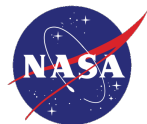




**STScI** | SPACE TELESCOPE  
SCIENCE INSTITUTE

**James Webb Space Telescope  
Cycle 1 Director's Discretionary Early Release Science  
Observations  
Call for Proposals  
22 May 2017**



[jwst.stsci.edu](http://jwst.stsci.edu)

[jwst-docs.stsci.edu](http://jwst-docs.stsci.edu)

[jwsthelp.stsci.edu](http://jwsthelp.stsci.edu)

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# JWST Director's Discretionary Early Release Science Call for Proposals

The policies governing the JWST Director's Discretionary Early Release Science (DD ERS) program in Cycle 1 are established in this Call for Proposals.

## Late Breaking News

None at this time (May 19, 2017)

## About this Document

We invite scientists to participate in the James Webb Space Telescope (JWST) Director's Discretionary Early Release Science (DD ERS) program. We anticipate allocating up to 500 hours to support up to 15 teams in providing early access to substantive, representative datasets to enable full scientific exploitation in Cycle 2 and beyond.

This document establishes the goals, requirements, policies for the JWST Director's Discretionary Early Release Science (DD ERS) program. Notices of Intent (NoI) to propose submissions are **required**; *only teams who have submitted NoIs are permitted to submit proposals*. Proposers are encouraged to follow the [JWST DD ERS Proposal Checklist](#) in preparing to submit their JWST DD ERS Proposal.

## Important Dates

The DD ERS Proposal Deadline is **Friday, August 18, 2017, 8pm EDT**. *Only teams who have submitted [Notices of Intent \(NoI\)](#) to propose by the March 3, 2017 deadline are permitted to submit proposals in response to this Call.*

## Who's Responsible

Members of the Science Mission Office at STScI are responsible for the oversight of the JWST science program selection process. The members involved include Neill Reid (Associate Director for Science and Head of the Science Mission Office), Amaya Moro-Martin, Louis-Gregory Strolger, and Technical Manager Brett Blacker.

## Where to Get Help

Submit questions to the JWST helpdesk at [jwsthelpt.stsci.edu](http://jwsthelpt.stsci.edu). Consult JWST documentation at [jwst-docs.stsci.edu](http://jwst-docs.stsci.edu), and see [jwst.stsci.edu](http://jwst.stsci.edu)

u for additional tools and resources.

*Next: JWST DD ERS Proposal Checklist*

# JWST DD ERS Notice of Intent to Propose

**The call for Notices of Intent to Propose is now closed.**

Each prospective team intending to submit a JWST DD ERS proposal must submit a Notice of Intent (NoI) to STScI by March 3, 2017 using the webform at <https://proper.stsci.edu/proper/noticeOfIntent>

A MyST account is required to access the NoI webform and to submit. *To create an account, to check whether you have an account, or to reset your password, go to <https://profile.stsci.edu/proper/password/forgot> and enter your e-mail address.*

**NoI submission is a required step of the proposal process. Only teams who submit NoIs will be permitted to submit proposals,** and will receive alerts regarding JWST DD ERS program updates or amendments that may occur until the proposal submission deadline. In May 2017, STScI will issue detailed instructions on the proposal and budget submission process in the final version of the DD ERS Call for Proposals, as discussed on the [cover page](#) of this solicitation.

Submission of an NoI is required to help STScI to prepare for the proposal review. DD ERS NoI materials will be treated confidentially to the extent allowed by the proposal review preparation process.

The NoI requires the following information, **provided to the best of the proposing team's knowledge at the time of NoI submission:**

- a proposal title,
- the name, email address, and affiliation of the Principal Investigator (PI),
- the name(s), email address(es), and affiliation(s) of up to two [Co-Principal Investigators](#) (Co-PIs), if any,
- the name(s), email address(es), and affiliation(s) for as many of the [Co-Investigators](#) as are known at the time of NoI submission,
- the name(s), email address(es), and affiliation(s) for as many of the [Science Collaborators](#) as are known at the time of NoI submission,
- an overview of the anticipated proposal, not to exceed 300 words, describing:
  - the proposed types of JWST observations and science goals,
  - how the proposed project supports the [DD ERS goals and principles](#),

Proposal title, PI, any Co-PIs, and the proposal overview are entered directly into the webform. A single text file listing Co-Is and Science Collaborators is uploaded per the instructions on the webform page.

# JWST DD ERS Proposal Checklist

JWST Cycle 1 proposers are encourage to follow this checklist for writing and submitting proposals for the James Webb Space Telescope (JWST).

## Know the deadlines

Rows are color coded by opportunity, where red = GTO, green = DD ERS, and white = Cycle 1 GO

Release of the Cycle 1 Call for GTO Proposals	January 6, 2017
Release of the Cycle 1 Call for DD ERS Notices of Intent	January 6, 2017
DD ERS Letters of Intent due	March 3, 2017, 8pm ET
Cycle 1 GTO Science Descriptions and Observation Specifications due	April 1, 2017, 8pm ET
Release of the Cycle 1 Call for DD ERS Proposals	May 19, 2017
APT version 25.1 Released (with updated Cycle 1 overhead calculations)	June 1, 2017
GTO Observation Specifications Published (public)	June 15, 2017
APT version 25.2 Released (primarily HST updates)	June 21, 2017
GTO APT Technical Reviews and Revisions Begin	July 28, 2017
DD ERS Proposal Deadline	August 18, 2017, 8pm ET
GTO APT Technical Reviews and Revisions End	September 15, 2017
APT version 25.4 Released (further updates for Cycle 1 GO Call)	November 1, 2017
DD ERS Results Released	November 2017
Release of the Cycle 1 Call for GO Proposals	November 30, 2017
Formal DD ERS Budget Proposals	Early December 2017
GTO APT Files Published (public)	December 15, 2017

DD ERS APT Files Published (public)	December 2017
Cycle 1 GO Proposal Deadline	March 2, 2018

## ✔ Read the JWST ERS Call for Proposals and Related Policies

JWST Director's Discretionary Early Release Science Call for Proposals

JWST General Science Policies

## ✔ Read the JWST User Documentation

JWST Observatory and Instrumentation Documentation

JWST Observatory Overview

Mid-Infrared Instrument, MIRI

Near Infrared Camera, NIRCAM

Near Infrared Spectrograph, NIRSpec

Near Infrared Imager and Slitless Spectrograph, NIRISS

JWST Observation Planning Documentation

JWST Data

JWST Data: Information for Early Release Science (ERS) Proposers

## ✔ Learn the JWST observation planning tools.

- **Proposers should assume nominal performance from JWST, as described in the [JWST User Documentation](#), and as assumed by the [JWST Exposure Time Calculator \(ETC\)](#).**
- [JWST Exposure Time Calculator \(ETC\)](#) – The JWST ETC is a [web-based tool](#) for estimating how much exposure (science) time will be required for different JWST instrument modes and configurations to achieve the desired science goals. Users may save and share their calculations in workbooks.
- [Astronomer's Proposal Tool \(APT\)](#) – APT is a stand-alone software package required for preparing JWST observations and submitting JWST Cycle 1 [Early Release Science](#) and General Observer proposals. Training material on APT can be found [http://apst.stsci.edu/apt/external/help/jwst\\_whats\\_new.html](http://apst.stsci.edu/apt/external/help/jwst_whats_new.html). The JWST NIRSpec MSA Planning Tool, JWST Visit Planner, and Aladin

visualization tool are included in APT. [Download APT software here.](#)

