Agency Priority Goal | Action Plan | FY 2023 – Q3

James Webb Space Telescope

Goal Leader(s):

Lead: Science Mission Directorate

Goal Leader: Mark Clampin, Astrophysics Division Director

Deputy Goal Leader: Eric Smith, Program Scientist

Goal Overview

Goal statement

After launch, deployment, and start of science operations, the James Webb Space Telescope will study every phase in the history of our universe, ranging from the first luminous glows after the Big Bang, to the formation of other stellar systems capable of supporting life on planets like Earth, to the evolution of our own solar system. *By September 30, 2023, NASA will complete commissioning of the James Webb Space Telescope, the most powerful and complex space telescope ever built, and begin Webb's Cycle 2 observations.*

Problem to Be Solved

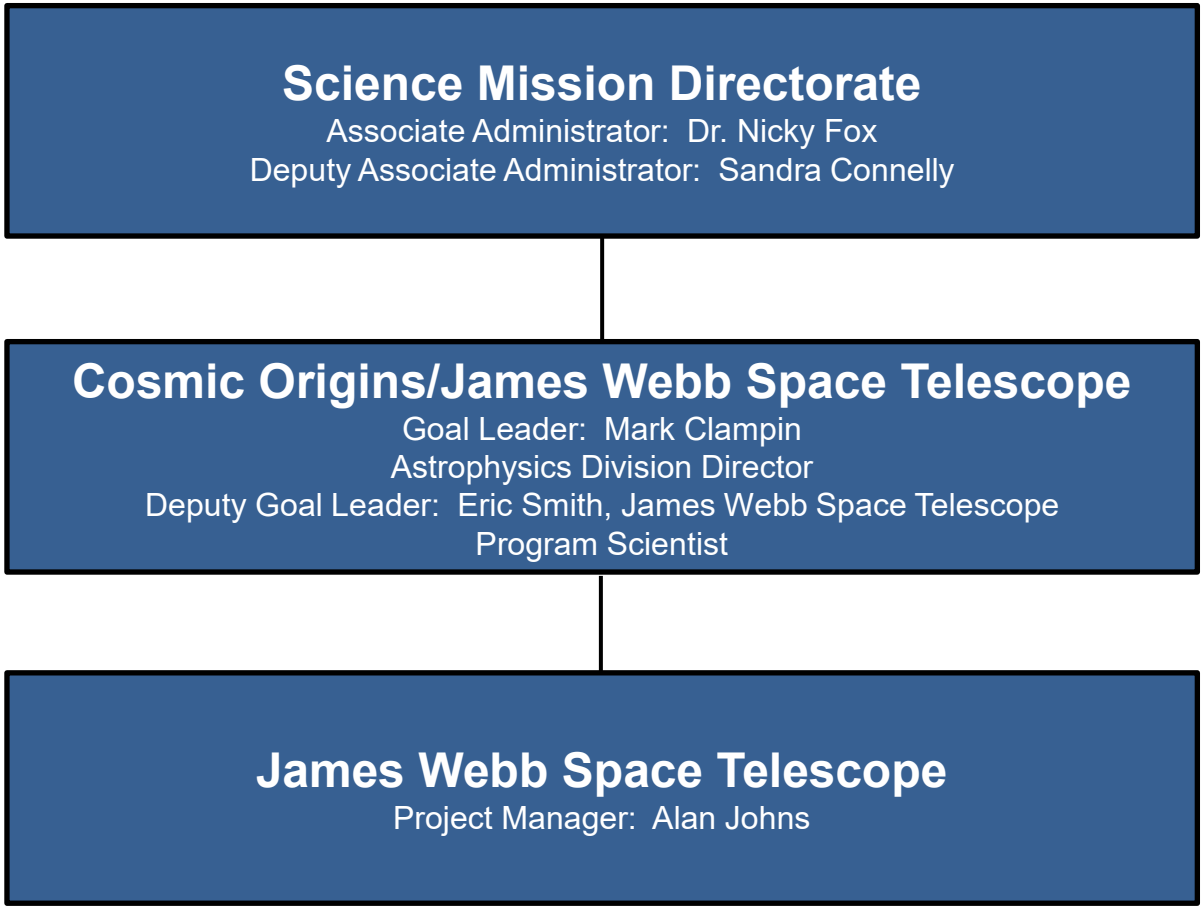
- To launch, deploy, operate the largest-ever cryogenic space telescope, and enable science discoveries.

