



Chandra Users' Committee Meeting

November 10, 2025

CXC Manager's Status Report

Mark Weber, CXC Manager

Edward Mattison, CXC Deputy Manager



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- Mission Operations 15–25
- Grants & Fellowships 26–27
- Public Communication and Outreach 28–30



- Spacecraft and instruments have been performing well
 - With the primary exceptions of low-energy ACIS quantum efficiency and the restrictions imposed by the HRC power supply anomaly, Chandra continues to meet or exceed all other Level 1 requirements.
 - The pre-launch AXAF Level 1 requirements specify performance for a minimum of 3 years of mission operations. The Program has considerably exceeded that span.
 - HRC has been operating successfully with the new thermal and scheduling constraints. (Very recently, observations have been paused for a power supply anomaly on 24 Oct. More details later today.)
 - Relaxation of thruster temperature limits and the increasing perigee altitude are allowing staff efforts to retain high efficiency planning.
- Senior Review 2025
 - **Budget guidelines were extremely low and challenging to propose to.**
 - Proposals were due 12 Dec 2024.
 - Project presentation was on 4 Feb 2025.
 - The Chandra and Overall reports were shared to CXC leadership on 30 May 2025.
 - Chandra received an overall rating of **Excellent/Very Good**.
 - **See Director's report for more detail.**



- Budget

- FY 2025 expenditures were within budget.
- The FY 2026 budget outlook remains uncertain, but Chandra leadership has received guidance from NASA HQ to plan for a budget of \$63 M under the presumption of Continuing Resolutions.
 - With existing reserves, this would enable Chandra to complete FY 2026 without reducing operations (and with full GO funding restored for Cycle 27). **This is encouraging.**

- Contract

- Current contract for operating mission ends Sep 2027.
 - There remains a contract option for the nominal three-year mission closedown plan, which could begin in Oct 2027 if NASA chose to exercise it.
- Expectation of a Request For Proposal for an extension of mission operations, with that solicitation process commencing immediately after the federal shutdown ends.



- **Communications & Public Engagement**

- Chandra was mentioned or featured in >5k popular news articles, including: **NY Post, Associated Press, USA Today, Newsweek, CNN**, also **Nature Astronomy** (cover).
- Chandra science heavily represented on digital/social platforms, e.g., **10M views on Chandra Instagram for MSH 15-52 post with NASA flagship**.
- Demonstrated value to expanded audiences through sound, long-form video & public events, leading to award-winning documentary & collaborations with artists that are unique in astronomy.

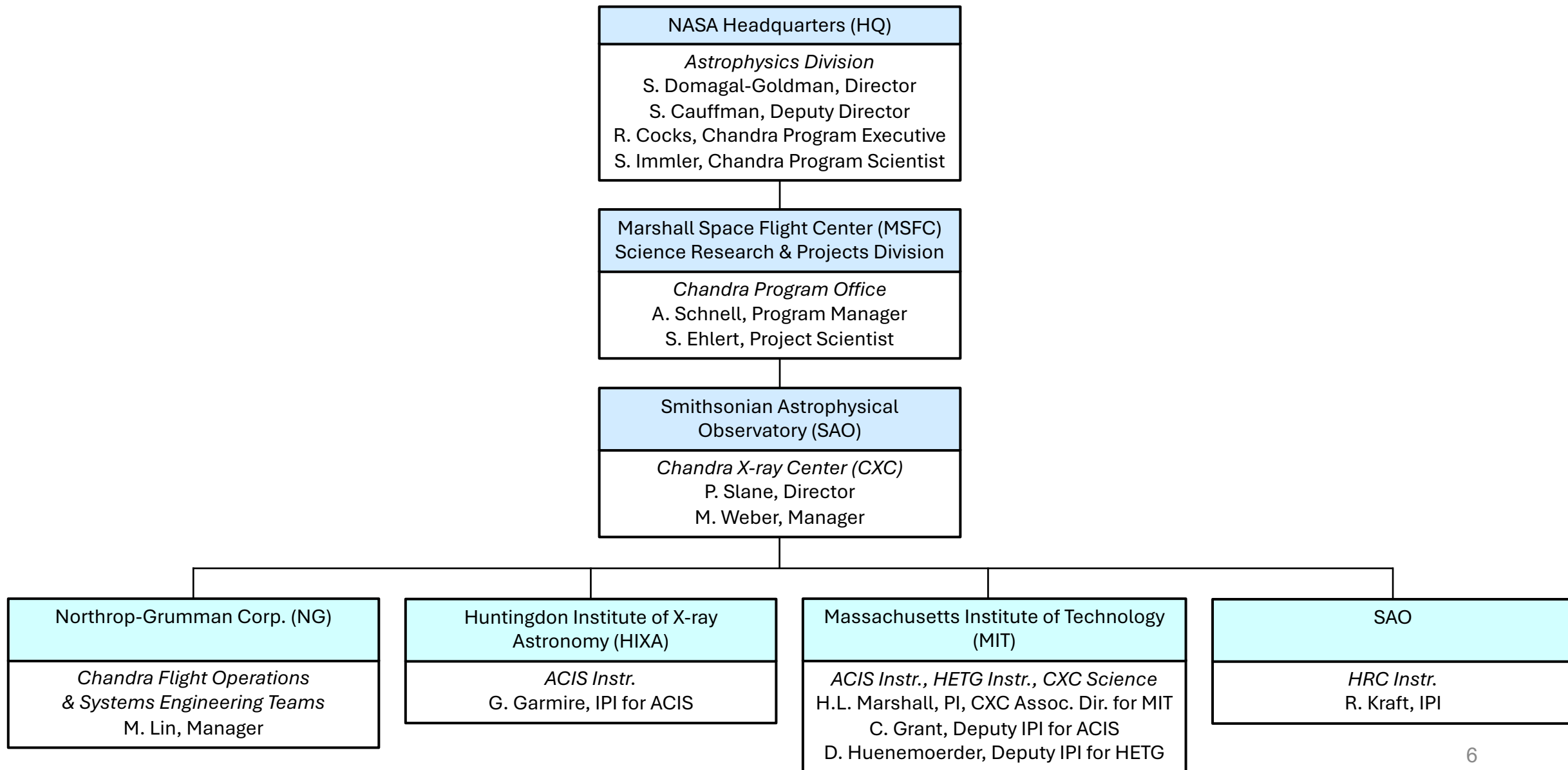
- **Changes in Leadership Personnel**

- **Stephen (Steve) O'Dell** (MSFC) retired as Chandra Project Scientist, after a long association with Chandra.
 - **Steven Ehlert** is the Acting Chandra Project Scientist.
- **Laurence (Larry) David** (SAO), the Calibration lead, has stepped down but continues as a team member.
 - **Akos Bogdan** has taken over as Calibration lead.
- **Christopher (Chris) Eagan** (SAO) retired as the OCC Manager. A replacement search is underway.
 - **Scott Wolk** is temporarily serving in the role of OCC Manager.
- **Herman Marshall** (MIT) replaced **Claude Canizares** as the CXC Associate Director for MIT, and as the PI for the MIT subcontract providing support to CXC, ACIS, and HETG science.
- **David Huenemoerder** (MIT) is now MIT's Deputy IPI for the HETG Spectrometer.
- **Catherine Grant** (MIT) is now MIT's Deputy IPI for the ACIS instrument.