- [JWST Target Visibility Tools](#) – The entire sky is available to JWST observations, but not all at the same time. Any targets needing observation at a particular time, time separation, or aperture position angle on the sky may have significantly constrained visibility or even be unschedulable. There is a simple tool to perform a quick assessment of schedulability of proposal targets prior to developing an APT proposal. There are also more specialized tools to help users plan coronagraphy observations and Pre-imaging observations for NIRSpec MOS mode.
- [WebbPSF](#) – Stand-alone software calculates the JWST Point Spread Function for a range of instrument modes and assumptions. The engine behind WebbPSF, however, is already integrated into the [JWST ETC](#), and so accessing the separate tool may be unnecessary for most users. [Download WebbPSF here.](#)

## ✔ Design a JWST observing program in APT

- [Download and install the latest version of APT.](#) (APT v25.1, available June 1 2017, or APT v25.2, available June 20, should be used to submit DD ERS proposals)
- Create a New JWST 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](#) or with the NIRSpec MSA Planning Tool.
- View an Observation with the Aladin visualizer tool.
- Run the Visit Planner for one or more Observations.
- When all observations have been entered and run successfully through the Visit Planner, run [Smart Accounting](#) for the full proposal to compute your total time allocation request.
- Check for duplicate observations with the JWST Duplication Checking Tool.
- Resolve any errors and warning in APT.
- In some cases it may not be possible to fully specify a proposal at the time of submission (e.g. to resolve all errors and warnings in APT). Proposals that may be exempted from the [nominal single-stream process](#) will be described in the [special submission requirements section](#) of each call for proposals.

## ✔ Write your science proposal (the PDF attachment)

The [PDF attachment](#), i.e., the proposal narrative and a preliminary budget template, includes a number of required text sections such as the **Scientific Justification**, the **Description of Observations**, and the **Rationale for DD ERS selection**.

## ✔ Submit your JWST 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).

## Wait.

After you submit your proposal, the PI and all CoIs will receive an automatic email acknowledgment that the submission was received successfully. If you do not receive an acknowledgement within **48 hours** of the deadline, please contact the STScI Help Desk 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, you will be contacted by email separately.

Notification of your proposal's status (approved or rejected) generally occurs within 2-3 weeks of the Telescope Allocation Committee meeting.

## Next steps for approved programs

**U.S. investigators with approved JWST programs are eligible for funding.** Refer to [JWST DD ERS Funding and Institutional Endorsement](#) for details on funding policies, eligibility, and budgets.

Successful JWST observing proposals will be reviewed by a STScI contact scientist and program coordinator. Programs may require adjustments or revisions; in particular, the final version of each program will be submitted via APT v25.4, available on November 1 2017. The Contact 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: JWST DD ERS Program Goals, Project Updates, and Status Reviews*

# JWST DD ERS Program Goals, Project Updates, and Status Reviews

The primary purpose of the Director's Discretionary Early Release Science (DD ERS) program is to educate and inform the community regarding JWST's capabilities, and provide rapid access to substantive, representative datasets to enable full scientific exploitation in Cycle 2 and beyond. The rationale, goals, and organizing principles of the DD ERS program are described. Approved JWST Director's Discretionary Early Release Science (DD ERS) programs are required to provide project updates to the astronomy community and undergo status reviews by STScI.

## Introduction

With its 6.5m mirror and suite of four science instruments, JWST will provide imaging, spectroscopic and coronagraphic capabilities from 0.6 to 28.5 microns, offering an unprecedented combination of sensitivity and spatial resolution to study objects from the Solar System to the most distant galaxies. Realizing JWST's full science potential requires that the scientific community rapidly learns to use its sophisticated capabilities. To that end, STScI, in consultation with the JWST Advisory Committee, has developed the Director's Discretionary Early Release Science (DD ERS) program.

## Goals and Principles

The overall goals of the DD ERS program are to:

- ensure open access to representative datasets in support of the preparation of Cycle 2 proposals, and
- engage a broad cross-section of the astronomical community in familiarizing themselves with JWST data and scientific capabilities.

These goals distinguish the DD ERS program from standard GO investigations. In service of these goals, DD ERS proposals are invited from the community.

The DD ERS program is guided by the following key principles:

- Projects must be substantive science demonstration programs that utilize key instrument modes to provide representative scientific datasets of broad interest to researchers in major astrophysical sub-disciplines. **Note that a meritorious DD ERS project need not cover every mode of the observatory. The request should match the focused science goals of the proposal.**
- Projects must design, create, and deliver [science-enabling products](#) to help the community understand JWST's capabilities. An initial set of products must be delivered by the release of the Cycle 2 GO Call for Proposals (September 2019). Each project must define a [core team](#) to be responsible for the timely delivery of such products according to a proposed project management plan, with performance subject to periodic review.
- All observations must be schedulable within the first 5 months of Cycle 1 (planned to be from April to August 2019), and a

substantive subset of the observations must be schedulable within the first three months. Target lists must be flexible to accommodate possible changes to the scheduled start of science observations.

- Both raw and pipeline-processed data will enter the public domain immediately after processing and validation at STScI. These data will have no exclusive access periods (i.e., no proprietary time).
- STScI recognizes and supports the benefits of having diverse and inclusive scientific teams involved in the formulation of ERS proposals. Programs with diverse representation of community members in a given sub-discipline helps ensure that the investigations will be of broad interest. Broad involvement also facilitates the dissemination of JWST expertise through a more extensive network, and promotes more equitable participation in JWST scientific discovery.

The DD ERS program will be essential for informing the scientific and technical preparation of Cycle 2 General Observer (GO) proposals, submitted seven months after the end of commissioning.

## Project Updates for the Community

A prime goal of the DD ERS program is informing the astronomical community of JWST's scientific capabilities. DD ERS teams will contribute to this goal by sharing progress on their projects, with special focus on lessons learned on JWST observation planning strategies, data processing, and science analysis. **Webcasted briefings** given by DD ERS teams, will be organized by STScI as part of JWST community workshops. Prospective DD ERS teams should account for the effort required to support such briefings in the workplan and budget outlined in the submitted proposal. DD ERS teams should plan to support two major briefings in January and September 2019.

## Status Reviews

To help ensure that the overall DD ERS program will achieve its stated goals, STScI will review the status of each project at key points. Where appropriate, review panels will include both STScI staff and external community members. The timing of the reviews will be such that materials prepared by the DD ERS teams for the reviews can be used to inform the broader community in January and September 2019. The reviews will assess the progress of each team relative to schedule milestones and delivery of [science-enabling products](#) as described in their workplans, identifying challenges that arise, together with potential solutions. Continued funding will be contingent upon satisfactory progress at each stage.

The nature of each review is as follows:

- **Technical Review:** Iterations between STScI staff and DD ERS teams to optimize programs will begin after the announcement of DD ERS review results in late October 2017. Teams will provide basic documentation describing the rationale underlying their observing strategies. That documentation will be released to the community with the final APT files in December 2017. This will enable DD ERS programs to serve as templates for planning of Cycle 1 GO proposals.
- **Readiness review:** Prior to the beginning of science observations, each team will report on their progress on preparatory activities and their readiness to process and analyze JWST data. Preparatory activities might include analyses of simulated

datasets to test post-pipeline data processing plans (if proposed), and customization and/or development of data analysis and/or software tools (if proposed). This review will occur approximately three months prior to the beginning of science observations (three months after launch), and will support a community briefing in January 2019.

- **Results review:** Each team will report on the successes and challenges encountered based on the analysis of early data from their DD ERS project. The status of initial products that must be delivered by the release of the Cycle 2 GO Call for Proposals (September 2019) will be evaluated. This review will support a community briefing in September 2019.

*Next: JWST DD ERS Proposal Policies*

# JWST DD ERS Proposal Policies

The goals of the JWST Director's Discretionary Early Release Science Program (DD ERS) are supported by policies that distinguish it from standard General Observer programs.

