



# Chandra Users' Committee Meeting

November 5, 2026

## CXC Manager's Program Update

Mark Weber, CXC Manager



# Topics

CXC


- Program Management 3–7
- Mission Operations 8–13
- Public Communication and Outreach 14



# Organization by Institutions — Prog. Mgmt. (1/5)

CXC

**NASA Headquarters (HQ)**

*Astrophysics Division*
S. Domagal-Goldman, Director
S. Cauffman, Deputy Director
J. Van Eepoel, Chandra Prog. Exec.
S. Immler, Chandra Prog. Scientist

Sep 2027 → J. Van Eepoel, Chandra Prog. Exec. → R. Cocks, Chandra Prog. Exec. →

**Marshall Space Flight Center (MSFC)**
**Science Research & Projects Division**

*Chandra Program Office*
A. Schnell, Program Manager
S. Ehlert, Project Scientist

**Smithsonian Astrophysical Observatory (SAO)**

*Chandra X-ray Center (CXC)*
P. Slane, Director
M. Weber, Manager

**Northrop-Grumman Corp. (NG)**

*Chandra Flight Operations & Systems Engineering Teams*
M. Lin, Manager

**Huntingdon Institute of X-ray Astronomy (HIXA)**

*ACIS Instr.*
G. Garmire, IPI for ACIS

**Massachusetts Institute of Technology (MIT)**

*ACIS Instr., HETG Instr., CXC Science*
H.L. Marshall, PI, CXC Assoc. Dir. for MIT
C. Grant, Deputy IPI for ACIS
D. Huenemoerder, Deputy IPI for HETG

**SAO**

*HRC Instr.*
R. Kraft, IPI



# Organization by Function — Prog. Mgmt. (2/5)

CXC

= External support

= Mission ops. role

= Mission ops. support during an anomaly

MSFC Science Research & Projects Division
Schnell (Program Manager)
Ehlert (Project Scientist)

Chandra X-ray Center Program Office
Slane (Director) Marshall (Assoc. Dir. For MIT)
Weber (Manager) Aldcroft, Wolk, Vrtilek (Flt. Dirs.)

Public Communication
Arcand

Director's Office
Slane

SAO Grants Section
Dzengelewski

Chandra Users' Committee

**Flight Operations Team**
Lin
- Online Operations
- Mission Planning
- Spacecraft Engineering
- Flight Software
- Factory Support Team

**Systems Engineering**
Leussis

**OCC Operations**
Kohls
- Systems Team
- Integration & Ground Software Maintenance
- Ground Ops. Team
- Tech. Support Team
- Mgmt. & Facilities

**Science**
Slane
- Ops. Science Support
- Calibration
- Mission Planning
- Instrument Teams
- Sci. Data Sys. Planning

**Science Data System**
Fabbiano
- Hardware & Systems
- Software Development & Maintenance
- Data Processing & Archive Ops.



# Current Funding — Prog. Mgmt. (3/5)

CXC

- Current Funding and Federal Shutdowns
  - Current CXC funding runs to the end of April 2027.
    - NASA HQ has provided **exceptional** support to Chandra by forward funding the mission several months into the future.
  - The current Continuing Resolution runs to Dec. 11, at which point there could be a Federal shutdown.
    - CXC is funded to operate four months further. It is unlikely that a shutdown starting in December would run that long.
    - CXC only has one Federal employee; the rest are subcontractors and Trust Fund employees who are not furloughed during shutdowns.
    - MSFC Chandra project staff that are necessary for operation approvals and anomaly responses are available as needed.

    ➔ There is no risk to Chandra operations / grants from Federal shutdowns in the Dec–Apr timeframe.
  - There could be multiple C.R.s as the Federal government negotiates over the budget, so funding uncertainty could persist to April in that manner.
    - However, if there are multiple C.R.s, NASA will have the funds and opportunity at each one to extend Chandra's runout date, which they have historically managed well.

    ➔ At this point, risk of interruption to operations circa April is still considered to be low.
  - In the event that MSFC is unable to provide adequate funding for Chandra to continue operations through a shutdown...
    - If necessary, CXC could preserve funds by pausing 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 emergency funds have to paid back by the mission. After 3 months, these "loans" incur interest.

    ➔ There are measures available to Chandra even when funding from NASA is delayed.