Program Management (1/9)

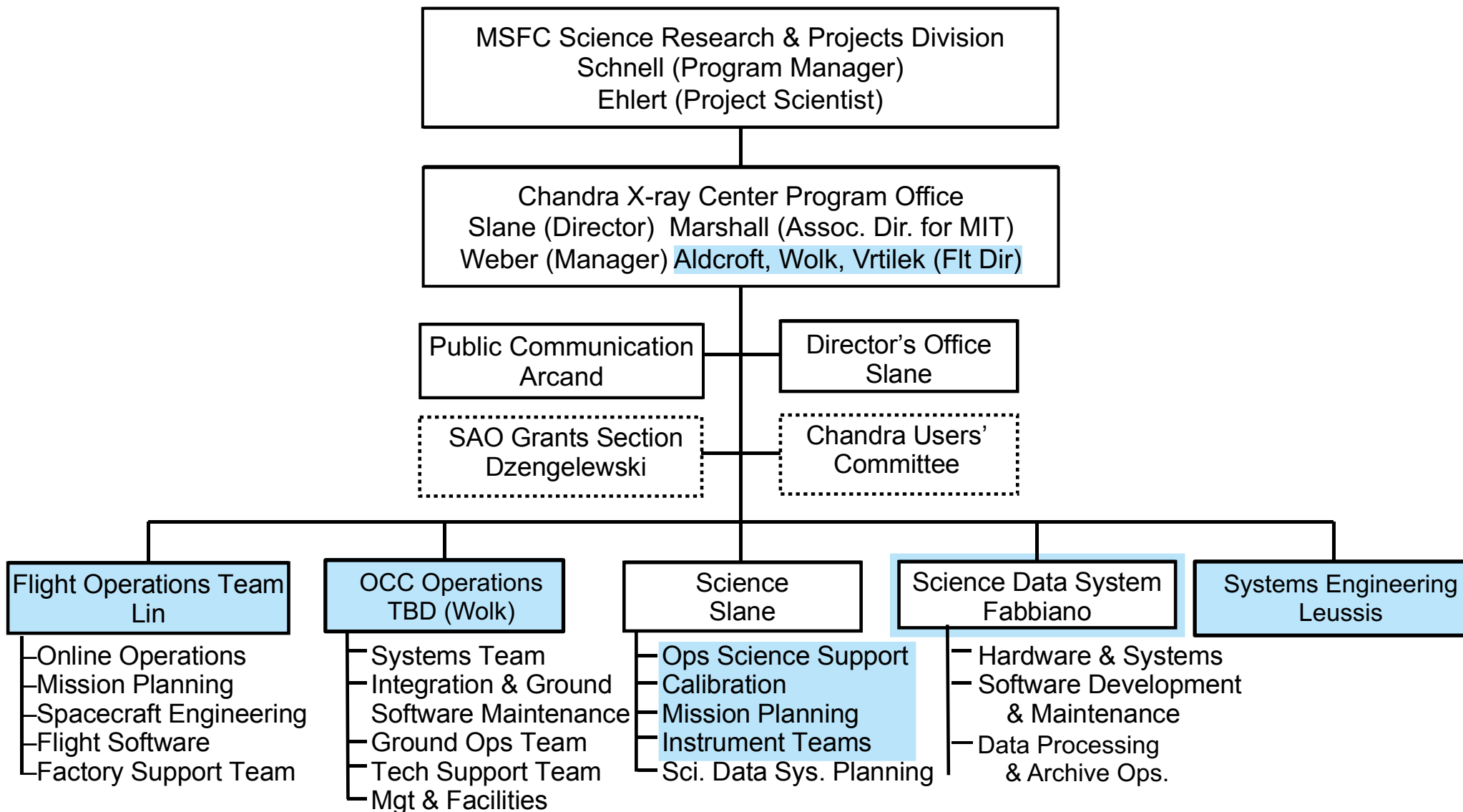
CXC



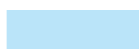


Program Management (2/9)

CXC



= External support



= Mission operations role



= Mission ops support during anomaly



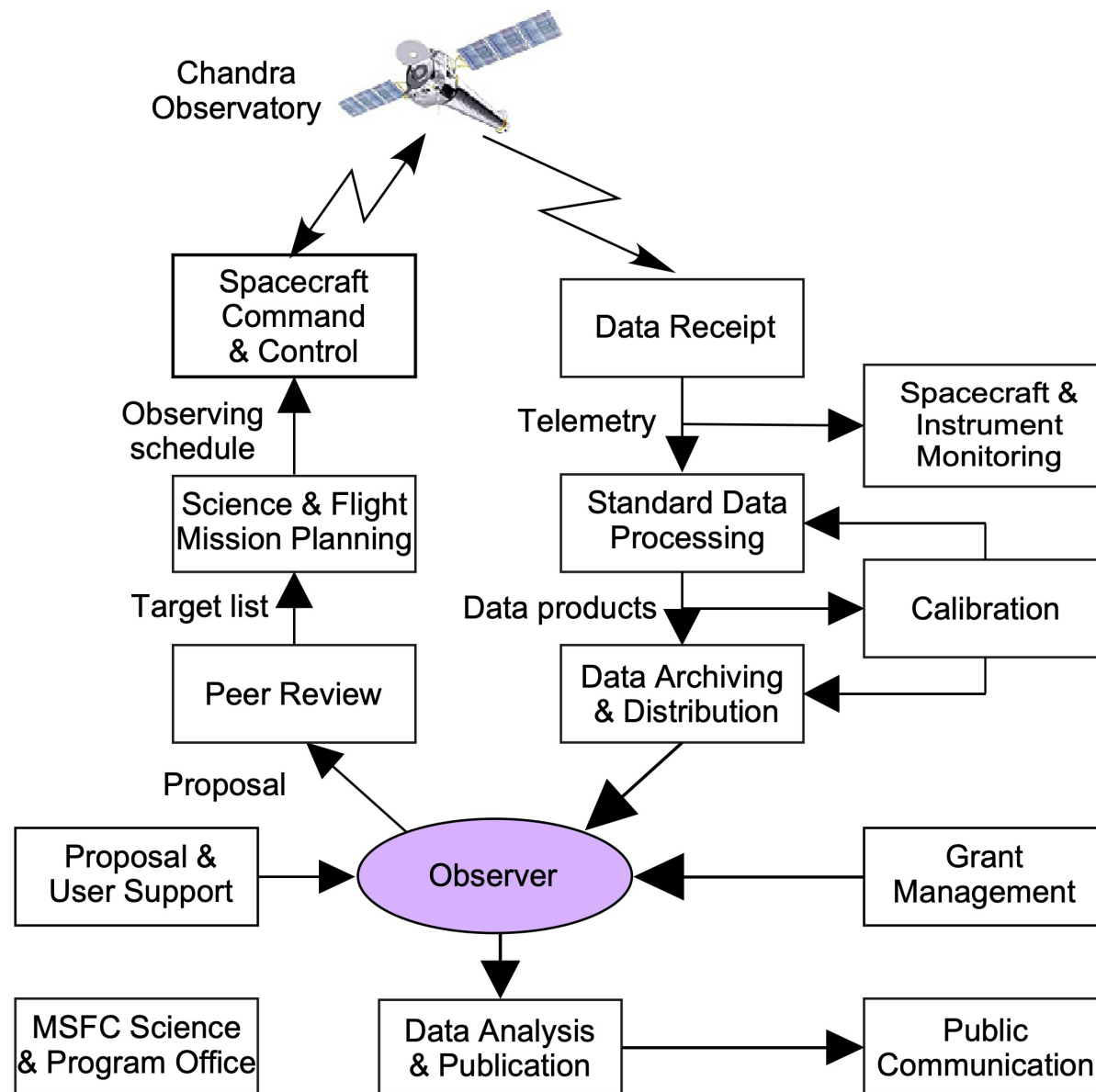
Program Management (3/9)

CXC

Chandra Task Thread

MSFC and the Chandra X-ray Center conduct all aspects of the Chandra X-ray Observatory program

- Science
- Spacecraft operations
- Data processing, archiving, & distribution
- General observer grants management
- Public communication





- CXC-organized Reviews and Conferences

- Cycle 27 Dual Anonymous Distributed Peer Review
 - Held April – June 2025.
- Science conferences:
 - Chandra / CIAO Workshop at Univ. of Mass. Lowell (19–23 May 2025).
 - “A Journey Into X-ray Astronomy and Data Science”, with 30 students from around the world.
 - Considering potential topics for Summer 2026 workshop.

- Programmatic Meetings

- | | | |
|--|---|-------------|
| – Chandra presentation to NASA Senior Review Panel | — | 4 Feb 2025 |
| – Quarterly #58 | — | 6 May 2025 |
| – Chandra budget presentation to NASA PPBE-27 | — | 14 May 2025 |
| – Quarterly #59 | — | 3 Nov 2025 |



- **Current CXC Contract**

- Current contract continues mission operations through Sep 2027.
- Option on current contract for a nominal 3-year closeout period that follows the end of mission operations.
- No remaining contract options for extending mission ops beyond Sep 2027. Further extension of mission operations will require a new proposal in coming 2 years.
 - CXC leadership has been informed by NASA HQ of their intention to solicit an extension proposal from SAO.
 - The proposal process should be starting about now according to the typical schedule, but the federal shutdown has delayed initial steps on NASA's side.