## Observing Time Available

The STScI Director will make up to 500 hours of Director's Discretionary time available for early release science, and resources are allocated to support up to 15 teams. Proposals will be chosen in research areas spanning the science themes of JWST: first light and reionization; the assembly of galaxies; the birth of stars and protoplanetary systems; and planets and the origin of life. Proposals will also be chosen to cover a range of key instrument modes and observing capabilities. A multi-disciplinary committee of experts will recommend a suite of proposals for observation and funding that both fulfills the [goals of the DD ERS](#) and makes optimal use of the available time.

## Submission Eligibility

Investigators of any nationality or affiliation may submit and be included on JWST DD ERS proposals. Only teams who have submitted a [Notice of Intent \(NoI\)](#) to propose are permitted to submit a proposal.

Students may also submit a proposal as the PI. These proposals should be accompanied by a letter from the student's faculty advisor certifying that she or he is qualified to conduct the program, and organize the delivery of the [science-enabling products](#). This letter from the advisor should be e-mailed before the proposal deadline to [student-pi@stsci.edu](mailto:student-pi@stsci.edu).

## Proposer Types

Scientists included on DD ERS proposals must be designated as Principal Investigator, Co-Principal investigators, Co-Investigators, or Science Collaborators. Principal Investigators and Co-Investigators must be identified in [APT](#) under the appropriate sections. Science Collaborators must be identified in the proposal [PDF attachment](#).

- The **Principal Investigator** is responsible for leading the overall investigation and informing the community of the results. The PI has responsibility for the proper conduct of the research, including the appropriate use of funds (regardless of whether or not the PI receives support through the award) and administrative requirements such as the submission of scientific progress reports. Teams may identify up to two **Co-Principal Investigators** with appropriate justification, clearly specifying the leadership roles and responsibilities in the project management plan.
- **Co-Investigators**, together with the PI (and any Co-PIs) comprise a **core team** with the responsibility of developing and delivering [science-enabling products](#) as described in the proposal, as well as carrying out selected key aspects of the science investigations. A Co-I must have a well-defined, and generally sustained, continuing role in team activities, serve under the

direction of the PI, or co-PI(s). Co-investigators may or may not receive funding, pending eligibility, through the DD ERS program.

- **Science Collaborators** contribute to the formulation of the proposed observations and articulation of the full range of science applications enabled and may participate in core team activities, but do not have formal obligations to contribute to the development and delivery of [science-enabling products](#). Science collaborators are not funded through the DD ERS program but may propose for funding through the JWST Cycle 1 Archival Research program (in development).

## Funding Support

Financial support is available to eligible JWST DD ERS investigators for the primary purpose of development, production, and delivery of [science-enabling products](#). Proposers should request appropriate funding for those activities. Proposers may request additional funding to develop value-added quantitative information or higher-level science products within one year of the completion of ERS observations. Further details on funding policies, eligibility, and budgets are discussed in [JWST DD ERS Funding and Institutional Endorsement](#).

## Proposal Confidentiality

DD ERS NIs and proposals submitted to STScI will be kept confidential to the extent allowed by the review process. For accepted proposals, the following information will become publicly accessible: names of PI, any Co-PIs, Co-Is, and science collaborators, project titles, abstracts, description of observations, special scheduling requirements, and details of all targets and exposures. APT files submitted for approved proposals become publicly accessible in their entirety, largely to aid planning of Cycle 2 GO proposals.

## Data Rights and Duplications

All observations taken as part of the DD ERS program will have no exclusive access period (i.e., a zero proprietary period). Both raw and pipeline-processed data will enter the public domain immediately after processing and validation at STScI. DD ERS proposals will be reviewed, selected, and publicized prior to the Cycle 1 GO deadline. Archival Research proposals based on DD ERS data beginning in Cycle 1 will be permitted.

Observations taken as part of the DD ERS program cannot duplicate those specified in the Guaranteed Time Observer (GTO) Cycle 1 Reserved Observations Catalog unless there is a scientific justification for the additional observations. The GTO Cycle 1 Reserved Observations Catalog will be released no later than June 15, 2017. Likewise, proposed GO Cycle 1 observations cannot duplicate DD ERS observations. Generally, an observation is considered a duplication if it is on the same astronomical target or field, with the same instrument in the same/similar mode, with a similar spectral resolution and similar spectral range, and an on-target exposure time within a factor of 4 of the previously-scheduled observation. Any duplicate observations must be explicitly justified in the proposal. Further details are provided in the [JWST Duplication Policy](#).

*Next: [JWST DD ERS Funding and Institutional Endorsement](#)*



# JWST DD ERS Funding and Institutional Endorsement

Financial support is available for eligible JWST DD ERS investigators to develop and produce science-enabling products. Budget submissions must adhere to the [2016 STScI General Grants Provisions](#).

Subject to the availability of funds from NASA, STScI will provide financial support to eligible JWST DD ERS investigators for the primary purpose of development, production, and delivery of [science-enabling products](#), and closely related science activities. The base level requirements for DD ERS programs is that they provide deliverables that include quantitative, data-related measurements by the release of the Cycle 2 GO Call for Proposals (September 2019) and help maximize the science return from JWST. Proposers should request appropriate funding for those activities. Proposers may request additional funding to develop value-added quantitative information or higher-level science products within one year of the completion of ERS observations.

Continued funding will be contingent upon satisfactory progress of each project. Further details are discussed in [JWST DD ERS Program Goals, Project Updates, and Status Reviews](#).

Members of the science community, including investigators on accepted DD ERS proposals, may propose for funding through the Cycle 1 Archival Research program to pursue studies beyond science investigations funded directly through the DD ERS program. Information regarding the nature and scope of accepted DD ERS proposals will be provided with the Cycle 1 GO Call for Proposals.

It is anticipated that a total of up to \$5M will be available to support the activities of successful DD ERS teams. STScI's current plan is to award funding beginning October 2018 to allow DD ERS teams to organize their processing and analysis pipelines in preparation for the receipt of data beginning in about April 2019.

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## Funding Eligibility

STScI funding cannot be used in any way to support research efforts by non-U.S. investigators or institutions. Regardless of where they reside, an investigator who has a formal or contractual affiliation (*funded or unfunded*) with a non-U.S. institution is considered a "non-U.S. Investigator" and may not apply for funding.

Investigators must meet the eligibility requirements of a "U.S. investigator", as described in the 2016 [STScI General Grants Provisions \(GP 2016\)](#), by the budget submission deadline (nominally December 2017). Non-U.S. investigators who attain eligibility status after the budget deadline may not propose for funding to support their work on ERS projects.

"U.S. investigators" (including postdocs and graduate students) are defined as named PI's or Co-I's who are:

1. U.S. citizens residing in the United States, or abroad if salary is being paid only by a U.S. institution. (STScI funds are not intended to support U.S. investigators who live abroad full-time even if they do not receive a salary from a non-U.S. institution. Investigators in this status may not affiliate with a U.S. institution merely for the purpose of requesting STScI grant funds.), or



2. U.S. permanent residents and foreign national investigators working in the United States if salary is being paid only by a U.S. institution.

## **Certification, Assurance, and Representations**

Budgets submitted to STScl or the acceptance of an STScl grant award by a grantee institution, signify that the Authorizing Official or Authorizing Official Representative of that institution certifies compliance with the STScl and regulatory certifications, assurances, and representations in the [GGP 2016](#), Section 36 and Appendix A.

## **STScl Review of Risk Posed by Applicants**

STScl has an obligation and the authority to ensure that grantee institutions meet the requirements related to the award of federal funds. See [GGP 2016](#), Section 7 for criteria considered in STScl's evaluation of risk posed by applicants.

