Hubble Space Telescope
Call for Proposals
Cycle 30

Policies, Procedures, and Phase I Proposal Instructions
January 2022

https://hsthelp.stsci.edu

NASA LOCKHEED MARTIN esa STScI | SPACE TELESCOPE SCIENCE INSTITUTE

Hubble Space Telescope Call for Proposals for Cycle 30

STScI solicits proposals for HST Observing, Archival, and Theoretical Research. The full details are made available through two documents, the Call for Proposals, and the HST Primer. Downloadable PDF collections of these articles are provided as a courtesy, made available and updated when feasible. ***The online documentation is the authority***, and will be updated with the latest information.

Late Breaking News

- Check frequently for late breaking news before the Phase I deadline

See also HST New and Important Features.

Welcome

We invite scientists to participate in Cycle 30 of 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). We anticipate allocating up to 3000 orbits in this cycle, including 1500 orbits for Small Programs, 800 orbits for Medium Programs, and 700 for Large and Treasury Programs. An additional 1000 Snapshot observations and 500 Pure-Parallel observations may be allocated. Abstracts of previously accepted programs can be found on the HST proposal catalogs webpage.

This document establishes the goals, requirements, and policies for General Observer (GO) and Archival Research (AR) programs in Cycle 30. The table of contents for the web version of this document is on the right side of the page, and links there can take you to any page from any other page (click the arrow to expand the entire table of contents under "Hubble Space Telescope Call for Proposals for Cycle 30"). The links at the top of each page correspond to sections within that given page.

Proposing Calendar and Deadlines

Cycle 30 Dates: **October 1, 2022 – September 30, 2023**

Cycle 30 Phase I proposal deadline: **March 25, 2022 at 8:00pm EDT**

Cycle 30 Peer Review meeting: **June 1-8, 2022**

Cycle 30 Phase II proposal deadline: **July 14, 2022**

Cycle 30 Budget submission deadline: **August 4, 2022 at 8:00pm EDT**

Cycle 30 1st Mid-Cycle deadline: **September 30, 2022**

Cycle 30 2nd Mid-Cycle deadline: **January 31, 2023**

Notification of the outcome of the Phase I selection process will be sent to all proposers in late June 2022.

What's New for Cycle 30

See HST New and Important Features

Where to Get Help

- Read this Call for Proposals and The Hubble Space Telescope Primer for Cycle 30.
- Visit the STScI HST Phase I Proposal Roadmap and the HST Phase II Proposal Roadmap
- Visit STScI's website at http://www.stsci.edu/
- Register (or review/check) a STScI Single Sign-On (SSO) Account.
- Contact the STScI HST Help Desk (web: https://hsthelp.stsci.edu). We encourage use of the new website where you can submit questions directly to the appropriate team of experts.

Who's Responsible

The HST Call for Proposals and related materials for Cycle 30 were edited by John Debes and Laura Watkins. The Associate Director for Science, Neill Reid, and the Science Mission Office at STScI are responsible for the oversight of the HST science program selection process, whose members include Alessandra Aloisi (Head of Science Mission Office), John Debes (Deputy Head of Science Mission Office), Claus Leitherer (Head of Hubble Space Telescope Science Policies Group), Katey Alatalo, Christine Chen, Andrew Fruchter, Amaya Moro-Martin, Molly Peeples, Jamila Pegues, Linda Smith, Laura Watkins, and Technical Manager Brett Blacker.

Download the PDF

This PDF is provided as a courtesy, made available and updated when feasible. ***The online documentation is the authority,*** and will be updated with the latest information.

Next: HST New and Important Features

HST Cycle 30 New and Important Features

What's New for Cycle 30

The following are the important features for proposers to consider this Cycle:

Policy

- Since Cycle 27, proposals must be submitted and will be reviewed in an anonymous format. See HST Anonymous Proposal Reviews for more information on the review process. Guidelines are provided on how to anonymize a proposal.
- The PDF attachment no longer has a page limit for the scientific justification, though a total page limit for different proposal types remains. See Guidelines and Checklist for Phase I Proposal Preparation for further details.
- Proposers must also submit a brief "Team Expertise and Background" section, incorporated in the Astronomer's Proposal Tool. This section will be available to the review panel after the final ranked list is complete, at which point, the review panel may disqualify proposals that are not sufficiently poised to carry out the proposed work. See also Anonymous Proposal Reviews.
- The term "exclusive access period" is used throughout this Call, as a replacement for "proprietary period." The connotations on data rights, however, remain much the same.
- Phase I proposals **must include in their Description of Observations section bright object protection information** sufficient to establish the safety of any proposed measurements which utilize instruments subject to health and safety concerns. Programs that do not contain this information may be subject to cancellation.
- Phase I proposals that are awarded observing time will be held to a strict deadline for subsequent Phase II and budget submissions. Programs that submit Phase II proposals that are either late or insufficient for long-range planning will be subject to cancellation. Programs that submit late budgets may not receive funding.
- **Phase I proposals must itemize and briefly justify the special requirements that will be implemented in Phase II, using the Phase I section designated for this purpose. This includes the potential for orientation constraints.** The detailed orientations do not need to be specified until Phase II. All visit-level special requirements and exposure-level special requirements must be justified (see HST Preparation of the PDF Attachment).
- The orbit limit for mid-cycle proposals in Cycle 30 is 15 orbits. This applies to both the **September 30, 2022** and the **January 31, 2023** deadlines.
- Observers are strongly encouraged to craft their programs in blocks of 6 consecutive orbits or less. If your science requires more than 6 consecutive orbits scheduled continuously, the program will proceed under a shared risk between STScI and the observer. Specifically, if the planning & scheduling team can reasonably schedule your program in this manner, it will be attempted, but if there is a problem, any subsequent attempt must be done in a series of 6 orbits or less. In the Description of Observations section of your Phase I proposal, you must justify the use of a longer series of consecutive orbits, and explain the impact to your science goals if your observations cannot be scheduled in that manner, either on the 1st attempt or in the event of failure.
- We encourage accepted programs to minimize scheduling constraints. STScI recognizes that some of the scheduling restrictions for successful programs may not be apparent to an observer using APT. If the final constraints on your program result in only one scheduling opportunity per year (i.e., falling in only one of the weekly HST schedules), that program will proceed under a shared risk between STScI and the observer. Specifically, if the observations fail, a request to repeat the observations might not be granted unless the program constraints are relaxed.
- Due to current observatory operational constraints, Venus is not allowed as a target for Director's Discretionary Proposals for Cycle 30. See HST Observation Types for more information.
- **No Ultra-Rapid ToOs will be allocated in Cycle 30.**

Opportunities

- **HST UV Legacy DD program**: The STScI Director devoted 600-1000 orbits of Director's Discretionary time in Cycles 27-29 to a Legacy program that takes advantage of Hubble's unique UV capabilities to probe star formation processes and related stellar astrophysics. **The Hubble UV Legacy Library of Young Stars as Essential Standards (ULLYSES)** serves as a UV spectroscopic reference sample of young high and low-mass stars, uniformly sampling fundamental astrophysical parameter-space for each class of star. STScI constituted an implementation team to work with the community to define target lists and detailed observing modes. No observations have exclusive access periods, and all are immediately available to the community. Further details are provided on the working group site. As of Cycle 30, the majority of ULLYSES observations are complete and multiple data releases have been announced. *The community is encouraged to consider submitting Cycle 30 proposals to supplement and complement the conceptual program. This includes Archival proposals to analyze all or a subset of the full ULLYSES datasets.*
- Joint HST-TESS proposals: proposers may request high-cadence photometric monitoring by the Transiting Exoplanet Survey Satellite (TESS) for individual targets in their HST program. There is no guarantee that the TESS data will be obtained simultaneously with the HST observations. See Joint Proposals for further information.
- STScI will continue the HST-TESS Exoplanet Initiative, designed to provide the community with an opportunity to submit long-term (multi-cycle) Treasury programs that capitalize on the exciting small exoplanet discoveries generated by the Transiting Exoplanet Survey Satellite. HST-TESS Exoplanet Initiative proposals **should be identified as such in the proposal abstract**. See Special Initiatives for further information.
- STScI will discontinue the JWST Preparatory Science Initiative in Cycle 30, due to the impending launch of JWST.
- TESS data are publicly available through MAST.
- Successful HST proposers will be eligible to apply for NASA High-End Computing Time. Please indicate whether you intend to apply for HEC time in the text of the 'Special Requirements' section of the PDF submission. See HST General Information, Resources, Documentation, and Tools. More information on NASA HEC Program can be found on https://www.hec.nasa.gov.
- All non-exclusive access data for current Hubble instruments (ACS, COS, STIS, WFC3, FGS) have been made available as part of the Amazon Web Services (AWS) public dataset program. Proposers may request to make use of this dataset under the Archival Cloud Computing Studies category.
- In Cycle 30, proposers have an opportunity under the HST AR Program to obtain financial support for the development of software products that will be made available to the community for the purposes of analyzing HST data. The 'Scientific Justification' section of the proposal should describe the proposed software plan and also its impact on observational investigations with HST. For more information, see Cycle 30 Proposal Categories for further information, and please contact the Data Science Mission Office (dsmo@stsci.edu) for additional guidance.

Instrumentation

- With the current performance of the pointing control system, the gyro bias drift must be updated more frequently, and this is not possible when pointing under gyro control or during slewing (e.g., during moving target tracking or spatial scanning). For spatial scanning programs, each visibility period must have at least 6 minutes of time under FGS control (i.e., 6 minutes without scanning).
- Due to the current performance of the pointing control system, the Sun avoidance angle has been increased from 50 to 54 degrees to maintain the safety of the observatory and its instruments.
- COS NUV observations with the G285M grating are available but unsupported because of declining throughput. The available COS gratings are described in the COS Instrument Handbook. Users interested in medium-resolution spectroscopic coverage of the wavelength region from 2500 to 3200 Angstroms are encouraged to use STIS instead.

- Users preparing COS proposals are reminded that the COS2025 policies are still in effect. These policies consist of restrictions on the choice of detector segment and FP-POS positions for the G130M observing modes. The policies are designed to maximize the FUV detector lifetime by minimizing the exposure of the FUVB detector to geocoronal Lyman-alpha emission. Under COS2025, there are now four G130M central wavelengths (cenwaves) that can be used with both detector segments on: 1055, 1096, 1222, and 1291. For the other G130M cenwaves (1300, 1309, 1318, 1327) only segment FUVA can be switched on. Observations requiring the Ly-alpha wavelength range can be performed at Lifetime Position 3 and need to be justified in the Phase I. Detailed information about the changes is available at the COS2025 policies page.
- The COS FUV detector is susceptible to gain sag, a reduction in the ability of the detector to convert incoming photons into electrons. One strategy for mitigating this, and subsequently extending the lifetime of the COS/FUV detector, is to occasionally change the location along the cross-dispersion direction where spectra are recorded on the detector, the lifetime position (LP). In the interests of extending the lifetime of COS operations until 2030, from Cycle 30 onwards, COS will operate under a hybrid LP-mode with the following default LPs: G130M 'blue modes' = LP2, G140L = LP3, G130M/1222 = LP4, G130M standard modes = LP5, G160M = LP6. Starting in Cycle 30, G160M exposures that are approximately longer than half an orbit will use a new LP6, while shorter G160M exposures may remain at LP4 (if requested). There are several notable changes for users at LP6, such as increased overheads and a slight reduction in resolution compared to LP4. Since LP6 will be the default LP for G160M observations, users who require the use of LP4 due to overheads and/or resolution must request to do so during the Phase I process. The calibration of LP6 is expected to be complete before Cycle 30 begins, and the COS team will provide additional updates to users as they become available. Starting in Cycle 30 there will be updated FP-POS requirements for COS users at LP6. Users are encouraged to use 4 FP-POS (to achieve the maximum FP-POS at all wavelengths) regardless of their S/N goals and may do so at their discretion. However, users are permitted to use alternative FP-POS combinations at LP6 based on their S/N requirements. Use of fewer than 4 FP-POS may result in small wavelength ranges without spectral coverage. Details are provided in the COS Instrument Handbook.
- The zeropoints for the Solar Blind Channel have been updated to correct a longstanding 30% discrepancy in the absolute flux calibration of the imaging modes. The error was found to be caused by inaccuracies in the filter and detector throughput tables used to derive the zeropoints. The discrepancy is in the sense that the SBC is actually 30% more sensitive than previously estimated: a source of a given astronomical flux should have produced a 30% larger SBC count-rate; conversely, prior conversions of observed SBC count-rate to flux have overestimated the astronomical flux by 30%. The throughput tables have now been corrected, and new zeropoints have been derived for the relevant imaging modes.

  In the past year, the ACS Team also characterized the time-dependent sensitivity of the SBC. The sensitivity has been found to decline 9% since launch. Corrections for this effect are now included in the pipeline, and adjustments to the zeropoints made accordingly. Additionally, new flatfield reference files have been delivered for all SBC imaging filters. The total effect of these changes brings the SBC absolute flux calibration within 5% accuracy. More information can be found in ISR ACS 2019-04 and ISR ACS 2019-05.
- Users preparing exoplanet/scanning mode grism observations with WFC3 must specify the filter to be used for the accompanying direct image in the Phase 1. Direct imaging should use the specific band recommended for a particular grism, if possible. For infrared grism observations, it is recommended to use one direct image at the beginning and end of each orbit to best calibrate for the variable background. Observers may want to consider multiple bandpass direct images.
- Users should refer to the ETC calculations for updated recommended background levels, in particular regarding the setting of the FLASH parameter in WFC3/UVIS observations.
- Spatial scanning with the STIS CCD is an available-but-unsupported mode for obtaining high signal-to-noise ratio spectra of bright targets. A recent analysis of this mode (as reported in the September 2020 STAN) demonstrated that after de-trending, the white light flux measurements can achieve an rms scatter of only 30 ppm.

Next: HST Proposal Checklist

HST Cycle 30 Proposal Checklist

HST Cycle 30 proposers are encouraged to follow this checklist for writing and submitting proposals for the Hubble Space Telescope (HST).

Know the deadlines

The Cycle 30 Phase I proposal deadline is **March 25, 2022 at 8:00pm EDT**.

The first Cycle 30 Mid-cycle Phase I proposal deadline is **September 30, 2022**.

The second Cycle 30 Mid-cycle Phase I proposal deadline is **January 31, 2023**.

Director's Discretionary Time proposals can be submitted at any time.

HST Phase I Proposal Roadmap

Know where to find the HST User Documentation

- HST User Documentation
- HST Proposal Opportunities and Science Policies
- HST Observatory and Instrumentation Documentation
  - The Hubble Space Telescope Primer for Cycle 30
  - Advanced Camera for Surveys
  - Cosmic Origins Spectrograph
  - Space Telescope Imaging Spectrograph
  - Wide Field Camera 3
  - Fine Guidance Sensor

Learn the HST observation planning tools

- ***Proposers should assume nominal performance from HST, as described in the HST User Documentation, and as assumed by the HST Exposure Time Calculator (ETC).***

- HST Exposure Time Calculator (ETC) – The HST ETC is a web-based tool for estimating how much exposure (science) time will be required for different HST instrument modes and configurations to achieve the desired science goals.

- Astronomer's Proposal Tool (APT) – APT is a stand-alone software package required for preparing HST observations and submitting HST proposals. Download APT here.

Design a HST observing program in APT

- Download and install the latest version of APT.
- Create a New HST proposal in APT and fill out the Proposal Information section
- Enter your target or targets
- Create a new Observation Folder and a new Observation with an observation template.
- View an Observation with the Aladin visualizer tool.

- Resolve any errors or warnings in APT.
- Check for duplicate observations in the archive and with the list of approved observations.

Write your science proposal

Create the PDF attachment of the proposal narrative, which includes a number of required text sections such as the Scientific Justification and Technical Justification.

Submit your HST proposal

- Attach the PDF of your scientific proposal to the APT program on Proposal Information form.
- Preview the entire proposal by selecting the APT PDF Preview tool. This view will merge the information provided in APT along with the PDF attachment, and is what the Telescope Allocation Committee (TAC) will review.
- Submit your completed proposal with APT. Select the APT **Submission Tool** in the top tool bar and follow the instructions. In the **Submission Log** window you will see a message giving the time of the submission, the assigned proposal ID (if a new proposal), and the submission status.
- After the initial submission, proposals can be re-submitted as needed (up to the stated deadline). Resubmitting does not change the proposal number received upon the initial submission.

Wait and Check

After you submit your proposal, all investigators will receive an automatic email acknowledgment that the submission was received successfully. If you do not receive that email within minutes of your submission, please check the APT Submission Log Window for a problem. In addition, all investigators will receive an additional email indicating whether your proposal was successfully processed after the submission deadline. If you do not receive this acknowledgement within **72 hours** of the deadline, please submit an incident to the HST Help Desk, http://hsthelp.stsci.edu/, as your submission was **NOT RECEIVED** and the TAC **WILL NOT** see your proposal; please provide the submission ID information from the APT Submission Log window. If there are any problems associated with your PDF attachment or APT information submitted, you will be contacted by email separately.

Notification of your proposal's status (approved or rejected) generally occurs within ~3 weeks of the Telescope Allocation Committee meeting.

Next steps for approved programs

Selected Phase I programs are contingent on the approval of the Phase II proposal. The HST Phase II Proposal Roadmap provides an overview and further details of the Phase II process.

U.S. investigators with approved HST programs are eligible for funding. See HST Grant Funding and Budget Submissions for further details. Successful HST observing proposals will be reviewed by a STScI instrument scientist and program coordinator. Programs may require adjustments or revisions after the award. The Instrument Scientist and Program Coordinator will iterate with proposers to finalize the observations in accordance with the TAC recommendations, under the approval of the STScI Director.

Next: HST Anonymous Proposal Reviews

HST Cycle 30 Anonymous Proposal Reviews

STScI has implemented a dual-anonymous proposal review process, where the identities of the proposing team are concealed from reviewers. The primary goal in so doing is to reduce bias for all, not provide a fix for a specific group that currently appears to be under-performing.

STScI has a responsibility to simultaneously ensure that the community has equal opportunity for the use of HST and that the best science is being done with the finite amount of observing time available. The Institute places a high value on the equity and integrity of the proposal review process. The goal is to enable each reviewer to focus on the science, not the scientist. Several studies have shown that a reviewer's attitude toward a submission may be affected, even unconsciously, by the identity of the lead author or principal investigator (see the Anonymous-Double Blind Review Annotated Bibliography [.pdf]). We have noted that HST proposals led by women have had systematically and successively lower success rates than those led by men. While the exact cause is unknown, independent studies (see On Gender Bias in Hubble Proposal Ratings [.pptx]) of our reviews suggest a double-anonymous process might help resolve this inequity, and may balance out other areas of potential bias including affiliation and country of origin. Such a process may also level the playing field between new and established researchers. The focus of the TAC review is to recommend the best science. The identity of the proposing team should not be a consideration in making this judgement.

In the spring of 2018, STScI convened a working group from the astronomy community to explore the idea of a dual-anonymous system and issue a set of recommendations to the STScI Director. The working group's report, along with detailed instructions to proposers and reviewers, and a list of FAQs, can be found on the Working Group's website. The dual-anonymous system was successfully implemented during the Delta 26 through Cycle 29 proposal reviews and will be implemented in Cycle 30. A summary of the dual-anonymous process guidelines, along with a description of how the review process will work, is given below.

The Review Process for Cycle 30

As in past cycles, proposers submit their proposals through APT. However, the PDF attachment that is uploaded containing the scientific and technical justifications must be anonymized following the guidelines below. Additionally, proposers must submit, via the Astronomer's Proposal Tool, a separate section titled "Team Expertise and Background." The review panels (and the Executive Committee) will conduct their review without seeing any of the names associated with the proposal, and without seeing the information in the "Team Expertise and Background" section. The panels will discuss the proposals and generate a final ranked list of proposals that are recommended for selection. In addition to the Panel Chair, each review panel (including the Executive Committee) will have a full-time "Leveler" present in the room during all panel discussions. The job of the Leveler is to ensure that discussions remain focused on the scientific merit of the proposal.

Once the ranked list is set, the panels will be given access to the "Team Expertise and Background" information associated with each proposal recommended for implementation. At this point, proposals may only be flagged for downgrade, where a downgrade would result in a non-selection of the proposal. If a proposal is downgraded after the team expertise review, other lower ranked proposals may not be upgraded to take its place. This flag, assigned by majority vote of the panel, should only be used in the most extreme circumstances of a team being clearly unqualified to undertake the work proposed. Should a proposal be suggested for downgrade, both the Panel Chair and the Leveler will participate in the discussion about why this recommendation is necessary. A detailed description of the reason for the flag must be given. This flag will then be passed on to the STScI Director, along with the proposal's initial ranking, and a statement by the panel on the rationale for flagging the proposal. The Director will make the final decision, in consultation with appropriate personnel from STScI, including the Science Mission Office (SMO), HST Mission Office, ESA Office, and operations/scheduling staff. Finally, any proposals that are downgraded will have the reasons for downgrade passed on to the proposers. The same process will be applied to Large proposals by the TAC.

Guidelines for the PDF Submission

Provided here are guidelines to assist proposers in preparing their proposals, specifically their PDF Submissions, to help conceal the identities of the proposers, and ensure a fairer proposal evaluation process. The anonymous review does not mean proposals will be accepted from anonymous sources. As with previous cycles, proposers must still enter the names and affiliations of all investigators into the APT system. **APT will not include names or affiliations in the versions generated for the reviews.**

While APT will largely obscure the proposing teams identities in cover materials, it will not change or alter information contained in the PDF submission. **Thus, it is necessary for proposers to take additional steps to further anonymize their PDF attachment before it is uploaded to APT**. Below are some guidelines to accomplish this:

- Do not include author names or affiliations anywhere in the PDF attachment. This includes but is not limited to, page headers, footers, diagrams, figures, or watermarks. This does not include references to past work, which should be included whenever relevant (see below).
- Referencing is an essential part of demonstrating knowledge of the field and progress. When citing references within the proposal, use third person neutral wording. **This especially applies to self-referencing**. For example, replace phrases like “as we have shown in our previous work (Doe et al. 2010)” with “as Doe et al. (2010) showed…” Do not refer to previous campaigns using HST or other observatories in an identifying fashion. For instance, rather than write "we observed another cluster, similar to the one we are proposing under HST program #XXXXX," instead write "HST program #XXXXX has observed this target in the past…"
- We encourage references to published work, including work citable by a DOI. It may be occasionally important to cite exclusive access datasets or non-public software that may reveal (or strongly imply) the investigators on the proposal. We suggest proposers use language like "obtained in private communication" or "from private consultation" when referring to such potentially revealing work.
- Do not include acknowledgements, or the source of any grant funding.

It takes some effort by authors to anonymize their PDF submissions. As the guidelines show, grammar and structure are expected to be different than in previous HST submissions. Some examples of re-worked text can be found on Example text for anonymous proposing. **Take sufficient time to prepare the manuscript, especially if planning to resubmit a proposal from a previous cycle or other submissions**.

Proposers should make an effort to describe the past work in the field, and how this proposal will improve, build-upon, or complete that past work. Many successful proposals include a discussion of stated-sample goals or statistical completeness and how this proposed work fits into this broader context. Similarly, proposals may also discuss the uniqueness of the sample, and goals in comparison to similar work.

Team Expertise and Background Section

As part of the proposal submission, proposers should complete the "Team Expertise and Background" section in APT. This section should provide a brief description of the expertise, background, and roles of key team members, as they relate to the science proposed. This section should be limited in length; for most proposals, a paragraph or two will suffice. For proposals with a large number of Co-Investigators, it is not necessary to report on the qualifications of every team member, nor is it necessary to provide a bio of all team members. If proposers wish, they can identify the PI in this section. An example is provided in the Proposer Guidelines in Anonymous Reviews.

Please note: the text box will support ascii text. Special text markup and LaTex are not supported.

Compliance

Compliance with this policy is mandatory. Proposals received with flagrant violations will be subject to disqualification before the review-panel stage. Proposals with less serious violations (e.g., forgetting to change a reference from first person to third person) will be allowed to remain in contention, but will be flagged for review by SMO and the STScI Director for a final decision. Feedback will be provided to the proposers regarding any violations.

A possible concern that may arise is the following: "I've made every effort to anonymize my proposal, have followed all the guidelines, changed all my references to third-person, but I fear that my work is so specialized (or my analysis methods so unique) that panelists who know me will still be able to figure out who I am. Will my proposal be disqualified?" So long as the guidelines above are followed, the answer is NO, such a proposal will not be considered to be in violation. **It is not necessary to "water down" or obscure your science, your methods, or your tools**; it is simply your responsibility to write about them in the third-person, in a way that does not intentionally identify yourself.

