/MAMA and STIS/CCD observations (other than target acquisitions) in the same visit (see Section 6.2.2 of the HST Primer).
- Requests for expedited data access (see Section 7.2 of the HST Primer).
- Other special scheduling requirements (e.g., requests for non-SAA impacted observations).

9.5 Coordinated Observations

If you have plans for conducting coordinated observations with other facilities that affect the HST scheduling, please describe them here (examples are coordinated or simultaneous observations with other spacecraft or ground-based observatories). Describe how those observations will affect the scheduling.

If you have plans for supporting observations that do not affect HST scheduling, then don't describe them here. If they improve your science case, then describe them in the 'Scientific Justification' section of the proposal (see Section 9.1).

9.6 Justify Duplications

Justify, on a target-by-target basis, any potential duplication with previously accepted GO or GTO observing programs. Use the 'Duplication' checkbox in the OS (see Section 8.16) to identify the duplicating observations. See Section 5.2 for policies on duplications.

9.7 Management Plan

Each MCT Program will represent a substantial investment of resources, in terms of HST observing time, support by STScI technical staff and grant funding. In this section, the proposer must outline a general plan of work, identifying the roles and responsibilities of the PI and key Co-Is, and describing how the activities of those individuals will be integrated to achieve the scientific goals of the proposed research program. The plan should include anticipated key milestones for accomplishments and the management structure for the personnel involved.

This section of the proposal should discuss the data products that will be made available to the community, the method of dissemination, and a realistic time line. Data products delivered to STScI must be in suitable digital formats for further dissemination via the HST Data Archive or related channels. Any required technical support from STScI and associated costs should be described in detail.

9.8 Past HST Usage and Current Commitments

Please list the program numbers and status of the data for all accepted GO/ART/SNAP programs of the PI which are relevant to the current proposal. Include a list of *major* publications from past HST observations. Please also describe the commitments of key personnel to other current ongoing projects.

CHAPTER 10:

Proposal Implementation and Execution

In this chapter . . .

10.1 Notification

The MCT TAC will meet to consider Phase I proposals in early January 2010. The final selection process will be completed, and electronic notifications sent to all proposers, by early February 2010, well in advance of the Cycle 18 Phase I deadline.

10.2 Phase II Submission

Successful MCT proposers must submit a Phase II program which provides complete details of the proposed observations. Detailed instructions on the preparation of Phase II programs are provided in the STScI Phase II documentation. Complete observational details must be provided by the Phase II submission deadline in May/June 2010, approximately 4 months after the Phase I notifications. Accurate target coordinates must also be supplied at this time, except for certain Targets of Opportunity (or in other exceptional circumstances, provided that those circumstances were described clearly in the Phase I proposal).

Failure to submit a Phase II program by the required deadline will result in loss of the time allocation. Program changes after the Phase II deadline are allowed as described in the Policy Document for the Telescope Time Review Board (TTRB), available on the Web.

Proposers are not allowed to make changes to the list of investigators (PI and CoIs) after acceptance of the Phase I proposal, unless permission for this is granted by the Head of the Science Policies Group. Requests for this should be well-justified, and must be submitted to spd_staff@stsci.edu.

10.3 Program Coordinator and Contact Scientist Support

Accepted MCT observing programs will be assigned a Program Coordinator (PC) and a Contact Scientist (CS). The role of the PC is to help the observer deliver a Phase II program that is syntactically correct and will schedule successfully on the telescope. The role of the CS is to provide advice on observing strategies, and to answer specific questions about instrument performance. The CS is generally an Instrument Scientist involved in the calibration and characterization of the primary instrument used in the observer's program. In the case of other HST Programs, the role of the CS ceases at program execution. Given the long-term nature of the MCT Programs, the CS will remain available as a consultant while the program executes.

10.4 Duplication Checking

The policies with respect to duplication checking that are outlined in Section 10.4 of the Cycle 17 Call for Proposals will also hold for MCT Programs.

10.5 Technical Review

Highly ranked MCT Programs will be subject to technical review by STScI scientists. A more detailed technical/feasibility review will be undertaken once an MCT proposal is accepted for Phase II ingestion, and special attention will be given to observations/modes that may damage the instrument, are particularly complex, are recent/experimental, are human and technical resource-intensive, or require the use of limited resources (such as TOO Programs). All technically challenging or infeasible observations are flagged. As with other types of observing programs, it is the responsibility of the PI to ensure that none of the observations violate bright objects constraints (see Section 5.1 of the HST Primer).

10.6 Proposal Scheduling

After Technical Review, observations determined to be feasible are scheduled for execution. MCT Programs will not be scheduled until the results of the Cycle 18 time allocation process are available; we anticipate the Cycle 18 TAC meeting in mid-May 2010, with a Phase II deadline of mid-July 2010. The scheduling process attempts to optimize the overall HST efficiency. STScI will not contemplate requests to advance or postpone the scheduling of individual programs based on other considerations, with the possible exception of compelling scientific arguments.

10.6.1 Unschedulable or Infeasible Observations

The policies with respect to unschedulable or infeasible programs that are outlined in Section 10.6.1 of the Cycle 17 Call for Proposals will also hold for specific observations that are part of MCT Programs.