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## **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 STScl Financial Review Committee (FRC) to assess funding that is appropriate to reduce and analyze data in conjunction with the work in the 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.

## **Reasonable, Allowable, Allocatable**

Costs to complete the science goals submitted in the proposal must be reasonable, allowable, and allocable (Ref. [GGP 2016](#), Sections 9 and 10). Costs outside the original scope of work will not be considered during budget reviews.

## **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.

## **Period of Performance**

It is anticipated that the period of time required to deliver [science-enabling products](#) will be up to one year, depending on the complexity of the project. The period of performance will be stated in the Grant Award Document.

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## Program Management Plans

Management Plans are required with the budget proposal submission for all DD ERS 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 that do not meet the requirements of the Management Plan and the budget. Further details on what is required in the management plans are provided in the Budget Requirements document located on the [STScI Grants Administration Webpage](#).

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## 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. Key questions to assist proposers with preparing budgets and narratives:

- Are the responsibilities, contributions, and level of effort for each team member (funded, unfunded, and foreign) clearly stated, justified, proportional (directly linked), and in conjunction with their role in the project and the proposal? Note that only tasks that are specifically identified or absolutely necessary for the delivery of [science-enabling products](#) will be considered.
  - Is the budget justification correct and consistent with the budget request?
  - 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?
  - Are the computers (laptops, desktops), computing costs /page charges requested justified for the project?
  - Are the publication costs commensurate with the level of the project?
  - Are unusual or particularly high costs well justified?
  - Is it clear that foreign team members are contributing their appropriate share of the costs (e.g., Labor, Travel, and Publications)?
- 

## Budget Review and Approval Process

Following the notification of approved programs, the STScI Grants Administration Office will send instructions for budget preparation and submission to eligible 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.

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## STScI Authority

Allowable costs for all budgets, awards, and expenditures will be determined in accordance the [GGP 2016](#), the JWST DD ERS Call for Proposals, and the applicable institutional, NASA, and federal guidelines, policies, and regulations. STScI has the final authority to determine whether or not a cost is allowable for an STScI grant and reserves the right to recover grant funds that were unexpended or

were spent out of compliance with the terms and conditions of a grant.

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*Next: JWST DD ERS Observation Types and Restrictions*

# JWST DD ERS Observation Types and Restrictions

Most observational targets will be available for DD ERS programs, however certain restrictions apply to some types of targets.

Most observations of external targets are expected to be scheduled as primary observations, which are observations that determine the telescope pointing and orientation. There are, however, certain restrictions that apply to some types of targets. The [JWST Observation Planning Documentation](#) should provide guides for most observing modes, including for observations of [moving targets](#) and [time-critical observations](#).

## Coordinated and Pure-Parallel Observations

DD ERS proposals may also include [coordinated science parallel observations](#), in which simultaneous observations may be made with instruments other than the primary instrument. Coordinated science parallel observations must have science goals that support or complement the prime science programs, and must be explicitly justified in the proposal. In Cycle 1, the following coordinated parallel modes will be supported:

1. NIRCam Imaging and MIRI Imaging,
2. NIRCam imaging and NIRISS Wide-Field Slitless Spectroscopy (WFSS),
3. NIRCam imaging and NIRISS imaging (NIRCam must be the prime instrument),
4. NIRCam imaging and NIRSpec MOS (NIRSpec must be the prime instrument),
5. MIRI imaging and NIRISS WFSS.

Only direct imaging with standard narrow, medium, or broad band filters is allowed for NIRCam and MIRI observations in these coordinated parallel modes.

Additional instrument combinations will be available in future cycles.

[Pure-parallel observations](#), which utilize instruments other than the primary instrument on observations from unrelated proposals, **may not be proposed** for in the DD ERS program due also to inherent scheduling uncertainties.

## Target of Opportunity Observations

[Target of opportunity \(ToO\)](#) **may not be proposed** for the DD ERS program. The inherent uncertainty in scheduling such observations is inconsistent with the objective of the DD ERS program to provide the community open access to JWST science data early in Cycle 1. It should be noted that ToO observations are distinct from time critical observations (TCOs), which are allowed as part of the DD ERS program.

## NIRSpec MSA Observations Requiring NIRCam Pre-imaging

NIRSpec Micro-Shutter Assembly (MSA) observations requiring NIRCam pre-imaging **are not permitted** due to the estimated time needed for planning and scheduling between execution of pre-imaging and MSA observations (~2.5 months; [Beck et al. 2016](#)). NIRSpec MSA observations proposed for the DD ERS program must be based on existing source catalogs and imaging (e.g., [Ubeda et al. 2016](#)). NIRSpec MSA-based target acquisition for MOS observations of extended sources can tolerate catalog coordinates up to 50 milli-arcseconds accuracy. However, optimal data calibration will be achieved with relative astrometric accuracy of 5-10 milli-arcseconds, which is comparable to standard HST imaging astrometric calibration accuracy.

## Other NIRSpec MSA Restrictions

- NIRSpec MSA-based observations (MOS Science or MSA Target Acquisition) of moving targets may not be proposed. It is recommended that NIRSpec IFU be used for moving targets.
- NIRSpec observations that require the MSA-based Target Acquisition in fields with a high density of targets ( $>1$  stars sq. arcsec) or with many bright targets ( $<ABMag$  19.1 at higher density than 1 star per 10 sq. arcsec) may not be proposed.

## MIRI Restrictions:

Proposers must specify a viable observing strategy using capabilities available in APT at the ERS proposal deadline (v25.2 or 25.1). However, proposers may state in their PDF attachment that the following capabilities, for the specified templates, would be preferred if they become available before program execution:

- Skip target acquisition (for [MIRI Low Resolution Spectroscopy](#), or [MIRI Medium Resolution Spectroscopy](#))
- Suppress dithers (MIRI Imaging with SUB64 subarray)
- Expose longer than 10,000 seconds (MIRI Imaging with SUB64 subarray)

Updates to the status of these modes may be posted here, or in the [jwsthelphelp.stsci.edu](http://jwsthelphelp.stsci.edu) knowledge base.

*Next: JWST DD ERS Special Observational Policies*

# JWST DD ERS Special Observational Policies

Most observational modes will be available for DD ERS programs, however some have specific special requirements for implementation, relevant largely to just DD ERS or Cycle 1.

## Target Visibility and Alternate Targets

DD ERS teams must establish that the visibilities of their proposed observations will allow them to be obtained in the first 5 months of Cycle 1 (planned to be from April to August 2019), with a substantive subset observable within the first 3 months. DD ERS proposers must also describe the steps they will take to identify alternate observations in the event of a change to the scheduled start of Cycle 1. Teams with accepted proposals will then be required to specify observations of a minimum set of alternate targets to allow the program to be executed at any point during the year. DD ERS alternate observation lists will be published, and GO Cycle 1 proposals including such observations will be allowed.

## NIRSpec Multi-Object Spectroscopy

The multiplexing capabilities offered by the NIRSpec Multi-Object Spectroscopy (MOS) modes represent a major opportunity for JWST observers. They also introduce significant complexities in planning, scheduling and implementing specific observations.

**Orientations, optical distortions and target selection:** The target selection process for NIRSpec MOS observations must take account of how objects are projected onto the micro-shutter array, and therefore depends on the orientation of the observations and the distortions present along the NIRSpec optical path. The flight optical distortion maps can only be measured after launch, during and after NIRSpec commissioning. The exact orientation for any observation will not be determined until that observation is placed on the Long Range Plan (LRP) for Cycle 1. Consequently, at the time of the DD ERS proposal submission (and Cycle 1 GO as well), proposers will not be able to specify which of their targets will actually be observable.