How Your Anonymous Proposal is Reviewed

Proposers need to write a proposal that concentrates on the science and is properly anonymous in regard to the Proposal Team, but the reviewers also have responsibilities to follow the dual-anonymous process, detailed in Dual Anonymous Proposals Guide for Reviewers. The primary objective of these reviews is to select the best science, not the best science teams. Panels, facilitated by Panel Chairs, rank proposals in order of scientific merit, and recommend the resources that should be allocated to each. The experience of the team with HST or otherwise is not a consideration until after rankings occur. **Reviewers are instructed to not spend time attempting to identify the team or the principal investigator**. All accepted proposals are assigned a Program Coordinator who works with the PI to finalize the Phase II submission for feasible observations. MAST provides "science ready" data for most uses, and there is help/documentation for further data processing. A reviewer's preliminary grading should be centered on the main review criteria. This includes technical issues in the design of the study, as described in the Description of Observations section and elsewhere. The discussion should focus on the scientific merit of the proposal. Chairs and Levelers are instructed to refocus or terminate discussion when it moves to PI or team.

Next: HST General Information, Resources, Documentation, and Tools

HST Cycle 30 General Information, Resources, Documentation, and Tools

This page contains general information about the Hubble Space Telescope proposal process, the organization of this document, and links to useful information.

About this Document

Two documents are of primary relevance for HST proposers: this Call for Proposals for Cycle 30 and the HST Primer for Cycle 30. The Call for Proposals discusses policies and procedures, and explains how to submit a Phase I proposal. The 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 requests.

The Call for Proposals is available electronically 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 hard copy, and with this in mind, the PDF version was optimized for printing.

General Guidelines for Proposal Preparation

- Stress why your science is critically important and why it requires HST.
- Write for the appropriate audience. Review panels span a broad range of scientific topics and reviewers necessarily span a broad range of expertise. This is especially true of the Executive Committee that reviews the Large and Treasury proposals. Keep in mind that often reviewers with the closest expertise to the topic of the proposal have a conflict of interest with the proposal and are prohibited from its review. It is therefore crucial that your proposal provides sufficient introductory material for the non-specialist, and explains the importance of the program to astronomy in general.
- Explain clearly and coherently what you want to do and why. Make sure to get your point across to reviewers who have to judge many proposals in a few days.
- If you have a project that requires a significant investment of HST observing time, do not hesitate to propose it. Cycle 30 will be open to all proposal categories.
- It is the responsibility of the proposer to ensure that the proposed observations are technically feasible. Proposals that are not technically feasible will be rejected, so familiarize yourself with the technical documentation provided by STScI. In particular, make sure that your observations do not exceed bright object safety limits in the Observing Considerations section of the HST Primer). Contact the STScI Help Desk if anything is not clear, or if you are unsure about the feasibility of a particular approach or observation.
- Proposers who are eligible for NASA funding and intend to request funds for supporting resources, including support for ground-based observations or for the analysis of archived ground-based observations, should make those intents clear in the scientific justifications of their Phase I proposals. The Financial Review Committee will not approve requests to cover costs for support resources in budget proposals (from successful programs) that are not justified in the approved Phase I proposals.

Resources, Documentation, and Tools

The Cycle 30 Announcement webpage provides links to information and documentation that will be useful to you while preparing your proposals. This page will also provide any late-breaking updates on the Phase I process, and answers to frequently asked questions. The 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 (Call for Proposals, Primer, etc.) are given for each step. The The Hubble Space Telescope Primer for Cycle 30 provides a basic introduction to the technical aspects of HST and its instruments, and explains how to request the appropriate number of orbits in a Phase I proposal. The Instrument Handbooks are the primary source of information for the HST instruments. They can be found following the relevant links on the HST Instruments Page. You should use current versions of the Instrument Handbooks when preparing a proposal. They are available for all instruments, including former instruments that may be of interest for Archival Research. The Handbooks are distributed electronically, and can be accessed from the HST Documents webpage. This page also provides links to more detailed technical information, such as that provided in Instrument Science Reports.

The Astronomer's Proposal Tool (APT)

The Astronomer's Proposal Tool (APT) is the interface for all Phase I and Phase II proposal submissions for HST. The current version of APT, along with minor bug fixes and enhancements, is essentially the same system as was used in the last cycle. See the "HST What's New" button in APT for details on the changes. The APT webpage contains information on the installation and use of APT.
The Aladin Sky Atlas is available via APT. This interface can be used to display HST apertures on images of the sky. This tool brings a variety of benefits to users including access to a wide variety of images and catalogs. The GALEX catalog is available in Aladin to assist in checking for potentially dangerous objects for the UV detectors. Training documentation and videos can be found on the APT Training Materials page.

Exposure Time Calculators (ETCs)

STScI provides Exposure Time Calculators (ETCs) for each of the HST instruments. Please use those electronic tools to estimate how long you need to integrate to achieve the signal-to-noise ratio required for your project. The ETCs will also issue warnings about target count rates that exceed linearity and safety limits. The ETCs can be accessed from the HST ETC webpage.

HST Data Archive

The HST Data Archive is part of the Mikulski Archive for Space Telescopes (MAST). The HST Data Archive contains all the data obtained by HST. Completed HST observations from both General Observer (GO) and Guaranteed Time Observer (GTO) programs are available to the community upon the expiration of their exclusive access periods. Observations taken by Large, Treasury, and Large GO Pure Parallel programs generally carry no exclusive access period.

The HST Archive Page provides links to information about getting started, search and retrieval, documentation, etc. You can search for HST data using either of two main search pages: the dedicated HST search page or the Data Discovery Portal. The Canadian Astronomy Data Centre (CADC) and the European Space Astronomy Centre (ESAC) maintain copies of the HST science data.

The Hubble Legacy Archive (HLA) is a project designed to enhance science from HST data by augmenting the HST Data Archive and by providing advanced browsing capabilities. Features of the HLA include a preview viewer, an interactive image display, a footprint service, individual and combined and mosaicked images, improved astrometric positions, object catalogs, and selected grism extractions. The HLA is a joint project of the Space Telescope Science Institute, the European Coordinating Facility (ST-ECF), and the Canadian Astronomy Data Centre. It offers access to high-level HST products including composite images and interactive tools for previewing data products. The Primer contains more detailed information about the HLA.

The HLA also produces source lists for tens of thousands of HST images. The Hubble Source Catalog (HSC) combines these visit-based WFC3, ACS, and WFPC2 source lists from the HLA into a master catalog with roughly 300 million sources. Version 1 of the HSC was released in February 2015, Version 2 was released in the Fall 2016 and Version 3 was released in July 2018. The HSC is an invaluable resource for exploring a wide range of new archival proposals, a few potential examples of which are also included in the HST Cycle 30 Primer.

Proposers can use high-level data products in the HST Spectroscopic Legacy Archive (HSLA) to increase the scientific use of existing spectroscopic data. This archive contains “science grade” co-added spectra of all usable public data, combining exposures for each target from across visits, programs, and cycles. This data is organized into “smart archives” by target type (such as “hot stars” and “white dwarfs”) and by scientific purpose (“IGM absorption sources”) so that samples can be readily constructed and downloaded without manual interaction with MAST. The third generation of these products that include FUV and NUV modes of COS is available on line via MAST. We encourage the development and submission of archival programs based on these products.

All non exclusive access data for current Hubble instruments (ACS, COS, STIS, WFC3, FGS) have been made available as part of the Amazon Web Services (AWS) public dataset program. Proposers may request to make use of this dataset under the archival legacy category.

Questions about the Archive and archival data should be sent to the Archive Help Desk at http://masthelp.stsci.edu.

NASA High-End Computing Program

NASA's High-End Computing (HEC) Program maintains a comprehensive set of resources and services for the agency's four Mission Directorates, the NASA Engineering and Safety Center, external collaborators, and the nation. By closely partnering with each Mission Directorate, the HEC Program addresses their specific resource requirements and user needs. Mission support includes ensuring reliable remote access for a user community spread broadly across NASA centers and partner organizations nationwide.

Successful HST proposers will be eligible to apply for NASA High-End Computing Time. Please indicate whether you intend to apply for HEC time in the text of the ‘Special Requirements’ section of the PDF submission. More information on NASA HEC Program can be found on https://www.hec.nasa.gov.

Duplication Checking

The HST Data Archive provides access to several tools that allow you to check whether planned observations duplicate any previously executed or accepted HST observations. See Data Rights and Duplication Policies for details.

STScI Help Desk

If this Call for Proposals and the materials referenced above do not answer your questions, or if you have trouble accessing or printing Web Documents, contact the STScI Help Desk at http://hsthelp.stsci.edu.

Next: HST Proposal Submission Policies

HST Cycle 30 Proposal Submission Policies

An overview of the policies regarding HST proposals, including deadlines, funding eligibility, and the definitions of the roles of principal investigator and co-investigator.

The Proposal Process: Phase I and Phase II

STScI manages the review of HST proposals in two phases. In Phase I, proposers submit a scientific justification and observation summary for peer review. The review panels and the Telescope Allocation Committee (TAC) recommend a list of proposals to the STScI Director for preliminary approval and implementation (see HST Proposal Selection Procedures). 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.**

Eligible investigators who request funding must submit detailed budgets (see HST Grant Funding and Budget Submissions).

Proposal Deadlines

Cycle 30 has the following deadlines:

- Phase I proposals are due **March 25, 2022 at 8:00pm EDT**
- Phase II proposals are due **July 14, 2022**
- Budget proposals are due **August 4, 2022 at 8:00pm EDT**

Who May Submit

Scientists of any nationality or affiliation may submit an HST proposal. Endorsement signatures are not required for Phase I observing proposals (unless required by the regulations of the proposing institution).

Principal Investigator and Co-Investigators

Each proposal must have a Principal Investigator (PI), who is responsible for the scientific conduct of the project. A Co-PI option is also available, allowing two or more proposers to share the scientific responsibility of the project. Any other individuals who are actively involved in the proposal should be listed as Co-Investigators (Co-Is). The proposal itself may be submitted through APT by either the PI or a Co-I.

Proposals by non-U.S. PIs that have one or more U.S. Co-Is must designate one of the U.S. Co-Is as the Administrative PI (Admin PI). This person will have overall oversight and responsibility for the budget submissions of the U.S. Co-Is in Phase II (see Grant Funding for funding eligibility requirements). All proposals have the option of designating a Contact Co-I, who will serve as the contact person for that proposal. The PI remains responsible for oversight of the proposal.

All proposals are reviewed without regard to the nationalities or affiliations of the investigators.

ESA Scientists

An agreement between NASA and ESA states that a minimum of 15% of HST observing time (on average over the lifetime of the HST project) will be allocated to scientists from ESA member states. It is anticipated that this requirement will continue to be satisfied via the normal selection process, as it has been in previous cycles. ESA scientists will be identified automatically by APT based on the institution selected; the ESA flag will only be visible in the PDF output.

Student PIs

Observing proposals from student PIs will be considered.

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.

Funding

Subject to availability of funds from NASA, STScI will provide financial support for U.S. PIs and Co-Is of approved Cycle 30 programs. Budgets are not due in Phase I, but are required by the budget submission deadline from successful proposers. Details of the STScI Funding Policies are outlined in HST Grant Funding and Budget Submissions.

NASA's Science Mission Directorate has restructured its education program, and as a result STScI no longer solicits Education/Public Outreach (E/PO) proposals. We will keep the HST Cycle E/PO community informed of future opportunities should they become available.

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.

Proposal Confidentiality

Proposals submitted to STScI will be kept confidential to the extent allowed by the review process described in HST Proposal Selection Procedures. For accepted proposals, the scientific justification section of the proposal remains confidential, but other sections become publicly accessible, including PI and Co-I 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.

Next: HST Proposal Categories

HST Cycle 30 Proposal Categories

This page describes all proposal types in detail. Proposals can be General Observer (GO) or Archival (AR) in nature, and can be joint projects with other observatories. STScI also accepts Mid-cycle and Director's Discretionary time proposals.

Overview of Proposal Categories

HST observations can be requested with a General Observer (GO) or a Snapshot (SNAP) Proposal. A GO Proposal in Cycle 30 can be *Small, Medium, Large, Calibration, Long-Term*, or *Treasury*. Subject to the availability of funds from NASA, STScI will provide financial support for **U.S. PIs and Co-Is** of approved programs. Funding for projects that do not require new HST observations can be requested with an Archival Research (AR) Proposal. An AR proposal can be a *Regular AR, Legacy AR*, or *Theory* Proposal. AR proposals can also take advantage of Cloud Computing for compute-intensive analyses.

Proposals can request observing time on Chandra, XMM-Newton, TESS, NOIRLab telescopes, and NRAO facilities in conjunction with requests for HST observations. Mid-cycle proposals may be submitted at any time, those received prior to **September 30, 2022** will receive consideration for execution beginning in November or December 2022, and those received prior to **January 31, 2023** will receive consideration for execution beginning in March or April 2023. Investigators may also request Director's Discretionary (DD) time at any time for unanticipated and scientifically compelling astronomical observations.

All proposals are peer reviewed. The panels have an orbit allocation for small proposals and a specific quota for medium proposals. Archival and SNAP proposals are ranked with the GO proposals. The Large/Treasury /Legacy proposals are reviewed separately. Further details on the peer review process are described in HST Proposal Selection Procedures.

General Observer (GO) Proposals

A GO Proposal may be submitted for any amount of observing time, counted in terms of HST Orbits. The proposal categories are intended to ensure that compelling science programs of different sizes have comparable success rates.

GO Proposals are classified as Small (1-34 orbits), Medium (35-74 orbits), and Large (75 or more orbits). The HST Primer's Orbit Calculation Overview page describes how the required number of orbits can be calculated for a particular set of observations. Proposals in each of these categories can request observing time in future cycles when this is scientifically justified (long-term proposals). The additional category of Treasury Proposals is designed to stimulate certain types of ambitious and innovative proposals that may not naturally fit into the Small, Medium, or Large Proposal categories.

Proposers should note that all HST observations are accepted with the understanding that the timescale on which the observations will actually be obtained will depend on scheduling opportunities and demands on HST resources. Experience has shown that programs with scheduling constraints may require execution over an extended period.

In general, proposals are either accepted or rejected in their entirety. Accordingly, you are urged to request the actual number of orbits required to achieve your science goals.

Subject to the availability of funds from NASA, STScI will provide financial support for **U.S. PIs and Co-Is** of approved programs. For accepted proposals, a Program Management Plan is required with the budget proposal submissions (see HST Grant Funding and Budget Submissions).

Small GO Proposals

Small GO Proposals are those that request between 1 and 34 orbits.

It is anticipated that up to 1500 orbits in total will be available for the allocation of Small Proposals in Cycle 30. A total of 1397 orbits in this category were allocated for execution in Cycle 27. A total of 1698 orbits in this category were allocated for execution in Cycle 28. A total of 1240 orbits in this category were allocated for execution in Cycle 29.

Medium GO Proposals

Medium GO Proposals are those that request between 35 and 74 orbits.

It is anticipated that up to 800 orbits in total will be available for the allocation to Medium Proposals in Cycle 30. This nominal allocation is consistent with previous cycles. In Cycle 27, 15 Medium Proposals were selected totaling 678 orbits. In Cycle 28, 11 Medium Proposals were selected totaling 520 orbits, in Cycle 29, 17 Medium Proposals were selected totaling 761 orbits. However, the Executive Committee has the ability to recommend an increase or decrease in the Medium proposal allotment to balance the over-subscription between Small, Medium, and Large Proposals categories.

Large GO Proposals

Large GO Proposals are those that request 75 orbits or more.

Large Programs should lead to a clear advance in our understanding in an important area of astronomy. They must use the unique capabilities of HST to address scientific questions in a comprehensive approach that is not possible in smaller time allocations. Selection of a Large Proposal for implementation does not rule out acceptance of Medium Proposals to do similar science, but target duplication and overall program balance will be considered.

Approximately 700 orbits will be available to new Large and Treasury Proposals in Cycle 30. Descriptions of previous programs are available on the Treasury, Archival Legacy and Large (TALL) Programs webpage. Most Large Proposals accepted in previous cycles were allocated between 100 and 150 orbits, although larger orbit requests are welcome if scientifically justified.

Data taken for all Large Programs have no exclusive access period as a default. Proposers may request an exclusive access period, and that request should be justified in the 'Special Requirements' section of the proposal. Such a request will be subject to review by the TAC.

Investigators submitting Large Proposals should consult the Large Program Scheduling User Information Report (pdf) and the HST Orbital Viewing and Schedulability page. These documents contain necessary information for developing a Large Program that is feasible with respect to HST orbit scheduling. A target's orbital visibility depends on its declination and varies with HST's 56-day orbit precession. In Phase I, the minimum visibility period must be used for planning Large programs in order to maximize scheduling flexibility. This minimum visibility (SCHED 100) will be enforced in Phase II as well. Proposers should include additional technical detail on the scheduling aspects of their program in the 'Description of Observations' section. The shorter orbital visibility will be enforced in Phase II for each approved Large Program.

Detailed Program Management Plans will be required with the budget submissions (see HST Grant Funding and Budget Submissions), and are not requested with the Phase I submission (see HST Anonymous Proposal Reviews).

Long-Term GO Proposals

Small, Medium, Large, and Treasury GO Proposals may request HST observing time in more than one cycle if a clear scientific case is made.

Long-Term Proposals must be limited to cases where long-baseline, multi-epoch observations are clearly required to optimize the scientific return of the project.

Long-Term Proposals require a long time baseline, but not necessarily a large number of HST orbits, in order to achieve their science goals. Examples include astrometric observations or long-term monitoring of variable stars or active galactic nuclei.

You may request time in up to three observing cycles (30, 31, and 32). Long-Term Proposals should describe the entire requested program and provide a cycle-by-cycle breakdown of the number of orbits requested. The Cycle 30 review panels and TAC will only be able to award a limited amount of time in future cycles, so a detailed scientific justification for allocating time beyond Cycle 30 must be presented. Scheduling concerns are not a sufficient justification. The sum of all orbits requested in Cycles 30, 31, and 32 determines whether a Long-Term Proposal is Small, Medium or Large. Only the orbits requested for Cycle 30 count against the Cycle 30 orbit allocation available to the TAC. Target-of-Opportunity Proposals are eligible to be Long-Term if certain conditions are met.

GOs with approved Long-Term Proposals need not submit continuation proposals in the subsequent cycles (and hence, GOs who had Cycle 30 time approved in Cycles 28 or 29 do not have to submit a Phase I continuation proposal, although a new Phase II and budget submission will be required for each cycle).

Budget requests submitted for the first cycle of a Long-Term Proposal should include costs only for the effort to reduce and analyze the data obtained in the first cycle. Separate budget proposals are required in each subsequent cycle; see Grant Funding and Budget Submissions.

Treasury GO Proposal

Treasury Proposals are those designed to create datasets of lasting value to the HST project that should be obtained before HST ceases operations. A Treasury Program is defined by the following characteristics:

- The program should focus on the potential to solve multiple scientific problems with a single, coherent dataset. It should enable a variety of compelling scientific investigations.
- 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 a Treasury Program will usually have no exclusive access period (see Data Rights), although brief exclusive access periods may be requested if that will enhance the public data value. Such requests are subject to TAC approval.

The following additional characteristics are particularly encouraged:

- Development of new techniques for observing or data reduction.
- Creation and dissemination of tools (software, web interfaces, model, etc.) for the scientific community to work with the data products.

The emphasis in Cycle 30 remains on observations whose value is maximal if taken soon. However, Treasury Proposals may request observing time to be distributed in future cycles if scientifically required (similar to the situation for Medium and Large Long-Term GO Proposals). In this cycle approximately 700 orbits of HST time will be available for new Large and Treasury Proposals. Descriptions of previous Treasury Programs are available on the HST Treasury, Archival Legacy and Large Programs webpage.

Treasury Programs will be selected by the TAC as part of the normal peer review process. Successful proposals will be reviewed by STScI to ensure observing efficiency. STScI resources may be made available to approved Treasury Programs by decision of the STScI Director. In particular, some programs 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.

Investigators submitting Treasury Proposals must select the Treasury Program flag on the APT cover page, use an orbital visibility that enhances schedulability (use the Increase Schedule Flexibility flag in APT), and include additional technical details on the scheduling aspects of their program in the “Description of the Observations” section. Note that a proposal can be both Large and Treasury. Submitters of Large Treasury Proposals should consult the Large Program User Information Report, which can be found on the HST Documents webpage (linked from the Cycle 30 Announcement webpage.) This document contains a discussion of the issues surrounding Large Program scheduling.

Treasury Proposals should be identified in the 'Special Proposal Types' section of the proposal.

The Scientific Justification section of the proposal (see HST Cycle 29 Preparation of the PDF Attachment) should include a description of the scientific investigations that will be enabled by the final data products, and their importance. The Description of the Observations section of the proposal 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.

Detailed Program Management Plans should be submitted with the budget submissions (see HST Grant Funding and Budget Submissions).

Calibration GO proposals

HST is a complex observatory, with many possible combinations of observing modes and spectral elements on each instrument. Calibrations and calibration software are maintained by STScI for the most important and most used configurations. However, STScI does not have the resources to calibrate fully all potential capabilities of all instruments. On the other hand, the astronomical community has expressed interest in receiving support to perform calibrations for certain uncalibrated or poorly calibrated modes, or to develop specialized software for certain HST calibration and data reduction tasks. In recognition of this, STScI is encouraging outside users to submit Calibration Proposals, which aim to fill in some of the gaps in our coverage of the calibration of HST and its instruments.

Calibration Proposals must be identified in the ‘Special Proposal Types’ section of the proposal.

Calibration Proposals should not be linked explicitly to a specific science program, but should provide a calibration or calibration software that can be used by the community for existing or future programs.

Users submitting Calibration Proposals must contact the appropriate instrument group to discuss their program prior to submission.

Successful proposers will be required to deliver documentation, data products, and software products (depending on the case) to STScI to support future observing programs or archival research. Funding is available to support Calibration Proposals in the same manner as for normal science programs, with the exception that **scientists affiliated with STScI are not eligible for any funding to support their role (as PI or Co-I) in a Calibration Proposa**l.

Calibration Proposals will be reviewed internally at STScI by the Instruments Division. The internal review will provide the TAC with an assessment of the feasibility of the proposal, how the proposal complements or extends the existing calibration program, and the type of science impacted by the proposed calibrations. Proposers should summarize the relevance and overall scientific utility of the calibration techniques and products described in their proposal.

Proposed science programs that have special calibration requirements should not be submitted as Calibration Proposals, and should instead be submitted according to its size categorization (Small, Medium, or Large). Such a proposal should describe the necessary calibration observations in the PDF attachment (see HST Cycle 30 Preparation of the PDF Attachment).

Investigators interested in the submission of a Calibration Proposal are encouraged to study the Instrument Handbooks to determine the level at which STScI provides calibration and characterization. Examples of the kinds of topics that have been addressed by previous Calibration Programs include:

- Calibration of faint photometric standards for ACS and WFC3.
- ACS photometric zero point verification.
- Calibration of the ACS emission line filters

See the HST Scientific Instruments webpage for a complete description of the instrument calibration plans and accuracies, and for other potential topics.

The data obtained for a GO Calibration Proposal will nominally be non-exclusive access, as is the case for regular calibration observations. Proposers may request an exclusive access period (which should be explained in the 'Special Requirements' section of the proposal), but such a request will be subject to panel and TAC review and will be granted only in exceptional circumstances. Calibration Proposals may also be submitted as Snapshot Proposals or Archival Proposals. AR Proposals are appropriate in cases where the necessary data have already been taken, or for programs that do not require specific data but aim to develop specialized software for certain HST calibration and data reduction tasks.

Snapshot (SNAP) Proposals

Snapshot (SNAP) Programs consist of separate, relatively short observations that are required to have a duration of no more than 45 minutes per visit including all overheads except for the final data buffer dump which can be pushed into occultation or be done during slews. During the process of optimizing the HST observing schedule, the scheduling algorithm occasionally finds short time intervals where it is impossible to schedule any exposures from the pool of accepted GO Programs. In order to make the HST schedule more efficient, STScI has developed the capability to insert Snapshot exposures of objects selected from a large list of available candidates. In Cycle 30, up to 1000 SNAP observations may be accepted to provide a sufficiently large pool of candidates.