What Success Looks Like

This observatory is key for meeting the Strategic Goal to expand human knowledge through new scientific discoveries. Webb is NASA's new telescope that will allow us to explore deeper into space and see things that even the Hubble Space Telescope cannot see. Success for the Webb mission and the APG would be:

- Launching the telescope to the second Lagrange point (L2)
- Completing commissioning activities, which includes deploying the primary mirror and sun shield and testing the instruments
- Beginning telescope operations
- Reviewing Cycle 2 proposals
- Beginning Cycle 2 observations

Goal Team


Science Mission Directorate
Associate Administrator: Dr. Nicky Fox
Deputy Associate Administrator: Sandra Connelly
Cosmic Origins/James Webb Space Telescope
Goal Leader: Mark Clampin
Astrophysics Division Director
Deputy Goal Leader: Eric Smith, James Webb Space Telescope
Program Scientist
James Webb Space Telescope
Project Manager: Alan Johns

Goal Strategies

In continuing to work with its partners toward completion of Observatory commissioning and initiation of normal operations, NASA will:

- Complete Telescope commissioning, followed by commissioning of all science instruments, including those of our international partners, the European Space Agency (ESA) and the Canadian Space Agency (CSA).
- Begin normal science operations using the Cycle 1 program of U.S. and international partner led investigations.
- Use the Space Telescope Science Institute to issue a call for Cycle 2 proposals, collect and peer-review those proposals, and formulate the Cycle 2 observing program.
- Inform NASA senior officials and others through a regular series of updates on observatory operations progress.

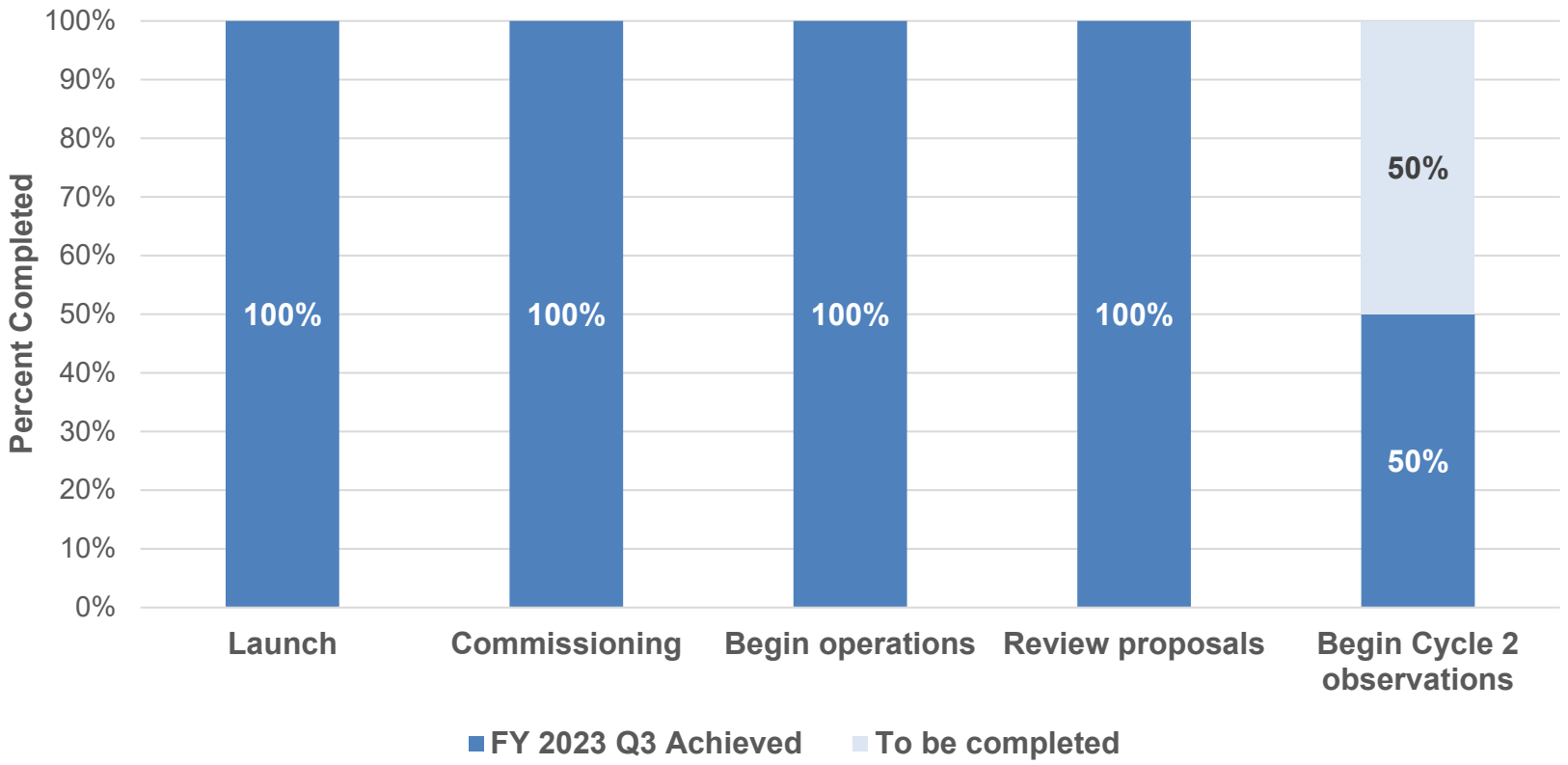
Goal target(s)