- **Current Funding**

- Current CXC funding runs to mid-Apr 2026.
 - NASA HQ provided **exceptional** support to Chandra by forward funding the mission, several months into the future, before the federal shutdown commenced. As a result, there is currently no expectation of running out of funds before the shutdown ends.
- The Einstein program (SAO's participation in the NASA Hubble Fellowship Program) is funded to ~ Mar 2026.



- Budget FY 2025

- The FY 2025 budget went through several adjustments after the 2024 Operating Paradigm Change Review and 2024 PPBE process. The net result was that some cost saving measures had to be implemented, with NASA directing us to preserve program capabilities and full observing time.
- Cost-saving measures included reductions to Cycle 26 grants program, delaying some hires to refill positions, and deferring some equipment purchases.
- As a result, FY25 expenditures were within budget.

- Budget FY 2026

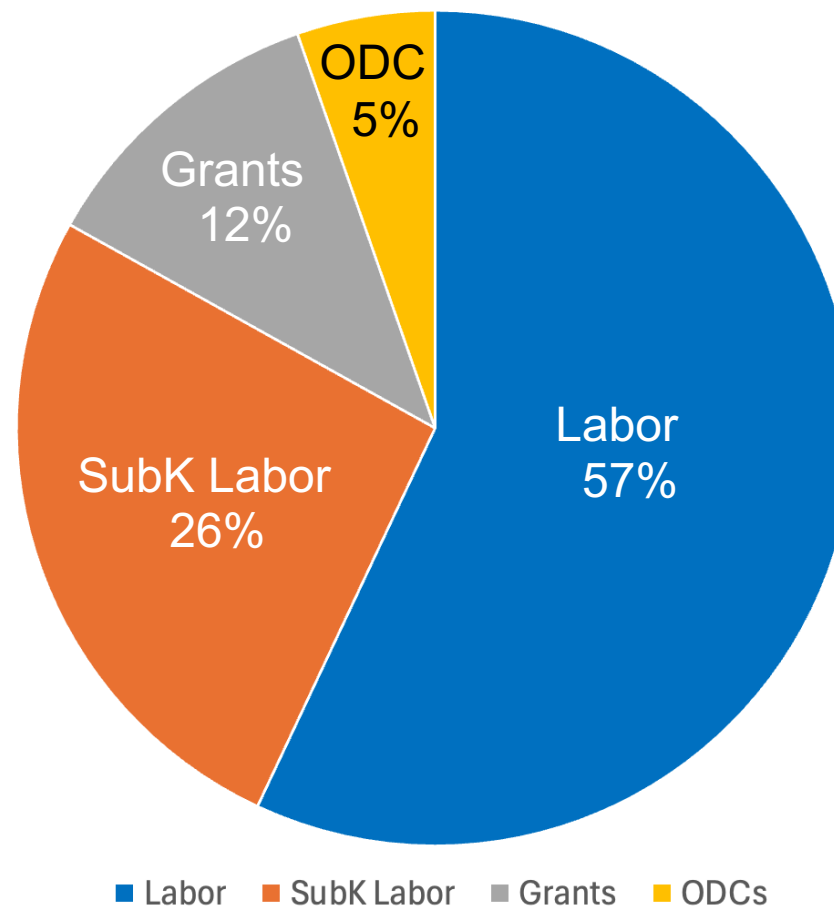
- The FY 2026 budget outlook **remains uncertain**, with the federal government in shutdown and the Congressional appropriations process in abeyance.
 - Guidance received from MSFC regarding the federal shutdown is to continue CXC at status quo. **Available funds can continue CXC operations into April 2026.**
 - Guidance received from NASA HQ regarding the case of Continuing Resolutions is to plan for a budget of \$63 M. With existing reserves, this will allow us to complete FY 2026 without reductions to the status quo program (and with full GO funding restored for Cycle 27). MSFC has directed CXC to prepare an operating plan for FY 2026 under this assumption. **This is encouraging.**
 - The potential passing of a federal budget for FY 2026 may yet change the budget outlook for FY 2026 and require re-evaluation both by NASA HQ and by Chandra Management.

See Director's report for more details on the budget context.



FY25 CXC Budget Structure

The CXC budget is dominated by labor and Chandra grants.





- Federal shutdowns

- *How do Federal shutdowns potentially affect Chandra?*

- There is only **one** Federal person on CXC staff, and none in the SAO Contracts & Procurement department. Effectively all SAO and subcontractor staff can continue working as long as we have funds. SAO can continue to fund, and work with, subcontractors.
 - MSFC Chandra project staff that are necessary for operation approvals and anomaly responses are available as needed, so no impact to operations.
 - However, MSFC is not able to issue funds to CXC, so it is important to enter shutdowns with sufficient forward funding. **For the Oct 2025 Federal shutdown, Chandra was given forward funding to last until April 2026.**
 - If necessary, CXC can pause on some new obligations, such as purchases and funding to grants.
 - CXC has the option to seek emergency funds from SI. There is precedent for that action. But there is also elevated risk this year because SI itself faces potentially large budget cuts in FY26, and emergency funds have to be paid back by the mission. After 3 months, these "loans" incur interest.

- *The Federal shutdown is **NOT** an immediate concern for CXC.*

- CXC is currently funded to mid-April 2026.



- Senior Review 2025
 - **Budget guidelines were extremely low and challenging to propose to.**
 - Proposals were due 12 Dec 2024.
 - Project presentation was on 4 Feb 2025.
 - The Chandra and Overall reports were shared to CXC leadership on 30 May 2025.
 - Chandra received an overall rating of **Excellent/Very Good.**

See Director's report for more details on the Senior Review results.



- Spacecraft — Overall status

- **The spacecraft continues to operate extremely well.**
- Low perigee constraints have all been removed and thruster-usage conservation efforts have been extremely effective, allowing us to retire thruster usage from the longevity risk watchlist.
- Mission planning efficiency remains at all time mission average, having benefited from many process improvements and constraint relaxation.
- The team has completed all actions in response to the Jan 2025 grating insertion fault.
- Operations remain nominal, and engineering activities are proactive.



- Science Operations

- **ACIS continues to operate well.**

- ACIS is the on-board radiation monitor for Chandra, and has an autonomous function for safing the science instruments using the “TXings” algorithm. (Remote and in-situ space weather data are *a/so* regularly evaluated for managing the safety of Chandra.)
 - There were 7 radiation safing actions in the reporting period (5 TXings triggered, 2 manual). Two of the TXings triggers were false positives; see next bullet.
- ACIS flight software patch H-K-L (FSW v61) uploaded on 15 Aug 2025. First new patch set since Sep 2023.
 - The new ACIS flight software patch fixes a bug that caused anomalous TXings triggers during observations of the Crab nebula and Cyg X-2.
- Due to relaxed thermal constraints elsewhere on the spacecraft, longer dwelltimes at pitch angles around 90 degrees have been possible for over 2 years running. These longer dwelltimes have led to lower average temperatures for the ACIS FP and electronics, and reduce the number of split observations.

- **HRC A-side electronics have functioned nominally* within new operational constraints since the return to regular science observations in Apr 2023.**

- The team is working on improving the accuracy of the thermal model for the HRC electronics.
- Nearly 2 Ms of HRC time has been awarded via the Cycle 27 AO to the GO and GTO programs.
 - High demand, high selection.