Subject to the availability of funds from NASA, STScI will provide financial support for **U.S. PIs and Co-Is** of approved programs.

Characteristics of SNAPs

Accepted SNAP Programs are allocated a specific number of targets. However, there is no guarantee that any individual target will be observed, because SNAPs are placed on the schedule only after the observing sequence has been determined for the higher-priority GO targets. The number of observations actually executed depends on the availability of appropriate schedule gaps. In general, only a fraction of the allocated targets will be observed. Unlike GO Programs, SNAP Programs cannot request observing time in future cycles. However, un-executed SNAPs remain active at decreased priority for a second cycle.

There is no commitment on the part of STScI to obtain any specific completion factor for SNAP Programs.

The average expected completion rate for SNAP Programs is ~33%. However, the actual completion rates for individual programs vary, depending on several factors including the number of targets and the average duration and sky distribution of the observations. In general, shorter-duration and well-distributed SNAP observations have a higher number of scheduling opportunities and a higher chance of being executed than longer duration and/or spatially clustered SNAP observations.

Investigators interested in proposing for SNAPs are encouraged to consult the SNAP User Information Report , which contains details on how SNAPs are scheduled, the rules pertaining to them, and other useful information.

Budget proposals for SNAPs should be submitted, and will be reviewed, based on the average completion rate. Subject to availability, supplemental funding may be requested for SNAPs that execute at a higher rate.

Calibration SNAP Proposals

Calibration Proposals may also be submitted as SNAP Proposals. As with GO Calibration Programs, all data obtained will be non-exclusive access unless proposers specifically request an exclusive access period. Successful proposers will be required to deliver documentation, and data products, and software (when applicable) to STScI to support future observing or archival programs.

Users submitting Calibration Proposals are required to contact the appropriate instrument group to discuss their program prior to submission.

Calibration Proposals must be identified in the 'Special Proposal Types' section of the proposal.

Guidelines for SNAP Proposals

Please consider the following when developing your SNAP Proposal:

- Your willingness to waive part or all of the exclusive access data-rights period. This willingness is included in the selection criteria.
- You need not give a complete list of all targets and their coordinates in your Phase I proposal. However, you must specify the number of targets, and unambiguously identify the targets (e.g., reference to target lists in papers, or give a detailed description of the target characteristics). SNAP exposures may not be used for targets of opportunity observations.
- In the 'Observation Summary' section of the proposal you should provide a typical example of a SNAP exposure.
- SNAP Programs cannot request observation times longer than 45 minutes, including guide star acquisition and target acquisition. In general, shorter duration SNAP observations have more scheduling opportunities than longer ones.

- All SNAP targets must be submitted by the Phase II deadline, and follow the same procedures for target changes as GO programs.
- SNAP observations should not include any special scheduling constraints (e.g., CVZ or telescope orientation requirements). However, the special requirement BETWEEN may be used in the Phase II Program in some circumstances; for details see the SNAP User information Report.
- A SNAP observation must not have any links to other SNAPs (e.g., relative timing or orientation constraints), even if the SNAPs are of the same source.
- SNAP Programs may not contain identical observations of the same source in different visits, unless there is a scientific motivation for obtaining observations of the same source at different times (e.g., monitoring or follow-up observations). In the latter case, multiple identical visits of the same source may be requested; they should be counted as multiple targets (e.g., 10 different SNAP visits of the same galaxy count as 10 targets). Due to the nature of SNAPs, repeated observations are not guaranteed.
- Moving-target SNAP Programs are acceptable only if the timing requirements are of at least one month duration. Solar system targets interior to the orbit of Jupiter are not permitted. Timing constraints will reduce the chance of a target being scheduled. Due to the amount of effort required in implementing moving target SNAP Programs, these observations ordinarily cannot be revised during the observing cycle, once the initial processing has been completed.
- SNAP Programs with the ACS/SBC are not allowed.
- The number of spectroscopic COS and STIS/MAMA SNAPs (other than those using the NUV-PRISM) is limited to 150, due to the target and field bright-object checking requirements. For the same reason, imaging and moving target SNAPs with COS or STIS/MAMA modes are not allowed. Variable STIS /MAMA and COS SNAP targets must have well-defined MAXIMUM UV fluxes, which will be used for the bright-object checking. There are no restrictions on the numbers or variability of proposed STIS/CCD SNAP targets, which do not require bright-object checking and have a higher expected completion rate since they are not restricted to SAA-free orbits. Thus, use of the CCD NUV configurations should be considered instead of the MAMA NUV when possible.
- STIS/CCD SNAPs are allowed for both imaging and spectroscopic modes.
- STIS/MAMA SNAP Proposals should be limited to one or a few straightforward configurations. Specifically, use of the NDQ filters is not allowed. Use of the 0.2x0.2 echelle aperture is recommended for first-order programs without a scientific long-slit requirement, in order to expedite the field-screening process. Excessively complex STIS/MAMA SNAP targets, fields, or instrumental configurations may not be implemented in Phase II because of the limited resources available for bright-object checking, combined with the relatively low expected completion rate; if you are in doubt on this issue, contact the STScI Helpdesk.
- Programs that require both GO orbits and SNAP targets should be submitted as two separate proposals. The proposals should refer to each other so the reviewers will be aware the proposals are part of the same project. This allows you to ensure that some essential targets are observed (the GO Program) with the rest of the targets being sampled statistically (the SNAP Program).
- Because SNAP targets are added to the observing schedule at a late stage of the schedule building process, moving-target SNAP Programs may not use any detector that requires bright object screening (e.g. STIS/MAMA or COS). It is simply not practical to screen the field for any background objects that might violate bright-object screening limits.

Archival Research (AR) Proposals

Observations that are no longer exclusive access are available for analysis by interested scientists through direct retrieval from the HST Data Archive or from the Hubble Legacy Archive (HLA). The retrieval is free and does not involve financial support. The HST Archival Research (AR) Program can, however, provide financial support for the analysis of such data sets. AR Phase I proposals must outline an Analysis Plan for the

program. Detailed budgets are due in Phase II only (as is the case for GO Proposals). Proposals for AR funding are considered at the same time, and by the same reviewers, as proposals for observing time, on the basis of scientific merit.

Subject to the availability of funds from NASA, STScI will provide financial support for **U.S. PIs and Co-Is** of approved programs.

Regular AR Proposals

The general goal of a Regular AR Proposal is to analyze a subset of data from the HST Archive to address a specific scientific issue. The analysis must improve on the previous use(s) of the data, or the scientific questions addressed must differ from those tackled by the original programs that obtained the data.

There is no limit to the amount of funding that may be requested in a Regular AR Proposal. The majority of the awards in recent cycles have been under $120,000, with a median around $50,000. However, STScI actively encourages the submission of more ambitious AR Programs for which larger amounts of funding may be justified. Budget details are not required in the Phase I submission. Detailed Program Management Plans are required with the budget submissions, and should be commensurate with the work plan scoped by the Phase I (see HST Grant Funding and Budget Submissions).

An AR Proposal will be considered to be a Regular AR Proposal, unless it is identified in the 'Special Proposal Types' section of the proposal as an AR Legacy, Theory, Cloud-Computing, or Calibration Proposal. Multiple Special Proposal Types can be selected.

Legacy AR Proposals

A Legacy AR Proposal is defined by the following characteristics:

- The project should perform a homogeneous analysis of a well-defined subset of data in the HST Archive.
- The main goal should be to provide a homogeneous set of calibrated data and/or ancillary data products to the scientific community.
- The results of the project should enable a variety of new and important types of scientific investigations.
- We also encourage the development of software tools for dissemination to the community. The development effort can be the main focus of the program provided that the tools have broad application to HST data.

The main difference between a Regular and a Legacy AR Proposal is that the former aims at performing a specific scientific investigation, while the latter will also create data products and/or tools for the benefit of the community. While Legacy AR Proposals will be judged primarily on the basis of scientific merit, the importance and broad applicability of the products produced by the Legacy Proposal will be key features in judging the overall scientific merit of the proposal.

It is a strict requirement for Legacy AR Proposals that the proposed data products be created and distributed to the community in a timely manner. Data products should also be delivered to STScI in suitable digital formats, to allow dissemination via the HST Data Archive or related channels.

It is anticipated that Legacy AR Proposals will be larger in scope and requested funds than most Regular AR Proposals. While there is no lower limit on the requested amount of funding, it is expected that most Legacy AR Proposals will require at least $120,000, and possibly up to a few times this amount, to accomplish their goals. Commensurate with the expected scope, Legacy AR Proposals are allowed to be multi-year projects, although this is not a requirement. Multi-year projects will be funded on a yearly basis, with continued

funding beyond the first year subject to a performance review. Budget details are not required in the Phase I submission. Detailed Program Management Plans are required with the budget submissions, and should be commensurate with the work plan scoped by the Phase I (see HST Grant Funding and Budget Submissions).

Legacy AR Proposals will be evaluated by the TAC (see Proposal Selection Procedures) in conjunction with Large and Treasury GO Proposals. The Scientific Justification section of the proposal should include a description of the scientific investigations that will be enabled by the final data products, and their importance. The Analysis Plan section should describe the plans for data analysis, the data products that will be made available to STScI and the community, the method of dissemination, and a realistic timeline. Descriptions of past programs are available on the HST Treasury, Archival Legacy and Large Programs webpage.

Calibration AR Proposals

Calibration Proposals may be submitted as AR Proposals. AR Proposals are appropriate in cases where the necessary data have already been taken, or for programs that do not require specific data but aim to develop specialized software for certain HST calibration and data reduction tasks. Examples of topics that have been addressed by Calibration Programs of the type discussed here are:

- Calibration of Lyman-alpha flat fields
- Creation of a coronagraphic PSF library for STIS/CCD
- Characterization of the spectroscopic PSF for STIS/CCD

For a complete description of the instrument calibration plans/accuracies, and for other potential topics, please see the Scientific Instruments webpage.

Users submitting Calibration Proposals must contact the appropriate instrument group (accessible via the STScI Helpdesk) to discuss their program prior to submission.

AR Theory Proposals

The opportunity exists under the HST Archival Research Program to obtain financial support for theoretical research. Research that is primarily theoretical can have a lasting benefit for current or future observational programs with HST, and it is appropriate to propose theory programs relevant to the HST mission.

A Theory Proposal should address a topic that is of direct relevance to HST observational programs, and this relevance should be explained in the proposal. Funding of mission-specific research under the HST Theory Program will be favored over research that is appropriate for a general theory program (e.g., the NASA Science Mission Directorate Astrophysics Theory Program; ATP). The primary criterion for a Theory Proposal is that the results should enhance the value of HST observational programs through their broad interpretation (in the context of new models or theories) or by refining the knowledge needed to interpret specific observational results (a calculation of atomic cross sections may fall under the latter category). The results of the theoretical investigation should be made available to the community in a timely fashion.

Theory proposals should describe the impact on observational investigations with HST. Review panels will consist of observational and theoretical astronomers with a broad range of scientific expertise. They will not necessarily have specialists in all areas of astrophysics, particularly theory, so the proposals must be written for general audiences of scientists. The ‘Analysis Plan’ section of the proposal should discuss the types of HST data that will benefit from the proposed investigation, and references to specific data sets in the HST Data Archive should be given where possible. This section should also describe how the results of the theoretical investigation will be made available to the astronomical community, and on what time-scale the results are expected.

As with the other AR Proposals, there is no limit to the funding that may be requested in Theory Proposals. It is expected that most Legacy Theory Proposals will require at least $120,000, and possibly up to a few times this amount, to accomplish their goals. Commensurate with the expected scope, Theory Proposals are allowed to be multi-year projects, although this is not a requirement. Multi-year projects will be funded on a yearly basis, with continued funding beyond the first year subject to a performance review. While regular Theory proposals will be evaluated by the panels, Legacy Theory Proposals will be evaluated by the TAC (see Proposal Selection Procedures) in conjunction with Large and Treasury GO Proposals. Descriptions of past programs are available on the HST Treasury, Archival Legacy and Large Programs webpage.

The Scientific Justification section of the proposal should include a description of the scientific investigations that will be enabled by the final data products, and their importance. The Analysis Plan section should describe the plans for data analysis, the data products that will be made available to STScI and the community, the method of dissemination, and a realistic timeline.

Detailed Program Management Plans are required with the budget submissions (see HST Grant Funding and Budget Submissions).

AR Cloud Computing Studies

All non-exclusive access data for current Hubble instruments (ACS, COS, STIS, WFC3, FGS), have been made available as part of the Amazon Web Services (AWS) public dataset program (aws.amazon.com/public-datasets/). Providing these data in close proximity to AWS faciliates new types of compute-intensive analyses that may have not previously been possible due to individual researcher or research group compute resources. Proposals to make use of this dataset should select the Cloud Computing check box next to the AR category in APT, and be prepared to include a line item in their budget for AWS costs (limit $10,000).

Example use cases for leveraging this data could include: Large scale (re)analyses of data to measure photometric properties or proper motions, computationally-intensive tasks such as training machine learning classifiers, and live community-facing services.

Further reading:

- Link to HST data on AWS: https://registry.opendata.aws/hst/
- AWS machine learning services: aws.amazon.com/machine-learning/
- AWS spot computing: aws.amazon.com/ec2/spot/spot-and-science/
- Educational & research use cases: aws.amazon.com/government-education/research-and-technical-computing/

AR Data Science Software Proposals

Proposers have an opportunity under the AR Program to obtain financial support for the development of software products that will be made available to the community for the purposes of analyzing HST data. Introductory descriptions of the data products created by the HST calibration pipeline and related software tools and links to more details are available on the HST Primer: Data Processing and the HST Data Archive page. Examples of additional products include, but are not restricted to,

- scripts to mitigate artifacts from specific detectors,
- tools to identify and extract fluxes/magnitudes from multiple sources within a field,
- utility software for working with HST data products,
- or codes to produce background-subtracted spectra or software to interact with HST archive services.

Please contact the Data Science Mission Office (dsmo@stsci.edu) for additional guidance. The primary criterion for a Community Data Science Proposal is that the results should broadly enhance the value of HST

observational products for anyone in the astronomical community. The results of the data science software development should be made available to the community in a timely fashion through an appropriate distribution platform. Open source software using a standard license (https://opensource.org/licenses) is encouraged. The software should have thorough internal documentation at a level consistent with software best practices, and, if computationally intensive, should be compatible with a cloud computing service.

There is no limit to the amount of funding that may be requested, but it is expected that the amounts will be at a similar level to those in the Regular AR category. The effort detailed in the Management Plan section of the proposal should be commensurate with the level of funding requested.

A Community Data Science Software Proposal may be submitted by a non-U.S. PI if there are one or more U. S. Co-Is who request funding.

The 'Scientific Justification' section of the proposal should describe the proposed software plan and also its impact on observational investigations with HST. Review panels will consist of observational and theoretical astronomers with a broad range of scientific expertise. They will not necessarily have specialists in all areas of astrophysics, particularly software development, so the proposals must be written for general audiences of scientists. The 'Analysis Plan' section of the proposal should discuss the types of HST data that will benefit from the proposed investigation, and references to specific data sets in MAST should be given where possible. This section should also describe how the results of the investigation will be made available to the astronomical community, and on what time-scale the results are expected.

Guidelines for AR Proposals

Please consider the following when developing your AR Proposal:

- In general, any HST data that you wish to analyze must reside (or be expected to reside) in the Archive, and be released from exclusive access rights by the start of Cycle 30 (October 1, 2022). This restriction does not apply to the ULLYSES datasets.
- Users should consult the Large Searches and Requests webpage for information on searching for and downloading large datasets.
- Programs that require funding for Archival Research and also new observations should be submitted as two separate proposals: one requesting funding for the Archival Research, and the other proposing the new observations. The proposals should refer to each other so that the reviewers will be aware that the proposals are part of the same project.
- Investigators are allowed to submit an AR Proposal to analyze data that was obtained in a previous GO Program on which they were themselves PI or Co-I, but only if the goals of the AR Proposal differ significantly from those for which GO funding was awarded previously.
- STScI encourages the submission of AR Proposals that combine HST data with data from other space-missions or ground-based observatories, especially those data contained in the Mikulski Archive for Space Telescopes (MAST). STScI is an active partner of the Virtual Observatory (VO), and MAST is implementing VO technology to make its data holdings available. In particular, the MAST Data Discovery Portal is available at http://mast.stsci.edu/explore. The Discovery Portal is a one-stop Web interface to access data from all of the MAST supported missions, including HST (in particular the Hubble Legacy Archive- HLA, and Hubble Source Catalog- HSC), TESS, Kepler, GALEX, FUSE, IUE, EUVE, and Swift-UVOT.

Suggestions for AR Proposals

STScI would like to point out the following sources for Archival Research:

- The data being obtained for the Frontier Fields Program.
- The data obtained by the HST Pure Parallel Program.

- The data obtained for the Hubble Deep Field (HDF), the Hubble Deep Field-South (HDF-S) and the Hubble Ultra Deep Field (UDF).
- The data obtained by the HST Treasury Programs, which are described on the HST Treasury, Archival Legacy and Large Programs webpage. Community-contributed high-level science products from imaging and spectroscopic surveys (including GOODS, GRAPES, and GEMS) are available from the MAST High Level Science Product webpage.
- Projects that utilize the Hubble Source Catalog. A few potential examples are listed in the HST Primer.

Joint Observing Programs

STScI has reached agreements with several other observing facilities (Chandra, XMM-Newton, TESS, NOIRLab, NRAO) to award time for joint programs in which HST science is the prime science, but multi-wavelength observations from another ancillary observatory are critical for the science goals of the proposal. Joint programs may be for any amount of HST time.

Joint HST-Chandra Observing Proposals

If your science project requires observations from both HST and the Chandra X-ray Observatory, you can submit a single proposal to request time on both observatories to either the HST Cycle 30 or the Chandra Cycle 24 review. This avoids the "double jeopardy" of having to submit proposals to two separate reviews. A description of past HST joint programs is available on the HST Joint Programs webpage.

Joint HST-Chandra proposals are of two types:

Regular HST-Chandra Proposals: By agreement with the Chandra X-ray Center (CXC), STScI will be able to award up to 400 kiloseconds of Chandra observing time. Similarly the CXC will be able to award up to 100 orbits of HST time to highly rated proposals awarded Chandra time in its TAC process. The only criterion above and beyond the usual review criteria is that the project must be fundamentally of a multi-wavelength nature, and that both sets of data are required to meet the science goals. Time will only be awarded to joint proposals if both data sets are required for the proposed science. It is not essential that the project requires simultaneous Chandra and HST observations. Chandra time will only be awarded in conjunction with new HST observations (and should not be proposed for in conjunction with an AR or Theory Proposal).

Large HST-Chandra Proposals: By agreement with the CXC, STScI will be able to award an additional 600 kiloseconds of Chandra observing time for Large joint programs. These programs are defined as requiring at least 75 orbits of HST time and at least 400 ksec of Chandra observations. Similarly, CXC will be able to award up to 150 orbits for Large Programs submitted to the Chandra TAC. As with Regular HST-Chandra Proposals, the only criterion above and beyond the usual review criteria is that the project must be fundamentally of a multi-wavelength nature, and that both sets of data are required to meet the science goals. It is not essential that the project requires simultaneous Chandra and HST observations.

Of the 1 Msec of Chandra observing time that can be awarded in the HST review, only approximately 15% of the observations may be time-constrained. In addition, only one rapid ToO can be awarded (less than 20 days turn-around time). A Chandra ToO is defined as an interruption of a command load, which may include several predictable observations within that one-week load. HST Cycle 30 proposers should keep their Chandra requests within these limits.

Regular proposals for combined HST and Chandra observations should be submitted to the observatory that represents the prime science (not to both observatories). Large HST-Chandra proposals (or Very Large Programs, as CXC defines them) may be submitted to either, but not both, observatories. STScI reserves the right to disallow HST observations that duplicate those approved via any joint program unless the duplications are justified in the original proposals. The Chandra Cycle 24 deadline is expected to be in mid-

March, 2022. While there is multi-wavelength expertise in the review panels for both observatories, typically the HST panels will be stronger in IR/optical/UV science and the Chandra panels in X-ray science.

Establishing the technical feasibility of the Chandra observations is the responsibility of the PI, who should review the Chandra documentation or consult with the CXC. A description of the technical information that should be included in the proposal is given in Joint HST-Chandra Observations. For proposals that are approved by HST, the CXC will perform detailed feasibility checks in Chandra Cycle 24. The CXC reserves the right to reject any previously HST-approved observation that proves infeasible, impossible to schedule, and /or dangerous to the Chandra instruments. Any Chandra observations that prove infeasible or impossible could jeopardize the overall science program and may cause revocation of the corresponding HST observations. Duplicate Chandra observations may also be rejected by the CXC.

Joint HST-Chandra Proposals must be identified in the 'Special Proposal Types' section of the proposal. Also, you must include technical information about the Chandra observations in the 'Coordinated Observations' section of the proposal.

Joint HST/XMM-Newton Observing Proposals

If your science project requires observations from both HST and the XMM-Newton Observatory, you can submit a single proposal to request time on both observatories to either the HST Cycle 30 or the XMM-Newton Cycle AO-22 review. Joint HST/XMM-Newton Proposals should be submitted to the observatory that represents the prime science facility (not to both observatories). A description of past HST joint programs is available on the HST Joint Programs webpage.

By agreement with the XMM-Newton Observatory, the HST TACs will be able to award up to 150 kiloseconds of XMM-Newton observing time. Similarly the XMM-Newton TACs will be able to award up to 30 orbits of HST time. The only criterion above and beyond the usual review criteria is that the project must be fundamentally of a multi-wavelength nature, and that both sets of data are required to meet the science goals. Time will only be awarded to joint proposals if both data sets are required for the proposed science. XMM-Newton time will only be awarded in conjunction with new HST observations (and should not be proposed for in conjunction with an AR or Theory Proposal). **Proposers should take special care in justifying both the scientific and technical reasons for requesting time on both missions**.

It is not essential that the project requires simultaneous XMM-Newton and HST observations. No XMM-Newton observations with a reaction time of less than five working days from the trigger date will be considered. Target of Opportunity (ToO) Proposals must state explicitly whether the HST observations require a disruptive ToO. No more than one disruptive ToO will be allocated per proposal. It is the responsibility of the PI to inform both observatories immediately if the trigger criterion is fulfilled.

Proposals for combined HST and XMM observations should be submitted to the observatory that represents the prime science (not to both observatories). STScI reserves the right to disallow HST observations that duplicate those approved via any joint program unless the duplications are justified in the original proposals. The XMM-Newton AO-22 deadline is nominally in early October 2022. While there is multi-wavelength expertise in the review panels for both observatories, typically the HST panels will be stronger in IR/optical /UV science and the XMM panels in X-ray science.

Establishing the technical feasibility of the XMM-Newton observations is the responsibility of the PI, who should review the XMM-Newton Instrument Handbooks. A description of the technical information that should be included in the proposal is given in Joint HST-XMM Observations. All standard observing restrictions for both observatories apply to joint proposals. For proposals that are approved, both projects will perform detailed feasibility checks. Both projects reserve the right to reject any approved observation that is in conflict with safety or schedule constraints, or is otherwise deemed to be non-feasible.

Joint HST/XMM-Newton Proposals must be identified in the 'Special Proposal Types' section of the proposal. Also, you must include technical information about the XMM-Newton observations in the 'Coordinated Observations' section of the proposal.

Joint HST-TESS Observing Proposals

By agreement, STScI will be able to award a limited number of short cadence target slots from the Transiting Exoplanet Survey Satellite (TESS) mission. Currently in its first extended mission, TESS has been observing fields in both the northern and southern ecliptic hemispheres in addition to parts of the ecliptic plane. TESS operates by staring at one part of the sky for a duration (sector) of ~27 days in length, collecting 10-minute full frame images which cover a 24 x 96 degree field of view, and 2-minute or 20-second cadence postage stamps for selected targets of interest. After this ~27 day coverage, TESS then moves to observe a different sector of sky for another ~27 days. All TESS observations are collected in a single broadband red-optical bandpass.

TESS is anticipated to begin its second extended mission in September 2022. TESS plans to continue its ~27 day coverage for each sector of the sky. Information about the specific TESS pointings in the extended mission is available on the TESS Guest Investigator (GI) Program Office website. In the second extended mission, the full frame image cadence is expected to be reduced from 10 minutes to 200 seconds. As in current operations, 2-minute and 20-second cadence target slots are expected to be available to all Guest Investigators in the second extended mission.

