National Aeronautics and Space Administration

Headquarters
Washington, DC 20546-0001

June 9, 2016

Reply to Attn of: SMD/ Director, Astrophysics Division

SUBJECT: NASA Response to the 2016 Senior Review for Astrophysics Operating Missions

Background

The NASA Science Mission Directorate (SMD) conducts comparative reviews of operating missions within each division to maximize the scientific return from these missions within finite resources. The Senior Review, held every two years, assists NASA in maximizing the scientific productivity from its operating missions within a constrained budget. NASA uses the findings from the Senior Review to define an implementation strategy and give programmatic direction to the missions and projects concerned through the next four fiscal years. NASA uses the findings from the Senior Review to:

- Prioritize continued funding of the operating missions and projects;
- Define an implementation approach to achieve astrophysics strategic objectives;
- Provide programmatic and budgetary direction to missions and projects for Fiscal Year (FY) 2017 and FY18; and
- Issue initial funding guidelines for FY19 and FY20 (to be revisited in the 2018 Senior Review).

This established practice was codified in the NASA Authorization Act of 2005 (Public Law 109-155), Section 304(a): "The Administrator shall carry out biennial reviews within each of the Science divisions to assess the cost and benefits of extending the date of the termination of data collection for those missions that have exceeded their planned mission life time."

Missions in the 2016 Senior Review for Astrophysics include strategic missions, Principal Investigator-led Explorers missions, and foreign-led missions in which the U.S. is a minor partner (the NASA Senior Review assesses only U.S. funding for foreign-led missions). The 2016 Senior Review included the following astrophysics missions (in alphabetical order):

- Chandra X-ray Observatory;
- Fermi Gamma-ray Space Telescope;
- Hubble Space Telescope;
- K2 mission using the Kepler Space Telescope;
- Nuclear Spectroscopic Telescope Array (NuSTAR);
- Spitzer Space Telescope;
- Swift Gamma-ray Burst Explorer; and
- X-ray Multi-Mirror Mission-Newton (XMM-Newton) (ESA mission);

The 2016 Senior Review was conducted in February and March, 2016. As in the 2014 Senior Review, there were individualized panels for Hubble and Chandra separate from the main comparative panel. Both the Hubble and Chandra reviews were undertaken as incremental reviews from those held in 2014. The Call for Proposals and Charge to the review panels was released on September 25, 2015, and can be accessed at http://science.nasa.gov/astrophysics/2016-senior-review-operating-missions/.

NASA Response

The report of the Senior Review panel makes clear that all of the missions proposing within the 2016 Senior Review are scientifically meritorious and deserving of continued funding and continued operations. The panel recommended that additional funding be found to preserve the portfolio of operating missions. Although NASA will continue operations for all of the proposing missions, the current constrained budget conditions prevent NASA from being able to maintain current funding levels for all of the operating missions without unacceptable impacts on other parts of the astrophysics program.

NASA used the prioritized rankings and individual recommendations of the Senior Review to make the following decisions for each of the missions in the Senior Review. The missions are presented in alphabetical order.

Summary of NASA decisions

- Chandra X-ray Observatory: continued operation is confirmed.
- Fermi Gamma-ray Space telescope: extension is approved.
- Hubble Space Telescope: continued operation is confirmed.
- K2 mission: extension is approved through end of mission.
- Nuclear Spectroscopic Telescope Array (NuSTAR): extension is approved.
- Spitzer Space Telescope: extension is approved through end of mission.
- Swift Gamma-ray Burst Explorer: extension is approved.
- X-ray Multi-Mirror Mission-Newton (XMM-Newton) (ESA mission): extension is approved.

These decisions are contingent on the Astrophysics Division receiving the funding requested in the FY 2017 President's Budget Request. Additionally, some adjustments will need to be made within the Astrophysics Division budget to accommodate all operating missions.

Detailed NASA decisions for each mission

Chandra X-ray Observatory

The Chandra mission is directed to continue planning against the current budget guidelines. Any changes to the guidelines will be handled through the budget formulation process. The Chandra mission will be invited to the 2018 Astrophysics Senior Review. Current planning is that the 2018 Senior Review for Chandra will be another incremental review, not a full review.

Fermi Gamma-ray Space Telescope

The Fermi mission extension is approved for FY17-FY18 with reduced funding requiring further operation efficiencies. The Fermi mission will be invited to the 2018 Astrophysics Senior Review. Fermi will plan on operations in FY19-FY20 subject to the findings of the 2018 Astrophysics Senior Review.

Hubble Space Telescope

The Hubble mission is directed to continue planning against the current budget guidelines. Any changes to the guidelines will be handled through the budget formulation process. The Hubble mission will be invited to the 2018 Astrophysics Senior Review. Current planning is that the 2018 Senior Review for Hubble will be another incremental review, not a full review.

K2 Mission using the Kepler Space Telescope

The K2 mission extension is approved for FY17-FY19. The mission is to continue science operations through the end of the FY19, by which time the on-board fuel is expected to be fully depleted. As the fuel-limited lifetime is better estimated, the FY19-FY20 budget guidelines will be adjusted to accommodate the expected end of science operations. The project will plan on an orderly close-out and delivery of all data products and documentation to MAST, following exhaustion of fuel and end of science operations. The K2 mission will not be invited to the 2018 Astrophysics Senior Review. This constitutes approval of a K2 closeout plan through FY19 operations and FY20 closeout.

Nuclear Spectroscopic Telescope Array (NuSTAR)

The NuSTAR mission extension is approved near the requested level in FY17-FY18. The project will propose savings on the administration of the GO awards. The project will insure that Target of Opportunity data be made publicly available without a period of limited data access. The NuSTAR mission will be invited to the 2018 Astrophysics Senior Review. NuSTAR will plan on operations in FY19-FY20 subject to the findings of the 2018 Astrophysics Senior Review.

Spitzer Space Telescope

The Spitzer mission will continue science operations with reduced funding requiring further operation efficiencies and with an emphasis on observations that will act as precursor studies for key JWST projects. The Spitzer mission will cease observations in mid-FY19 following successful commissioning of JWST. The project will plan on an orderly close-out and delivery of all data products and documentation to IPAC. Spitzer will not be invited to the 2018 Astrophysics Senior Review. This constitutes approval of a Spitzer closeout plan through mid-FY19 operations and FY19-FY20 closeout.

Swift Gamma-ray Burst Explorer

The Swift mission extension is approved for FY17-FY18. The project is directed to apply a portion of the FY17 funding towards the proposed automation activities. The Swift mission will be invited to the 2018 Astrophysics Senior Review. Swift will plan on operations in FY19-FY20 subject to the findings of the 2018 Astrophysics Senior Review.

X-ray Multi-Mirror Mission-Newton (XMM-Newton) (ESA mission)

The XMM-Newton mission extension is approved for FY17-FY18 with an augmented GO program. Guidelines provided for FY19-FY20 will be revisited in Senior Review 2018. The XMM-Newton mission will be invited to the 2018 Astrophysics Senior Review. XMM-Newton will plan on continued NASA participation in FY19-FY20 subject to the findings of the 2018 Astrophysics Senior Review.

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Paul Hertz
Director, Astrophysics Division
Science Mission Directorate