# Budgets — Prog. Mgmt. (4/5)

CXC

- Budget FY 2026
  - CXC and MSFC agreed to maintain the current operating model through FY26, forestalling a transition to the Minimum Cost Mission.
  - The FY 2026 Chandra funding budget ("New Obligation Authority", NOA) was set to $63.0 M by Congress as a line item. The $63.0 M amount is below the current operating model's costs, and close to the Minimum Cost Mission level.
  - CXC and MSFC used remainder funds to supplement the FY26 NOA funds in order to meet the needed budget.
  - FY26 expenditures were within the planned budget.

- Budget FY 2027
  - CXC and MSFC have agreed that the transition from the current operating model to the Minimum Cost Mission will be completed by the end of FY 2027 (Sep 2027).
  - The government has not yet settled NASA's budget for FY27, which could potentially include a line item for Chandra. Under Continuing Resolutions, Chandra would receive $63.0 (again) in FY27 funds (NOA).
  - In the meantime, NASA has presumed Chandra's NOA will be $63.0 M, and CXC has been directed to prepare and follow budgets with that presumption.
  - CXC and MSFC have a plan to use remainder funds to supplement the $63.0 NOA in order to meet the needed budget during this year's transition down to the Minimum Cost Mission.

See Director's report for more details on the Minimum Cost Mission operating model.



# CXC Contract — Prog. Mgmt. (5/5)

CXC

- Current CXC Contract (through FY 2027)
  - Current contract continues mission operations through Sep 2027 (FY 2027).
  - Current contract has option for a nominal 3-year closeout period that follows the end of mission operations.
    - The closeout plan includes a grace period of two years for existing grants.
  - There is no option on current contract for extending mission ops beyond Sep 2027. Further extension of mission operations will require a new proposal.
    - However, both MSFC and HQ have indicated that their intention is to extend the mission.
- Extension of CXC Contract and Chandra Science Mission (FY 2028+)
  - The continuation of the the Chandra science mission beyond Sep 2027 requires a contract extension. That solicitation process is run by MSFC and will require a proposal from SAO.
  - MSFC and HQ have commenced the early stages of preparing that solicitation.
  - CXC has been directed to be operating at the Minimum Cost Mission model by the beginning of FY28. Other details like contract options, Period of Performance, and budget are uncertain at this time.
  - In response to the budget guidelines in NASA's 2026 PPBE (#28) budgeting process, Chandra submitted a budget plan that would sustain the Minimum Cost Mission to circa FY 2031.
    - "Overguide" budgets were also proposed to the PPBE that would retain HRC operations and Chandra Source Catalog expertise through the next Senior Review (FY 2028) in order for that process to render assessments for continuing each into the future.



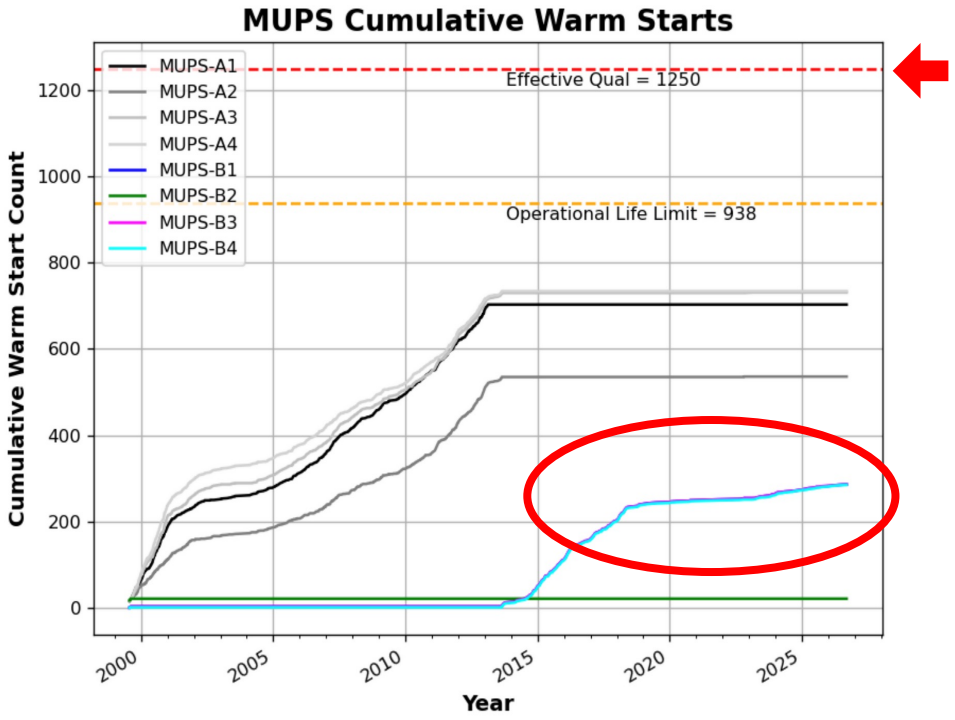
# Overview — Mission Ops. (1/6)