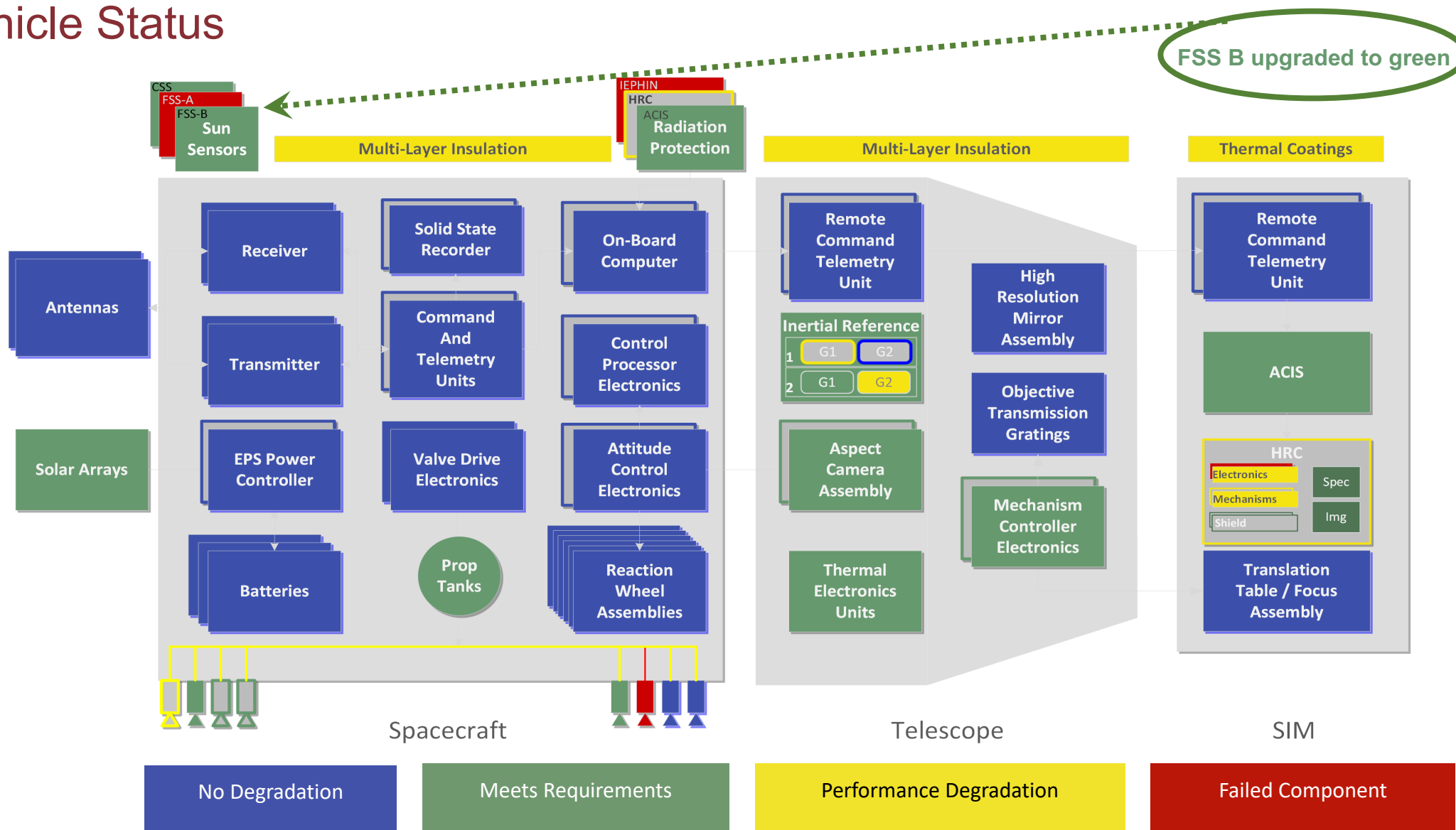
(*) Very recent update: On 24 Oct 2025, (~ 00:03 UT), the High Voltage Power Supply for the HRC-S was unexpectedly disabled at the start of an observation. This was discovered during the subsequent comm pass (~03:00 UT). A decision was made (~ 04:00 UT) to safe the HRC and prevent two subsequent HRC observations in the weekly loads from running. The HRC currently remains safed while investigations are being carried out. All HRC science observations are temporarily suspended. See HRC presentation for a more detailed update.



Mission Operations (3/11)

CXC

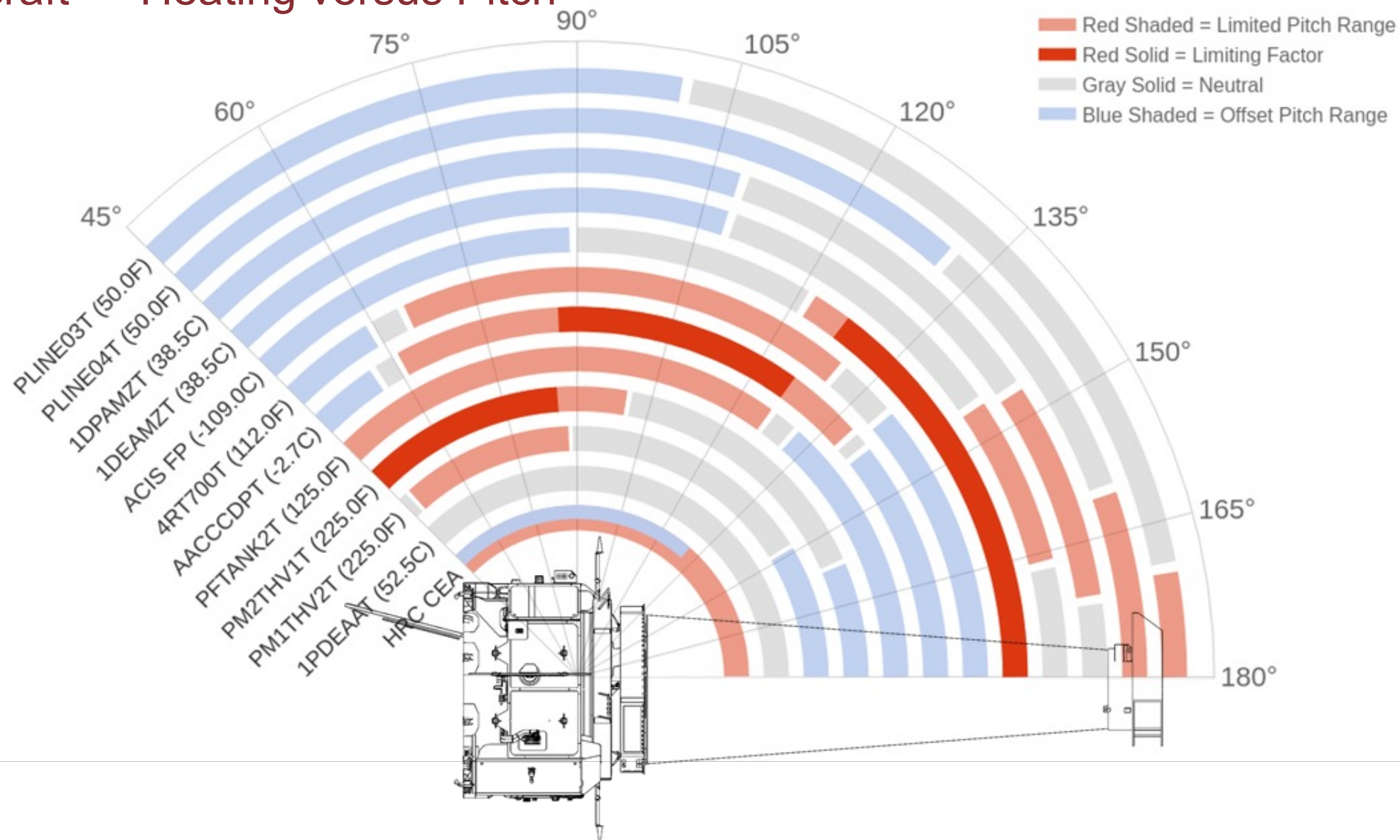
- Vehicle Status





Mission Operations (4/11)