**Catalog sizes:** The number of targets within a given observing catalogue that can be observed during a single NIRSpec MOS observation is limited by the availability of suitably-positioned micro-shutters to accommodate the appropriate nod and dither patterns, and, if relevant, by the need to avoid overlapping spectra on the detector. Taking this into account, the NIRSpec team has conducted analysis to determine that up to ~190 objects can be targeted at low spectral resolution ( $R=100$ , no overlap) and ~55 at high spectral resolution ( $R\sim 1000$  and  $2700$ , no overlap). This work also shows that approaching these asymptotic multiplex values requires a large input catalog with high target densities of  $\sim 720$  sources  $\text{arcmin}^{-2}$  and  $240$   $\text{arcmin}^{-2}$ , respectively, corresponding to  $\sim 7,000$  and  $\sim 2,400$  targets within the NIRSpec field of view. Thus, for an efficient use of the multiplex capabilities of NIRSpec MOS, the catalogs provided by observers at the time of proposal submission must include many more targets than can actually be observed (Jakobsen et al. 2017). Conversely, in many cases a substantial number of potential targets will remain unobserved at the conclusion of a program.

These considerations lead to several operational consequences:

- In order to accommodate the full range of possible orientations and the small nominal pointing adjustments necessary to maximize the science return from an observation, observers should specify a potential target list covering an area of radius at least 3 arcminutes for any particular pointing. If possible, the catalogue should be oversized in the number of targets to maximize the NIRSpec MOS multiplexing.
- By policy, proposers do not reserve access to the field of view covered by a NIRSpec MOS observation. Consequently, proposers may not reserve the full list of targets associated with any accepted observing proposal. At the time of submission, proposers may flag high priority targets, but there is no guarantee that any one target will be observed.
- By policy, proposals for MOS observations may be submitted with source catalogues that overlap with those of previously accepted proposals. Proposers must identify potential duplications with prior programs, and must provide an appropriate scientific justification and a demonstration that sufficient targets are available to justify the additional observations. If the Telescope Allocation Committee accepts such a proposal, the previously accepted proposal will have priority in target selection; thus, in JWST Cycle 1, GTO programs have priority in target selection over DD ERS programs, which have priority over Cycle 1 GO programs.
- Multiple proposals using overlapping source catalogues may be proposed and accepted by the Telescope Allocation Committee during the same cycle. In such cases, the TAC will provide a clear specification of the relative priority of those proposals with regard to target selection.

Duplicate observations with JWST are generally not allowed without an approved scientific justification. However, in order to maximize the scientific return, NIRSpec MOS observations may include a limited number of duplicate observations of individual targets without specific scientific justification. The latter sources may not exceed 10% of the total targets within a given NIRSpec MOS observation as implemented for execution. The final target lists will be reviewed for compliance and, if necessary, subjected to adjudication by the STScI Director.

## MIRI and NIRCам Mosaic and Dithering Strategy in Regards to Filter Wheel Moves

Filter mechanisms have the potential to be life limiting factors for JWST instrumentation. This is particularly the case for NIRCам, which serves as the wave-front sensing imager for the telescope. As a consequence, **observers must take steps to minimize filter wheel moves**. Programs with either instrument that involve mosaics or closely spaced observations should step through the observing positions with a single filter before moving to a second filter. Exceptions to this protocol must be justified scientifically. Increasing observing efficiency is not an adequate justification except under exceptional circumstances. Regarding the MIRI IFU, restrictions are already in place to prevent the abuse of its gratings.

## Data Volume Limitations

Some observations will generate a high data volume per visit and/or high data rates that may exceed limits in [the storage capacity of the solid state recorder \(58.8 Gbytes\)](#) and/or in [the downlink rate \(28.6 Gbytes per 12 hour period\)](#). In some cases, APT has implemented limitations regarding the readout patterns to avoid exceeding these limits, but other observing options enabled by APT could create problems. APT (25.2) will only create an error if the visit exceeds the capacity of the solid state recorder. If this is the case, the user is **required** to change the observing strategy to comply with solid state recorder storage limits. Users should keep in mind, however, that data

volume issues can only be fully identified downstream and the Visit Scheduling Subsystem and the Visit Planning Subsystem are designed to take these issues into consideration. To facilitate the scheduling of the observations, users are encouraged to keep the data volume under 28.2 Gbytes in a 12 hour period (0.654 MB/s). Please, refer to [APT documentation](#) on how to obtain data volume and data rate information. The Contact Scientists and Program Coordinators will iterate with proposers to finalize observations in accordance with the TAC recommendations.

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# JWST DD ERS Special Submission Requirements

Some types of observations submitted in response to the DD ERS Call may require special accommodations for full specification in the Astronomers Proposal Tool.

The Astronomer's Proposal Tool (APT) is still under development. Consequently, there are known limitations for a number of observing modes that we describe in this section. At this relatively early stage of preparation for Cycle 1, other features or limitations may be discovered in the process of preparing DD ERS proposals. When necessary, major updates will be made to this document and included in the [Late-Breaking News](#) section of this call. However, it is expected that most updates to planning guides, or more specific submission tips, will be posted as articles in the [JWST Help Desk](#), particularly in the [Knowledge Base](#).

## General Considerations

Proposers should be aware that there may be inaccuracies in the total charged duration reported in their APT submission. Known issues, such as uncertainties in the slew times for closely spaced observations, will be flagged in [APT User Documentation](#); proposers should check that site for updates, as well as the [Late Breaking News](#) section of the Call. In some cases, specific guidelines will be given with regard to adjusting the charged duration reported by APT; in those cases, the proposer should report and justify their corrected charged duration in the PDF of the proposal.

Proposers should be aware that accepted proposals may require modifications based on the results of the JWST commissioning process.

## Mosaic Observations

Proposers are required to submit complete APT files of programs requesting mosaics by the proposal deadline, as this is the only way to estimate the total time requested. In addition, another reason for requesting complete APT files is because complex programs like large mosaics, that involve timing constraints, impose significant restrictions on the Long Range Plan and therefore need to be incorporated into the schedule [as early as possible, in order to be able to accelerate the intellectual cycle](#). Proposers should be aware that:

1. The [Guide Star Catalog](#) used by APT at the time of the release of this Call (May 19, 2017) may be insufficient to find guide stars for all the mosaic tiles at the same time. In those cases, when running the program through the [Visit Planner](#) in APT, errors are triggered and the mosaic tiles cannot be scheduled simultaneously. If guide stars are not available for all the tiles at the same orientation, proposers should refer to the [mosaic documentation](#) for guidelines on how to proceed (see for example documentation discussing [mosaic planning](#) and [tile splitting](#)). Please note that it is important to resolve these scheduling errors before submission because otherwise smart accounting will not work and APT will assume each tile is a separate observation, each requiring a [major slew](#), greatly overestimating the requested time.
2. If [tile splitting](#) is required for scheduling purposes, proposers are recommended to set the Position Angle at a value that allow the largest number of tiles to be scheduled simultaneously. Proposers should be aware that a fixed position angle imposes constraints on

scheduling observations in the Long Range Plan. Consequently, if the proposal is accepted, STScI may adjust the Position Angle of the mosaic to minimize disruptions to the schedule. If a specific Position Angle is necessary to achieve the science objectives, this should be clearly indicated in the PDF of the proposal. Proposers are discouraged to request this unless necessary to achieve science objectives.

3. Proposers should bear in mind that if [tile splitting](#) is necessary, observations of problematic tiles will be made at a different Position Angle from the majority of the mosaic. This may create gaps in the coverage. If the science goals require full coverage, the proposer should indicate this clearly in the PDF of the proposal because it may require adjusting the size and/or dithering pattern of the tiles that need to be scheduled separately.