CXC

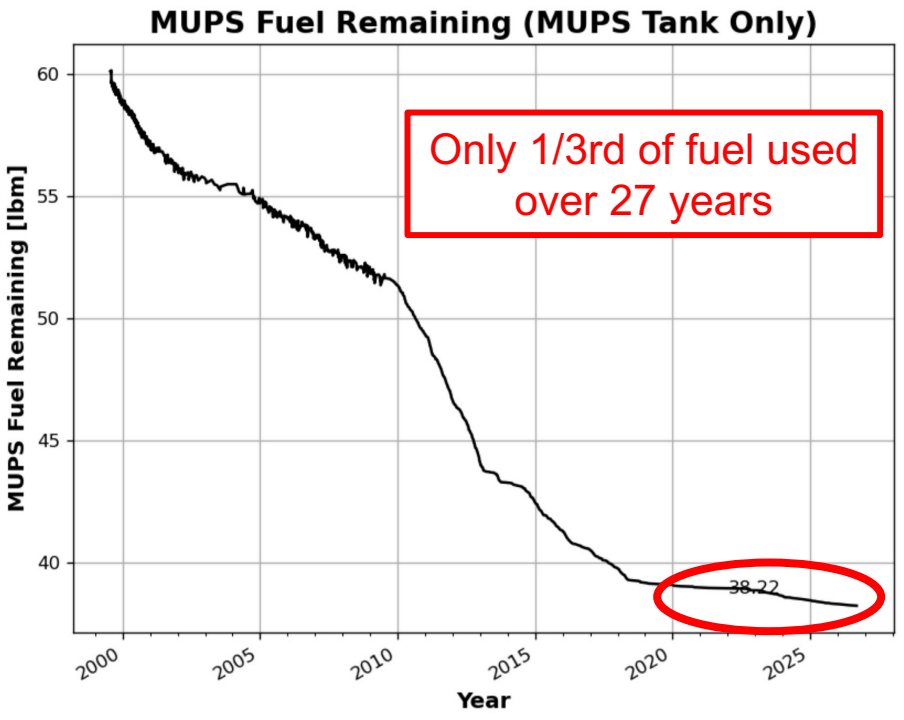
- Spacecraft — Overall status
  - **The spacecraft continues to operate extremely well.**
  - The mission planning efficiency for the past year, 68.1%, remains near the all-time mission average of 68.7%. It has benefited from many process improvements and constraint relaxation.
  - Operations remain nominal, and engineering activities are proactive.
- Instruments — Overall status
  - With the primary exceptions of low-energy ACIS quantum efficiency and the restrictions imposed by the HRC Feb 2022 15V 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-S experienced a (different) power supply anomaly on 24 Oct 2025, but is now supporting science operations.
    - HRC-I was unaffected and has been supporting nominal operations since investigation cleared it.
    - See the HRC Update presentation for details.

# Resources & Consumables — Mission Ops. (2/6)

- MUPS cumulative warm starts:
  - **Retired from watchlist**. Changes made to scheduling of unloads to conserve warm starts for the 2024 low-perigee period were so effective that the number of warm starts is no longer considered to be a life-limiting factor.




