

Selection Decision Document
Astrophysics Probe Mission Concept Studies
March 15, 2017

In preparation for the 2020 Astrophysics Decadal Survey, NASA solicited proposals for mission concept studies for Astrophysics Probes, with the intent of selecting a number of them for more detailed mission concept studies over 18 months (ROSES2016, solicitation NNH16ZDA001N, Appendix D.12). The selected studies' results will be provided by NASA as input to the 2020 Decadal Survey.

A total of 27 compliant proposals were received on November 15, 2016, spanning a range of science disciplines. The proposals were evaluated by peer review panels against the criteria established in the solicitation: merit, relevance, and cost. The evaluation factors included:

- The scientific merit of the science goals of the mission concept proposed for study,
- The value of the proposed study given any previous or ongoing mission concept studies,
- The relevance of the proposed mission concept to NASA's scientific goals in astrophysics, and
- The likelihood that the proposed mission concept will be in the ~\$400M to ~\$1B range.

In addition to evaluating the proposals against the evaluation criteria, the members of the peer review panels were asked to suggest general guidelines to NASA for assembling an Astrophysics Probe Mission Concept Studies portfolio. The panel members recommended a broad, diverse portfolio spanning a range of science disciplines, focusing on compelling, breakthrough science questions while allowing at the same time a variety of topics to be addressed.

The following proposals are selected, which includes funding to the PI-led mission concept team to conduct the mission concept study and the assistance of a NASA design laboratory to provide space system analysis and development of conceptual designs.

- 16-APROBES16-0004, Inflation Probe Mission Concept Study, PI: Shaul Hanany (Univ. of Minnesota)
 - Mission concept study of a probe-scale mission to extract the wealth of physical, cosmological, and astrophysical information contained in the spectrum and polarization of the cosmic microwave background.
- 16-APROBES16-0005, Galaxy Evolution Probe, PI: Jason Glenn (Univ. of Colorado)
 - Mission concept study of a far-infrared probe that combines new, large-format detector array technology – kinetic inductance detectors – and proven telescope technology to enable very large-scale galaxy surveys.
- 16-APROBES16-0008, STROBE-X: X-ray Timing and Spectroscopy on Dynamical Timescales from Microseconds to Years, PI: Paul S. Ray (Naval Research Laboratory)
 - Mission Concept study of an X-ray probe that will perform timing and spectroscopy over both a broad energy band (0.2-30 keV) and a wide range of timescales from microseconds to years.
- 16-APROBES16-0009, Cosmic Evolution through UV Spectroscopy (CETUS), PI: W. Danchi (NASA Goddard Space Flight Center)
 - Mission concept study for an ultraviolet probe that will combine 1.5 m aperture, wide field-of-view telescope with scientific instruments designed for ultraviolet (UV) imaging and spectroscopic surveys as well as single-object UV spectroscopy, to address a variety of topics in cosmic origins.

- 16-APROBES16-0010, Transient Astrophysics Probe Concept Study, PI: J. Camp (NASA Goddard Space Flight Center)
 - Mission Concept study for a multiwavelength probe that will study the transient high-energy sky, with particular emphasis on Gamma-ray Bursts and electromagnetic counterparts to gravitational wave sources.
- 16-APROBES16-0017, AXIS: A High Spatial Resolution X-ray Probe Satellite, PI: R. Mushotzky (Univ. of Maryland)
 - Mission concept study of an X-ray probe that will have similar or better angular resolution than Chandra and have ten times the counting rate for most sources allowing considerably more science per unit time and the accomplishment of science objectives not possible with Chandra.
- 16-APROBES16-0022, Cosmic Dawn Intensity Mapper, PI: A. Cooray (Univ. of California, Irvine)
 - Mission concept study of a far-infrared probe that will use a 1.5m telescope capable of three-dimensional spectro-imaging observations over the wavelength range of 0.75 to 7.5 microns, at a spectral resolving power of 500, to study the epoch of reionization.
- 16-APROBES16-0023, Concept Study of the Probe Of Extreme Multi Messenger Astrophysics (POEMMA), PI: A. Olinto (Univ. of Chicago)
 - Mission concept study of a probe that will enable, for the first time, charged particle astronomy with ultra-high energy cosmic rays (UHECRs) and the discovery of cosmogenic tau neutrinos.

The following proposals are partially selected, as described.

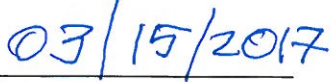
- 16-APROBES16-0020, EarthFinder: A Diffraction-Limited Precise Radial Velocity Observatory in Space, PI: P. Plavchan (Missouri State Univ.)
 - This proposal is partially selected in order to establish the science case for going to space with a precision radial velocity mission. There is no funding to develop a notional mission architecture or provide mission design lab sessions. Section 1.1.4 of the proposal lists four areas of trade study. Only study item #4 will be pursued - simulating the precision radial velocities obtainable by removing Earth's atmosphere from the error budget.
- 16-APROBES16-0021, Starshade Rendezvous, PI: S. Seager (Massachusetts Institute of Technology)
 - This proposal is for a mission concept study of a starshade to be flown with WFIRST for the purpose of imaging and characterizing exoplanets. This proposal is partially selected in order to update the previously completed starshade Rendezvous mission concept studies for the Decadal Survey. The plan to study a different Rendezvous mission is not approved.

All the selected proposals were highly rated by the peer-review panels based on merit and other criteria stated in the solicitation. Selection of the listed proposals follows programmatic criteria as well as taking into account the panels' guidelines for a diverse portfolio addressing a variety of science questions.

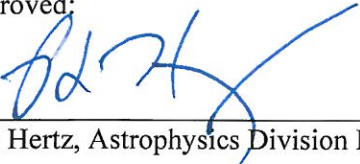
The remaining 17 proposals are declined.


Recommended:


Rita Sambruna, APROBES Program Officer


Date

Approved:


Paul Hertz, Astrophysics Division Director


Date