- Spacecraft — Heating versus Pitch





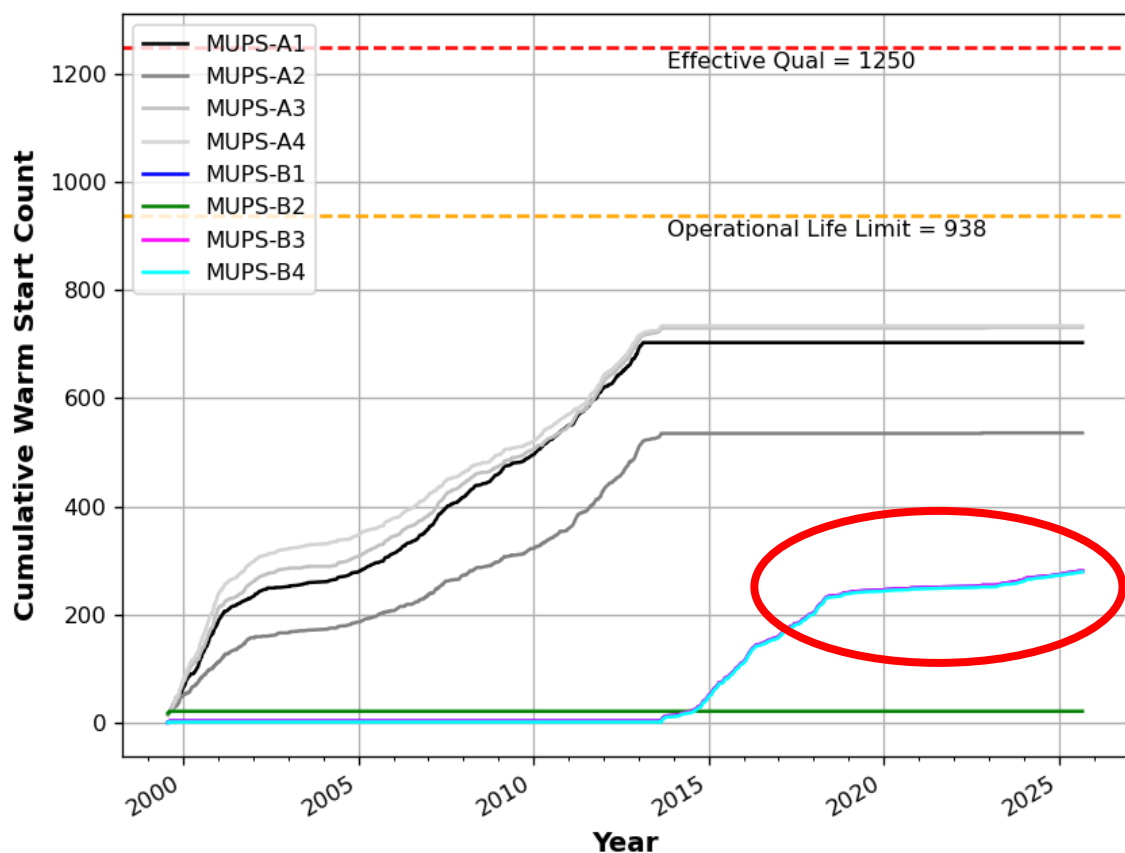
Mission Operations (5/11)

CXC

- Spacecraft — Trends on Resources

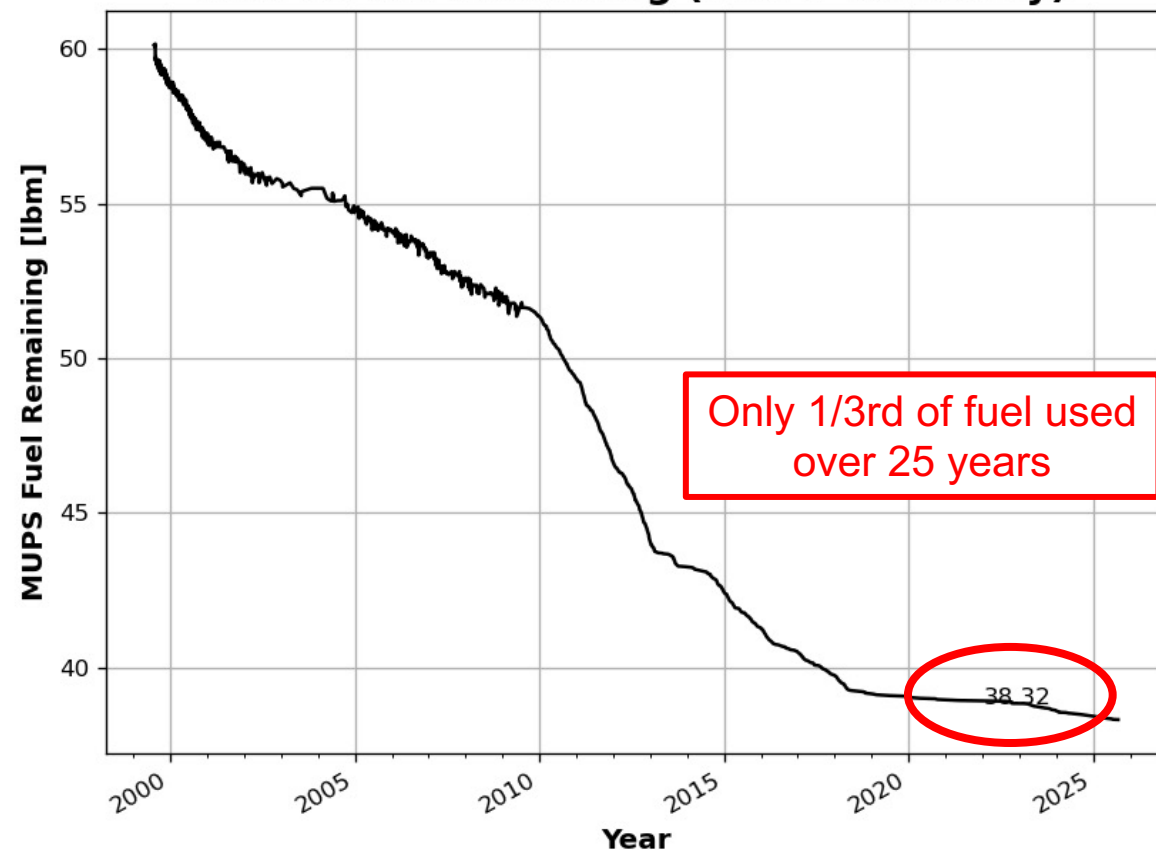
- Slow trend; not yet close to exhausting number of Warm Starts

MUPS Cumulative Warm Starts



- Slow trend; not close to exhausting thruster fuel

MUPS Fuel Remaining (MUPS Tank Only)





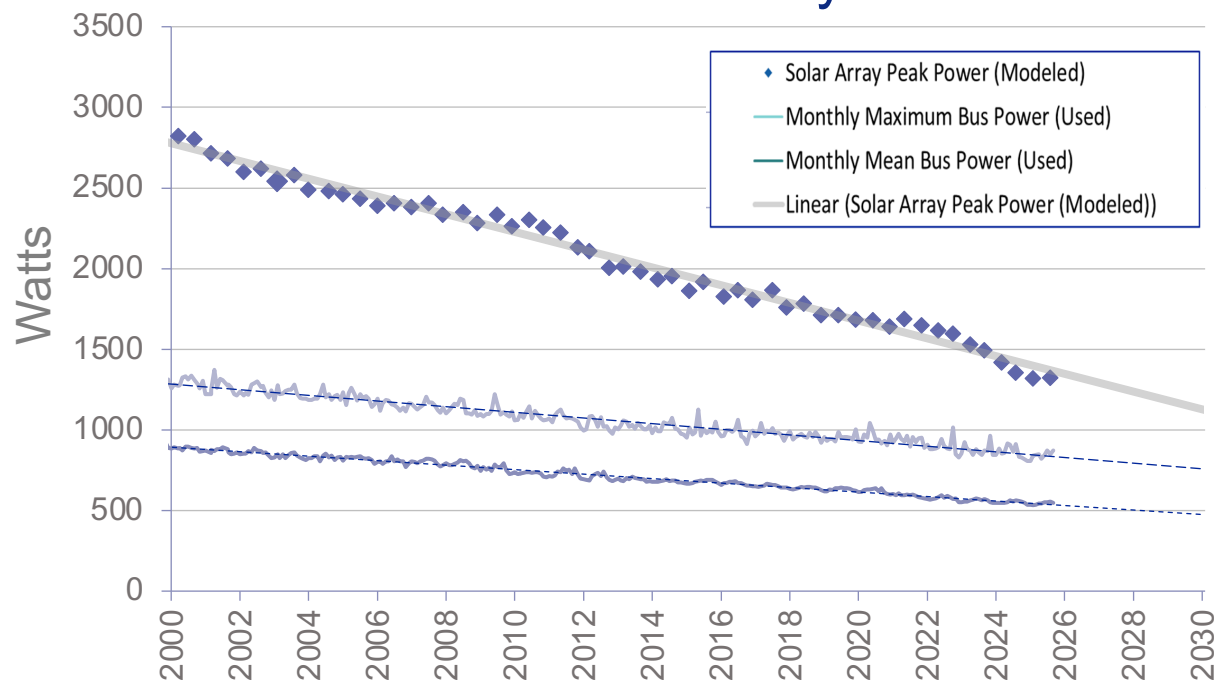
Mission Operations (6/11)