## NIRSpec MOS Observations

The target selection process for NIRSpec MOS observations must take account of how objects are projected onto the micro-shutter array, and therefore depends on the orientation of the observations and the distortions present along the NIRSpec optical path. In general, to ensure program schedulability, NIRSpec MOS science observations should be submitted with no orient constraint in proposals. We recommend that proposers who wish to constrain their observation orient define a preferred orientation within a range of no less than  $30^\circ$  (or  $\pm 15^\circ$ ), with an appropriate scientific justification. The exact execution orientation for any observation will not be determined until that observation is placed on the Long Range Plan (LRP) for Cycle 1. As a result, NIRSpec MOS observations cannot be fully specified at the time of submission. Proposers must submit in their proposals an associated source list for the final target assignment within any given pointing (see JWST DD ERS Special Observational Policies). Once the orientation has been defined for successful proposals, the proposer will be informed and can select the individual targets for MOS observation. A full description of the NIRSpec MOS APT submission process is given in the NIRSpec MOS JDox pages (placeholder).

DD ERS proposers may not apply for NIRSpec MOS programs that require NIRCcam pre-imaging to identify targets. Planning for NIRSpec MOS science must be based on existing catalogs and source information.

## Coronagraphic Observations

Proposers are required to submit complete APT files by the proposal deadline as a means of specifying the total time requested and to identify available roll angles. However, proposers should be aware that:

1. The PSF calibrator star that needs to be fully specified in their DD ERS proposals might be changed prior to executing an accepted program if both the proposer and STScI agree that this change is beneficial to the science yield of the program, under the condition that the science goals are unaffected and requested time is not increased.
2. The overheads associated with a given observation depend on the exact observing sequence and the ordering of the exposures. Proposer should make their best effort to optimize the program by minimizing overheads following the guidelines in the [High Contrast Imaging documentation](#). If the proposal is accepted, the Contact Scientist may also suggest changes to achieve this goal.

## Moving Target Observations

For a set of fixed target observations, after running the [visit planner](#), [Smart Accounting](#) corrects the initial APT [overhead](#) estimate by considering that there is only one 1800 sec major slew on the first observation, while the rest of the observations have far smaller minor slew times (similar to slew times between visits within an observation). However, at the time the ERS call is released, [Smart Accounting](#) may not have been implemented for solar system observations. If this is the case, APT will overestimate [overheads](#) in moving target observations because it will assume multiple major slews when in reality the telescope will not need that much time to get to the target because it will be approximately there from the previous observation. Guidelines for manually correcting the slew time are given in [Question #1 in this Knowledge Article](#) on solar system targets. The corrected time would need to be introduced in APT by clicking on the "Request custom time allocation" under the Charged Time, entering a *TIME REQ EXPLANATION* of "Manual accounting correction for Solar System target". In addition, in the PDF attachment of the proposal, proposers should include an explanation of how they calculated their own estimate of the time, taking into account the need for only one major slew, when appropriate. If by the time of the final APT submission, after the proposal has been already approved, [Smart Accounting](#) were to be implemented for moving targets, the APT-calculated time estimates would be adopted.

*Next: [JWST DD ERS Proposal Process](#)*

# JWST DD ERS Proposal Process

The submitted single-phase JWST DD ERS proposals should include all information necessary to accurately estimate the direct overheads and schedule the program in the JWST Long Range Plan.

## Introduction and motivation

For most proposals, JWST follows a hybrid "single-stream" approach where a single submission is made for each proposal by the deadline. Only certain classes of proposals may be revised after submission. A single-stream process for JWST proposal submission has been adopted for three reasons:

1. As was the case for Spitzer, JWST visits will be scheduled in an event-driven continuous process, as opposed to discrete orbits. JWST proposers must therefore specify more information up front than Hubble proposers so that the total time required for an observing program can be determined, and that information is available to the Time Allocation Committee (TAC). This includes accounting for slews and instrumental [overheads](#) that are often hidden from Hubble observers since they occur during Earth occultation.
2. For cycle 2 and beyond, a single-stream process minimizes the time between proposal deadlines and the start of an observing cycle. This, in turn, maximizes the amount of Webb data that's available when the subsequent round of proposals is written, thus accelerating the intellectual cycle as new discoveries guide the direction of new Webb observations. Cycle 1, however, is the exception because proposal submission occurs well before JWST launch and commissioning. In this case, a single-stream submission allows a longer and more thorough review of accepted proposals and more opportunities to provide support to successful proposers.
3. A "single-stream" approach enables the rapid construction of the long range plan (LRP); this allows observers with complex programs, such as observations using the [NIRSpec MSA](#), to quickly address constraints, like roll angles, in their programs.

The proposal system has been developed to enable users to, in many cases, enter essentially complete proposals at initial submission. Accepted proposals can then flow directly into the scheduling system with little delay. This is similar to the process at other space observatories such as Spitzer and Chandra, but is different from the two-step proposal system familiar to many HST users.

## Requirements

A faster turnaround can be achieved if proposals can be scheduled for observing soon after they are recommended by the Webb telescope Time Allocation Committee (TAC) and accepted by the STScI Director. This means that most submitted proposals must include sufficient information to define scheduling constraints for all visits (where each visit is directed at a specific target).

Following Spitzer's example, astronomers will submit their observing requirements using a set of templates for specific instrument modes.

These templates are available in the [Astronomer's Proposal Tool \(APT\)](#). The submitted observing requirements include a full list of targets, specifications of the observations (instruments, filters, exposure times, dithers, observational sequence), and all user-requested scheduling constraints (including roll angle and other timing constraints). Complete APT files are required at submission so that APT can compute the [direct overhead duration](#), which is defined by the sum of slews, the guide star and target acquisitions, mechanism motions, and small angle maneuvers. The sooner that information is available, the sooner an initial Webb LRP can be prepared using all visits in all the accepted programs.

In a few cases, APT may issue warning flags when APT template values are not adequately determined, or when it is not possible to fully determine whether a proposal is schedulable. Even in those cases, the complete APT file will contain valuable information to estimate direct [overheads](#) and observing constraints. If this program is accepted, a program coordinator or instrument scientist can quickly address these issues prior to scheduling. Generally, APT will generate a TAC review report that does not contain any technical flags.

## Exceptions

Proposals that cannot be fully specified at the time of submission are exempted from the nominal single-stream process. Details on the types of ERS proposals that are exempted and the kind of information that is required for submission are specified in [JWST DD ERS Special Submission Requirements](#). Note that these exceptions partly depend on APT functionality (expected to evolve with time) and therefore these special requirements might change from one Call to another.

At the present time, the JWST Astronomers Proposal Tool is still in development. DD ERS proposals will be submitted via APT, using at least v25.1 (available June 1 2017-- v25.2 is planned for June 20 2017). The full set of capabilities that will be available in APT v25.4, the version available for Cycle 1 General Observer proposals. In particular, a significantly expanded version of the guide star catalogue will be included in APT v25.4. **DD ERS proposals may be submitted with errors or warning flags**, although proposers are strongly encouraged to resolve as many submission issues as possible. All accepted DD ERS proposals will be re-processed using APT v25.4 before implementation.

## How APT can help

Several strategies are being employed to help JWST users prepare LRP-ready APT files for initial proposal submission. Training materials and demo proposals can be found on [the JWST What's New section on the APT site](#).

## Observation templates in APT

In APT, once a user selects an instrument and an observing mode, the APT GUI changes to show only those parameters that need to be set for that mode. Each instrument and mode combination thus has an observation template format specific for that mode. Once the relevant parameters for that observation have been specified, the template is complete and ready for further processing. Each instantiation of a template represents a single observation (although an observation may have one or many visits encoded within that observation).

