

S&OC update

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Developing an observing schedule for JWST science observations

- Even with single-stream, the TAC APT file is just the first step to getting data
- The program coordinator works with PI to develop flight-ready observations
 - Finalize observations & resolve outstanding issues
 - Minimizing observing constraints maximizes scheduling opportunities
- Flight-ready observations are combined to give the Long Range Plan (LRP)
 - This allocates plan windows for individual observations
 - Observations may be pulled forward if opportunities arise
- The detailed observation plan is set by Short Term Scheduling (STS)
 - Each STS covers one week, with observations drawn from the LRP
 - STS construction starts 10 days before execution
 - Each STS is uploaded to JWST on Sunday evening and starts executing @midnight
 - STS can be interrupted for unplanned events (rapid ToOs or DDs)



Current status of schedule development

- Unscheduled observations
 - 511.7 hrs
 - Future DD: 350 hrs (not in database)
- Failed observations
 - 500 hrs (not in database)
 - Assuming 5% WOPR rate
- Planning issues so far
 - large mapping programs
 - GOODS-S, GOODS-N, COSMOS, ...
 - Depending on ecliptic latitude, fixed-orient programs have ~7-14 days of visibility
 - Observations for such programs will be spread over 2+ years if the orient flip for visibility in 6 months is not allowed.

Current Breakdown of Programs for Cycle 1

Category	Total Time [hrs]	Planned [hrs] (%)
GO	6119.9 ¹	5563.4 (91%)
GTO	3751.2 ²	3568.5 (95%)
ERS	522.3	428.63 (82%)
CAL	826.9	615.9 (74%)
Total	11,220.3	10,176.5 (91%)

¹ Total time includes 200.5hrs of ToOs

² Total time includes 5.2hrs of ToOs

WOPR = Webb Operations Problem Report



Cycle 1 schedule timeline

- The 2-year JWST ephemeris required to develop the LRP only became available after MCC2 and JWST entered the L2 halo orbit
- Program coordinators resolving the final issues for a small number of programs
- An initial LRP will be constructed in February/March
 - ERS observations will be prioritized to execute in the first 5 months of Cycle 1
 - All other observations (GO & GTO) will be scheduled to maximize JWST observing efficiency while meeting the program science goals.
- The LRP will be finalized in late March and plan windows delivered to PIs in mid-April
- Cycle 1 is over-subscribed so many PIs will receive plan windows in Cycle 2 (July 1, 2023 – July 1, 2024)
- **The LRP is built for overall telescope efficiency, so plan window assignments will generally be final**
 - **Any changes must be requested through the Telescope Time Review Board and will only be considered if required scientifically.**



SOC development priorities – Commissioning context

Science and Operations Center (SOC) development process

- Requirements → Development → Integration and Test (I&T) → Operations

SOC 4.9.5 build is in I&T now. Plan to make operational next week

Still formulating build plan on longer timescales. Current concept:

- Patch SOC 4.9.5 as needed to support commissioning
- Make new SOC builds available to operations in May and November
 - May 2022 supports updates for Cycle 1 observing, e.g., MIRI subarray management
 - November 2022 supports Cycle 2 call for proposals (particularly proposal tool)
 - May 2023 supports Cycle 2 observing (particularly onboard scripts)

Constraints during commissioning

- Developers have some time to work on enhancements
- Onboard script test team and test bed are supporting commissioning 24/7



S&OC development priorities – Onboard script enhancements

Top priority enhancements

- Set MIRI detectors to full frame before anneals (data quality)
- Reduce time to switch NIRSpec detector mode (efficiency)
- Enable NIRCам SW + LW coronagraphy (improve multiplexing)
- Set MIRI detectors to full frame between visits (data quality)

Medium priority enhancements

- Enhance MIRI recovery in some anomaly recovery scenarios (efficiency)
- Enable NIRCам SW DHS + LW grism for time series (improve multiplexing)
- Enable target acquisition for MIRI imaging for time series (data quality)
- Enable NIRSpec MSA target acquisition for time series (handle bright targets)
- Reduce NIRSpec detector setup time when dithering (efficiency)
- Skip visit if guide star is far from expected position after ID phase (efficiency)



S&OC development priorities – User tools

- Fix high-priority bugs discovered during commissioning
- Anticipate and support onboard script enhancements (previous slide)
- Enhance proposal tools (high priority)
 - Update ETC to on-orbit performance to support Cycle 2 CfP
 - Enhance engineering templates to facilitate commissioning
 - MSA Planning Tool: wavelength cutoffs for each source, improve diagnostics, ...
 - Enable dithering for NIRISS Imaging template (no onboard script work)
- Enhance data analysis (high priority)
 - Correct wide-field slitless spectra for contamination by neighbors
 - Enhance extraction algorithm for NIRISS single-object slitless spectra
 - Enhance jump detection step for ramps with fewer than 5 groups
 - Integrate spectral extraction routines into spectral analysis workflows
 - Improve Jdaviz UX/UI, error handling, and quick-photometry functionality



Plans for JWST Early Science Conference

- Early planning stages for JWST science conference @ STScI
- Tentative dates: December 12-16, 2022 (no. of days TBD).
 - After ~5 months of science operations to include ERS data
 - Before AAS and Cycle 2 deadline
- Feature science presentations from a broad range of science
 - Diverse representation, GO/GTO/ERS, small/large programs, ECRs, etc.
- Final selection of speakers should take place late to take into account newest results.
 - Challenge to be broad while still supporting substantive presentations
 - Should include extensive poster sessions to accommodate all results in one form or another
- Consider supporting parallel sessions
 - Develop ways to support Cycle 2 proposal writing
 - Data analysis sessions with instrument experts
- Build SOC from JWST Observer community
- Baseline format: Live meeting with streamed and recorded presentations + online engagement (Slack, etc.).