The joint HST-TESS program can allocate short 2-minute cadence observations for up to 1,000 targets and short 20-second cadence observations for up to 50 targets from those available to the community via the TESS GI Program. Proposers should identify which targets should be considered for TESS observations and provide an explicit justification that a 2-minute or 20-second cadence is sufficient to achieve their science goals. TESS observations will only be obtained for approved HST targets. There is no guarantee that the HST and TESS observations will be simultaneous. Note that the first year of the second extended mission (TESS GI Cycle 5) will extend from approximately September 2022 to September 2023; proposals submitted to this joint HST-TESS program should not expect any TESS observations earlier than September 2022. Accepted targets will be passed to the TESS GI Program Office by STScI. Additional information about TESS can be found on the TESS GI Program Office website.

Joint HST-NOIRLab Observing Proposals

By agreement with the National Science Foundation's National Optical-Infrared Astronomy Research Laboratory (NOIRLab), STScI will be able to award time on NOIRLab facilities to highly ranked proposals that request time on both HST and NOIRLab telescopes. The award of time on NOIRLab facilities will be subject to approval by the NOIRLab Director, after nominal review by the NOIRLab TAC to avoid duplication of programs. Joint HST/NOIRLab Proposals should be submitted to the observatory that represents the prime science facility (but not both). The important additional criterion for the award of NOIRLab time is that both the HST and the ground-based data are required to meet the science goals of the project. Time will only be awarded to joint proposals if both data sets are required for the proposed science. It is not essential that the project requires simultaneous NOIRLab and HST observations. Under this agreement, NOIRLab time will only be awarded in conjunction with new HST observations (and should not be proposed for in conjunction with an AR or Theory Proposal). Major results from these programs would be credited to NOIRLab and HST. A description of past HST joint programs is available on the HST Joint Programs webpage.

NOIRLab has offered up to 5% of its available time to proposals meeting the stated criteria. NOIRLab observing time will be implemented during the two 2022 NOIRLab observing semesters (2022A for February

to July 2022, and 2022B for August 2022 to January 2023). Time cannot be requested for the preceding semester, 2021B. Time may be requested only for those facilities listed on the NOIRLab/NASA Collaboration webpage. In addition, time on heavily-subscribed resources may be limited by the NOIRLab Director.

Establishing the technical feasibility of the proposed NOIRLab observations is the responsibility of the PI, who should review the NOIRLab documentation or consult with NOIRLab directly. A description of the technical information that should be included in the proposal is given in Joint HST-NoirLab Observations. If approved for NOIRLab time, the PI must submit, by the nominal September 30, 2021 deadline for semester 2022A, an NOIRLab Phase II form giving detailed observing information appropriate to the particular NOIRLab telescope and instrument. In addition, for NOIRLab time on Gemini, successful PIs will be required to submit a complete NOIRLab proposal by the nominal September 30, 2021 deadline on the standard NOIRLab proposal form. This will be reviewed by the regular NOIRLab TAC.

NOIRLab will perform feasibility checks, and reserves the right to reject any approved observation determined to be infeasible, impossible to schedule, and/or dangerous to the telescopes or instruments. Any NOIRLab observations that prove infeasible or impossible could jeopardize the overall science program and may cause revocation of the corresponding HST time allocation.

Joint HST-NOIRLab Proposals must be identified in the 'Special Proposal Types' section of the proposal. Also, you must include technical information about the NOIRLab observations in the 'Coordinated Observations' section of the proposal.

Joint HST-NRAO Observing Proposals

By agreement with the National Radio Astronomy Observatory (NRAO), STScI will be able to award time on NRAO facilities to highly ranked proposals that request time on both HST and NRAO telescopes. Since the initial agreement the GBT has split off into the Green Bank Observatory (GBO), but access to the joint observing program will continue with the GBT. NRAO has offered up to 3% of the available time on its North American facilities, namely the Robert C. Byrd Green Bank Telescope (GBT), the Very Large Array (VLA), and the Very Long Baseline Array (VLBA), for allocation by the HST TAC, subject to a maximum of 5% of the available time in any given array configuration. In return, STScI has offered 30 orbits of HST time for allocation by the NRAO TAC to proposals submitted on or before either of the two NRAO semester deadlines. These are nominally February 1, 2022 for semester 2022B, and August 1, 2022 for semester 2023A. Joint HST /NRAO Proposals should be submitted to the observatory that represents the prime science facility (not to both observatories). STScI reserves the right to disallow HST observations that duplicate those approved via any joint program unless the duplications are justified in the original proposals. A description of past HST joint programs is available on the HST Joint Programs webpage.

NRAO observing time awarded through the HST Cycle 30 review will be implemented during the 2022B and 2023A observing semesters. The award of time on NRAO facilities will be subject to approval by the NRAO Director, after nominal review by the NRAO TAC to avoid duplication of programs. The important additional criterion for the award of NRAO time is that both the HST and the radio data are required to meet the science goals of the project. Time will only be awarded to joint proposals if both data sets are required for the proposed science. It is not essential that the project requires simultaneous NRAO and HST observations. Under this agreement, NRAO time will only be awarded in conjunction with new HST observations (and should not be proposed for in conjunction with an AR or Theory Proposal). Major results from these programs would be credited to NRAO and HST.

Establishing the technical feasibility of the proposed radio observations is the responsibility of the PI, who should review the NRAO documentation or consult with NRAO directly. If approved for NRAO time, the PI must submit detailed observing information appropriate to the relevant NRAO facility. A description of the technical information that should be included in the proposal is given in Joint HST-NRAO Observations.

NRAO will perform a technical review of proposals approved by the HST TAC, and reserves the right to reject any approved observation determined to be infeasible, impossible to schedule, and/or dangerous to the telescopes or instruments. Any NRAO observations that prove infeasible or impossible could jeopardize the overall science program and may cause revocation of the corresponding HST time allocation. We therefore urge proposers to discuss technical concerns with appropriate staff at both observatories. Discussions with NRAO staff should occur via the NRAO helpdesk.

Proposers must always check whether appropriate archival data exist, and provide clear scientific and technical justification for any new observations of previously observed targets. Observations awarded time that duplicate observations already approved by HST or NRAO for the same time period may be canceled, or data sharing and cooperation among different groups may be necessary, as determined by the two observatories. This includes ToOs with similar trigger criteria, with or without previously known coordinates.

Be aware that some HST targets might not require new NRAO observations because the joint science goals can be met using non-exclusive access archival data from the VLA, VLBA, or GBT that are available at http://science.nrao.edu/facilities/vla/archive. Also note that VLA continuum images from sky surveys at a wavelength of 20cm and at a FWHM resolution of 45 arc seconds (see http://www.cv.nrao.edu/nvss/) or 5 arc seconds (see http://sundog.stsci.edu/top.html) are available.

All scientific data from NRAO telescopes have an exclusive access period where the data are reserved for the exclusive use of the observing team. The data archive policy and exclusive access periods are given at https://science.nrao.edu/observing/proposal-types/datapolicies

This policy applies to NRAO data taken through the joint HST-NRAO program.

Joint HST-NRAO Proposals must be identified in the 'Special Proposal Types' section of the proposal. Also, you must include technical information about the NRAO observations in the 'Coordinated Observations' section of the proposal.

Mid-Cycle GO Proposals

Up to 300 orbits per cycle will be available for Mid-Cycle GO programs. Mid-Cycle programs provide the community with an opportunity to propose for in-cycle observations of recently-discovered, non-transient objects. As such, they complement Director's Discretionary programs, which target unexpected transient phenomena and time-critical observations. Instructions and up-to-date information can be found on the HST Cycle 30 Mid-Cycle Time Submission Page.

Mid-Cycle GO Proposals must meet the following prime criteria:

1. Proposers must provide a well-justified explanation of why the proposal could not have been submitted in response to previous Calls for Proposals: for example, the target source may have been identified subsequent to the most recent proposal deadline.
2. Proposers must provide a clear description of the scientific urgency of these observations and why they should be executed in the present cycle.

Proposals should be submitted via the Astronomer's Proposal Tool (APT) as type GO, using the Mid-Cycle template for the pdf attachment. Upon completion of your Mid-Cycle submission, your program will be transferred to the STScI for processing. If you run into problems submitting a Mid-Cycle Request, submit a question to http://hsthelp.stsci.edu for investigation/resolution.

Mid-Cycle proposals may be submitted at any time. Proposals received prior to **September 30, 2022** will be considered for implementation beginning in November or December 2022, and those received prior to **January 31, 2023** will be considered for implementation beginning in March or April 2023.

Proposals for Mid-Cycle time must be sufficiently detailed for adequate evaluation, comparable with proposals submitted for the regular observing cycles as described in the current Call for Proposals. Among other things,

- Both the proposed observations and the use of Mid-Cycle time must be justified explicitly,
- There must be an adequate description of how the proposed observations relate to the current state of knowledge,
- And the proposed observations must be described in sufficient detail to allow technical evaluation.
- Proposals must comply with the guidelines for anonymizing proposals.

Mid-Cycle GO Proposals will have the following characteristics:

- Proposals are limited to requesting no more than 15 orbits;
- Observations should have minimal constraints to maximize scheduling flexibility - Target of Opportunity proposals may not be submitted as Mid-Cycle proposals;
- Observations taken for accepted programs will have a exclusive access period of no more than 3 months;
- Proposals may request only HST time - joint proposals are not permitted;
- Proposers may apply for all available instruments;
- Proposals must be compliant with the technical restrictions described in the most recent Call for Proposals.

Members of the STScI Science Policies Group will undertake an initial review of GO Mid-Cycle proposals to determine whether the proposals meet prime criterion #1. Proposals that do not meet that criterion will not be distributed for further review; the Principal Investigator will be informed of that decision, and is free to submit the proposal at the next standard cycle deadline.

Re-submission of rejected proposals from past cycles (including past Mid-Cycle opportunities) will be rejected automatically unless a clear justification is given as to why circumstances justify a new Mid-Cycle submission.

Mid-Cycle proposals will receive scientific review by members of the community.

Subject to availability of funds from NASA, STScI will provide financial support for U.S. PIs and Co-Is of approved Mid-Cycle GO Programs (see HST Grant Funding and Budget Submissions).

Director's Discretionary (DD) Time Proposals

Up to 10% of the available HST observing time may be reserved for Director’s Discretionary (DD) allocation. Scientists wishing to request DD time can do so at any time during the year, by using APT. Instructions and up-to-date information can be found on the DD Proposal Submission webpage.

Observations obtained as part of a DD Program generally do not have an exclusive access period, and are made available immediately to the astronomical community. However, DD proposers may request and justify exclusive access periods in their proposals.

Upon receipt of a DD Proposal, the STScI Director will usually seek advice on the scientific merit and technical feasibility of the proposal from STScI staff and external specialists. A proposal for DD time might be appropriate in cases where an unexpected transient phenomenon occurs or when developments since the last proposal cycle make a time-critical observation necessary.

Recognizing the limited lifetimes for major space facilities such as HST and Chandra, DD Proposals for timely follow-up of new discoveries will also be considered even if the astrophysics of the phenomena do not require such rapid follow-up. In such cases, the proposers must demonstrate that the observations will provide a critical link in the understanding of the phenomena and that carrying them out quickly is

particularly important for planning future observations with major facilities. They should then also indicate their plans for quickly making the scientific community aware of their discoveries, to enable subsequent wider community follow-up.

DD observations should not generally be requested if any of the following is true:

- The observations could plausibly have been proposed in the most recent regular proposal cycle, possibly as a Target-of-Opportunity Proposal. Requests to reserve ToO targets that have not been discovered would not be appropriate.
- The observations were proposed in a recent regular proposal cycle, and were rejected.
- The observations were proposed in a recent Mid-Cycle, and were rejected.
- The proposed observations could wait until the next proposal cycle with no significant reduction in the expected scientific return.

Proposals must comply with the guidelines for anonymizing proposals.

The primary criteria for acceptance of DD Proposals are high scientific merit and a strong demonstration of the timeliness of the observations. Proposals must make an appropriately compelling science case.

Weekly HST Command Loads are uplinked to the telescope on Sunday evenings; for nominal operations, the observing schedule is determined eleven days in advance of the uplink date. Although it is technically feasible to interrupt the schedule and initiate observations of a new target, short-notice interruptions place severe demands on the planning and scheduling process, decreasing overall observing efficiency and delaying other programs. Hence, requests for DD time must be submitted at least two months before the date of the requested observations, if possible. Requests for shorter turn-around times must be exceedingly well justified. In the case that a DD Program with a turn-around time of less than one month is accepted, the PI or their designee is required to be reachable by STScI personnel on a 24 hour basis between the submission and the implementation of the program, for Phase II preparation.

Subject to availability of funds from NASA, STScI will provide financial support for U.S. PIs and Co-Is of approved DD Programs (see HST Grant Funding and Budget Submissions).

Next: HST Special Initiatives

HST Cycle 30 Special Initiatives

STScI especially seeks proposals that fall into one of several "Special Initiatives," described below. These initiatives highlight the unique science capabilities possessed by HST.

Ultraviolet Initiative

Ultraviolet GO Proposals

In recognition of the unique UV capabilities of Hubble and the finite lifetime of the mission, the UV Initiative will continue in Cycle 30. The initiative uses orbit allocations to increase the share of primary GO observing time dedicated to UV observations. A description of past programs is available on the HST UV Initiative Programs webpage.

Both the review panels and the TAC will have UV orbit allocations, which are advisory, not quotas, and UV proposals recommended for acceptance must meet the usual requirement of high scientific quality set for all successful Hubble proposals. Small, Medium, Large, and Treasury GO Proposals can benefit from the UV Initiative, in Cycle 30, as can Archival Proposals. Two conditions must be met for a GO Proposal to be eligible.

• The proposal must use the UV capabilities of Hubble. The eligible instrument modes (with central wavelength <3200 Angstroms) are ACS/SBC imaging (all filters), COS spectroscopy (all modes), STIS/MAMA spectroscopy and imaging (all gratings and filters), STIS/CCD spectroscopy (UV gratings only), and WFC3 /UVIS imaging (UV filters F200LP, F300X, F218W, F225W, F275W, FQ232N, FQ243N, and F280N), and WFC3 /UVIS G280 grism spectroscopy.

• The UV observations must be essential to the proposed science investigation. This condition will automatically be met for proposals requesting UV observations only. For proposals requesting both UV and optical/IR observations, the scientific necessity for the UV observations must be carefully justified in the Scientific Justification of the proposal.

Proposers must check the UV Initiative box in APT to identify whether their proposal qualifies for the benefit based on the above criteria.

Ultraviolet Archival Proposals

The UV Initiative also extends to Archival Proposals in the Legacy AR category. STScI will ask the review panels and the TAC to give particular consideration to UV-specific archival proposals in the review process, provided they lead to UV high level data products and tools for the Hubble archive, and enable broader use of those datasets by the community, or (in the case of Theory Proposals) provide new models or theories to aid in the interpretation of UV HST data.

For Archival Programs that propose the joint analysis of UV and optical/IR datasets, the UV datasets must be essential to the scientific investigation for the UV Initiative benefit to apply. In this case, the proposers should carefully justify the importance of the UV component of their program in the Special Requirements section of the proposal.

AR proposers should check the "UV Initiative" box in APT to identify their proposal as eligible for the benefit.

Fundamental Physics with HST

Over the past quarter century Hubble has played a crucial role in probing parameters relevant to fundamental physics and cosmology. Given that heritage, the STScI Director constituted a working group to explore the intersection between Hubble's capabilities and the scientific priorities in fundamental physics research and to provide advice on future strategies for implementing appropriate observing programs with HST. The working group's report highlights a number of areas where they believe HST can make significant contributions in the near future.

STScI encourages the community to submit proposals that address questions in fundamental physics, particularly with regard to the science areas highlighted by the Fundamental Physics Working Group. Those proposals can be for observations (GO), archival research (AR) or theoretical investigations related to HST observations (AR Theory). Given the limited resources available in Cycle 30, proposers may consider pilot investigations that could be expanded in future cycles. The proposals will be reviewed by experts in the appropriate field.

Proposers must check the "Fundamental Physics" box in APT to identify whether their proposal qualifies for this initiative.

Report of the Working Group on Fundamental Physics with HST [PDF]

HST-TESS Exoplanet Initiative

NASA's Transiting Exoplanet Survey Satellite has discovered a wide range of planetary systems, notably small exoplanets (mini-neptunes and super-earths) around nearby stars. The HST-TESS Advisory Committee was constituted by the STScI Director to provide guidance on optimal strategies for maximizing the scientific return from HST observations of TESS exoplanet targets. Following extensive consultation with the community, the HST-TESS AC final report highlights the vital role that HST can play in characterizing small exoplanets and identifying high priority targets for subsequent JWST observations.

Specifically, the committee noted that in order to maximize the science return, it is crucial that TESS targets have well determined periods and masses. Proceeding in a linear fashion, however, will lead to significant delays in obtaining follow-up HST observations of sufficient systems. Moreover, working on a target-by-target, proposal-by-proposal basis is unlikely to optimally sample the exoplanet population. Based on those considerations, the Space Telescope Users Committee has recommended the HST-TESS Exoplanet Initiative (HTEI) to provide the community with an opportunity to propose for observations of a well-characterized, representative sample.

Exoplanet Initiative proposals should

- Focus on mini-neptunes and super-earths
- Be sufficiently comprehensive in scope to address demographic questions
- Characterize the atmospheric properties as a function of size and equilibrium temperature
- Lay the foundations for subsequent observations with JWST

HST-TESS Exoplanet Initiative programs are Treasury programs and must meet the requirements for those programs. They are anticipated as long period (multi-cycle) programs that can capitalize quickly on the ongoing characterization of TESS exoplanet discoveries. The HST-TESS AC also recommended strong community participation in these programs, particularly with regard to target selection.

All HTEI exoplanet targets **must** have reliable mass determinations. Since an appropriately characterized sample of TESS targets is not available at the present time, HTEI proposals should identify specific targets

that could be observed in Cycle 30 but may list generic targets for future cycles. The proposal **must** specify the quantitative criteria (such as mass, density and separation) that will be used to define the full sample. In addition, the proposals **must** describe appropriate mechanisms for building community consensus on how new targets will be added in future cycles.

HTEI programs will be assessed by the TAC along with other Large, Treasury and Legacy programs. There is no specific orbit allocation for this initiative.

HTEI proposals must conform with the dual anonymous guidelines.

Next: HST Observation Types

HST Cycle 30 Observation Types

This page describes the different observations types available to proposers. Primary observations encompass any observation taken with the primary instrument on an astronomical target. There is also the opportunity for Parallel observations, which are simultaneous observations with instruments other than the primary instrument. Special Calibration observations can be obtained if standard observatory calibrations are insufficient for the science goals of the program.

Primary Observations

Primary observations are those observations that determine the telescope pointing and orientation. GO and SNAP Programs with external targets are normally scheduled as primary. Primary observations can use a variety of special requirements and observation types, as described in the following subsections.

Phase I proposals must itemize and briefly justify the special requirements that will be implemented in Phase II, using the Phase I section designated for this purpose. All visit-level special requirements and exposure-level special requirements must be justified (see Preparation of the PDF Attachment).

Continuous Viewing Zone (CVZ) Observations

Most targets are occulted by the Earth during a portion of the 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 previous cycles. Please refer to the HST Orbital Viewing and Schedulability webpage for information on determining the number of CVZ opportunities in Cycle 30 and their approximate duration for a given target location. Passages of HST through the South Atlantic Anomaly generally restrict the length of uninterrupted observations to 5 to 6 orbits per day. See the HST Primer for technical details about the CVZ.

CVZ orbits are a limited resource whose use can lead to scheduling conflicts. If CVZ orbits are scientifically necessary for your program, check that sufficient opportunities exist that your orbit request can likely be accommodated. (It is not possible, at present, to determine the exact number of CVZ orbits available during a particular opportunity.)

STScI will make every effort to schedule the observations in this optimal way. However, because the number of CVZ opportunities are limited, and unpredictable conflicts may occur between the proposed CVZ observations and other observations, a particular target's CVZ times may be oversubscribed. Therefore, it may be necessary to schedule the requested CVZ observations using standard orbital visibilities (i.e., using a larger number of total orbits). This will be done at no penalty to the observer.

CVZ observations must be marked in the Observation Summary section of the proposal with APT. In the PDF attachment two areas must contain further details. In the Description of the Observations section, you must include the number of CVZ opportunities available for each target in your proposal for which you are requesting CVZ time as well as a list of which observations require CVZ time and a justification within the Special Requirements section.

Restrictions on Using the CVZ

Observations that require special timing requirements should not be proposed for execution in the CVZ, and orbit estimates in the Phase I proposal should be based on standard orbital visibilities (see the Orbital Visibility section of the HST Primer). Because of the extra scattered earthshine that enters the telescope on

the day side of the orbit, sky-background limited observations through broadband optical or infrared filters do not gain significant observing efficiency from CVZ observations. If it is determined during the Phase II proposal implementation that an observation is unschedulable because of conflicts between the CVZ requirement and any other Special Requirements (e.g., SHD, LOW, timing, etc.), then the observing time may be revoked unless the Special Requirement will be relaxed. Proposers who are in doubt about whether or not to request CVZ observations should contact the STScI Helpdesk.

Target-of-Opportunity (ToO) Observations

A target for HST observations is called a 'Target-of-Opportunity' (ToO) if the observations are linked to 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.). ToOs are generally **not** suitable for observations of periodic phenomena (e.g., eclipsing binary stars, transiting planets, etc.). ToO Proposals must present a detailed plan for the observations to be performed if the triggering event occurs.

Requests for Target of Opportunity observations should not be submitted as Mid-Cycle or Director's Discretionary proposals.

Target-of-Opportunity observations must be marked in the Observation Summary section of the proposal with APT. In the PDF attachment, the Special Requirements section must provide an estimate of the probability of occurrence of the ToO during the observing cycle, and describe the required turn-around time.

Turn-Around Time and ToO Limits in Cycle 30

The turn-around time for a ToO observation is defined as the time between STScI receiving a ToO activation and the execution of the observations. The HST observing schedule is updated weekly, and construction of each weekly calendar starts approximately eleven days in advance of the first observations on that calendar. Thus, in the normal course of events, almost three weeks can elapse between Phase II submission of a ToO and execution of the observations. Any short-notice interruptions to the schedule place extra demands on the scheduling system, and may lead to a decrease in overall efficiency of the observatory. ToOs are therefore classified into two categories: disruptive ToOs that require observations on a rapid timescale and therefore revisions of HST observing schedules that are either active or in preparation; and non-disruptive ToOs that can be incorporated within the standard scheduling process. Disruptive ToOs are defined as those having turn-around times of less than three weeks. Non-disruptive ToOs have turn-around times longer than three weeks.

Disruptive ToOs: The minimum turn-around time for ToO activation is normally 2-5 days; this can be achieved only if all details of the proposal (except possibly the precise target position) are available in advance. Any required bright object screening (COS, STIS/MAMA, or ACS/SBC) must be completed before a ToO can be placed on the schedule. The ability to perform any bright-object check will depend on the quality of the flux information provided by the observer, the complexity of the field, and the availability of suitable expertise at STScI to evaluate that information on a short time scale. Under exceptional circumstances, it may be possible to achieve shorter turn-around times, but only at the expense of significant loss of observing efficiency. Ultra-rapid (<2 day turn-around) ToOs therefore require an extremely strong scientific justification, and may only be requested for instruments that do not require bright object checking (ACS/WFC, WFC3, STIS/CCD, FGS). Because of the significant effect disruptive ToO observations have on the HST schedule, the number of activations will be limited to eight in Cycle 30.

No Ultra-rapid ToO opportunities will be available in Cycle 30.

Non-disruptive ToOs: Observations of transient phenomena that require turn-around times longer than three weeks can be accommodated in the normal HST scheduling process. Non-disruptive ToOs will be incorporated in the HST observing schedule at the earliest opportunity consistent with normal scheduling process. Consequently, there is no limit on non-disruptive ToOs in Cycle 30. However, programs that have been allocated a specific number of non-disruptive ToOs may not subsequently request activation on shorter timescales.

Proposers are encouraged to check the ToO webpage for further information and examples on defining and activating ToO observations.

Activation of a ToO

A Phase II proposal must be submitted before the ToO event occurs. If the observing strategy depends on the nature of the event, then the Phase II proposal should include several contingencies from which the observer will make a selection. The PI is responsible for informing STScI of the occurrence of the event and must provide an accurate target position. Implementation of a ToO observation after notification of the event requires approval by the STScI Director and is not guaranteed (e.g., high-priority GO observations, critical calibrations, and engineering tests may take precedence over ToO Programs). If approval is granted, then the HST observing schedule is replanned to include the new observations. **STScI will give proposers a formal deadline for submission of the Phase II. Any subsequent request for changes may jeopardize the execution of the program and will be accepted only under highly exceptional circumstances.** Disruptive ToOs require the PI or their designee to be reachable by STScI personnel on a 24-hour basis between the ToO activation and the scheduling of the program.

