



Memorandum

Establishment of Large Astrophysics Mission Concept Studies

This memo establishes Large Astrophysics Mission Concept Studies to serve as input to the 2020 Astrophysics Decadal Survey.

The 2010 Astrophysics Decadal Survey (*New Worlds, New Horizons in Astronomy and Astrophysics*) recommended a wide-field infrared survey telescope, an international X-ray observatory, and a gravitational wave space observatory. Each of these missions is supported by a community-based science team: the preformulation of WFIRST is well underway¹ and the WFIRST Formulation Science Team will be established soon in response to proposals received in October 2015; U.S. scientists are participating in the formulation of the European Space Agency (ESA)-led Athena x-ray observatory through participation on the Athena Science Team and the Athena Science Working Groups; and NASA is establishing an L3 Study Team in December 2015 to analyze the options for NASA participation in ESA's L3 gravitational wave mission.

The 2020 Astrophysics Decadal Survey will be charged with prioritizing large, NASA-led missions to follow JWST and WFIRST. In January 2015, I initiated a process to identify a small number of large astrophysics mission concepts for study as input to the 2020 Astrophysics Decadal Survey². In initiating this process, I suggested a specific set of four large mission concepts for consideration. I then charged the Astrophysics Program Analysis Groups (PAGs), to "review this small set of candidate large mission concepts and suggest additions, subtractions, and other useful commentary."

Throughout 2015, the PAGs have coordinated community discussion regarding large mission concept studies. Each PAG submitted its report to me in October 2015, and these reports were subsequently discussed at the October 2015 meeting of the NASA Advisory Council (NAC) Astrophysics Subcommittee³. In its letter to the NAC Science Committee, the Astrophysics Subcommittee agreed with the analysis of the three PAGs. Now that community discussion has concluded, it is timely to initiate large mission concept studies to be considered as input for the 2020 Astrophysics Decadal Survey.

I am therefore establishing mission concept studies for the following four large astrophysics mission concepts (in alphabetical order), to be prepared as input for the 2020 Decadal Survey, and I am assigning responsibility for conducting these studies to the following NASA Centers.

¹ <http://wfirst.gsfc.nasa.gov/>

² <http://science.nasa.gov/astrophysics/documents/>

³ <http://science.nasa.gov/science-committee/subcommittees/nac-astrophysics-subcommittee/>

	Brief description	Lead Center
Far Infrared Surveyor	The Astrophysics Visionary Roadmap identifies a Far IR Surveyor with improvements in sensitivity, spectroscopy, and angular resolution.	Goddard Space Flight Center
Habitable-Exoplanet Imaging Mission	The 2010 Astrophysics Decadal Survey recommends that a habitable-exoplanet imaging mission be studied in time for consideration by the 2020 Astrophysics Decadal Survey.	Jet Propulsion Laboratory
UV/Optical/IR Surveyor	The Astrophysics Visionary Roadmap identifies a UV/Optical/IR Surveyor with improvements in sensitivity, spectroscopy, high contrast imaging, astrometry, angular resolution and/or wavelength coverage. The 2010 Astrophysics Decadal Survey recommends that NASA prepare for a UV mission to be considered by the 2020 Astrophysics Decadal Survey.	Goddard Space Flight Center
X-ray Surveyor	The Astrophysics Visionary Roadmap identifies an X-ray Surveyor with improvements in sensitivity, spectroscopy, and angular resolution.	Marshall Space Flight Center

Each study will be led by a Science and Technology Development Team (STDT) and enabled by a NASA Center-based study office. The objective of these mission concept studies is the delivery to the 2020 Astrophysics Decadal Survey of compelling and executable concepts for all four large missions so that the science of the missions can be adequately prioritized by the Decadal Survey Committee. The studies are not in competition with each other.

The Astrophysics Division will issue an open call to the community in January 2016 for applications for STDT membership. I am assigning each study to the Center identified in the Table. A Center scientist will be appointed as the Study Scientist for each study. The Center will also provide a study manager and appropriate engineering support to the STDT. The STDT will define science objectives and a notional payload for the mission concept. The STDT will also identify the technology development requirements for the mission concept. The Center study office will develop a design reference mission and conduct a cost assessment, with the participation of the STDT, and with the possibility of iteration in order to identify a cost-effective approach.

These studies will be initiated once the STDTs are established and begin meeting in Spring 2016. By January 2016, the conduct of these studies will be further described with the establishment of

- A charter for the Science and Technology Definition Teams, and
- A Management Plan for the Study Offices, Program Offices, and HQ Astrophysics Division.



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