- MUPS fuel:
  - Fuel Remaining: **Not a concern or life-limiting factor.**



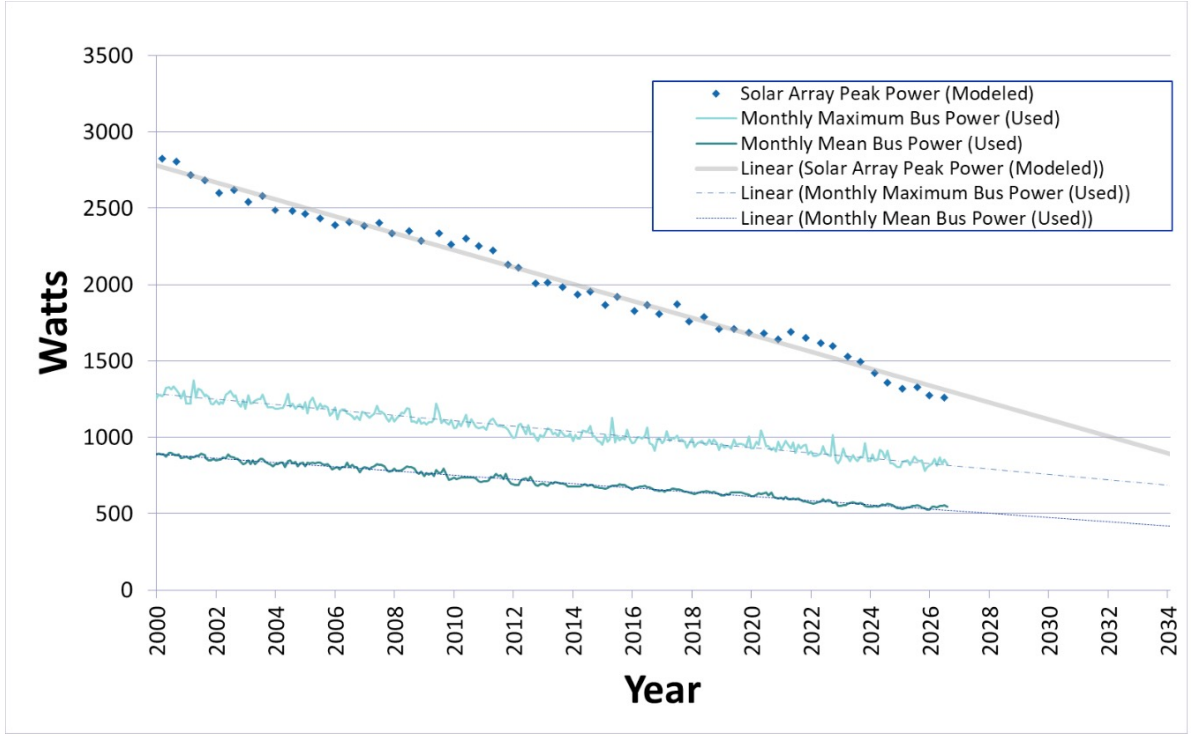


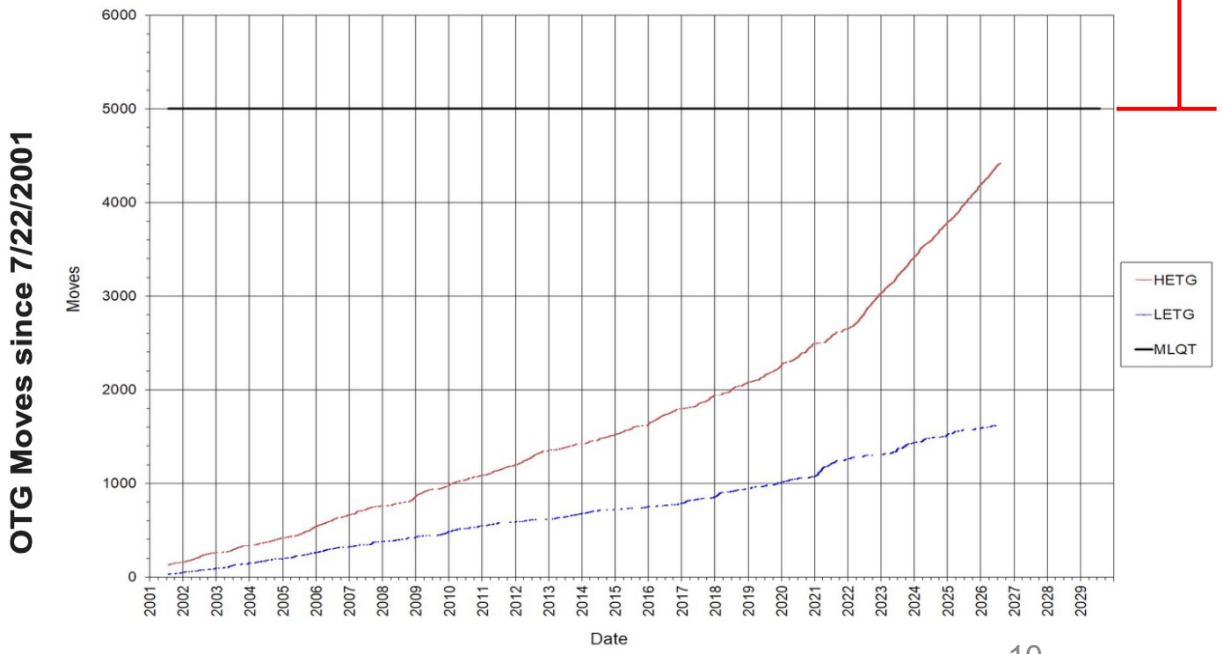
# Resources & Consumables — Mission Ops. (3/6)