Carry-Over ToOs

Proposers may apply for Carry-Over status for ToO Programs only if the target phenomena have a low probability of occurrence during one cycle. This is not to be confused with the Long-Term program category of proposal. The request must be justified in the 'Special Requirements' section of the proposal and will be subject to review by the TAC. Carry-Over ToO Programs are valid for up to 2 cycles. If a Carry-Over ToO does not trigger in Cycle 30 the program will be extended to Cycle 31. If there is no trigger in Cycle 31, the program will be terminated.

If the triggering event for a standard ToO Program does not occur during Cycle 30, the program will be deactivated at the end of the cycle. Unused ToO time carries over to the following cycle only for Carry-Over ToO Programs.

Long Term GO Proposals with ToO targets

Long term GO proposals can also contain ToO targets, but they are restricted to non-disruptive ToO targets.

ToO Programs with COS, STIS/MAMA or ACS/SBC

ToO Programs that use COS, the STIS/MAMA detectors, or ACS/SBC must pass bright-object checking before they can be scheduled. Ultra-rapid turn-around programs are not allowed with these instruments. For rapid turn-around programs, where the target may be varying in intensity, a strategy must be outlined to ensure that the ToO will be safe to observe. A description of how you plan to deal with this issue should be provided in the 'Special Requirements' section of the proposal.

STIS/MAMA and ACS/SBC observations cannot be scheduled in orbits affected by passages of HST through the South Atlantic Anomaly (SAA), which limits the duration of a MAMA visit to five orbits.

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

The COS, STIS/MAMA, and ACS/SBC instruments employ photon counting detectors and are vulnerable to damage through exposure to bright sources. Consequently, there are a number of restrictions on the use of these configurations. All targets and field objects within the appropriate field of view must pass bright-object safety reviews. All Phase I proposals must include a discussion of the safety of the proposed targets and fields in the Description of the Observations, based on the relevant Instrument Handbook sections and calculations with the appropriate APT and ETC tools.

Observations of Variable Sources

Proposals to observe variable objects with the COS, STIS/MAMA, or ACS/SBC detectors must pass bright-object checking before they can be scheduled. Proposers should assume the maximum flux values for targets unless there are specific reasons for adopting other values (for example, time constrained observations of periodic variables at flux minima); the justification for adopting alternative flux values should be given in the Special Requirements section of the proposal.

Observers interested in proposing for UV observations of cool stars should keep in mind the possibility that low mass stars may undergo extreme enhancements during stochastically occurring flares. Proposers must demonstrate the health and safety of their targets under these extreme conditions (STIS ISR 2017-02; COS ISR 2017-01).

In the case of aperiodic variables that are either known to undergo unpredictable flares or outbursts, or belong to classes of objects that are subject to flaring or outbursts, the proposer must determine whether the target will violate the bright object limits during outburst. If a violation is possible, the proposer must outline a strategy that will ensure that the target is safe to observe with COS, STIS/MAMA, or ACS/SBC.

A description of how to deal with bright object checking for variable sources must be included in the Special Requirements section of the proposal.

The observing strategy might include additional observations, obtained over a timescale appropriate to the particular type of variable object, with either HST or ground-based telescopes. Proposers should be aware that this type of observation requires extra resources. STScI reserves the right to limit the number of visits requiring quiescence-verification observations within 20 days or less of an HST observation to no more than 12 such visits per Cycle. If you are planning such observations, please contact the STScI Helpdesk for more information on the options and requirements for confirming quiescence.

Additional Restrictions

- Due to bright object safety considerations, STIS/MAMA observations cannot be performed under gyro control. This limitation is generally identified at the Phase II level when guide-star control is found to be infeasible (e.g., for fast moving targets such as comets near perihelion). Infeasible programs cannot be executed (see HST Proposal Implementation and Execution under Unschedulable or Infeasible Programs).
- STIS/MAMA and ACS/SBC observations cannot be scheduled in orbits affected by passages of HST through the South Atlantic Anomaly (SAA), which limits the duration of a MAMA visit to five orbits.
- Pure Parallel observations with COS, STIS/MAMA, or the ACS/SBC detectors are not permitted.
- In order to preserve SAA-free orbits for MAMA observations, STIS programs that contain both CCD and MAMA science observations (excluding target acquisitions) must normally be split into separate CCD and MAMA visits. Exceptions are allowed if at least one of the following conditions apply:

  A) There is less than 30 minutes of science observing time (including overheads) using the CCD;
  B) The target is observed for only one orbit;
  C) There is a well-justified scientific need for interspersed MAMA and CCD observations.

- By default, STIS spectroscopic exposures are accompanied by separate AUTO-WAVECAL exposures. The observer can insert additional GO-WAVECAL exposures adjacent to any external exposure and, although not recommended without adding an equivalent GO-WAVECAL exposure, can turn off the AUTO-WAVECAL exposures. For additional information see the Contemporaneous Calibrations Section of the STIS Instrument Handbook.
- To optimize the science return of COS the following is recommended: the use of TIME-TAG mode and the use of the default wavelength calibration procedures. To minimize the effects of gain sag on the FUV detector, the use of all four FP-POS positions is required for each FUV CENWAVE setting unless a strong scientific justification is provided in the Phase I proposal. The exception is the G130M/1291 setting, for which only two FP-POS positions (3 and 4) are allowed (and required). This is done using the FP-POS=ALL parameter in APT for each CENWAVE, by spreading out the four FP-POS positions over multiple orbits within a visit for each CENWAVE, or over multiple visits of the same target. Observers who wish to employ non-optimal observing techniques must strongly justify their observing strategy in the Description of the Observations section of the PDF attachment. Non-optimal observing techniques should not normally be adopted solely for the purpose of producing a modest reduction of the observational overheads; in such cases the observer should normally just request adequate time to use the recommended optimal strategy. For more details, please see the COS section of the HST Primer.

Solar System Targets

HST can observe most targets within our Solar System, although there are a few exceptions. Mercury is always well within the 54-degree Solar pointing exclusion, and cannot be observed. Venus is always within the 54-degree Solar pointing exclusion, but at maximum elongation can be over 45 degrees from the Sun. STScI and the HST Project at GSFC have developed (and used) procedures that support observations of Venus when it is slightly within the 54 degree limit. GO and DD proposals to observe Venus will not be permitted in Cycle 30. Observations of comets can be made while they are farther than 55 degrees from the Sun.

The HST pointing control system and the HST scheduling systems were not designed to support observations of objects as close as the Moon. However, lunar observations are possible under gyro control in three-gyro mode. GO proposals to observe the Moon can be submitted for consideration by the Cycle 30 TAC. These programs must use observing strategies that have been used in previous HST lunar observing programs. The execution of lunar observations will be subject to the availability of resources to carry out the extra work required. Investigators interested in proposing for lunar observations are encouraged to consult the Lunar Observations User Information Report, which contains details on how such observations will be scheduled, the rules pertaining to them, and other useful information.

With the current performance of the pointing control system, the gyro bias drift must be updated periodically, and this is not possible when pointing under gyro control or during slewing (e.g., during moving target tracking). For moving target programs, visits cannot be longer than two contiguous orbits.

Pointing constraints are discussed further in the HST Primer.

Observations of Targets That Have Not Yet Been Discovered or Identified

There are a variety of plausible scenarios in which investigators may wish to propose for HST observations of targets that have not yet been discovered or identified (i.e., targets with unknown coordinates, such as the next supernova in our own Galaxy, or the next gamma-ray burst in the southern hemisphere). In general, such proposals are allowed only if there is a certain time-criticality to the observations; i.e., proposing for the same observations in the next regular review cycle (after the target has been discovered) would be impossible or would make the observations more difficult (e.g., the object fades rapidly, or its temporal behavior is important), or would lead to diminished scientific returns. These criteria are generally satisfied for

GO observations of ToO targets, and there may also be other circumstances in which proposals for such targets are justified. However, in the absence of demonstrated time-criticality, observations will generally not be approved for targets that have not yet been discovered or identified.

Time-Critical Observations

Proposals may request that HST observations be taken at a specific date and time, or within a range of specific dates, when scientifically justified. Some examples of such cases are:

- astrometric observations
- observing specific phases of variable stars
- monitoring programs
- imaging surface features on solar-system bodies
- observations requiring a particular telescope orientation (since the orientation is fixed by the date of the observations; see the HST Primer)
- observations coordinated with another observatory

Any requests for time-critical observations must be listed in the Special Requirements section of the proposal. Time-critical observations impose constraints on the HST scheduling system and should therefore be accompanied by an adequate scientific justification in the proposal.

Limitations Related to Time-Critical Observations

Time-critical events that occur over short time intervals compared to the orbital period of HST (such as eclipses of very short-period binary stars) introduce a complication because it will not be known to sufficient accuracy, until a few weeks in advance, where HST will be in its orbit at the time of the event, and hence whether the event will occur above or below the spacecraft's horizon (see the Orbital Constraints Section of the HST Primer). Proposals to observe such events can therefore be accepted only conditionally.

Undithered Observations with ACS and WFC3

Experience has shown that ACS and WFC3 imaging observations are best taken as dithered exposures. Proposers who do not intend to use dithering for primary observations must provide a justification for their choice of strategy in the Description of Observations section of the PDF attachment. In general, undithered observations with ACS or WFC3 detectors will not be approved without strong justification that such an approach is required for the scientific objectives. Otherwise, hot pixels and other detector artifacts may compromise the archival value of the data.

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 primary instrument. Those additional observations are called parallel observations.

Since each instrument samples a different portion of the HST focal plane, 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 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). 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). This is particularly directed toward pure parallels where the definition of the observations is independent of and subordinate to a primary observation.
- Parallel observations will not be made if the stored command capacity or data volume limits would be exceeded.
- Pure Parallel observations may not explicitly constrain the scheduling of the primary observations, that is, they may not specify orientation or timing constraints.
- Coordinated Parallel observations may include orientation or timing constraints as requested and justified in the accepted HST Phase I proposal.
- Pure Parallel observations are subject to the availability of parallel observing opportunities as identified by STScI.

Coordinated Parallel Observations

Coordinated Parallels use one or more instruments, in addition to and simultaneously with the primary 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. Any such requests will be adjudicated by the Telescope Time Review Board (TTRB). Coordinated Parallel Observations will ordinarily be given the same exclusive access period as their associated primary observations.

Coordinated Parallel observations must be marked in the Observation Summary section of the proposal.

Pure Parallel Observations

The Pure Parallel observing process is designed to take advantage of the full complement of instruments installed in SM4. Similar to primary science planning, the parallels process provides a reliable estimate, in advance of observations, of the number of orbits that will be executed on accepted parallel programs during the cycle. The Parallel Observing User Information Report provides a complete description of this observing mode and is required reading if you are considering submitting a Pure Parallel Proposal. It is anticipated that up to 500 orbits of Pure Parallel observations will be available in Cycle 30.

Restrictions

Pure Parallel observations are currently restricted to orbits where COS and STIS are the primary instruments. Consequently, parallel opportunities will be limited by the actual number of orbits allocated to these instruments and to the corresponding regions of sky being observed. Past experience shows that the final allocation of Pure Parallel orbits also depends on the science goals of the parallel programs (e.g. desired

targets may not be available and multiple Pure Parallel Programs can compete for the same primary opportunities.) STScI continues to investigate ways to expand the number of Pure Parallel observing opportunities.

For the purpose of Pure Parallel orbit allocation, an orbit is defined as having visibility of at least 2500 seconds. The number and types of parallel observing opportunities will vary depending on the mix of primary GO Programs each cycle. Additionally, the total number of Pure Parallel orbits actually executed could be less than planned due to changes to the Primary Programs or on-board execution failures. PIs with accepted Pure Parallel Programs will be given a list of parallel science opportunities that STScI has identified as being suitable for their program. The PI then selects and submits a final list of opportunity matches to STScI in the Phase II Pure Parallel Program submission.

The process of matching Pure Parallel observations to Primary Programs will occur during the planning and implementation phase (Phase II) so that it can be known in advance when and how the parallel observations can be executed. Proposals for Pure Parallel observations may specify either particular or generic targets, although the latter are more common and provide more flexibility for matching parallel observations to actual opportunities.

Review and Execution

The review panels and the TAC will select the programs based on the proposed science. The TAC will consider all accepted programs and produce a ranked list as an aid for resolving potential conflicts. The exclusive access period for a GO Pure Parallel Program will depend on the number of orbits requested, as is the case for Primary GO Programs. Medium (35-74 orbits) Pure Parallel Programs will have a default exclusive access period of 6 months; Large (75 orbits or more) Pure Parallel Programs will have no exclusive access period by default. Pure Parallel observations are assigned to specific primary observations, and the parallel observations will be carried over to subsequent cycles if the primary observations are not executed in Cycle 30.

Restrictions and Limitations on Parallel Observations

Parallel Observations with ACS

- The ACS/SBC may not be used for either Pure or Coordinated Parallel observations in any mode.
- The ACS/WFC detector may be used for Coordinated Parallel observations with any other instrument as primary.
- The ACS/WFC may be used for Pure Parallel observations with the COS and STIS instruments as primary.

Parallel Observations with COS

- The COS/FUV MCP detector may be used for Coordinated Parallel observations with any other instrument as primary, provided that the telescope orientation is specified exactly and the parallel field passes bright-object checking.
- The COS/NUV MAMA detector may be used for Coordinated Parallel observations with any other instrument as primary, provided that the telescope orientation is specified exactly and the parallel field passes bright-object checking.
- COS may not be used for Pure Parallel observations in any detector mode.

Parallel Observations with FGS

- The FGS cannot be used for either Pure or Coordinated Parallel observations.

Parallel Observations with STIS

- The STIS/CCD detector may be used for Coordinated Parallel observations with any other instrument as primary.
- Neither the STIS/NUV-MAMA PRISM mode nor any STIS/MAMA imaging mode can be used for Coordinated Parallel observations.
- STIS/MAMA spectroscopic modes (other than the NUV/PRISM) may be used for Coordinated Parallel observations, but only if an exact ORIENT is specified, and the field passes bright object checking.
- STIS may not be used for Pure Parallel observations in any detector mode.
- When STIS is the primary instrument and another instrument is used for a Coordinated Parallel, STIS auto-wavecals will never be done during an occultation. Instead these calibration exposures have to be scheduled when the external target is visible, leading to a slight reduction in the observing efficiency.

Parallel Observations with WFC3

- WFC3 may be used for Coordinated Parallel observations with any other instrument as primary. WFC3 may only be used for Pure Parallel observations with COS or STIS as primary.

Pointing Accuracy for Parallel Observations

- The spacecraft computers automatically correct the telescope pointing of the primary observing aperture for the effect of differential velocity aberration. This means that image shifts at the parallel aperture of 10 to 20 mas can occur during parallel exposures.

Special Calibration Observations

Data from HST observations are normally provided to the GO after application of full calibrations. Details of the standard calibrations are provided in the Instrument Handbooks.

In order to obtain quality calibrations for a broad range of observing modes, yet not exceed the time available on HST for calibration observations, only a restricted set, the so-called ‘Supported’ modes, may be calibrated. Other modes may be available but are not supported. Use of these ‘Available-but-Unsupported’ modes is allowed to enable potentially unique and important science observations, but is discouraged except when driven by scientific need. Observations taken using Available-but-Unsupported modes that fail due to the use of the unsupported mode will not be repeated. Use of these modes must be justified prior to the Phase II submission. For details consult the Instrument Handbooks.

Projects may need to include special calibration observations if either:

- a Supported mode is used, but the calibration requirements of the project are not addressed by the standard STScI calibration program, or
- an Available-but-Unsupported mode is used.

Any special calibration observations required in these cases must be included in the total request for observing time and in the Observation Summary of the proposal, and must be justified explicitly. During the Phase II process, proposals to calibrate Available-but-Unsupported modes must be pre-approved by the appropriate instrument team. For details please consult the relevant Instrument Handbook.

Proposers can estimate the time required for any special calibration observations from the information provided in the Instrument Handbooks. Also, the STScI Help Desk can assist you on this estimate, but such requests must be made at least 14 days before the submission deadline.

The data reduction of special calibration observations is the responsibility of the observer.

Data flagged as having been obtained for calibration purposes will normally be made non-exclusive access.

Next: HST Data Rights and Duplications

HST Cycle 30 Data Rights and Duplications

This page describes the exclusive access periods that are associated with various types of HST proposals, as well as the policies regarding duplication of existing data.

Data Rights

Depending on the category, observers may have exclusive access to their science data during an exclusive access period. For Small and Medium GO Proposals, this period is normally 6 months following the date on which the data are archived. At the end of the exclusive access period, the data become available for analysis by any interested scientist through the HST Archive.

Submitters of Small and Medium GO Proposals who wish to request a shorter exclusive access period of 3 months, or who are willing to waive their exclusive access rights altogether, should specify this in the 'Special Requirements' section of the proposal.

Data taken under the Treasury and Large Program categories will by default have no exclusive access period. Any request for non-zero exclusive access periods for programs in these categories must be justified in the ' Special Requirements' section of the proposal and will be subject to review by the TAC.

Policies and Procedures Regarding Duplications

Special policies apply to cases in which a proposed HST observation would duplicate another observation either already obtained or scheduled to be obtained.

Duplication Policies

An observation is a duplication of another observation if it is on the same astronomical target or field, with the same instrument, with a similar instrument mode, similar sensitivity, similar spectral resolution and similar spectral range. It is the responsibility of the proposers to check the proposed observations against the catalog of previously executed or accepted programs.

If any duplications exist, they must be identified in the 'Observation Summary' section of the proposal, and justified strongly in the 'Justify Duplications' section of the proposal as meeting significantly different and compelling scientific objectives.

Any unjustified duplications of previously executed or accepted observations that come to the attention of the peer reviewers and/or STScI could lead to rejection during or after the Phase I deliberations. Without an explicit Review Panel or TAC recommendation to retain duplicating exposures, they can be disallowed in Phase II. Specifically,

(1) Regular GO programs will have their orbit allocations reduced if genuine duplications are found.
(2) SNAP programs are allowed to substitute similar targets if duplications are found, provided the new targets match the original target selection criteria.
(3) Parallels are not considered in terms of duplications, so a prime observation will not be disallowed even if an accompanying parallel observation duplicates an existing observation

ACS and WFC3 Duplications of WFPC2, NICMOS or STIS imaging

ACS and WFC3 have imaging capabilities superior to WFPC2, NICMOS and STIS for many purposes (see the Scientific Instrument Comparisons section of the HST Primer). Nonetheless, proposers should note any

duplications of previously approved or executed WFPC2, NICMOS, or STIS imaging exposures that lie in their fields, and justify why the new observations are required to achieve the scientific goals of the project. Proposers for WFC3 observations should note and justify any duplications of previous ACS observations.

How to Check for Duplications

To check for duplications among the observations that you wish to propose, please use the tools and links on the HST Proposal Support webpage at MAST. The following two options are available:

- The HST Duplication Checking Web Form
- The Planned and Archived Exposures Catalog (PAEC), which is available from the HST Catalogs webpage at MAST. This catalog contains summary information about exposures in ASCII format and can be browsed with any text editor. It is normally updated monthly, but will be kept fixed between the release of this Call for Proposals and the Phase I deadline.

Please make sure that you are either searching in the HST duplication table (automatic if you use the Duplication Checking Web Form) or the PAEC. Other archive tables, such as the science table or the ASCII format Archived Exposures Catalog (AEC) do not include exposures that have been approved but have not yet executed, and are therefore not suitable for a complete duplication check.

Next: HST Proposal Selection Procedures

HST Cycle 30 Proposal Selection Procedures

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How STScI Conducts the Proposal Review

HST programs are selected through competitive peer review. A broad range of scientists from the international astronomical community evaluates and ranks all submitted proposals, using a well-defined set of criteria and paying special attention to any potential conflicts of interest. The review panels and the Telescope Allocation Committee (TAC) offer their recommendations to the STScI Director. Based on these recommendations, the STScI Director makes the final allocation of observing time.

The Review Panels

Dependent on their size, proposals in Cycle 28 will be reviewed either by external panelists or by on-site review panels.

The Cycle 28 on-site review will comprise eight topical panels, one each for solar system astronomy, exoplanets and exoplanet formation, stellar physics and stellar types, stellar populations (and the ISM), galaxies, the intergalactic medium and the circumgalactic medium, supermassive black holes and active galaxies, and large scale structure of the universe. Panelists are chosen based on their expertise in one or more of the areas under review by the panels. With one exception, the on-site panels will assess and grade Medium GO proposals and Small GO proposals requesting 16-34 orbits; the exception is solar system, where the number of proposals is not sufficient for a split review. Each panel will be managed by a panel chair and a co-chair, and there will be one overall TAC chair overseeing the review process.

The remaining GO proposals (up to 15 orbits), regular AR and SNAP proposals will be distributed for external review. Those proposals will be assessed by five experts who will grade on an absolute scale against the primary criteria: scientific merit within the field, broader importance for astronomy & the strength of the data analysis plan; HST's unique capabilities must also be required to achieve the scientific goals. Each external panelist will receive a limited number of proposals. The proposals will be grouped by subject area; the rank ordered list will be provided to the chair and co-chair of the appropriate on-site panel prior to the meeting to allow them to identify potential conflicts with the proposals reviewed by the panel. In addition, the chairs will have an opportunity to flag proposals with divergent grades for discussion by the on-site panel.

Note: The review panels will conduct a largely anonymous proposal review. It is important that submissions are sufficiently made anonymous to enable this type of review. Failure to do so may result in the disqualification of the submission. See HST Cycle 28 Anonymous Proposal Reviews for more information on what is required, and how it will be used in the Cycle 28 review.

The Telescope Allocation Committee (TAC)

The TAC will include the TAC chair, the on-site panel chairs and co-chairs, and the three at-large members to ensure broad expertise across the full range of scientific categories. The primary responsibility of the TAC is to review Large and Treasury GOs, and Legacy AR Proposals for scientific balance. The TAC will also consider particularly large requests of resources, including GO Calibrations, large SNAPs, or Pure Parallel programs.

Selection Criteria

Evaluations of HST proposals are based on the following criteria.

Primary Criteria for all Proposals

- The scientific merit of the program and its potential contribution to the advancement of scientific knowledge;
- The program's importance to astronomy in general. This should be stated explicitly in the "Scientific Justification" section of the proposal;
- The strength of the data analysis plan;
- A demonstration that the unique capabilities of HST are required to achieve the science goals of the program.

Additional Criteria for all GO and SNAP Proposals

- What is the rationale for selecting the type and number of targets? Reviewers will be instructed to recommend or reject proposals as they are and to refrain from orbit- or object trimming. Therefore, it is very important to justify strongly both the selection and the number of targets in your proposal, as well as the number of orbits requested.
- 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.

Additional Criteria for Large GO, Treasury GO, and Legacy AR Proposals

- Is there a plan to assemble a coherent database that will be adequate for addressing all of the purposes of the program?
- Is there evidence that the observational database will be obtained in such a way that it will be useful also for purposes other than the immediate goals of the project?

Additional Criterion for SNAP Proposals

- Willingness to waive part or all of the exclusive access period. While this is not the primary criterion for acceptance or rejection, it can provide additional benefit to any proposal and will be weighed by the reviewers as such.

Additional Criterion for Calibration Proposals

- What is the long-term potential for enabling new types of scientific investigation with HST and what is the importance of these investigations?

Additional Criteria for Archival Research Proposals

- What will be the improvement or addition of scientific knowledge with respect to the previous original use of the data? In particular, a strong justification must be given to reanalyze data if the new project has the same science goals as the original proposal.
- What are the demands on STScI resources (including funding, technical assistance, feasibility of data requests, archiving and dissemination of products)?
- Is there a well-developed analysis plan describing how the scientific objectives will be realized?

- Will the project result in the addition of new information that can be linked to the Hubble Source Catalog (HSC)?

Additional Criteria for Treasury GO and Legacy AR Proposals

- What scientific investigations will be enabled by the data products, and what is their importance?
- What plans are there for timely dissemination of the data products to the community? High-level science products should be made available through the HST data archive or related channels.