CXC

• Spacecraft — Trends on Resources

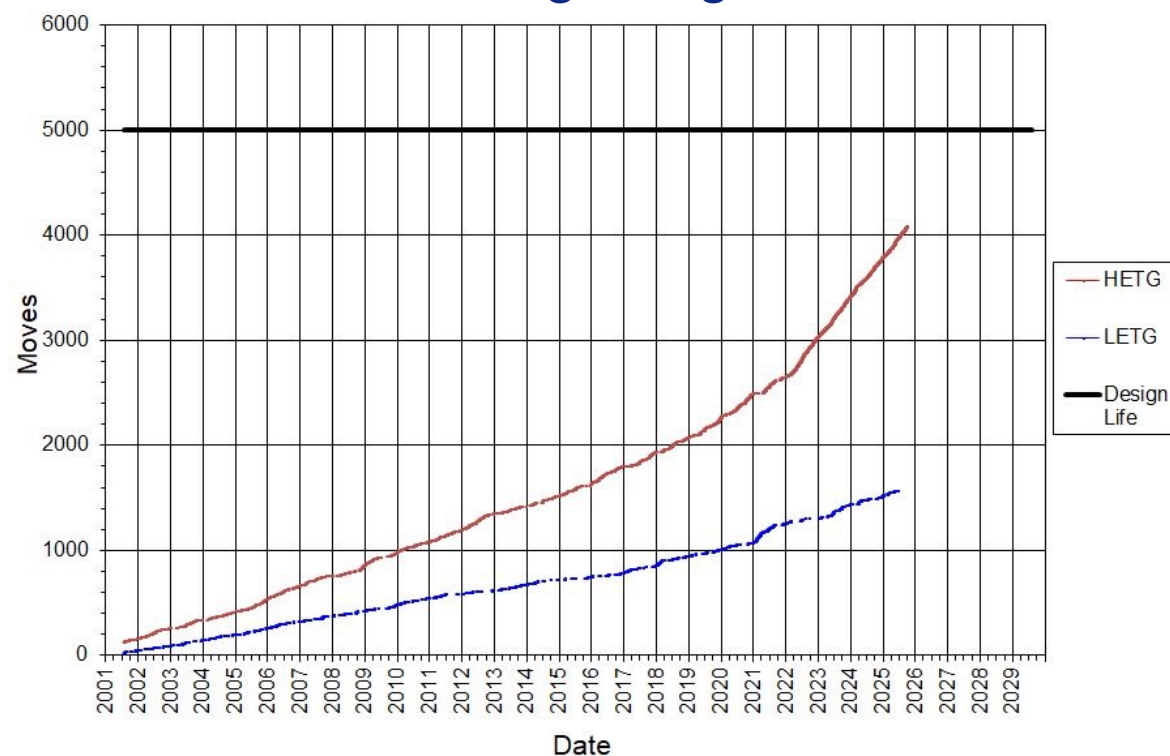
- Slow trend; solar panel power converging to peak power usage

Power Availability



- Trend accelerated by inserting grating for rad zone passages; HETG converging to “design life” threshold

Grating Usage





- Major Operational Improvements

- MUPS thruster planning limits increases continue to support longer dwell times.
 - Ongoing trending continues to show standard performance.
 - ➔ **Decreases planning complexity and maintains high science efficiency.**
- Continued improvements to safing response and monitoring capabilities completing the multi-year effort to autonomously point the vehicle tail-sun to cool critical subsystems during Normal Sun and Safemode response. All products complete.
 - ➔ **Improved safety during anomalous conditions and faster recovery to science.**
- Processing Electronics Assembly bug fix and algorithm improvements patch implemented five changes to reduce star acquisition failure rates by more than 30%.
 - ➔ **Equivalent to over 1 year of performance improvement.**
- Uplinked 3 flight software patches in response to the Jan 2025 LETG insertion fault.
 - ➔ **Grating insertion logic is much more robust to aging mechanisms, such that we do not expect this fault to re-occur.**



- Major Operational Improvements

- New and updated thermal models implemented.
 - ➔ **Maintaining excellent spacecraft thermal management is critical for Chandra science.**
- Developed initial response plan in the event of Fine Sun Sensor degradation or failure.
 - ➔ **Proactive response planning will reduce lost science time in the event of an FSS failure.**
- Concentrated effort to cross-train personnel provides an additional certified Lead Systems Engineer, Flight Operations Manager, Propulsion Engineer, and 2 new Command Controllers.
 - ➔ **Redundancy in critical roles substantially reduces risk for nominal and anomaly operations.**



- Spacecraft — Interruptive events

- (11 Jan) Failed LETG insertion

- Potentiometer readings showed correct insertion but LETG Insert microswitch did not register full insertion.
- Likely root cause is reduced holding torque of the insertion stepper motor due to aging and increased temperature. This allows the leaf spring to push the LETG back enough to disengage the insert microswitch.
- Three OBC patches along with ground system updates have restored nominal LETG operations.
- Science time lost = 205 ks.

Pauses from radiation monitoring:

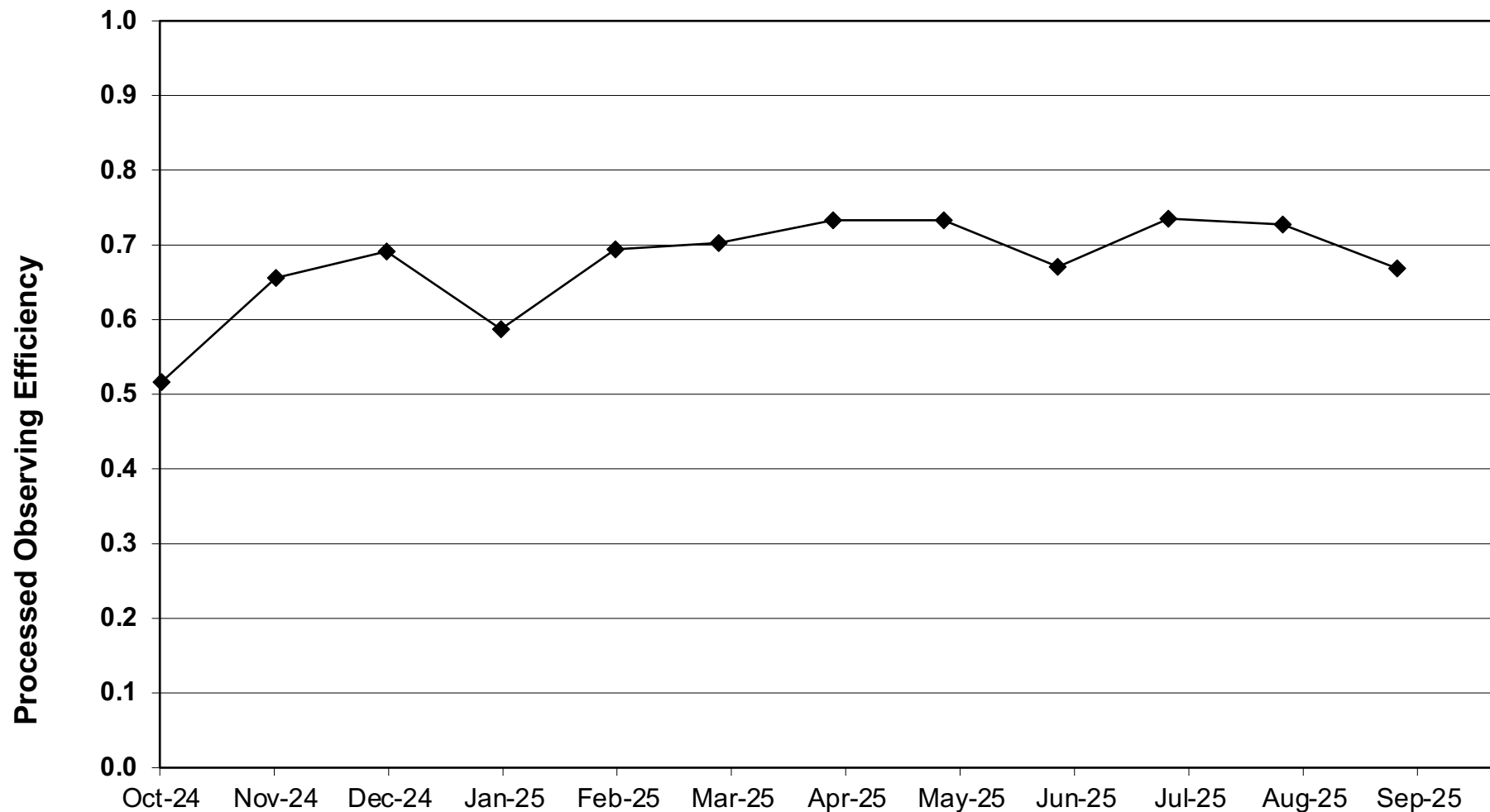
- (21 Oct) “SCS 107” ACIS TXings
 - “False” trigger based on the target (Crab)
 - Science time lost = 99 ks.
- (27 Oct) “SCS 107” ACIS Txings
 - Science time lost = 161 ks.
- (21 Nov) “SCS 107” ACIS Txings
 - Science time lost = 114 ks.
- (31 Dec) “SCS 107” manually triggered
 - Science time lost = 142 ks.
- (24 Mar) “SCS 107” ACIS TXings
 - “False” trigger based on the target (Cyg X-2)
 - Science time lost = 88 ks.
- (1 Jun) “SCS 107” ACIS TXings
 - Science time lost = 92 ks.
- (1 Sep) “SCS 107” manually triggered
 - Science time lost = 77 ks.