In the table below, please repeat the key metrics included in the goal statement (previous slide) that will be used to track progress.

Please update this column each quarter.

Achievement statement Repeat the achievement statement from the goal statement on the previous slide		Key indicator(s) A "key performance indicator" measures progress toward a goal target	Quantify progress These values enable us (and you!) to calculate % complete for any type of target*			Frequency When is there new data?
By…	**We will…**	**Name of indicator**	**Target value**	**Starting value****	**Current value**	**Update cycle**
09/2023	Launch the James Webb Space Telescope • Deliver Webb to French Guiana • Webb inspection and testing • Webb stacked on Ariane 5 rocket • Successful launch • Orbiting L2	Launch	100%	0%	100%	Quarterly
09/2023	Complete commissioning • Telescope fully deployed • Sunshield and other deployment • Mirror segment deployed • Optical telescope element commissioning • Instruments (NIRCam, NIRISS, FGS) on • Ready for science/commissioning complete	Commissioning	100%	0%	100%	Quarterly
09/2023	Begin telescope operations • Select Cycle 1 General Observers proposals • Begin telescope operations	Begin operations	100%	0%	100%	Quarterly
09/2023	Review Cycle 2 proposals • Early Release Science products available in public archive • Cycle 2 call for proposals • Review Cycle 2 proposals	Review proposals	100%	0%	100%	Quarterly
09/2023	Begin Cycle 2 observations • Award Cycle 2 observation time • Begin Cycle 2 observations	Begin observations	100%	0%	50%	Quarterly

Key indicators



Key milestones

Milestone Summary			
Key Milestone	**Milestone Due Date**	**Milestone Status**	**Comments**
Launch James Webb Space Telescope	FY 2022 Q1	Completed	Launched 12/25/2021
Perform all deployments of the observatory	FY 2022 Q2	Completed	Completed 1/12/2022
Initiate commissioning and operations for all science instruments	FY 2022 Q3	Completed	Completed 4/26/2022
Complete science instrument commissioning and begin normal operations	FY 2022 Q4	Completed	Completed 6/30/2022
Make Early Release Science products available in public archive	FY 2023 Q1	Completed	Completed 7/12/2022
Receive Cycle 2 proposals for second year of Webb Operations	FY 2023 Q2	Completed	Call released November 2022; proposals received January 2023
Conduct review of Cycle 2 proposals	FY 2023 Q3	Completed	Proposals reviewed April 2023; selections announced May 2023.
Begin Cycle 2 observations	FY 2023 Q4	On Track	July 1