Additional Criteria for Theory Proposals

- What new types of investigations with HST or with data in the HST Data Archive will be enabled by the theoretical investigation, and what is their importance?
- What plans are there for timely dissemination of the theoretical results, and possibly software or tools, to the community?

Next: HST Cycle 28 Guidelines and Checklist for Phase I Proposal Preparation

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HST Proposal Opportunities and Science Policies

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HST Cycle 30 Guidelines and Checklist for Phase I Proposal Preparation

This page describes the formatting of Phase I proposals, the page limits for various types of proposals, and provides a checklist for proposers to consult when developing their observing proposals.

General Guidelines

Deadline

The deadline for proposal submission is **March 25, 2022 at 8:00pm EDT**. As part of the proposal submission process, proposers should submit a Team Expertise and Background section, following the instructions in HST Filling Out the APT Phase I Proposal Form. We strongly recommend that proposers start preparing their proposals early in order to give themselves enough time to learn APT. Cycle 30 will use APT 2022.1, released on February 3, 2022.

Please submit well before the deadline whenever possible, to avoid possible last-minute hardware or overloading problems, or network delays/outages. Late proposals will not be considered.

Questions about policies and technical issues should be addressed to the STScI Helpdesk 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.

Phase I Proposal Format

Cycle 30 Proposals must be submitted electronically. The Java-based 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; and
- an attached PDF file. **Note: Proposals should be anonymized in accordance with the specified guidelines.**

Both are submitted to STScI directly from within APT.

Page Limits for PDF Attachment

There are page limits on the size of your PDF attachment. The table below outlines these limits for different proposal categories.

Table: Page Limits

Proposal Category[1]	Total Page Limit for PDF Attachment
Small GO	8
Medium GO	9
Large GO	11

Treasury GO	11
Snapshot	8
Regular AR	8
Calibration AR	8
Theory AR	8
Legacy AR	11

[1]For Calibration GO, Joint HST-Chandra, Joint HST/XMM-Newton, Joint HST-NOIRLab, Joint HST-TESS, and Joint HST-NRAO Proposals, users should determine whether their proposal is Small, Medium or Large based on the HST orbit request, and use the appropriate page limits. Mid-cycle and DD proposals are also required to follow these guidelines.

In relation to these page limits, 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.
- There are no limits on the numbers of figures and tables in the PDF attachment, and they may be interspersed in the text. However, the total page limit must be observed.
- References should be listed at the end of the proposal and do not count against the page limits.
- Your PDF attachment must be prepared with a font size of 12pt. Do not change the format of any of the templates provided by STScI.
- While there are no specific page limits on the scientific justification, the strongest proposals will have a balance between scientific justification and the other required sections (such as the Description of Observations or the Analysis Plan) so that reviewers can accurately assess the merits and feasibility of a proposal using the selection criteria. Historically, scientific justifications for different types of programs range from 3-6 pages (depending on proposal type).

Proposal Preparation Checklist

Table: Proposal Preparation Checklist

Step	Procedure
1) Review the Phase I Roadmap	The HST Phase I Proposal Roadmap is a high level step-by-step guide to writing a Phase I proposal. It includes links to various documents and training videos.
2) Install APT	Go to the APT webpage. Follow the instructions there to download and install the latest version of APT onto your machine. You can also ask your system administrator to do an institution-wide installation.
3) Fill out the APT Phase I form	Use APT to fill out the Phase I form. Information on the use of APT, including movie tutorials, is available on the APT webpage. A description of which items are requested as well as guidelines for answers are presented in HST Filling Out the APT Phase I Proposal Form. Proposers can save work in progress, so APT submission can be completed over several sessions.

4) Download a template file for the creation of your PDF attachment	Download one of the templates to create your PDF attachment. There are separate template files for GO and for AR/Theory Proposals. Template files are available in several popular word-processing applications, including LaTeX and Microsoft Word.
5) Edit the template	Edit the template using your favorite word-processing application. A description of which issues need to be discussed, and guidelines for how to discuss them, are presented in HST Preparation of the PDF Attachment.
6) Create the PDF attachment.	Transform your edited template into a PDF file. Any figures in your proposal must be included into this PDF file. We will provide the reviewers with the electronic PDF files so that figures can be viewed in color. However there is no guarantee that the reviewers will view the files electronically, so please make sure your figures are useful when printed using grey scales.
7) Anonymize the PDF attachment	Ensure that your PDF attachment containing your Scientific and Technical sections are sufficiently anonymized, in accordance with the HST Anonymous Proposal Reviews guidelines.
8) Add the PDF filename path to the APT form	In your APT form, list in the appropriate box the path that points to the PDF attachment file on your local disk.
9) Review your proposal	In APT, click on 'PDF Preview' to get a preview of all the final information in your proposal. What you will see is the fully synthesized proposal we keep on record at STScI. The reviewers will see essentially the same, without the list of investigators and without the Team Expertise and Background sections (see HST Proposal Selection Procedures). If you are not satisfied at this stage, make any necessary changes.
10) Institutional Endorsement	STScI does not require institutional endorsement of GO/AR Proposals in Phase I. However, some institutions do require such endorsement of all submitted proposals. It is the responsibility of each PI to follow all applicable institutional policies concerning the submission of proposals.
11) Submit your proposal	In APT, use the Submission tool to submit your proposal to STScI. All parts are sent together (i.e., both the APT form information and the PDF attachment).
12) Receive an STScI acknowledgment of your submission	Verification of a successful submission will appear in the Submission Log on the Submission Screen in APT within about a minute. Also, the PI and all Co-Is will receive an automatic email acknowledgment that the merged PDF submission was received successfully. After the Phase I deadline has passed, and all submissions are in their final form, you will receive final notification that your submission has been successfully processed; this email will mark the completion of the submission. If you do not receive the final notification email within 72 hours of the deadline, please contact the STScI Help Desk and provide the submission ID from the APT Submission Log window. If there are any problems associated with your PDF attachment, you will be contacted by email.

Next: HST Filling Out the APT Phase I Proposal Form

HST Cycle 30 Filling Out the APT Proposal Form

This page walks the proposer through the various parts of the Astronomer's Proposal Tool (APT), the software through which HST proposals are developed and submitted.

As described in HST Guidelines and Checklist for Phase I Proposal Preparation, 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. Not every item described here needs to be filled out for every proposal. For example, some items are only relevant for observing proposals, while others are only relevant for archival proposals. APT will automatically let you know which items need to be filled out, depending on which proposal type you choose. HST Preparation of the PDF Attachment describes the items that must be addressed in the attached PDF file.

Introductory Material

Title

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

Abstract

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 85 characters of text. This limit is enforced by APT.

Proposal Phase

No action is required by the proposer at this time. For Cycle 30 the Phase will automatically be set to ‘PHASE I. ’ See HST Proposal Submission Policies for a description of the different phases in the HST proposal process.

Category

Select one of the following categories:

• GO—General Observer Proposal
• SNAP—Snapshot Proposal
• AR—Archival Research Proposal

Proposals for Director’s Discretionary Time submitted outside of the normal review cycles should select:
• GO/DD—Director’s Discretionary Time Proposal

Cycle

For a Cycle 30 Proposal, enter '30' (this is the default).

Mid-Cycle

If you are submitting a Mid-Cycle GO proposal, please check the "Mid-Cycle" box. To learn more about the Mid-Cycle submission process, see the HST Mid-Cycle Time submission section.

Requested Resources

Primary and Parallel Orbits

(This item appears in the APT form only for GO Proposals)

Enter the total number of orbits requested for Primary observations and the total number of orbits requested for Coordinated Parallel observations OR enter the total number of orbits requested for Pure Parallel observations. Only whole orbits can be requested, and only whole orbits will be allocated. In general, only the boxes for 'This Cycle' need to be filled out. However, Long-Term Proposals should provide a year-by-year breakdown of the orbits requested by also filling out the boxes for 'Next Cycle' (Cycle 31) and 'After Next' (Cycle 32).

Total Targets

(This item appears in the APT form only for SNAP Proposals)

Specify the total number of targets requested. Multiple visits to the same source should be counted as multiple targets.

Exclusive Access Period

(This item appears in the APT form only for GO Proposals)

Enter the requested exclusive access period (formerly known as a proprietary period), of either 0, 3, 6 (months), that will apply to all observations in the program. The default exclusive access period is 0 for Large and Treasury GO Programs, and 6 for Medium GO Programs, and 6 months for Small GO programs. See Data Rights for more information. The benefits of or need for a non-default exclusive access period must be discussed in the 'Special Requirements' section of the proposal.

Scientific Category

Specify one Scientific Category from the list below. Please adhere to our definitions of these categories. If you find that your proposal fits into several categories, then select the one that you consider most appropriate. If you are submitting a Calibration AR Proposal, then choose the Scientific Category for which your proposed calibration will be most important. STScI reserves the right to re-assign proposals to categories to ensure the highest chance of the proposal being reviewed by the proper expertise.

• **SOLAR SYSTEM ASTRONOMY:** This includes all objects belonging to the solar system (except the Sun, Mercury, and Venus), such as planets, minor planets, comets, asteroids, planetary satellites, and Kuiper-belt objects.

• **EXOPLANETS AND EXOPLANET FORMATION**: This includes all objects belonging to known extrasolar planetary systems, and observations of their host stars, as well as all studies of circumstellar and proto-planetary disks.

• **STELLAR PHYSICS AND STELLAR TYPES**: This includes stars of all temperatures and evolutionary phases, including pre-main sequence stars, supernovae, pulsars, X-ray binaries, CVs, and planetary nebulae. It also applies to ISM and circumstellar matter in the Milky Way.

• **STELLAR POPULATIONS AND THE INTERSTELLAR MEDIUM**: This includes resolved stellar populations in globular clusters, open clusters or associations, and the general field of the Milky Way and other nearby galaxies. Studies of color-magnitude diagrams, luminosity functions, initial-mass functions, internal dynamics and proper motions are in this category.

• **GALAXIES**: This includes studies of the initial mass function, stellar content and globular clusters in distant galaxies, galaxy morphology and the Hubble sequence, and low surface-brightness galaxies. Starbursts, IR-bright galaxies, dwarf galaxies, galaxy mergers and interactions may fall under this heading. This category also includes studies of gas distribution and dynamics in distant galaxies. Starbursts, IR-bright galaxies, dwarf galaxies, galaxy mergers, and interactions may also fall under this heading if the emphasis is on the ISM.

• **THE INTERGALACTIC MEDIUM AND THE CIRCUMGALACTIC MEDIUM**: This category includes the physical properties and evolution of absorption-line systems detected along the line of sight to quasars, inflow and outflow of gas to the CGM/IGM, and other observations of the diffuse IGM, and the spectroscopy and imaging of damped Ly-alpha systems.

• **SUPERMASSIVE BLACK HOLES AND ACTIVE GALAXIES**: This encompasses active galaxies and quasars, including both studies of the active phenomena themselves, and of the properties of the host galaxies that harbor AGNs and quasars. The definition of AGN is to be interpreted broadly; it includes Seyfert galaxies, BL Lac objects, radio galaxies, blazars, and LINERs.

• **LARGE SCALE STRUCTURE OF THE UNIVERSE**: This includes studies of the structure and properties of clusters and groups of galaxies, strong and weak gravitational lensing, galaxy evolution through observations of galaxies at intermediate and high redshifts (including for example, the Hubble Deep Fields), cosmology in general, the structure of the universe as a whole, cosmological parameters and the extra-galactic distance scale.

Proposals in these Scientific Categories will be reviewed by panels of the same names.

Keywords

From the list of Scientific Keywords (see Appendix B: Scientific Keywords), please select those that best describe the science goals of the proposal. Your choice here is important. Based on the keywords that you specify, your proposal will be assigned to specific reviewers during the proposal review. Please give as many keywords as possible, but not more than five. You must give at least two.

Alternate Category

If your science goals straddle two separate science categories, users have the option to add an alternate category which will allow keywords from both categories up to a limit of 10 total keywords, thus providing more flexibility in where the proposal will be assigned for review.

Special Proposal Types

Chandra ksec

(This item appears in the APT form only for GO Proposals)

If you are asking for both HST and Chandra observing time then list the requested number of Chandra kiloseconds. You should then also provide detailed information on the Chandra observations in the ' Coordinated Observations' section of the proposal. If you are not requesting any new Chandra observations (or if you have Chandra time that has already been awarded), then enter '0' here.

XMM-Newton ksec

(This item appears in the APT form only for GO Proposals)

If you are asking for both HST and XMM-Newton observing time then list the requested number of XMM-Newton kiloseconds. You should then also provide detailed information on the XMM-Newton observations in the 'Coordinated Observations' section of the proposal. If you are not requesting any new XMM-Newton observations (or if you have XMM-Newton time that has already been awarded), then enter '0' here.

NOIRLab Nights

(This item appears in the APT form only for GO Proposals)

If you are asking for both HST and NOIRLab observing time then list the requested number of nights on NOIRLab telescopes. You should then also provide detailed information on the NOIRLab observations in the ' Coordinated Observations' section of the proposal. If you are not requesting any new NOIRLab observations (or if you have NOIRLab time that has already been awarded), then enter '0' here.

The National Optical Astronomy Observatory (NOAO) is now NOIRLab. Proposers may see references to both NOIRLab and NOAO as this change propagates.

NRAO Hours

(This item appears in the APT form only for GO Proposals)

If you are asking for both HST and NRAO observing time then list the requested number of NRAO hours. You should also provide detailed information on the NRAO observations in the 'Coordinated Observations' section of the proposal. If you are not requesting any new NRAO observations, then enter '0' here.

TESS Targets

(This item appears in the APT form only for GO Proposals)

If you are asking for additional TESS short-cadence targets in addition to HST observing time, then list the requested number of additional TESS targets. You should also provide detailed information on the TESS targets in the 'Coordinated Observations' section of the proposal. If you are not requesting any new TESS targets, then enter '0' here.

Theory

(This item appears in the APT form only for AR Proposals)

Mark this keyword if you are submitting an AR Theory Proposal.

Legacy

(This item appears in the APT form only for AR Proposals)

Mark this keyword if you are submitting an AR Legacy Proposal.

Cloud Computing

(This item appears in the APT form only for AR Proposals)

Mark this keyword if you are submitting an AR Cloud Computing Studies Proposal

Data Science Software

(this item appears in the APT form only for AR Proposals)

Mark this keyword if you are planning to request funding for the development of software products that will be made available to the community for the purposes of analyzing HST data.

Calibration

Mark this keyword if you are submitting a Calibration Proposal. This keyword can be set for both GO and AR Proposals.

Treasury

(This item appears in the APT form only for GO Proposals)

Mark this keyword if you are submitting a GO Treasury Proposal.

UV Initiative

Mark this keyword if your proposal is eligible for the UV Initiative. This keyword can be set for both GO and AR Proposals.

Fundamental Physics

Mark this keyword if your proposal is eligible for the Fundamental Physics Initiative. This keyword can be set for both GO and AR Proposals.

Proposal PDF Attachment

List the location on your computer of the PDF file to be attached to your Phase I submission. This file should contain the items described in HST Preparation of the PDF Attachment.

Team Expertise and Background

Selecting the arrow to the left of the items in the Tree Editor of APT will show subordinate sections that can be selected to enter additional information. For Proposal Information, this includes Principal Investigator and Co-Investigator information (see below), and the Team Expertise and Background selection. The Team Expertise and Background selection provides a free-format text box to enter the relevant information. See HST Anonymous Proposal Reviews for details on what information to provide here. Please note: the box supports ascii text. Special text markup and LaTeX characters will not show correctly.

Investigator Information

Principal Investigator

Enter the first and/or last name of the PI. Please use standard ASCII. 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 supply APT with the address information. For U.S. PIs, the institutional affiliation is defined as the institution that will receive funding if the proposal is approved.

If you are not in the database, click on "New Entry". If you are in the database, but the address information is incorrect, click on "Update This Address." Both clicks will take you to the ProPer tool so you can be added to, or update information in, the database. Once you have entered your information into ProPer, you must redo the database search and supply APT with the updated information.

APT will not compromise the anonymous status of the proposal. It will keep investigator and institutional information, as well as the separate Team Expertise and Background section, from the TAC and Panels until they are requested by an authorized person to be utilized in a last sensibility check.

Contact

For Large and Treasury Programs, 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 Phase I Contact box should be set accordingly. Any person may be designated as the Contact.

Co-Investigators

Co-investigators (Co-Is) can be added in APT as necessary in Phase I; once a program is approved (Phase II), a Co-I can only be added with prior approval. By default, APT will provide one blank Co-I template. Please add other Co-Is or delete as necessary. There is a limit of 999 Co-Is on any proposal. For each Co-I, enter the name and select the correct person from the list of database matches. As for PIs, new investigators or address updates should be submitted via ProPer. For U.S. Co-Is the institutional affiliation is defined as the institution that will receive funding if the proposal is approved.

If a proposal has a non-U.S. PI and one or more U.S. Co-Is, then you must select one of the U.S. Co-Is to be the Admin PI, who will oversee the grant funding for U.S. investigators.

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, and should be given generic target names.

GO Proposals must include a list of all targets. For proposals with a large number of fixed targets, there is a capability to ingest a comma-separated text file with the appropriate target information. See the Roadmap for details.

Target Number

Each target in your proposal will be assigned a unique number by APT. A different target must be defined when different coordinates or a different target description are required. Separate targets should be defined and listed if observations are planned at several points within an extended object. For example, acquiring spectra at three different locations within the Crab nebula requires each point to have its own target number, name and co-ordinates, such as CRAB1, CRAB2 and CRAB3. However, if you are proposing a large field mosaic with the same exposures at each point, you may define one target for the object. You should specify in the Description of Observations the exact number of fields you plan to observe.

Target Name

The target naming conventions for HST are defined in detail in the HST Phase II Proposal Instructions. Please adhere to these naming conventions throughout your proposal. For generic targets use a short text description either of the target location (e.g., RANDOM-FIELD) or of the target itself (e.g., NEXT-SUPERNOVA).

Provisional Coordinates

Supply the coordinates for fixed targets only. In Phase I, target positions with accuracies of ~1 arc minute are sufficient for the TAC and panel review (except in crowded fields where the identity of the target may be in question). However, in Phase II significantly more accurate coordinates will be required, and it is the responsibility of the proposers to provide these. See the STScI Phase II documentation for details.

V-Magnitude

A magnitude or flux should be specified for every target. Supply the V-magnitude for the entire target (galaxy, planet, etc.), if known. In the case of observations with ACS/SBC, STIS/MAMA, or COS, specify the V-magnitude of the brightest object in the field of view (this may not be the primary target). For variable targets, give the brightest V-magnitude expected during the observations. The configurations mentioned above have detectors with bright-object safety limits, and observations that violate those limits are infeasible. See the Bright-Object Constraints section of the HST Primer, or the respective Instrument Handbook for details. With the exception of the safety checks, this information is used only for scientific review, not for exposure-time calculations. It is not required to specify the V-magnitude or flux for generic targets.

Other Fluxes

For each target you should specify either a V-magnitude or another magnitude or flux. Supply the apparent total magnitude or flux in the relevant passband for the entire target (galaxy, planet, etc.), if known. For variable targets, give the brightest magnitude expected during the observations. This information is used only for scientific review, not for exposure-time calculations. The format is free text.

Observation Summary (OS)

(This item appears in the APT form only for GO Proposals)

The OS lists the main characteristics of the observations that you propose to obtain. In general you must include in the OS all the configurations, modes, and spectral elements that you propose to use, and (except for SNAPs) all the targets that you propose to observe. Configurations or targets 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:

• For Long-Term Proposals, the OS should include information for all the proposed observations, not just those requested in Cycle 30.
• Parallel observations must be included in the OS, and marked as such using the relevant special requirement flags (see the table below).
• Target acquisition observations 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. 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" section of the proposal.

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 the items that are listed and discussed below in separate sub-sections.

Target

Select the target from the pull-down menu. The menu will contain all the targets you have entered on the “Targets” page.

Instrument

Select an instrument from the pull-down menu. The menu will contain all the available instruments. Only one instrument can be selected in each observation block.

Instrument Setup(s)

Under “Instrument Setups” click on “Add.” This will bring up a pop-up menu which will allow you to select the parameters for the observation (e.g., config, science mode, spectral elements).

Config

Enter the Scientific Instrument configuration. A pull-down menu shows the available and allowed options for the instrument you have selected.

Science Mode

Enter the science mode. A pull-down menu shows the available and allowed options (which depend on the choice of Configuration).

Coronagraphy

If you are proposing coronagraphic observations with STIS, then set this keyword to ‘yes.’ Coronagraphic observations with the ACS/SBC are not permitted (see Section 3.3.2 of the ACS Instrument Handbook).

Polarizer

If you are proposing polarimetric observations with ACS, then set this keyword to ‘yes.’ There is no polarimetry keyword in the proposal PDF file, but this sets the appropriate flag in the Phase I submission.

Spectral Element

Enter the desired spectral elements (i.e., filters and gratings) using the ‘Spectral Element’ pull-down menus which show the available and allowed options (which depend on the choice of Configuration and Science Mode). Each Instrument Setup denotes a set of exposures with the same spectral elements. For example if you are taking four exposures with the B filter and two with the V filter, one instrument setup would give the B filter as the Spectral Element, and a separate instrument setup would give the V filter as the Spectral Element.

Central Wavelength

If a COS or STIS grating is used, then first select the grating and subsequently give the central wavelengths in Angstroms for the exposures.

Orbits

Enter the number of orbits requested (i.e., the sum of the orbits required for all the instrument setups in the observation block). Consult Orbit Calculation Overview for instructions on how to calculate the appropriate number of orbits for your observations.

Number of Iterations

If you require multiple sets of observations, enter the number of iterations (for example, if you will reobserve at a different time or if you have a large mosaic). This will automatically update the total number of orbits requested for the target.

Special Requirement Checkboxes

Mark one or more of the special requirement checkboxes, if applicable. The meanings of the checkboxes are indicated in the table below. For Snapshot observations, only the 'duplication' and 'coordinated parallel' checkboxes are allowed.

Table: Special Requirement Flags for the Observation Summary

Flag	Use this flag for
Coordinated Parallel	All of the exposures specified in this observation block are to be done in Coordinated Parallel mode.
Pure Parallel	All of the exposures specified in this observation block are to be done in Pure Parallel mode.
CVZ	Continuous Viewing Zone observations.
Duplication	Observations which duplicate or might be perceived to duplicate previous or upcoming exposures.
Target of Opportunity - Disruptive	Target-of-Opportunity observations with turn-around time shorter than 3 weeks .
Target of Opportunity - Non-disruptive	Target-of-Opportunity observations with turn-around time longer than 3 weeks.
Relative ORIENT Link	This observation block will have a given spacecraft orientation relative to other observations
On Hold	This observation block may be on hold until another exposure executes.
Observations Grouped in Time	This observation block will be grouped in time with other observations.
Sequential Observations in Time	Requiring that this observation block will be taken back to back within a given amount of time.
Non-Interruptible Sequential Observations	This observation block will be taken back to back in a given amount of time and cannot be interrupted by an occultation of the telescope

Scheduling Requirements

For all proposals, we request that you provide additional scheduling information and constraints for your observations; this request does not apply to observations of solar system or generic targets. The additional information will help STScI understand and assess the scheduling implications of your program. Be sure to read the Description of the Observations section and Special Requirements section, as those are the primary places for describing your observing strategy, including any justification for special requirements. Some special requirements are used when running the Visit Planner and others show up as flags only.

NO SCHEDULING CONSTRAINTS

Setting this requirement means there are no scheduling constraints on the Observation Block.

SHADOW

Set this requirement when all exposures defined in the Observation Block are affected adversely by geocoronal Lyman-alpha background emission, and therefore need to be obtained when HST is in Earth shadow. This requirement complicates scheduling and reduces HST observing efficiency, and must therefore have adequate scientific justification in the Phase I proposal. SHADOW is generally incompatible with CVZ. This requirement should not be used if low continuum background is required: in that case use LOW SKY instead.

LOW SKY

Set this requirement when all exposures defined in the Observation Block are affected adversely by scattered light (e.g zodiacal light and earthshine), and therefore need to be obtained with minimal sky background. The continuum background for HST observations is a function of when and how a given target is observed. Observations can be scheduled when the sky background is within 30% of its yearly minimum for the given target, which is done by restricting the observations to times that minimize both zodiacal light and earthshine scattered by the Optical Telescope Assembly (OTA). To minimize the zodiacal light, the scheduling algorithm places seasonal restrictions on the observations; to reduce the earthshine, the amount of time data is taken within an orbit is reduced by approximately 15%. The former complicates scheduling, while the latter reduces the observing efficiency of HST. Therefore, using the LOW SKY restriction must have adequate scientific justification included in the Phase I proposal. With this restriction, the zodiacal background light for low-ecliptic latitude targets can be reduced by as much as a factor of 4. Avoiding the earthshine at the standard earth-limb avoidance angle (see the Pointing Constraints section of the HST Primer) can make a similar difference. LOW SKY is generally incompatible with CVZ.