Mission Operations (10/11)

- Observation Efficiency

- Despite some interruptive events in this period; trend stayed near mission average of 68%





- **Operations Control Center (OCC)**

- The OCC has maintained smooth operations.
- Ongoing hardware refresh for systems purchased in 2017–18. Replacement of flight operations servers continues.
- Developing OFLS v13 (Offline System, primarily for mission planning and scheduling, command load management, attitude determination, and spacecraft clock correlation calculations), with delivery expected in Nov 2025.
- ONLS v4.2.1 (Online System, primarily for real-time spacecraft command and communications) was promoted to flight in May 2025. Ver.4.2.3 (minor fixes) is in test.
- Telemetry Database ver.018 has been approved and is being built.
 - TDB ver.P017 was built, tested, and transitioned to operations on 31 May 2024.
- Telemetry Display Client 2.0 was released and is in full system test.
- The Backup OCC is fully capable to support science operations.

- **Science Data Systems**

- Software development and deliveries have stayed on schedule.
- Standard data processing and archive operations are proceeding smoothly.
- Data delivered to observers within ~0.7 day (median time) of the end of the observation.
- Reprocessing of observations up through 1999 is complete. Expansion to include data to the end of 2024 is ongoing.
- Chandra Source Catalog v2.2 processing planning underway for early 2026 start.



- Grant Issuance

- We continue to issue grants typically within 2–3 weeks of initial observation.
- Grants $< \$30k$ are issued for total award amount.
- Grants $\geq \$30k$ and $< \$100k$ are initially issued for 50% of total award; remaining amount is awarded when 75% of initial award has been invoiced.
- Grants $\geq \$100k$ are initially issued for 33% of total award; remaining amount is awarded in multiple increments when 75% of previously awarded funds have been invoiced.

- General Observer Program

- The Observing Cycle 27 Call for Proposals was issued 19 Dec 2024.
- There were 299 observing proposals submitted (no Theory nor Archive proposals were solicited this call, which typically result in 70–90 additional proposals).
- Total time available: ~12 Ms; 2 Ms removed for Chandra Legacy Program.
- Oversubscription in time: 4.3x.
- Distributed Peer Review completed, and targets and reviews have been shared with proposers.
- Fair-share letters are on hold, pending resolution of the government closure.



- Chandra Legacy Program

- Two ~3 Ms programs were selected last year. A total allocation of ~6 Ms is drawn from several sources over two years (Cycles 26 & 27, DDT, and GTO time).
- Observing for the two selected CLP proposals continues into Cycle 27.

- Einstein Fellows Program

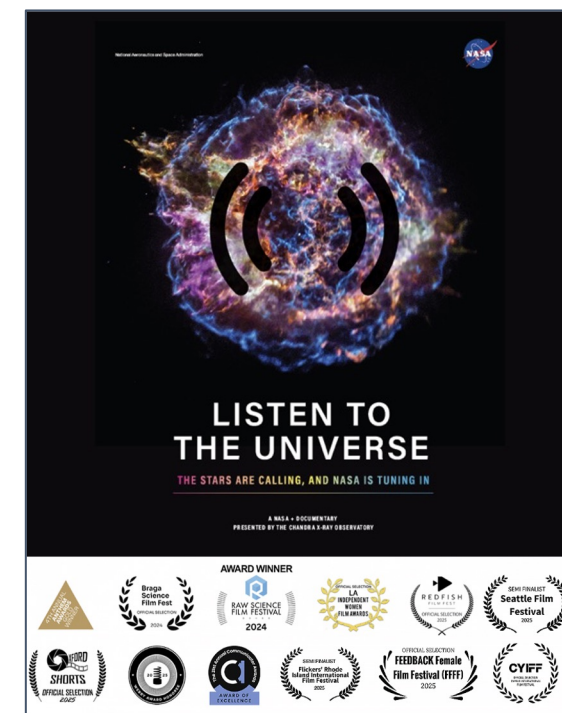
- NASA Hubble Fellowship Program (NHFP) retains Hubble, Einstein, and Sagan science-based categories and their lead project scientists; administered by STScI.
- Aneta Siemiginowska (SAO) provides scientific and policy leadership to Einstein fellows (9 this year).
- The annual NHFP Symposium was held at STSci (Baltimore, MD) on 6–10 Oct 2025.
- AO opened on Sep. 2nd for the selection of 2026 fellows. Applications were due Oct. 29th.



Communications & Public Engagement (1/3)

CXC

- The Chandra *Communications & Public Engagement* (CPE) team remains highly productive, influential, effective in reaching stakeholders with Chandra science
- Evolved 25th campaign into sustained Chandra innovation, legacy
 - Chandra/NASA+ documentary "Listen to the Universe" has won **12 national & international awards** incl. Best Short Film, Best New Media.
 - Chandra 25th campaign won Smithsonian **Excellence in Digital** award.
 - Collab w/ Dead & Co, Chandra sonifications/images for Las Vegas Sphere residency in spring 2025 (>**240k attendees**).
 - **U.S. premiere** of Chandra sonification composition at Hirshhorn (Nov); International premiere with Taiwan Nat'l Symphony Orchestra (May).
 - **~50k** pieces of Chandra print materials distrib. to rural (AZ, HI, NE) and urban (NY, MA, DC, CA) audiences & community partners across US.
 - Collaborations w/ Library of Congress, US Mint, Dept of State/Int'l Olympics Cmte., Nikon, etc., resulting in **innovative projects** incl. 3D print kits in 50 states, Rubin coin events, upcoming Olympics, and Nikon Small World.