CXC

- Power Availability:
  - **Watched trend** — solar panel power converging to peak power usage around 2034.
  - Preliminary investigations into potential mitigations have begun.

- Grating Mechanism Usage:
  - **Retired from watchlist**. HETG usage is expected to reach 1x life in 2028. A life study analysis was performed on the grating mechanisms, and documentation was found that supports increasing expected life from 1x (tested to life) to 3x (design life).





# Resources & Consumables — Mission Ops. (4/6)

CXC

- OBSID usage:
  - The spacecraft software currently limits OBSIDs to 0 – 65535 (16 bits).
  - Chandra may exceed this number of observations as early as Cycle 31 (circa 2030).
  - There is no impact on the spacecraft of reusing numbers, but there are broad impacts on the ground system.
  - **A working group has been convened to study the issue and develop possible solutions.**

- Science time lost to interruptive events:
  - Since the last CUC presentation (Nov 2025), there were **352 ks of lost** science time due to interruptions for increased radiation conditions.
  - The 24 Oct 2025 HRC-S anomaly occurred before the current reporting period, but was then-recent and not quantified at the Nov 2025 CUC meeting. There were **43.5 ks of lost science time** due to that anomaly.



# Major Operational Improvements — Mission Ops. (5/6)

CXC

- Improvements to safing response:
  - Uplinked new flight software to add capability to roll about the solar array normal, improving thermal and momentum management options when in Normal Sun Mode.

  ➥ **Improved safety during anomalous conditions and faster recovery to science.**

- Improved Aspect Camera Assembly (ACA) operations:
  - Patched latent error in ACA software in preparation for improved hot pixel correction.

  ➥ **Will improve star field acquisition, recovering pointing stability performance.**

- Updated thermal management:
  - Maintaining and adding additional thermal models, continuing with planned limit increases to maintain dwell capability and assessing future constraints before they become limiting.
  - Updated on-board software to autonomously shutdown HRC if it violates its temperature threshold.

  ➥ **Maintaining excellent spacecraft thermal management is critical for Chandra science.**



# Major Operational Improvements — Mission Ops. (6/6)

CXC

- Telemetry Display Client deployed to operations:
  - Updates operations commanding and telemetry interface to utilize more modern and maintainable software packages. Replaces legacy system.
  - ➥ **Using state-of-the-art systems for operations.**

- Updates in scheduling flight comms using Deep Space Network:
  - Added capability to utilize additional antennas, created new ground tools to aid scheduling, created contingency procedures to maximize onboard commanding and available data storage.
  - Successfully managed month-long-plus outage of DSN Madrid site with zero data loss.
  - ➥ **Improving robustness and versatility for spacecraft scheduling and comms.**

- Concentrated effort to cross-train Flight Ops personnel:
  - Objective is to maintain at least 2 certified personnel for all key flight ops. roles.
  - Certified 2 new controllers, 2 back-up subsystem engineers, and 1 back-up Flight Ops Manager.
  - ➥ **Redundancy in critical roles substantially reduces risk of inadequate support for nominal and anomaly operations.**