SAME ORIENT

Setting this requirement means that all exposures defined in the Observation Block MUST be observed at the exact same ORIENT. This requirement is only meaningful if the observations are to occur in multiple visits (e. g. Number of Iterations is greater than 1, or if the Total Orbits is greater than 5). This requirement must be specified in Phase I to be implemented in Phase II.

ORIENT RANGE

Enter the ORIENT range that all the exposures defined in the Observation Block must be observed within. If multiple ORIENT ranges are acceptable, then enter all values. This requirement must be specified in Phase I to be implemented in Phase II.

BETWEEN

Enter the range of dates that all exposures defined in the Observation Block must be observed within. If multiple BETWEENs are acceptable, then enter all values.

AFTER OBSERVATION BY

Enter any timing requirements between Observation Blocks. Timing requirements between observations WITHIN an Observation Block do not need to be specified. This is intended to capture repeated visits with spacings of multiple days or greater, not timing requirements of less than 1-2 days.

PERIOD <time> and ZEROPHASE <date> and PHASE <number1> TO <number2>

Supplies the period and zero-phase for observations to be made at a specific phase of periodically variable target. <time> is the period in days, hours, minutes, or seconds, and <date> is the date of the zero-phase with respect to the Sun (i.e., HJD, not calendar date), <number1> is the start of the phase ranges, and <number2> should be between 0.0 and 1.0.

For Large and Treasury Programs, 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. As noted previously, if a Co-I is to serve as the contact for this verification process, the Contact Co-I keyword box should be set.

Verifying Schedule Constraints

If you have specified any scheduling constraints, you are encouraged to use the APT Visit planner to verify that your observations are indeed schedulable. While it cannot check that the total number of orbits you have requested are available, the Visit Planner will at least confirm whether or not there are days during the cycle when your target(s) can be observed with your imposed scheduling constraints. In general, the more days that are available, the more feasible your program. This is particularly important for Large Programs. Detailed instructions for performing this verification can be found in the HST Help menu.

If you find that any observation is not schedulable, and it is not scientifically possible to adjust any special scheduling constraints (e.g. a BETWEEN), then you can increase the scheduling opportunities by selecting the Increase Scheduling Flexibility flag in APT. Note that using this option may require you to ask for a larger orbit allocation, since setting the flag will reduce the orbital visibility for the observation; this reduced orbital visibility is automatically used for Large Programs. Detailed instructions for performing this verification can be found in the HST Help menu.

Next: HST Preparation of the PDF Attachment

HST Cycle 30 Preparation of the PDF Attachment

This page describes the sections required to be present in the PDF attachment. This attachment is written as a standalone file using STScI provided templates, and is uploaded through APT.

Science Justification Templates

Templates for HST Cycle 30 Proposal PDF attachments:

Templates	LaTeX & phase1.sty	**Microsoft Word**	**PDF output**
GO	phase1-GO.tex	phase1-GO.doc	phase1-GO.pdf
AR	phase1-AR.tex	phase1-AR.doc	phase1-AR.pdf
GO/DD	phase1-DD.tex	phase1-DD.doc	phase1-DD.pdf
GO Mid-Cycle	phase1-MC.tex	phase1-MC.doc	phase1-MC.pdf

Note: the Word and LaTeX templates have intentionally different margins, to accommodate the same amount of text per page. See HST Guidelines and Checklist for Phase I Proposal Preparation for information on page limits.

As described in Guidelines and Checklist for Phase I, 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. Template files (above) are available in several popular word-processing environments for the creation of the PDF file. Your PDF Attachment should obey the page limits given in the guidelines section. There is a limit on the total number of pages, as well as on the amount of text in the 'Scientific Justification' section.

The entire PDF attachment must be anonymized, in accordance with the guidelines specified in HST Anonymous Proposal Reviews. Phase I proposals must itemize and briefly justify the special requirements that will be implemented in Phase II, using the Phase I section designated for this purpose.

Team Expertise and Background Section

Please remember to complete this section. The tree editor in APT shows a separate, free-format text box to provide this information. See HST Anonymous Proposal Reviews for further guidance.

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 it addresses. The members of the review panels will span a range of scientific expertise, so you should write this section for a general audience of scientists.

Depending on the type of proposal, the following items should also be included:

- GO Treasury, AR Legacy, and Pure Parallel Proposals should address the value 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 needed for the scientific objectives; dithering is required to eliminate hot pixels and other detector artifacts 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 Primer and the COS, STIS, or ACS Instrument Handbooks).
- SNAP Proposals should provide a complete description of the target sample.
- AR Proposals should describe how the project improves upon or adds to the previous use of the data.
- Theory Proposals should include a description of the scientific investigation that will be enabled by the successful completion of the program, and their relevance to HST.
- Calibration AR Proposals should describe what science will be enabled by the successful completion of the program, and how the currently supported core capabilities, their calibrations, and the existing pipeline or data reduction software are insufficient to meet the requirements of this type of science.

Description of the Observations

(This item is required only for GO and SNAP Proposals)

This section of the PDF file should be used to provide a short description of the proposed observations. It 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. For CVZ targets, state the number of CVZ opportunities available in the cycle (use the Visit Planner to determine this number).

Discuss and justify any non-standard calibration requirements. You should estimate the number of orbits required for these special calibrations, and include them in the Observation Summary.

Depending on the type of proposal, the following items should also be included:

- Long-Term Proposals should provide summary information for the entire program, with a cycle-by-cycle breakdown of the requested orbits.
- Treasury Proposals should discuss the data products that will be made available to the community, the method of dissemination, and a realistic time line. It is a requirement of Treasury Programs that data products be delivered to STScI 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.
- Investigators submitting Large or Treasury Proposals should discuss how they have designed their program with regard to schedulability.
- Proposers of programs with timing constraints and timing relationships between observations should describe those constraints, including allowable flexibility.
- Proposers of programs containing large blocks of orbits at constrained orientation angles, such as mosaics and surveys, should describe those constraints and allowable flexibility.
- Calibration Proposals should present a detailed justification of how they will achieve the goals of the program, and if applicable, a description of the conditions under which these goals will be achieved.
- Calibration Proposals should discuss what documentation, and data products and/or software will be made available to STScI to support future observing programs.

- Explicitly describe and justify any scheduling requirements requiring more than 6 consecutive orbits to be scheduled together.

Special Requirements

(This item is required for GO and SNAP proposals)

All visit-level and exposure-level special requirements must be itemized and justified in the Phase I proposal. Generally, proposers may not add special requirements in the Phase II submission or at a later date. Special requirements include:

- For Target-of-Opportunity (ToO) observations, estimate the probability of occurrence during Cycle 30, specify whether long-term status is requested, identify whether the ToOs are disruptive or non-disruptive, and state clearly how soon HST must begin observing after the formal activation.
- CVZ observations.
- Time-critical observations.
- Early acquisition observations.
- Coordinated Parallel observations.
- Target acquisitions that use offsets.
- Scheduling of STIS/MAMA and STIS/CCD observations (other than target acquisitions) in the same visit.
- Requests for expedited data access.
- Other special scheduling requirements (e.g., requests for non-SAA impacted observations, roll-angle constraints, SHADOW, LOW SKY, etc.).
- Other special requirements (e.g. PCS MODE, GUID TOL, DROP TO GYRO, CVZ, ON-HOLD, ORIENT (ORIENT TO, ORIENT FROM, SAME ORIENT), AFTER, BEFORE, BETWEEN, GROUP WITHIN, SEQ WITHIN, PERIOD, VISIBILITY INTERVAL CORON, SEQ-NON-INT)
- For observations in support of another NASA mission, proposers should identify the mission, describe how the HST observations complement the core mission science and indicate whether any coordination is required.

If applicable, discuss the need for a non-default proprietary period request.

If your proposal (either GO or AR) uses a mixture of UV and optical/IR observations and you wish to claim the benefit of the UV Initiative, justify why the UV component of your proposal is essential to the science investigation.

Coordinated Observations

(This item is required only for GO Proposals)

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 do not describe them here. If they improve your science case, then describe them in the 'Scientific Justification' section of the proposal.

Joint HST-Chandra Observations

Proposers requesting joint HST-Chandra observations must provide a full and comprehensive technical justification for the Chandra portion of their program. This justification must include:

- the choice of instrument (and grating, if used),
- the requested exposure time, justification for the exposure time, target count rate(s) and assumptions made in its determination,
- information on whether the observations are time-critical; indicate whether the observations must be coordinated in a way that affects the scheduling (of either Chandra or HST observations),
- the exposure mode and chip selection (ACIS) or instrument configuration (HRC),
- information about nearby bright sources that may lie in the field of view,
- a demonstration that telemetry limits will not be violated,
- a description of how pile-up effects will be minimized (ACIS only).

Proposers should note the current restrictions on observing time as a function of pitch angle of the satellite. Refer to Section 3.3.3 of the Chandra Proposers' Observatory Guide for detailed information. Proposers should check the pitch angles of their targets and be sure that any constraints they request do not render the proposed observation infeasible.

Technical documentation about Chandra is available from the Chandra X-ray Center (CXC) webpage, which also provides access to the Chandra Help Desk. The primary document is the Proposer's Observatory Guide, available from the Chandra Proposal Information webpage. Full specification of approved observations will be requested during the Chandra Cycle 23 period when detailed feasibility checks will be made.

Proposers requesting joint HST-Chandra observations must specify whether they were awarded Chandra time in a previous Chandra or HST cycle for similar or related observations. Proposers must also specify whether the team has submitted a similar proposal in response to the current Chandra call.

Joint HST/XMM-Newton Observations

Proposers requesting joint HST/XMM-Newton observations must provide a full and comprehensive technical justification for the XMM-Newton portion of their program, including

- the choice of prime instrument,
- the requested exposure time, justification for the exposure time, target count rates, and assumptions made in their determination,
- information on whether the observations are time-critical.

Technical documentation about XMM-Newton is available from the XMM-Newton webpage.

Joint HST-NOIRLab Observations

Proposers requesting joint HST-NOIRLab observations must provide a full and comprehensive scientific and technical justification for the NOIRLab portion of their program, including:

- the telescope(s) and instrument(s) on which time is requested,
- the requested observing time per telescope/instrument, a specification of the number of nights for each semester during which time will be required, a breakdown into dark, grey and bright time, and an explanation of how the required exposure time was estimated,
- information on whether the observations are time-critical, and whether the observations must be coordinated in a way that affects the scheduling (of either the NOIRLab or the HST observations),
- a description of any special scheduling or implementation requirements (e.g., optimum and acceptable dates).

Successful proposers will be asked to supply additional details about the observations, i.e., the same details required for NOIRLab proposals for the particular telescope/instrument. This 'Phase II - NOIRLab' information must be submitted by the nominal September 30, 2022 NOIRLab deadline for the 2023A

semester. In addition, for NOIRLab time on Gemini, successful PIs will be required to submit a complete NOIRLab proposal by the nominal September 30, 2022 deadline on the standard NOIRLab proposal form. Submission instructions will be forthcoming following notification of the results of the HST review.

Technical documentation about the NOIRLab facilities is available from the NOIRLab webpage. Questions may be directed to the NOIRLab Proposal Help Desk by e-mail to noaoprop-help@noao.edu. NOIRLab will perform feasibility checks on any approved proposals.

Joint HST-NRAO Observations

Proposers requesting joint HST-NRAO observations must provide:

- the choice of NRAO telescope(s) (VLA, VLBA and/or GBT), and
- the total estimated NRAO observing time in hours.

NRAO plans to make up to 3% of VLA, VLBA, and GBT observing time available for this opportunity with a maximum of 5% in any array configuration and including an 18-month period close to the HST Cycle 30 such that all VLA configurations are available. A VLA configuration schedule is published at:

- https://science.nrao.edu/facilities/vla/proposing/configpropdeadlines

Detailed technical information concerning the NRAO telescopes can be found at:

- http://science.nrao.edu/facilities/vla
- http://science.nrao.edu/facilities/vlba
- https://greenbankobservatory.org/science/gbt-observers/

For the VLA, joint proposals may only use capabilities defined as “general observing” in the NRAO VLA 2022B Call for Proposals, which will be available in January 2022. Technical questions about proposing or observing for NRAO telescopes (whose answers are not found in the above links) should be posted to the NRAO helpdesk.

If approved for NRAO time, successful PIs will be contacted by the NRAO Scheduling Officers (schedsoc@nrao.edu for the VLA/VLBA and gbtime@nrao.edu for the GBT). The successful PIs for GBT projects will be responsible for organizing the project's information in the GBT Dynamic Scheduling Software and for carrying out their GBT observations. For the VLA and VLBA, the PIs will be responsible for submitting scheduling blocks to the telescopes' dynamic queues. Projects requiring simultaneous HST-NRAO observations will be performed on fixed dates. In conjunction with HST, the NRAO Scheduling Officers will inform the PIs of those dates and times, and the PIs will be responsible for submitting scheduling blocks two weeks prior to the observations.

Joint HST-TESS Observations

Proposers requesting joint HST-TESS observations must provide a full and comprehensive technical justification for the TESS portion of their program, including:

- the suitability of using TESS survey data products,
- a justification for the selection and number of targets,
- and justification that the 2-minute or 20-second cadence will sufficiently meet their science goals.

Technical information on the TESS Guest Investigator Program is available on the TESS website.

Justify Duplications

(This item is required only for GO Proposals)

Justify, on a target-by-target basis, any potential duplication with previously accepted observing programs. Use the 'Duplication' checkbox in the Observation Summary to identify the duplicating observations. See Data Rights and Duplications for policies on duplications.

Analysis Plan

(This item is required only for all AR and Theory Proposals, and GO Calibration Proposals)

All AR and GO Calibration Proposals should provide a detailed data analysis plan and describe the datasets that will be analyzed. The plan should include a brief summary of the likely scale of the proposed program, including the number of personnel and associated work effort while still following the HST Cycle 30 Anonymous Proposal Review guidelines.

Legacy AR Proposals should also discuss the data products that will be made available to the community, the method of dissemination, and a realistic time line. It is a requirement that data products be delivered to STScI 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.

Theory Proposals should discuss the types of HST data that will benefit from the proposed investigation, and references to specific data sets in the HST Data Archive should be given where possible. They should also describe how the results of the theoretical investigation will be made available to the astronomical community, and on what timescale the results are expected.

Calibration Proposals should discuss what documentation, and data products and/or software will be made available to STScI to support future observing programs. Proposers should explain how their programs complement ongoing calibration efforts by the instrument groups. They should contact the relevant groups to ensure that efforts are not duplicated.

Next: HST Proposal Implementation and Execution

HST Cycle 30 Proposal Implementation and Execution

This page describes the process by which proposals go from being accepted to being implemented and executed, including technical reviews and scheduling, along with an overview of how to access the data once it has been observed by the telescope.

Notification

The review panels and the TAC will meet **June 1-8, 2022**. Electronic notification of the outcome of the Phase I selection process will be sent to all proposers in late June.

Phase II Submission

Successful GO proposers must submit a Phase II proposal providing complete details of the proposed observations. Detailed instructions on the preparation of Phase II proposals are provided in the STScI Phase II documentation. Complete observational details must be provided by the Phase II submission deadline. 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 proposal 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 Co-Is) after acceptance of the Phase I proposal, unless permission is granted by the Head of the Science Policies Group (Claus Leitherer; leitherer@stsci.edu). Requests for this should be well-justified.

Program Coordinator and Contact Scientist Support

Accepted observing programs are assigned a Program Coordinator (PC), whose role is to help the observer deliver a Phase II program that is syntactically correct and will schedule successfully on the telescope.

Certain types of programs (Large, Treasury, DD, ToO, moving-target, WFC3, or those using complicated observing strategies or require bright-object checking) will also be assigned a Contact Scientist (CS). The role of the CS is to provide advice on observing strategies, and to answer specific questions about instrument performance. Observers who are not automatically assigned a CS may request one. The CS is generally an Instrument Scientist involved in the calibration and characterization of the primary instrument used in the observer's program. The role of the CS ceases at program execution. Please contact the STScI Help Desk for post-execution assistance.

Duplication Checking

Some computer-aided duplication checks are carried out in Phase II, in part by STScI and also by observers who wish to check whether any of their own observations are being duplicated. Any duplications found that were not justified explicitly in the Phase I proposal and recommended by the review panels or the TAC will be disallowed. No compensatory observing time will be allowed and the observing time will be removed from the allocation.

Technical Review

In Phase I STScI does not perform technical reviews for the majority of the submitted proposals. In Phase II a technical feasibility review is performed and special attention is 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. It is the responsibility of the PI to ensure that none of the observations violate bright-object constraints.

Proposal Scheduling

After the technical review, observations determined to be feasible are scheduled for execution. 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.

Unschedulable or Infeasible Programs

Proposers should be aware that after acceptance of a proposal, the actual execution of the observations may in some cases prove impossible. Possible reasons include:

- The accepted observation may be found to be infeasible or extremely difficult for technical reasons only after receipt of the Phase II information; ToO and time-critical observations can be particularly complex to plan and execute, and will be completed only to the extent that circumstances allow.
- The observing mode or instrument selected may not be operational.
- Suitable guide stars or scheduling opportunities may not exist.
- Programs requiring blocks of more than 6 consecutive orbits must be explicitly justified in the Phase I "Description of Observations" and will proceed under a shared risk between STScI and the observer. If a program can be reasonably scheduled in this manner, it will be attempted, but if there is a problem, any subsequent attempt must be done in a series of 6 orbits or less.
- Programs with only one scheduling opportunity per year (i.e., falling in one of the weekly HST schedules) will proceed under a shared risk between STScI and the observer, and in the event of observation failure, any attempted repeat might not be granted without relaxed scheduling constraints.

Note: All HST observations are accepted with the understanding that there can be no guarantee that the data will actually be obtained.

The STScI Director reserves the right to disallow at any time any or all observations of an approved program if it is demonstrated that incorrect or incomplete information was provided in the Phase I proposal that may have significantly influenced the approval recommendation by the review panels or the TAC.

Access to Data Products

Data products are available from the HST Data Archive. Enhanced products for non-exclusive access observations may also be available from the Hubble Legacy Archive (HLA). Any processing or scientific analysis of the data beyond the standard pipeline calibrations performed by STScI is the responsibility of the observer.

Observers retrieve their data directly from the Data Archive through the MAST website. In order to retrieve exclusive access data from the Archive, proposal PIs and those designated by them must use their Single

Sign-On (SSO) account. Proposers are encouraged to consult the current Archive Account web page to determine if they already have an SSO account, or see the SSO FAQ for further information. HST data normally become non-exclusive access six months after they are taken, though this depends on the proposal type.

The HST Data Handbook describes the data produced by the instruments. Astroconda has information about how to install the latest software to calibrate and analyze HST data.

- Observers with questions about the retrieval of their data should contact the Archive Help Desk.
- Observers with questions about the analysis and calibration of their data should contact the STScI Help Desk.

Archival Research Support

STScI provides limited assistance in the reduction and analysis of archived data. Although a Contact Scientist is not usually assigned to a funded AR Program, STScI will do so upon request. The CS will serve as a single point of contact to help resolve calibration issues. Proposers should plan to conduct the bulk of their archival research at their home institutions, and should request funds accordingly. Limited resources preclude extensive assistance in the reduction and analysis of data by non-funded archival researchers.

Archival projects utilizing the Hubble Source Catalog (HSC) will be assigned a contact scientist. Proposers interested in the viability of potential projects should contact HSC personnel via the archive help desk.

- Archival Researchers with questions about the retrieval of data should contact the Archive Help Desk.
- Archival Researchers with questions about the analysis and calibration of data should contact the STScI Help Desk.

NASA High-End Computing Program

NASA's High-End Computing (HEC) Program maintains a comprehensive set of resources and services for the agency's four Mission Directorates, the NASA Engineering and Safety Center, external collaborators, and the nation. By closely partnering with each Mission Directorate, the HEC Program addresses their specific resource requirements and user needs. Mission support includes ensuring reliable remote access for a user community spread broadly across NASA centers and partner organizations nationwide.

Successful HST proposers will be eligible to apply for NASA High-End Computing Time. Please indicate whether you intend to apply for HEC time in the text of the 'Special Requirements' section of the PDF submission. More information on NASA HEC Program can be found on https://www.hec.nasa.gov.

Visits to STScI

Most GOs will find that they can analyze their data most efficiently at their home institution, using the STScI Help Desk to resolve issues that are not clear from the available documentation. However, observers who are new to HST may find it useful to visit STScI for 2-3 days to learn how to efficiently work with their data. Also, in cases of particularly complex or difficult programs, observers may consider visiting STScI before the Phase II deadline.

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

Failed Observations

HST observations fail at a rate of a few percent. Some of these failures result from occasional guide stars that cannot be acquired, or from an instrument anomaly, or the telescope happening to be in a safe mode when a particular observation was scheduled. Such failures, which are obviously beyond the proposer's control, can usually be scheduled for a repeat observation. When this is the case, the proposer receives a notice of the failure and information on obtaining a repeat observation.

A smaller fraction of failures do not have a clear cause, and may not be evident from our internal reviews of data quality. If you believe your observation has failed or is seriously degraded, then you may request a repeat for your program using the Hubble Observation Problem Report (HOPR) website available from the HST Program Information Page. The HOPR must be filed within 90 days after the observations are taken. In cases where the failure resulted from proposer error (e.g., incorrect target coordinates), a repeat will not be granted. In cases where the failure was a result of incorrect instrument performance, or incorrect information provided by STScI, a repeat is usually granted.

The policies that apply to failures and repeats are described in the Policy Document for the Telescope Time Review Board (TTRB). We wish to emphasize in particular:

- Standard policy dictates that if observations are to be repeated, the degraded/failed observations will be made public.
- If an observer has obtained more than 90% of the planned observations and the missing data are not uniquely important, then a repeat is not normally granted.
- If a Pure Parallel exposure fails during execution it may be repeated with suitable justification and if a suitable parallel scheduling opportunity is available.
- Observations taken using Available-but-Unsupported modes that fail due to the use of the unsupported mode will not normally be repeated.
- Observations that are lost due to bright-object violations will not be repeated.
- Observations that have partially or completely missing data due to a failure to successfully retrieve the data from the spacecraft may be repeated with suitable justification. PIs must describe how their data have been affected.

Publication of HST Results

It is expected that the results of HST observations and Archival Research will be published in the scientific literature. All refereed publications based on HST data must carry the following footnote (with the first phrase in brackets included in the case of Archival Research):

"Based on observations made with the NASA/ESA Hubble Space Telescope, obtained [from the Data Archive] at the Space Telescope Science Institute, which is operated by the Association of Universities for Research in Astronomy, Inc., under NASA contract NAS5-26555. These observations are associated with program # ___."

If the research was supported by a grant from STScI, the publication should also carry the following acknowledgment at the end of the text:

"Support for program #___ was provided by NASA through a grant from the Space Telescope Science Institute, which is operated by the Association of Universities for Research in Astronomy, Inc., under NASA contract NAS5-26555."

The relevant program ID should be entered in these phrases where indicated.

Because of the importance of maintaining the accuracy and completeness of the HST bibliography, a link to an electronic version of each preprint of publications based on HST research should be sent via email to the following addresses:

- Chief Institute Librarian, Space Telescope Science Institute, 3700 San Martin Dr., Baltimore, MD 21218, USA (library@stsci.edu)
- Office of Public Outreach, STScI, 3700 San Martin Drive, Baltimore, MD 21218, USA (villard@stsci.edu)

This requirement includes both refereed and non-refereed publications, but not abstracts or poster papers. As soon as links are received, they are entered into the publicly available HST bibliography.

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. The Office of Public Outreach (OPO) of STScI is available to help observers use their HST data for public information and education purposes (see Appendix A for contact information). Proposers can find guidelines and examples of these activities on the OPO webpage that discusses the Release of Scientific Findings to the Public.

NASA's policy is to distribute all news fairly and equitably, giving wide access to scientific findings, and enabling their broad impact. Both STScI and NASA can provide considerable resources to support the creation and distribution of press releases, and investigators are strongly encouraged to make use of those resources. The STScI Public Outreach news officers should be made aware of potentially newsworthy science results by principal investigators before the acceptance of HST publications, with sufficient time for consideration of a news release. STScI will only undertake a press release if the results are not circulated prematurely on social media or through an uncoordinated release from another entity.