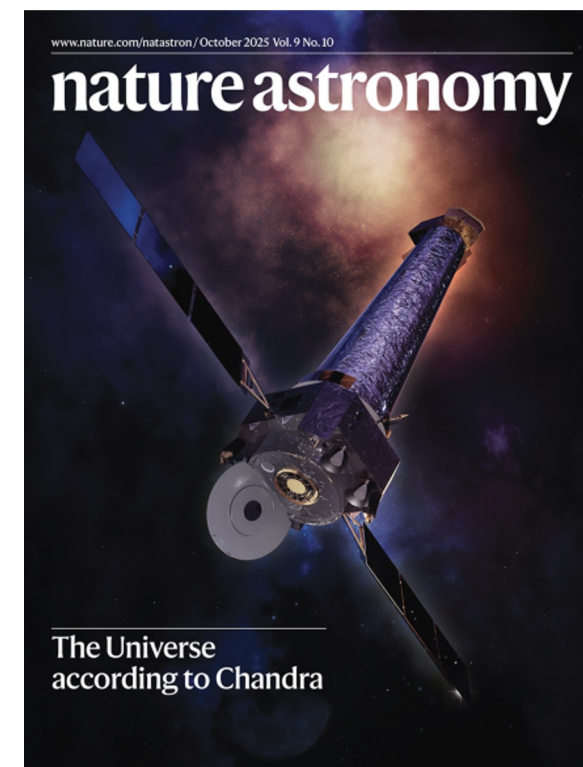




Chandra science made the news – a lot of it!

- Press Releases Oct 2024 – Oct 2025
 - **13** science press releases.
 - **18** additional image features, incl. image galleries, sonifications.
 - **48** Chandra images released overall.
- Press Results
 - Since 1 Oct 2024, Chandra has been mentioned or featured in **~5k** popular news articles.
 - Outlets include: ***NY Post, Associated Press, USA Today, Newsweek, CNN, Nature Astronomy*** (cover), others.
 - Potential viewership = **15.9B** people over the year; avg. of **~1.33B** people/month*.

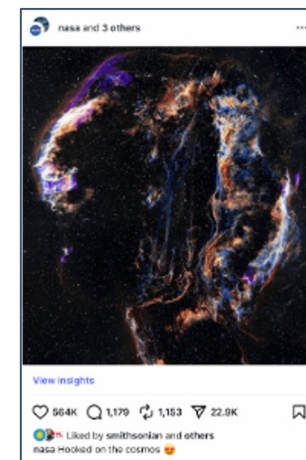
** Like STScI, the CXC uses Meltwater media monitoring services to track # of articles & potential audience reached from the articles.*





Chandra science heavily spread across digital platforms

- Strong Chandra public website traffic
 - Attracted average of **~30M** hits/month (Oct '24–Sep '25).
 - Posted **31** features, **30** release videos, **26** blogs, **48** images.
 - AI-driven research led to alt texts created, edited, and posted for **every publicly released** Chandra image on chandra.si.edu .
- Increased social media engagement across platforms
 - Instagram: **~1.4M** followers; highly active follower & non-follower engagement. Top 5 posts reached bet. **1.3M-10.1M** people each.
 - YouTube: **> 1.1M** video views.
 - X: **~420k** followers; Multiwavelength image posts with Webb & Hubble; high engagement throughout the year.
 - Facebook: Engagement up **29.9%**, Reach grew **411.1%**.





END

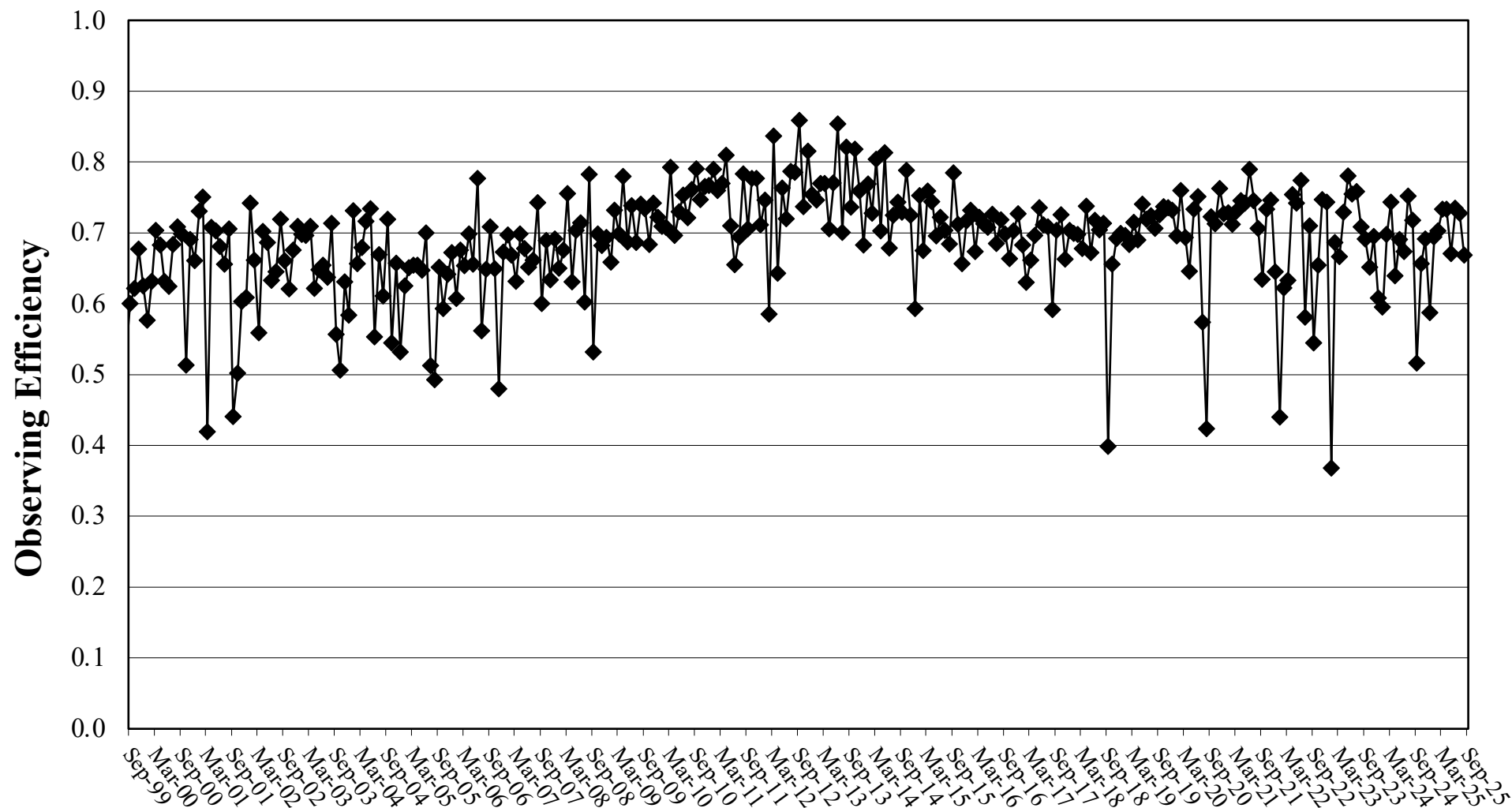


Supplementary Information



Observing Efficiency — Launch through Sep-2025

CXC





Data Delivery Effectiveness

	As of middle of following month							As of 10/7/25	
<u>Month</u>	<u>Number of</u>	<u>Days to Data Delivery</u>			<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Comments</u>
	<u>Obs</u>	<u>Min</u>	<u>Avg</u>	<u>Max</u>	<u>Deliv</u>	<u>Outstanding</u>	<u>Deliv</u>	<u>Outstanding</u>	
Oct-24	83	0.2	1.3	14	83	0	83	0	
Nov-24	104	0.2	0.8	6	104	0	104	0	
Dec-24	113	0.2	1.1	20	113	0	113	0	
Jan-25	119	0.2	0.9	9	119	0	119	0	
Feb-25	136	0.2	0.7	5	136	0	136	0	
Mar-25	128	0.2	0.8	6	128	0	128	0	
Apr-25	120	0.2	0.9	10	120	0	120	0	
May-25	116	0.2	0.9	18	116	0	116	0	
Jun-25	95	0.2	1.6	7	95	0	95	0	
Jul-25	99	0.1	0.7	7	99	0	99	0	
Aug-25	96	0.2	0.8	10	96	0	96	0	
Sep-25	102	0.3	0.9	5	102	0	102	0	



Science Observation Summary

	Total Mission through 9/30/25	
	No. ObsIDs	Total Msec
Cal ER	1,362	N/A
Cal	3,492	29.0
DDT	877	17.7
GO	16,913	417.4
GTO	3,419	69.4
TOO	1,113	26.7
CCT	607	8.1
CLP	89	1.6
Total	27,872	569.9
Time since first light (Ms)		824.2
Mission average efficiency		69.1%