Narrative – FY 2023 Q3

During this period, NASA and the entire international mission team continued normal Cycle 1 science observations. Review of General Observer proposals received for the second year of Webb science operations, or Cycle 2, was completed in April, with selections announced in May. Selection of the General Observer programs represents a tremendous effort by more than 5,000 investigators who submitted proposals, the 225 community members who served as expert reviewers, the 350 members of the Telescope Allocation Committee, and the Webb teams at the Space Telescope Science Institute and NASA. Webb is now poised to build on its first year of discoveries, with the 249 selected programs balanced across a wide range of science topics from asteroids and exoplanets to cosmology.

The observatory continues to exceed all its mission level requirements for sensitivity, spatial resolution, ability to track moving targets, and expected mission lifetime. Approximately 930 science papers using Webb data have been submitted for peer review as of the end of FY 2023 Q3.

Scientific discoveries based on Webb observations are shared with the public in the form of news releases, which report on results that have undergone peer review, and have been accepted for publication by a reputable scientific journal. However, because this process takes time, NASA also shares with the public observations and preliminary analyses as Early Highlights – a “sneak peek” into groundbreaking discoveries. Both the news releases and Early Highlights are available at https://webbtelescope.org/webb-science/early-highlights. The Webb operations site is available at https://webbtelescope.org/.

Among recent highlights: **Webb Detection of Heavy Neutron Capture Elements in a Compact Object Merger**

Webb used mid-IR imaging and spectroscopy of the exceptionally bright gamma-ray burst GRB 230307A, 29 and 61 days after the burst to detect very heavy element creation. This GRB is part of a class of long-duration gamma-ray bursts associated with compact object mergers and contains a kilonova. The spectroscopy shows an emission line at 2.15 microns interpreted as tellurium (atomic mass A=130), and a very red source emitting most of its light in the mid-IR due to the production of lanthanides. These observations demonstrate that nucleosynthesis in GRBs plays a central role in heavy element nucleosynthesis across the Universe.

Data accuracy & reliability

Verification and Validation:

- NASA monitors and tracks its progress towards this goal using various Agency documents and reports, including Directorate Program Management Council (DPMC) materials, monthly reports from the project and industry partners, non-profit partners and other program-internal documents.

Data Source(s):

- Emails and program-internal documents indicating progress NASA's industry and non-profit partners make toward the James Webb Space Telescope integration, test and launch.

Level of Accuracy Required for Intended Use:

- Using the documents and reports referenced above, the Agency can accurately report at the end of each quarter on whether it has met its planned milestones.

Data Limitations:

- Materials from the industry partners may include company proprietary information; such information cannot be released publicly.

How the Agency Compensates for Data Limitations:

- NASA has not identified any data limitations that would preclude it from reporting accurate, reliable, and timely performance information.

Additional information

Contributing Programs

Organizations:

- Science Mission Directorate, Cosmic Origins/James Webb Space Telescope
- Space Operations Mission Directorate, Space Communications and Navigation

Other: Webb is an international collaboration among NASA, the European Space Agency (ESA), and the Canadian Space Agency (CSA).

- ESA has provided the Ariane launch vehicle and some of the scientific instruments, the Near Infrared Spectrometer and half of the Mid-Infrared Instrument and operations staff at the Space Telescope Science Institute.
- CSA has provided the Fine Guidance Sensor, which will enable Webb to point precisely, so that it can obtain high-quality images, the Near Infrared Imager and Slitless Spectrograph and operations staff at the Space Telescope Science Institute.
- Northrop-Grumman Aerospace Systems (NGAS) is the main NASA industrial contractor, responsible for building the optical telescope, spacecraft bus, and sunshield, and preparing the observatory for launch. NGAS has led a team including three major sub-contractors: Ball Aerospace, Orbital-ATK, and Harris (formerly ITT Exelis).
- Operations of the mission and its science program are conducted by the Space Telescope Science Institute under contract to AURA, Inc.

Stakeholder / Congressional Consultations

- Regular updates to the Office of Management and Budget (OMB)