## Schedulability and guide star availability checks

Using APT, a proposer must carry out guide star and schedulability checks, verifying that the observations are schedulable given the specified constraints. When one or more templates have been filled out, the user runs the **Visit Planner** step in APT. This important step executes a range of checks that look into the schedulability of the proposed observation(s). In addition to observatory viewing constraints, this check also assesses the availability of guide stars as a function of time, thus producing valid windows where the observation can schedule. The proposer may not choose specific guide stars or exact scheduling windows, as the schedulers need flexibility to prepare the most efficient LRP.

## Minimization or elimination of time-consuming optimization steps

APT is tasked with nearly all of the "heavy lifting" in the proposal process. The user specifies observations, and if the proposed observations require many visits to be performed, this is handled internally in APT, by breaking the observations into visits as necessary, performing the relevant accounting of **overheads**, and reporting the results back to the user. (An HST user may be familiar with the phase II process of trying various combinations, or ordering of their proposed observations to make best use of their orbit allocation. None of that will be required for JWST).

## Review and implementation

Once the STScI director has approved the full list of JWST programs for the next cycle, a first version of the LRP may be constructed with the information provided in the single-stream proposals and also in the programs excepted from the nominal single stream process, as rough scheduling windows can be determined based on their target lists. This first draft of the LRP is useful for identifying conflicts in the schedule between approved programs and for identifying other issues not flagged by APT (e.g. severe persistence due to bright sources observed in previous programs, excessive heat load on the cooler mechanism operations due to MIRI mechanism movements and internal lamps usage, need for momentum dumps, etc). Any reviews of the approved programs may be prioritized based on the LRP scheduling window, with programs with targets that have scheduling windows early in the cycle receiving top priority.

Complex large programs with timing constraints (e.g., large mosaic images, exoplanet transit observations, coordinated observations with other facilities) impose significant constraints on the LRP; thus, it is important to incorporate these into the schedule as early as possible. To do so, any approved programs without full observing requirements must provide updates to their programs shortly after approval. It is expected that the target lists, total time requests, and observatory resources will be provided upon submission in a manner similar to HST phase I proposals, but specific pointings, dither patterns, and timing constraints must be provided rapidly after approval.

When all the LRP-ready programs are submitted, they will be reviewed to ensure that the submitted observing plan is consistent with the TAC allocation and that the approved programs are checked for duplications. Additionally, programs which are likely to cause severe persistence may be flagged so that they may be scheduled so as not to impact subsequent programs. Programs flagged by APT with scheduling issues, such as missing guide stars, would also be reviewed at this stage. Unlike HST instruments, JWST instruments do not require 'health and safety' reviews. Challenging JWST programs may require additional reviews, which may be done after the LRP is built. These operationally-complex programs are primarily those which require target acquisitions such as coronagraphy and spectroscopy. NIRSpec MSA configuration reviews would not impact the JWST proposal cycle timeline, as these would occur throughout the year as the pre-imaging is obtained.

After the initial program reviews and construction of the LRP, additional reviews by program coordinators and instrument scientists to further validate each program could be executed throughout the cycle without impacting the intellectual cycle of JWST. Any significant changes to an approved JWST program will be evaluated by the [telescope time review board](#) and will only be approved if they significantly improve the scientific return of the program.

*Next: JWST DD ERS Proposal Preparation*

# JWST DD ERS Proposal Preparation

DD ERS Proposals must be submitted through APT, and must include an uploaded PDF file containing the Proposal Narrative, Management Plan, and a Preliminary Budget.

## Science Justification Templates

Templates for JWST DD ERS Proposal PDF attachments:

- [Microsoft Word](#)
- [LaTeX and jwstproposaltemplate.sty](#)
- [PDF output](#)

The DD ERS proposal must be submitted electronically. [The Astronomer's Proposal Tool \(or APT\)](#) is the interface for all submissions for JWST.

The proposal consists of two parts:

- A completed APT proposal form (see [JWST Astronomers Proposal Tool Overview](#)); and
- An attached PDF file containing the [Proposal Narrative](#) and a [Preliminary Budget](#).

Both are submitted directly from within APT. The PDF attachment must be prepared with a font size of 12pt, and must not exceed the stated page limits. Those proposals which do not adhere to these restrictions will be penalized in the review process; non-compliant pages will be removed and not be made available to reviewers. Do not change the format of any of the templates provided by STScI.

DD ERS proposers were required to submit a mandatory Notice of Intent (NOI). **The reference number of the NOI must be cited in the proposal abstract.**

## Proposal Personnel

The Principal Investigator and Co-Investigators must be specified using the Astronomer's Proposal Tool. Up to **two** co-investigators can be designated as Co-Principal investigators. Co-PIs should be listed at the conclusion of the proposal abstract, and their leadership roles should be described in the proposal narrative. Science Collaborators should **not** be entered into APT, but should be listed in the attached PDF file. The collaborator list, including the scientists' names and institution, should be appended after the Preliminary Budget and Management Plan. This attachment does not count towards the proposal page limit.

## Proposal Narrative

The PDF attachment must contain a Proposal Narrative with sections that discuss the following topics. The page limit for the narrative is



12 pages in total (including figures but not references).

1. **Rationale for selection as a DD ERS program:** Explain how the proposal will support community preparations for Cycle 2 observations. Describe the anticipated interest in, and use of, the data and [science-enabling products](#) developed by the team. Describe how the proposal will serve as a pathfinder for science investigations.
2. **Science Justification:** Describe the scientific objectives supported by the proposed DD ERS observations and their overall importance to astronomy. Describe the selected aspects of the science to be directly funded by the DD ERS program. Discuss how the proposed observations support investigations beyond the immediate scientific objectives.
3. **Description of the Observations:** Describe the targets and observational modes to be used. Quantitative estimates must be provided of the accuracy required to achieve key science goals. Proposers must demonstrate that all observations can execute in the first 5 months of Cycle 1 (planned to be from April to August 2019), and that a substantive subset of the observations are accessible in the first 3 months. This description should also include the following,
  - a. **Plan for Alternative Targets:** As described in [JWST DD ERS Special Observational Policies](#), proposers should qualitatively describe the availability of alternate targets and the process used to identify those targets should the start of science observations be delayed. Robust ERS programs involve science investigations that can be performed with a variety of different targets and observations.
  - b. **Special Observational Requirements (if any):** Justify any special scheduling requirements, e.g., time-critical observations.
  - c. **Justification of Coordinated Parallels (if any):** 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.
  - d. **Justification of Duplications (if any):** as detailed in the [JWST DD ERS Proposal Policies](#) and the [JWST Duplicate Observations Policy](#), observations taken as part of the DD ERS program cannot duplicate those specified for the GTO Cycle 1 Reserved Observation Catalog (planned for release on June 15, 2017). Any duplicate observations must be explicitly justified.
4. **Data Processing & Analysis Plan:** Describe the data processing plan and identify science-enabling products that will be developed, including specifically those that will be made available by the release of the Cycle 2 Call for Proposals (September 2019). Describe the analysis required to pursue science investigations undertaken as an integral part of the DD ERS program, and include effort required to support [DD ERS community briefings](#). Proposers should assume an October 2018 start for the plan.

**Science enabling products** include, but are not limited to, higher-level data products (improved beyond the standard products from the STScI pipeline), additional software tools, documentation and other resources that demonstrate JWST's scientific

capabilities or facilitate community science. Deliverables must include quantitative, data-related measurements to support Cycle 2 proposal preparation. Science results by themselves are not science-enabling products. Proposers should take a broad, but realistic, view in determining the level and types of products to be developed given the relatively short timescales.