# Communications & Public Engagement

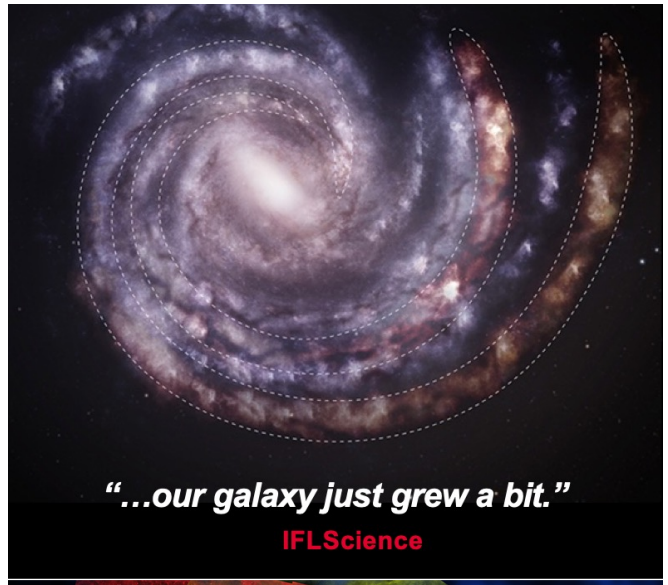
CXC

## Chandra research translated into public discoveries *Oct '25-Oct '26*

| 18 | 76 | 6.4K | 21B |
|---|---|---|---|
| Press releases | Chandra images | News articles | Potential reach* |

- **Chandra science generates major digital reach & engagement**
  - **35** total features (18 press; 17 image, gallery or sonification releases); **76** images
- **Significant press & social media coverage**
  - **6.4k** articles w/potential reach of **21B** Oct '25- Oct '26, **1.75B** averaged per month*
  - Prominent coverage incl: The New York Times, The Washington Post, Popular Science, CNN, National Geographic, Scientific American, New York Post, Nautilus, Reuters etc.
- **Increased social media engagement across platforms**
  - Chandra Instagram: **36.9M** views, **1.65M** engagements
    - Strong Chandra content @NASA: **144M** views, **10M** engagements over 19 posts
  - Chandra YouTube: **2.7M** video views
  - Chandra X: **2.83M** reach, 64.6k engagements
  - Chandra Facebook: **2.4M** views, 104.4k engagements
- **Chandra science drives a sustained pipeline of public engagement content that extends reach & lifetime of individual discoveries**

** Media coverage / estimated potential impressions tracked using Meltwater.*







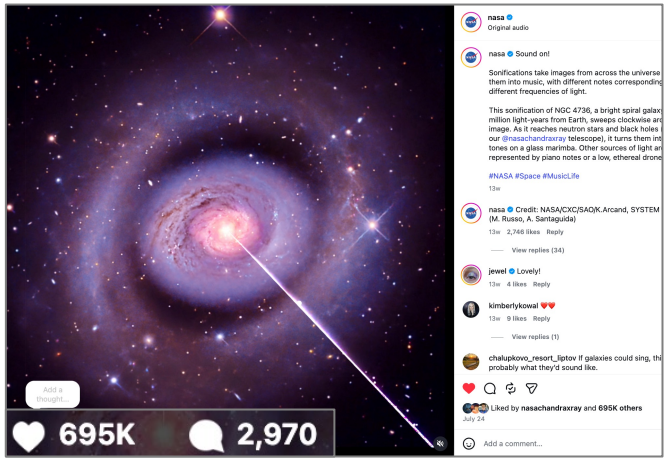

# Communications & Public Engagement

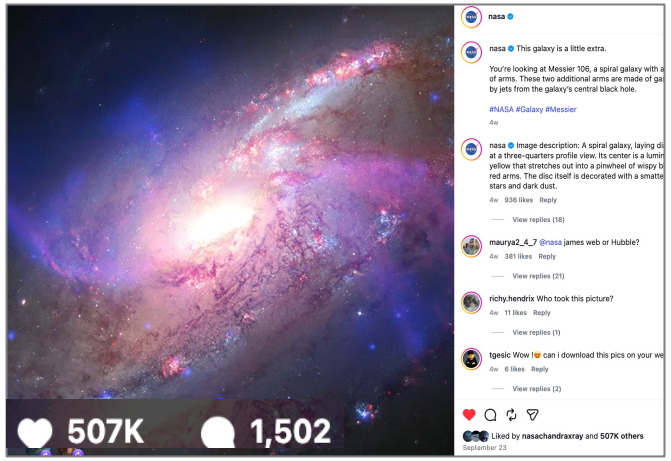
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END