

Congress of the United States

Washington, DC 20515

October 30, 2024

Patrick Slane, PhD
Director
Chandra X-ray Center
60 Garden Street
Cambridge, MA 02138

Dear Director Slane,

We write regarding the recently restored funding for the Chandra X-ray Observatory, and its control center in Burlington, Massachusetts. Members of Congress fought hard to ensure the National Aeronautics and Space Administration (NASA) kept the program funded,¹ and to maintain U.S. leadership in X-ray astronomy and cosmic discovery.²

NASA officials recently informed our offices that funding for Chandra, which is part of NASA's discretionary budget, will remain largely the same through fiscal year 2025. This funding will allow the telescope to remain fully operational, and we appreciate NASA's support.

However, we continue to have concerns about NASA's long-term plans for the observatory. In particular, NASA's fiscal year 2025 budget request submitted earlier this year called for a cut in program funding from \$68.3 million in 2024 to just \$41.1 million in 2025, and further reduced the program budget to only \$5 million by 2029.³ A scientist who used the Chandra telescope was "alarmed when NASA [] proposed steep cuts" and explained that "turning off this great observatory for a relatively small cost savings would severely damage the U.S.'s leadership in [the] entire field."⁴

Shutting Chandra down would have had far-reaching impacts on the scientific community and U.S. leadership in astronomy. Launched in 1999, the Chandra telescope was delivered to space by the first NASA shuttle mission commanded by a woman and would go on to provide essential data on everything from newborn stars to galaxy clusters, providing insight into the universe that would not be possible with Earth-based telescopes.⁵ The program grew to support around 200 jobs today, including 130 telescope staff and 60 support staff, postdocs, and students with X-ray-

¹ Office of Representative Seth Moulton, "Moulton, Warren, Markey Urge NASA to Rescind Proposed Severe Budget Cuts to Chandra X-Ray Observatory in MA," press release, June 12, 2024, <https://moulton.house.gov/news/press-releases/moulton-warren-markey-urge-nasa-rescind-proposed-severe-budget-cuts-chandra-x>.

² Washington Post, "NASA budget woes could doom \$2 billion Chandra space telescope," Joel Achenbach, April 14, 2024, <https://www.washingtonpost.com/science/2024/04/14/nasa-budget-mars-artemis/>.

³ National Aeronautics and Space Administration, "FY 2025 budget Estimates," April 15, 2025, p. 478, <https://www.nasa.gov/fy-2025-budget-request/>.

⁴ NPR, "Astronomers are scrambling to save the world's most powerful X-ray space telescope," Nell Greenfieldboyce, July 23, 2024, <https://www.npr.org/transcripts/nx-s1-5048828>.

specific skills. This program provides rare data, and helps maintain the United States' lead in astronomy and astrophysics: in a survey conducted by one of Chandra's leaders, 60 percent of the U.S. X-ray experts said they would leave the United States if Chandra was eliminated and the nation was left without an X-ray telescope, resulting in the possibility of the United States ceding X-ray telescope leadership to Europe, Japan, or China.⁶

In June 2024, we sent a letter to NASA questioning the decision to end Chandra and urging the agency to keep the program funded. The letter emphasized that "Chandra should serve as a bridge to a promising future in high energy astrophysics at NASA, including the development of its eventual flagship-scale successor," not leave U.S. leadership to fall behind.⁷ Ultimately, the letter requested that NASA maintain the full fiscal year 2025 funding for Chandra and "halt plans for significant reductions in FY25 until Congress determines Chandra's appropriations."⁸ Just last month, NASA officials assured Congress and Chandra staff that the agency would halt plans to eventually shut down Chandra for fiscal year 2025 and that it would maintain its funding at full operational levels.

We are glad NASA looked at the evidence we presented and decided to restore Chandra's funding for another year, but Congress and NASA need to continue their support for X-ray astronomy. To ensure Congress, NASA, and Chandra are looking toward the future, we request answers to the following questions by November 15, 2024:

1. What effect would the loss of Chandra before its successor is operational have on scientists with a specialty in X-ray astronomy?
2. What effect would the loss of Chandra before its successor is operational have on the United States' lead in X-ray astronomy?
3. What impact would the loss of this scientific expertise have on national and economic security?
4. Would keeping Chandra fully operational until its successor is ready allow for a smooth transition that keeps skilled scientists employed and keeps the United States in the lead of X-ray astronomy and astrophysics?
5. How much did it cost to develop, build, and get Chandra operational?
6. How much does it cost to keep Chandra operational?
7. What is the current demand for future observations and scientific inquiries?

⁵ Center for Astrophysics | Harvard & Smithsonian, Chandra, <https://pweb.cfa.harvard.edu/facilities-technology/telescopes-instruments/chandra>; Chandra X-Ray Observatory, About Chandra, https://chandra.harvard.edu/about/top_ten.html.

⁶ Center for Astrophysics Harvard | Smithsonian, "Impact - loss of chandra," slide deck, 2020, slide 27, [on file with the Office of Senator Elizabeth Warren].

⁷ Office of Representative Seth Moulton, "Moulton, Warren, Markey Urge NASA to Rescind Proposed Severe Budget Cuts to Chandra X-Ray Observatory in MA," press release, June 12, 2024, <https://moulton.house.gov/news/press-releases/moulton-warren-markey-urge-nasa-rescind-proposed-severe-budget-cuts-chandra-x>.

⁸ *Id.*

- a. How much of that demand are you able to supply?
 - b. How has the demand for observations grown or shrunk over the years?
 - c. Is the expectation that the demand will shrink, stay the same, or grow in the future?
 - d. What scientific inquiries will Chandra be involved with in the coming years?
8. What impact does Chandra have on other astronomy missions such as the James Webb Space Telescope?
 9. What is the current operational status of Chandra?
 10. What impact does that current operational status have on Chandra's projected lifetime?
 11. NASA's initial budget justification believed that Chandra "has been degrading over its mission lifetime... requir[ing] active management to keep temperatures within acceptable ranges for spacecraft operations."⁹ How significant is the impact of thermal management on the life of Chandra and its operations?
 12. Given that NASA also believes Chandra's thermal management "increas[es] mission management costs."¹⁰ Please describe how you are addressing thermal management.
 13. The fiscal year 2025 budget NASA committed to Chandra cuts the General Observer program. What are the impacts of cutting the General Observer program for scientists across the United States?

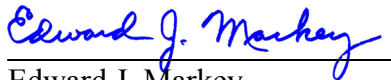
Sincerely,



Elizabeth Warren
United States Senator



Seth Moulton
Member of Congress



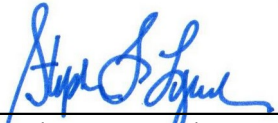
Edward J. Markey
United States Senator




James P. McGovern
Member of Congress

⁹ National Aeronautics and Space Administration, "FY 2025 budget Estimates," April 15, 2025, p. 477, <https://www.nasa.gov/fy-2025-budget-request/>.

¹⁰ *Id.*



Stephen F. Lynch
Member of Congress



Lori Trahan
Member of Congress