Proposals must present a delivery schedule for science-enabling products. A description of STScI pipeline data products, processing and analysis software, and their anticipated availability, will be provided by the May 2017 release of the final version of this Call for Proposals. Proposers may consider multiple deliveries, with more advanced products provided over longer timescales. Proposals may include the collection, processing and analysis of ancillary data as part of an integrated DD ERS proposal.

## **NIRSpec MOS Target Catalog**

Proposals using NIRSpec Multi-Object Spectroscopy should submit a target catalog as described in [JWST DD ERS Special Observational Policies](#). Complete the [NIRSpec MOS target catalog template \[.xls\]](#), save it as a PDF, and append to the PDF submission. There is no page limit on this form.

## **Preliminary Budget**

The PDF attachment must include preliminary budget that should estimate the expected costs in at least salaries, travel, equipment, and publications to be requested by each eligible co-investigator at their respective institutions. Complete the [Preliminary Budget Template form \[.xls\]](#), including the list of contributions from investigators and [Science Collaborators](#), save it as a PDF, and appended to the PDF submission. There is no page limit to this form.

*Next: JWST DD ERS Proposal Evaluation and Selection Procedures*

# JWST DD ERS Proposal Evaluation and Selection Procedures

The DD ERS programs will be reviewed by a panel of scientists from the international astronomical community, that will make recommendations to the STScI Director.

## How STScI conducts the proposal review

DD ERS 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 offer their recommendations to the STScI Director. Based on those recommendations, the STScI Director makes the final allocation of observing time.

## The review panels

All DD ERS proposals will be subject to panel review. There will be four multi-disciplinary panels covering the following example science areas:

- Exgal1 - The extragalactic distance scale, high redshift universe, galaxy assembly and evolution, lensing and galaxy clusters;
- Exgal2 -AGNs, black holes, QSOs and gamma ray bursts;
- Gal1 - solar system, exoplanets, debris disks, cool stars and hot stars, including supernovae;
- Gal2 – star formation, stellar populations, nearby galaxies, the interstellar medium.

Panelists are chosen based on their experience in one or more of the areas under review. Within a panel, proposals are assigned to individual expert reviewers based on the keywords specified in the proposal (see [JWST DD ERS Proposal Science Categories and Keywords](#) for the list of DD ERS Categories and Keywords). **These keywords should therefore be chosen with care.** Given the breadth of topics within each panel, all proposals should be written for non-specialists.

## Proposal evaluation and selection

Proposals will be chosen in research areas spanning the science themes of JWST: first light and reionization; the assembly of galaxies; the birth of stars and protoplanetary systems; and planets and the origin of life. Proposals will also cover a range of key instrument modes and observing capabilities. A multi-disciplinary committee of experts will evaluate and recommend a suite of proposals for observation and funding that fulfills the [goals of the DD ERS](#) and makes optimal use of the available time.

The JWST DD ERS time allocation committee (TAC) will advise the STScI Director on the projects to be selected. DD ERS TAC members will be drawn from the US, European, and Canadian astronomical communities. The TAC will be multi-disciplinary, and proposals should be written for a non-specialist astronomical audience.

Evaluation will be based on the following criteria, assessing the potential to achieve the [goals of the DD ERS program](#):

- The extent to which the project will improve community understanding of JWST science capabilities and guide subsequent JWST observations.
- The effectiveness in providing deliverables which include quantitative, data-related measurements that will support the development of Cycle 2 proposals.
- The extent to which [science-enabling products](#) will be developed to enrich overall scientific return of the mission.
- The credibility of the management plan for achieving the project goals in a timely manner, particularly the development and delivery of science-enabling products for the community.
- The overall scientific merit of the program; its significance to major astrophysical sub-disciplines, and to astronomy in general.

All proposals must demonstrate that the unique capabilities of JWST are required to achieve the proposed science goals.

All proposals must be technically feasible. Proposals must demonstrate adequate opportunities for execution of observations early in Cycle 1, and flexibility to accommodate possible changes to the start of Cycle 1 science observations.

*Next: [JWST DD ERS Proposal Science Categories and Keywords](#)*

## JWST DD ERS Proposal Science Categories and Keywords

JWST proposers use APT to select one of six science categories and identify a number of associated science keywords. Categories are used to assign the proposals to a set of mirror panels, while keywords are used to match proposals and panelists according to expertise and to track what type of science JWST supports.

<b>Solar System:</b>
Biomarkers
Chemical Composition
Comets
Giant Planets
Kuiper-Belt Objects
Minor Planets
Planetary Atmospheres
Planetary Satellites
Space Weather
Terrestrial Planets
Transits

<b>Stellar Physics:</b>
Accretion Disks And Jets
Astrometry
Atmospheres
Binaries
Brown Dwarfs
Chemical Abundances

<b>Planets And Planet Formation:</b>
Biomarkers
Chemical Composition
Coronagraphy
Disks
Exoplanet Host Stars
Extrasolar Planets
Giant Planets
Planetary Atmospheres
Planetary Satellites
Space Weather
Terrestrial Planets
Transits

<b>Stellar Populations:</b>
Astrometry
Bulges, Spheroids, And Ellipticals
Chemical Abundances
Color-Magnitude Diagrams
Cool Stars

Circumstellar Matter
Cool Stars
Dust
Evolution
Evolved Stars
Gamma-Ray Bursts
HII Regions
Hot Stars
Interstellar Medium
Low-Mass Stars
Main-Sequence Stars
Massive Stars
Molecular Clouds
Neutron Stars And Pulsars
Planetary Nebulae
Pre-Main Sequence Stars
Radiative Transfer
Supernovae
Transients
Variable Stars
<b>Galaxies and the IGM:</b>
Bulges, Spheroids, and Ellipticals
Chemical Abundances
Circumgalactic Medium

Distance Ladder
Dust
Dwarf Galaxies
Evolution
Galactic Center
Globular Clusters
HII Regions
Halos
Hot Stars
Interstellar Medium
Irregular Galaxies
Local Group Galaxies
Magellanic Clouds
Microlensing
Planetary Nebulae
Star Clusters
Star-Formation Histories
<b>Massive Black Holes And Their Host Galaxies:</b>
Accretion Disks
AGN Host Galaxies
BAL Quasars
Emission Lines
Feedback
High-Luminosity AGN/Quasars

Cooling Flows
Damped Lyman-Alpha Absorption
Dark Matter Halos
Disks
Dust
Dwarf Galaxies
Emission-Line Galaxies
Galaxy Formation and Evolution
Galaxy Environments
Gunn-Peterson Effect
Spectral Energy Distributions
Interacting/Merging Galaxies
IR-Luminous Galaxies
Irregular Galaxies
Lyman-Alpha Forrest
Local Group Galaxies
Magellanic Clouds
Metal Absorption Systems
Photometric Redshifts
Quenched Galaxies
Scaling Relations
Simulations And Models
Star Clusters
Starburst Galaxies
Star-Formation Histories

Jets
Liners
Low-Luminosity AGN/Seyferts
M-Sigma Relation
Quenched Galaxies
Radio AGN
Reverberation
Supermassive Black Holes
Winds And Outflows
X-Ray AGN

<b>Cosmology:</b>
Chemical Abundances
Clusters Of Galaxies
Cosmological Parameters And Distance Scale
Cooling Flows
Extragalactic Legacy And Deep Fields
First Light Stars And Galaxies
Gamma-Ray Bursts
Gravitational Lensing
Groups Of Galaxies
Intracluster Medium
Large-Scale Structure
Reionization
Simulations And Models

Stellar Halos
Stellar Populations
Structure And Morphology

Supernovae
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