Next: HST Grant Funding and Budget Submissions

HST Cycle 30 Grant Funding and Budget Submissions

Introduction

This section is intended to be an overview only of the budget proposal and funding policies for STScI grant programs. Budget notification letters will include specific details and resources for budget proposal preparation. The letters will be sent after proposers are notified of their successful Phase I programs. Contact STScI Grants Administration with questions concerning funding policies, budget submissions, allowable costs, or grant activities.

Phone: (410) 338-4200
email: gms_mail@stsci.edu

Budget Proposal Deadline

Budget proposals are due: **August 4, 2022 at 8:00pm EDT**. Late proposals will not be considered.

Budget proposals are submitted via STGMS (https://stgms.stsci.edu). Contact the Sponsored Research Office at your institution if you need an STGMS account.

STScI General Grant Provisions

STScI grants will be awarded in accordance with the GGP 2018. The terms of this Call for Proposals shall be incorporated into, and are considered to be part of, the GGP 2018.

Eligibility for STScI Grant Funds

Important: Carefully review the GGP 2018, Section 3, Eligibility for STScI Grant Funding, for specific eligibility requirements. Contact STScI Grants Administration if you have any questions regarding requirements or to determine if a person is eligible to request STScI grant funding.

Certifications, Assurances, and Representations

Budgets submitted to STScI or the acceptance of STScI grant awards represent the recipient institution's Authorizing Official or Authorizing Official Representative certification of compliance with the GGP 2018, its appended regulatory certifications, assurances, and representations, and the Budget Submission Certifications in STGMS.

STScI Review of Risk Posed by Applicants

STScI has an obligation and the authority to ensure that recipient institutions are eligible to receive federal awards and meet the requirements related to the award of federal funds. STScI evaluates risks posed by applicants before issuing an award. If an award is made, special conditions that correspond to the degree of risk assessed may be applied to the award. See GGP 2018, Sections 7 and 8 for criteria considered in STScI's evaluation of risk posed by applicants, and *examples* of specific conditions.

Budget Proposals

The budget is a detailed financial expression of the project or program and it shall be related to performance for program evaluation purposes whenever appropriate. GO/AR budget proposals are reviewed in detail and evaluated by the STScI Financial Review Committee (FRC) to assess funding that is appropriate to reduce and analyze HST data in conjunction with the work in the approved Phase I proposal.

The responsibility of a complete, accurate proposal rests with each investigator and their institution. It is important to include clear, detailed, and complete information in your budget, budget narrative, and management plan. Missing or incomplete information may result in a reduction of funding allocated to the program.

- Level of Effort – The level of effort proposed should generally not exceed 24 months. It is expected that HST data will be analyzed in one to two years, depending on the type and complexity of the project. Costs for level of effort in excess of 24 months will be removed from the budget unless clearly justified.

Reasonable, Allowable, Allocable

Costs to complete the science goals submitted in the approved Phase I proposal must be clearly stated, and scientifically justified in the approved Phase I proposal. All costs proposed must be reasonable, allowable, and allocable. See GGP 2018, Sections 9-11. Section 12 lists *examples* of specifically unallowable costs.

Costs that will not be considered during budget reviews:

- Costs to support Phase II preparation activities. The purpose of funding is to maximize the support provided for the research itself, and not the general proposal process.
- Costs for work not clearly stated and scientifically justified in the approved Phase I proposal (e.g. ground-based observing, analysis of data from other observatories).
- Costs for work that extends beyond the original work in the Phase I proposal, based on TAC comments.
- Costs for work outside the original scope of work (i.e. work not included in the Phase I proposal, then added to the cost proposal and budget narrative).
- Costs that are over-scoped (i.e. costs for work described in the Phase I proposal, but determined to be in excess of what is required to complete the project).
- Costs that are disproportionate to the funded level of effort for U.S. investigators.
- Costs included in the cost proposal, but are not included in the budget narrative, or are not described or clearly justified in the budget narrative.

Grant Administrative PI

Each budget must have an Administrative PI who will have overall fiscal and reporting responsibility for the grant proposal and subsequent award. Grant awards are issued to the proposing institution at which the Administrative PI is employed and not to the PI personally (Ref. GGP 2018, Section 4).

Continuation Programs

Approved GO Continuation programs will have orbits scheduled in more than one cycle. Continuation programs do not require a new Phase I proposal for each cycle. Phase II and budget proposals only, are required for each subsequent cycle of the program. Budgets submitted for the first cycle of a continuation proposal will include costs for the effort to reduce and analyze the data obtained in the first cycle only. Costs for subsequent cycles will be automatically removed by the Financial Review Committee (FRC). Budget

narratives will include a description of the overall effort for the multi-year project. Additionally, the narrative will include the same requirements as all other budget proposals.

Funding for Joint Programs

Funding requests submitted to STScI for joint programs should support only the HST portion of the project. Funding for the analysis of data from other observatories should be provided through their budget process. See those websites for more information. If a request is submitted to STScI to support the analysis of data from other than HST, a detailed justification of why the work is crucial to understanding the HST project is required. Clearly describe and differentiate the labor effort for each program in the budget narrative.

Program Management Plans

Management Plans, including a timeline, are required with the budget proposal submission for **all** proposals. The FRC reviews the Management Plans to determine if the costs requested are commensurate with the level of effort required to complete the project. The FRC cannot accurately assess budget proposals for programs with incomplete or inadequate information.

Program Management Plans should include the following information:

- An organized, integrated plan that uses a systematic approach for data reduction and analysis.
- A description of each person's tasks/role and the time commitments of funded and non-funded personnel (name where possible). Additionally, describe who is doing what, and whether any of those roles change throughout the project. If yes, explain. Large programs should include a description of the program manager's responsibilities and how the person will provide cohesive leadership and oversight.

The plan should also include:

- An outline of the project's goals and objectives.
- A quantitative list of actions or tasks required to achieve the goals and objectives of the project.
- Clearly identify the responsibilities of U.S. and foreign investigators. Budgets for U.S. investigators should be within the scope of the labor proposed for those investigators. *Foreign teams must contribute a proportionate amount to the project (including publications).*
- Describe any ramp up activities or preparation of ancillary data.
- Describe the value of any redundant effort.
- Describe how the expertise of the team members will be leveraged.
- A schedule with timelines, project milestones, and goals.
- A list of deliverables, if applicable.
- A list of tools (if any) that will be developed.
- Describe how the team plans to collaborate/communicate.

Priorities of the Financial Review Committee

The FRC reviews budget proposals based on the tasks, level of effort, and other costs required to complete the project. **Budgets are evaluated based on the work proposed in Phase I.**

Proposers should ask themselves these key questions before submitting a proposal:

- Are the responsibilities, contributions, and level of effort for each team member (including foreign and unfunded) clearly stated, justified, proportional (directly linked), and in conjunction with their role in the project and the approved Phase I proposal? Note that only tasks that are specifically identified or absolutely necessary for the Phase 1 science will be considered.
- Team members should have separate tasks. If there is overlap, is there a clear description of why it is necessary?
- Is the budget justification correct and consistent with the budget request?
- Are costs in the budget included in the budget narrative? Conversely, are all costs described in the budget narrative included in the budget?
- Is the travel requested really required for the project? Provide the specific reason project personnel must travel to specific conferences. Avoid generic TBD conferences whenever possible. Are higher costs for travel (i.e. international travel or attendance of multiple team members) well justified? Virtual meetings are encouraged.
- Are the computers (laptops, desktops) and computing costs requested required for the project and well justified in the budget narrative?
- Is there a clear, detailed justification for any major science software packages expected to be used?
- Are the publication costs commensurate with the level of the project? Is there a justification fo an unusually high number of pages or publications?
- Are unusual or particularly high costs well justified?
- Are the contributions of all unfunded and foreign investigators described in the budget narrative? Is it very clear that unfunded and foreign team members are contributing their proportionate share of the effort and costs (e.g., labor, travel, and publications)?

Budget Review and Approval Process

Following the notification of approved Phase I programs, STScI Grants Administration will send instructions for budget preparation and submission to U.S. investigators. Budget requests are reviewed by the STScI Financial Review Committee (FRC) and funding recommendations are presented to the STScI Director for approval.

Availability of Funds

All grant awards are made contingent upon the availability of funds from NASA.

If budget requests and FRC Recommendations exceed the funding provided by NASA for the GO/AR Grants Program, additional reductions may be applied to programs to remain within the funding guideline.

STScI Authority

Allowable costs for all budgets, awards, and expenditures will be determined in accordance with the GGP 2018, the Cycle 30 Call for Proposals, and the applicable institutional, NASA, and federal guidelines, policies, and regulations. STScI has the final authority to determine if costs for budgets, awards, and expenditures are allowable, reasonable, and allocable. STScI reserves the right to recover grant expenditures that were not in compliance with applicable policies and regulations

Next: Appendix A: Contact Information

HST Cycle 30 Appendix A: Contact Information

Contact information for STScI support.

Space Telescope Science Institute

http://www.stsci.edu/

Address:
3700 San Martin Drive, Baltimore, Maryland 21218, USA

Telephone:
[1] 410-338-xxxx (where xxxx is the extension number) or 667-218-xxxx (for extensions marked *)
Main switchboard extension: 4700

STScI HST Help Desk:
website: https://hsthelp.stsci.edu

Archive Help Desk:
website: https://masthelp.stsci.edu
ext. 4547; email: archive@stsci.edu

Director's Office:
Director: Ken Sembach; ext. 5052; email: sembach@stsci.edu

HST Mission Office:
Head: Tom Brown; ext. 4902; email: tbrown@stsci.edu

ESA Office:
Head: Antonella Nota; ext. 4520; email: nota@stsci.edu

Associate Director for Science:
I. Neill Reid; ext. 4971; email: inr@stsci.edu

Science Mission Office:
Head: Alessandra Aloisi; ext. 4519; email: aloisi@stsci.edu

Hubble Space Telescope Science Policies Group:
Head: Claus Leitherer; ext. 4425; email: leitherer@stsci.edu

Technical Manager:
Brett Blacker; ext. 1281; email: blacker@stsci.edu

Grants Administration Office:
Head: Paula Sessa; ext. 4816; email: sessa@stsci.edu

Office of Public Outreach:
Head: Hussein Jirdeh; ext. 4381; email: jirdeh@stsci.edu

Observation Planning:
Observation Planning Branch Head: William Januszewski; ext. 4964; email: williamj@stsci.edu

Instruments Division:

ACS Team Lead: Norman Grogin; ext. 4219; email: nagrogin@stsci.edu
COS Team Lead: Marc Rafelski; ext. 6740; email: mrafelski@stsci.edu
STIS Team Lead: Joleen Carlberg; ext. 6383*; email: jcarlberg@stsci.edu
WFC3 Team Lead: Sylvia Baggett; ext. 5054; email: sbaggett@stsci.edu

Canadian Astronomy Data Centre

http://cadcwww.hia.nrc.ca/

Address:
CADC, Dominion Astrophysical Observatory, 5071 W. Saanich Rd., Victoria, B.C. V8X 4M6, Canada

Telephone:
[1] 604-363-0025

Email:
cadc@dao.nrc.ca

Comments:
The CADC provides assistance to HST users in Canada.

Next: Appendix B: Scientific Keywords

HST Cycle 30 Appendix B: Scientific Keywords

Keywords to be used in APT when submitting a proposal.

The Tables in this Appendix list the Scientific Keywords that are valid for use in the Phase I proposal template. The science policies group will sort proposals according to the categories and keywords listed below. For additional information on the proposal sorting into each panel, see HST Proposal Selection Procedures. Please note Phase I keywords were revised and expanded slightly beginning with Cycle 28 to align with the Unified Astronomy Thesaurus.

Solar System Astronomy:
Asteroids
Astronomical models
Astronomical simulations
Atmospheric composition
Atmospheric variability
Binary systems / Multiple systems
Biomarkers
Centaurs
Chemical composition
Comets
Inner planets
Irregular satellites
Main belt asteroids
Minor planets
Natural satellites
Near-Earth objects
Occultation
Orbits
Outer planets
Planetary atmospheres
Planetary rings
Planetary surfaces

Galaxies:
Astronomical models
Astronomical simulations
Chemical abundances
Disk galaxies
Dwarf galaxies
Elliptical galaxies
Emission line galaxies
Galaxy bulges
Galaxy classification systems
Galaxy dark matter halos
Galaxy disks
Galaxy environments
Galaxy evolution
Galaxy formation
Galaxy mergers
Galaxy spheroids
Galaxy stellar halos
Galaxy structure
High-redshift galaxies
Infrared photometry
Interacting galaxies
Irregular galaxies

Small solar system bodies
Space weather
Surface composition
Surface ices
Surface processes
Surface variability
Trans-Neptunian objects
Transits
Trojan asteroids
Zodiacal cloud

Exoplanets And Exoplanet Formation:
Astronomical models
Astronomical simulations
Biomarkers
Chemical composition
Coronagraphic imaging
Exoplanet atmospheres
Exoplanet atmospheric composition
Exoplanet atmospheric variability
Exoplanet detection methods
Exoplanet evolution
Exoplanet formation
Exoplanet structure
Exoplanet surfaces
Exoplanet systems
Exoplanets
Extrasolar gas giants
Extrasolar ice giants
Extrasolar rocky planets

Local Group
Luminous infrared galaxies
Magellanic clouds
Quenched galaxies
Scaling relations
Spectral energy distribution
Star clusters
Star formation
Starburst galaxies
Stellar populations
Ultraluminous infrared galaxies

Intergalactic Medium and the Circumgalactic Medium:
Astronomical models
Astronomical simulations
Circumgalactic medium
Cooling flows
Damped Lyman-alpha systems
Gunn-Peterson effect
Intergalactic dust clouds
Intergalactic medium
Lyman-alpha forest
Metal line absorbers
Warm-hot intergalactic medium

Supermassive Black Holes And Active Galaxies:
AGN host galaxies
Astronomical models
Astronomical simulations
Blazars

Free floating planets
Natural satellites (Extrasolar)
Planet hosting stars
Protoplanetary disks (Extrasolar)
Space weather
Transits

Stellar Physics and Stellar Types:
Astrometry
Astronomical models
Astronomical simulations
Binary stars / Trinary stars
Brown dwarf stars
Circumstellar matter
Early-type stars
Evolved stars
Gamma-ray bursts
H II regions
Interstellar dust
Intermediate type stars
Interstellar medium
Late-type stars
Low mass stars
Main sequence Stars
Massive stars
Molecular clouds
Neutron stars
Planetary nebulae
Pre-main sequence stars

Broad-absorption line quasar
Emission line galaxies
Galaxy jets
Galaxy winds
High-luminosity active galactic nuclei
LINER galaxies
Low-luminosity active galactic nuclei
Markarian galaxies
M-sigma relation
Quasars
Quenched galaxies
Radio cores
Reverberation mapping
Seyfert galaxies
Stellar accretion disks
Stellar feedback
Supermassive black holes
X-ray active galactic nuclei

Large Scale Structure of the Universe:
Astronomical models
Astronomical simulations
Chemical abundances
Cooling flows
Cosmic infrared background
Cosmological parameters
Cosmology
Dark energy
Dark matter distribution
Extragalactic Legacy And Deep Fields

Pulsars
Radiative transfer
Stellar abundances
Stellar accretion disks
Stellar atmospheres
Stellar evolution
Stellar jets
Stellar phenomena
Supernovae
Variable stars
White dwarf stars
Young stellar objects

Stellar Populations (and the ISM):
Astrometry
Astronomical models
Astronomical simulations
Chemical abundances
Dwarf galaxies
Early-type stars
Elliptical galaxies
Galactic center
Galaxy bulges
Galaxy evolution
Galaxy halos
Galaxy spheroids
Globular star clusters
Gravitational microlensing
H II regions
Hertzsprung Russell diagram

Galaxy clusters
Galaxy groups
Gamma-ray bursts
Gravitational lensing
Intracluster medium
Large-scale structure of the universe
Protogalaxies
Protostars
Reionization
Stellar distance
Supernovae

Intermediate type stars
Interstellar dust
Interstellar ices
Interstellar medium
Irregular galaxies
Late-type stars
Local Group
Magellanic Clouds
Open star clusters
Planetary nebulae
Population I stars
Population II stars
Population III stars
Star clusters
Star formation
Stellar distance

Next: Appendix C: Glossary of Acronyms and Abbreviations

HST Cycle 30 Appendix C: Glossary of Acronyms and Abbreviations

A table of acronyms used in this document.

ACIS	Advanced CCD Imaging Spectrometer
ACS	Advanced Camera for Surveys
APT	Astronomer’s Proposal Tool
AR	Archival Research
ATP	Astrophysics Theory Program
AURA	Association of Universities for Research in Astronomy, Inc.
CADC	Canadian Astronomy Data Centre
CCD	Charge-Coupled Device
Co-I	Co-Investigator
COS	Cosmic Origins Spectrograph
CPAR	Coordinated Parallel Observation
CS	Contact Scientist
CVZ	Continuous Viewing Zone
CXC	Chandra X-ray Center
DD	Director’s Discretionary
DEC	Declination
DUP	Duplicate Observation
EDT	Eastern (U.S.) Daylight Time
E/PO	Education/Public Outreach
ERS	Early Release Science
ESA	European Space Agency
EST	Eastern (U.S.) Standard Time
FGS	Fine Guidance Sensor(s)
FTP	File Transfer Protocol
FUV	Far Ultraviolet

GO	General Observer
GSFC	Goddard Space Flight Center
GTO	Guaranteed Time Observer
HDF	Hubble Deep Field
HLA	Hubble Legacy Archive
HOPR	Hubble Observation Problem Report
HRC	High Resolution Channel (on ACS) or High Resolution Camera (on Chandra)
HSC	Hubble Source Catalogs
HST	Hubble Space Telescope
HSLA	Hubble Spectroscopic Legacy Archive
HTML	Hyper Text Markup Language
IDEAS	Initiative to Develop Education through Astronomy and Space Science
IR	Infrared
LOW	Low Sky Background
MAMA	Multi-Anode Microchannel Array
MAST	Mikulski Archive for Space Telescopes
MCP	Micro-Channel Plate
NASA	National Aeronautics and Space Administration
NICMOS	Near Infrared Camera and Multi-Object Spectrometer
NOAO	National Optical Astronomy Observatory
NOIRLab	National Optical-Infrared Astronomy Research Laboratory
NRAO	National Radio Astronomy Observatory
NUV	Near Ultraviolet
NVO	National Virtual Observatory
OS	Observation Summary
PAEC	Planned and Archived Exposures Catalog
PC	Planetary Camera or Program Coordinator
PDF	Portable Document Format
PI	Principal Investigator

PPAR	Pure Parallel Observation
RA	Right Ascension
SAA	South Atlantic Anomaly
SBC	Solar Blind Channel
SHD	Shadow Time
SM	Servicing Mission
SMD	Science Mission Directorate
SNAP	Snapshot
SSC	Spitzer Science Center
STAC	Space Telescope Advisory Committee
ST-ECF	Space Telescope - European Coordinating Facility
STIS	Space Telescope Imaging Spectrograph
STScI	Space Telescope Science Institute
STSDAS	Space Telescope Science Data Analysis Software
STUC	Space Telescope Users Committee
TAC	Telescope Allocation Committee
TESS	Transiting Exoplanet Survey Satellite
TOO	Target of Opportunity
U.S.	United States
UTC	Coordinated Universal Time
UV	Ultraviolet
WFC	Wide Field Channel (on ACS)
WFC3	Wide Field Camera 3
WF/PC	Wide Field and Planetary Camera 1
WFPC2	Wide Field and Planetary Camera 2
XDL	Cross Delay Line

Next: Appendix D: Internet Links

HST Cycle 30 Appendix D: Internet Links

Relevant links to help in proposal submission.

APT (Astronomer's Proposal Tool):
http://www.stsci.edu/hst/proposing/apt

Archival Pure Parallel Program:
http://www.stsci.edu/files/live/sites/www/files/home/hst/documentation/_documents/UIR_Parallels.pdf

Mikulski Archive for Space Telescopes (MAST, formerly the Multi-mission Archive at STScI):
http://archive.stsci.edu/

Canadian Astronomy Data Centre:
http://cadcwww.hia.nrc.ca/

Chandra Proposer Information:
http://cxc.harvard.edu/proposer/

Chandra X-ray Observatory and Center (CXC):
http://cxc.harvard.edu/

Prior Cycle Approved Programs:
http://www.stsci.edu/hst/proposing/approved-programs

Data Archive:
http://archive.stsci.edu/

Data Handbooks (Data Reduction, etc.):
http://www.stsci.edu/hst/documentation

DD Submission:
https://hst-docs.stsci.edu/hsp/hst-cycle-29-director-s-discretionary-time-submission

Duplication Checking:
http://archive.stsci.edu/cgi-bin/duplication

Grants Administration Office:
http://www.stsci.edu/scientific-community/grants-administration

Hubble Source Catalog:
http://archive.stsci.edu/hst/hsc

HST Archive Data Retrieval Options:
http://archive.stsci.edu/hst/help/retrieval_help.html

HST Help Desk:
http://hsthelp.stsci.edu

HST Instruments:
http://www.stsci.edu/hst/instrumentation

HST Primer:
The Hubble Space Telescope Primer for Cycle 29

HST Program Information:
http://www.stsci.edu/hst/observing/program-information

HST Proposal Catalogs:
http://archive.stsci.edu/hst/catalogs.html

HST Proposal Support:
http://archive.stsci.edu/hst/prop_support.html

HST Science Policies Group & Peer Review Information:
https://hst-docs.stsci.edu/hsp/hubble-space-telescope-science-policies-group-and-peer-review-information

HST Treasury, Archival Legacy and Large Programs:
http://archive.stsci.edu/hst/tall.html

Hubble Deep Field (HDF):
http://www.stsci.edu/ftp/science/hdf/hdf.html

Hubble Deep Field-South (HDF-S):
http://www.stsci.edu/ftp/science/hdfsouth/hdfs.html

Hubble Heritage Project:
http://heritage.stsci.edu/

Hubble Legacy Archive:
http://hla.stsci.edu

Hubble Observation Problem Report (HOPR):
http://www.stsci.edu/hst/observing/post-observation/reporting-problems

Hubble Spectroscopic Legacy Archive (HSLA):
https://archive.stsci.edu/missions-and-data/hsla

Hubble Ultradeep Field (UDF):
https://outerspace.stsci.edu/display/HPR/HST+ACS+Ultra+Deep+Field

HubbleSite:
https://hubblesite.org/

International Virtual Observatory Alliance:
http://www.ivoa.net/

Large Searches and Requests:
http://archive.stsci.edu/hst/bigsearch_request.html/

Legacy and other category proposals:
http://www.stsci.edu/hst/proposing/approved-programs

NASA Science Mission Directorate (SMD)
http://science.nasa.gov/

National Astronomical Observatory of Japan:
http://dbc.nao.ac.jp/

National Optical Astronomy Observatory (NOAO):
http://www.noao.edu/

National Radio Astronomy Observatory (NRAO):
http://www.nrao.edu

National Science Foundation's National Optical-Infrared Astronomy Research Laboratory (NOIRLab):
https://www.noirlab.edu/

Newsworthy Findings Submission
http://www.stsci.edu/news/scientist-resources

Phase I Proposal Roadmap:
Phase I Proposal Roadmap

Phase II Proposal Instructions:
http://www.stsci.edu/hst/proposing/phase-ii/guidelines-and-documents

Policy Document for the Telescope Time Review Board (TTRB):
http://www.stsci.edu/files/live/sites/www/files/home/hst/documentation/_documents/UIR_TTRB.pdf

Release of Scientific Findings to the Public:
http://outreachoffice.stsci.edu/news/newspolicy.shtml

Space Telescope Users Committee (STUC):
https://www.stsci.edu/hst/about/space-telescope-users-committee

Spitzer Science Center (SSC):
http://ssc.spitzer.caltech.edu

SNAP User Information Report:
http://www.stsci.edu/files/live/sites/www/files/home/hst/documentation/_documents/UIR_SNAP.pdf

Space Telescope Grants Management System (STGMS):
https://stgms.stsci.edu

Space Telescope Science Institute:
http://www.stsci.edu/

TESS Science Support Center
https://heasarc.gsfc.nasa.gov/docs/tess/

XMM-Newton Observatory:
https://heasarc.gsfc.nasa.gov/docs/xmm/