10.7 Access to Data Products

The policies with respect to data products that are outlined in Section 10.7 of the Cycle 17 Call for Proposals will also hold for data obtained for MCT Programs.

10.8 Visits to STScI

Given the potentially complex nature of some MCT Programs, observers may consider visiting STSCI before the Phase II deadline to finalize the observations. Expenses for such visits to STScI can be included in budgets for STScI grant funding if they conform to STScI's General Grant Provisions (see Chapter 12 for details).

Visits can be arranged through the STScI Help Desk (see Section 1.5). Observers who visit STScI will be assisted by STScI staff to the extent that resources permit.

10.9 Failed Observations

The policies with respect to failed observations that are outlined in Section 10.10 of the Cycle 17 Call for Proposals will also hold for MCT Programs.

10.10 Publication of HST Results

The policies with respect to publication of HST results that are outlined in Section 10.11 of the Cycle 17 Call for Proposals will also hold for MCT Programs.

10.11 Dissemination of HST Results

We remind HST observers that they have a responsibility to share interesting results of their HST investigations with the public at large. This is particularly important in the present juncture given the scale of the MCT Programs. The Office of Public Outreach (OPO) of STScI is available to help observers use their HST data for public information and education purposes. Proposers can find guidelines and examples of these activities on the OPO Web page that discusses the Release of Scientific Findings to the Public.

CHAPTER 11:

Education & Public Outreach Proposals

Education and Public Outreach (E/PO) proposals associated with successful MCT Programs should be submitted for consideration with E/PO proposals associated with successful Cycle 18 Programs. Please consult Chapter 11 of the Cycle 17 Call for Proposals for further details.

CHAPTER 12:

Grant Funding and Budget Submissions

In this chapter . . .

12.1 Overview

Subject to availability of funds from NASA, STScI will provide financial support to eligible investigators of approved MCT programs. Such funding is awarded under the general conditions contained in the document General Grant Provisions of the Space Telescope Science Institute, referred to hereafter as the 'General Grant Provisions'. The most recent version of this document is available at the STScI Grants Administration Office Web Page.

Budgets are not due in Phase I, but are required in Phase II from successful U.S. proposers only. Separate budgets must be submitted by all investigators who request funding. Investigators who are not eligible for or who do not request funding do not need to send a budget. Detailed instructions for budget preparation and submission using the Grants Management System will be sent to successful proposers after the Phase I review has been completed.

Chapter 12 of the Cycle 17 Call for Proposals presents a brief overview of STScI funding policies. The information presented in that document is of an introductory nature only, and is not intended to be complete. The governing policies are always those contained in the General Grant Provisions.

Questions concerning funding policies and budget submissions should be directed to the STScI Grants Administration Office (see Section A.1).

12.2 Eligibility for STScI Grant Funds

The policies with respect to eligibility for STScI Grant funds that are outlined in Section 12.2 of the Cycle 17 Call for Proposals will also hold for MCT Programs.

12.3 Allowable Costs

The policies with respect to allowable costs that are outlined in Section 12.3 of the Cycle 17 Call for Proposals will also hold for MCT Programs.

12.4 Grant Period

The policies with respect to the funding period for grants that are outlined in Section 12.4 of the Cycle 17 Call for Proposals will also hold for MCT Programs.

12.5 Award of Funds

The policies with respect to the awarding STScI Grant funds that are outlined in Section 12.5 of the Cycle 17 Call for Proposals will also hold for MCT Programs.

APPENDIX A:

Additional Information

In this appendix . . .

A.1 Contact Information

A.1.1 Space Telescope Science Institute

Proposers should consult Appendix A.1 of the Cycle 17 Call for Proposals for contact information, with the following exceptions:

Science Mission Office

Head: I. Neill Reid; ext: 4971; email: inr@stsci.edu

Science Policies Group

Head: Claus Leitherer; ext: 4425; email: leitherer@stsci.edu

Instruments Division:

ACS/WFPC2 Team Lead: Linda Smith; ext 4926; email:

lsmith@stsci.edu

COS/STIS Team Lead: Alessandra Aloisi; ext 4519; email aloisi@stsci.edu

NICMOS Team Lead: Anton Koekemoer; ext 4815; email: koekemoe@stsci.edu

WFC3 Team Lead: John Mackenty; ext 4559; email: mackenty@stsci.edu

A.1.2 Space Telescope – European Coordinating Facility

Proposers should consult Appendix A.2 of the Cycle 17 Call for Proposals for contact information.

A.1.3 Canadian Astronomy Data Centre

Proposers should consult Appendix A.3 of the Cycle 17 Call for Proposals for contact information.

A.2 Scientific Keywords

Proposers should consult Appendix B of the Cycle 17 Call for Proposals for information on the scientific keywords currently used in the APT.

A.3 Glossary of Acronyms and Abbreviations

Proposers should consult Appendix C of the Cycle 17 Call for Proposals for information on acronyms and abbreviations used throughout this document.

A.4 Internet Links

Proposers should consult Appendix D of the Cycle 17 Call for Proposals for information on internet links used in this document.