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NASA SPONSORS STUDIES OF NEXT GENERATION ASTRONOMY MISSIONS

WASHINGTON - NASA has selected 19 science teams to conduct yearlong studies of new concepts for its next generation of major observatories. The studies will help NASA make decisions about how it explores the heavens in the future, following the Astronomy and Astrophysics Decadal Survey.

Every 10 years, astronomers and physicists from across the U.S. work with the National Academy of Sciences to define the future research directions for the fields of astronomy and astrophysics. The science teams' work is part of an effort to ensure that technical and cost input is accurate for this upcoming Astronomy and Astrophysics Decadal Survey. The survey produces directions that guide federal agencies such as NASA and the National Science Foundation in planning their programs over the coming decade.

"Astrophysics is truly in a golden age, revolutionizing our knowledge of topics as diverse and compelling as the origin and evolution of the universe, the physics of black holes and the distribution and habitability of planetary systems across our galaxy," said Alan Stern, associate administrator for the Science Mission Directorate at NASA Headquarters, Washington. "The exciting new astrophysics mission concept studies we are funding will seed preparations for astronomical space missions and paradigm-shifting discoveries across the early 21st century. Today, NASA's Science Mission Directorate is setting sail on a whole new chapter in continued U.S. leadership in astrophysics."

The concept studies total approximately $12 million in fiscal years 2008 and 2009, ranging in cost from $250,000 to $1 million. Among the ideas selected for further study as potential new space telescopes are:

-A study of the organic molecules in interstellar space and star-forming clouds (Scott Sandford, NASA's Ames Research Center, Moffett Field, Calif.);
-A census of black holes in our galaxy, nearby neighbor galaxies and more distant galaxies (Jonathan Grindlay, Harvard College Observatory, Cambridge, Mass.);

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-A test of theories that predict a rapid inflationary expansion when the universe was less than a fraction of a second old by characterizing the distribution of distant galaxies (Gary Melnick, Smithsonian Astrophysical Observatory, Cambridge);
-Observations of faint signatures of polarized light in the cosmic microwave background that will also reveal information about inflationary expansion (Stephan Meyer, University of Chicago);
-Exploration of the origins of cosmic rays (James Adams, NASA's Marshall Space Flight Center, Huntsville, Ala.).

Several different methods to search for and characterize exoplanets, planets that orbit a star outside our solar system, also were chosen. Among these approaches are:

- Precise mapping of the movements of stars induced by planets circling them (Geoffrey Marcy, University of California, Berkeley);
-Direct imaging of giant planets around nearby stars (Mark Clampin, NASA's Goddard Space Flight Center, Greenbelt, Md.; Olivier Guyon, University of Arizona; Tuscon; John Trauger and Michael Shao, Jet Propulsion Laboratory, Pasadena, Calif.);
-Imaging nearby Earth-sized worlds using large telescopes with multiple instruments and separate spacecraft to block the light from these exoplanets' host star (Webster Cash, University of Colorado, Boulder; David Spergel, Princeton University, N.J.).

Some of the proposals explore a powerful new combination of telescopes and instruments optimized for observing the tenuous filaments of intergalactic hydrogen gas known as the cosmic web gas (Kenneth Sembach, Space Telescope Science Institute, Baltimore) or star formation in our own and distant galaxies (Paul Scowen, Arizona State University, Tempe).

Another mission would place two laser beacons on Mars. Precise measurements of the distance to these beacons would provide the most stringent test yet of Einstein's theory of general relativity (Thomas Murphy, University of California, San Diego).

NASA also will sponsor studies about how to create the next generation of extremely precise and large optics for X-ray and optical astronomy (Roger Brissenden; Smithsonian Astrophysical Observatory; Marc Postman, Space Telescope Science Institute). Another study investigates the possibility of putting an extremely large array of radio telescopes on the lunar surface to map clouds of hydrogen gas that formed during the infancy of our universe, even before the first stars (Jacqueline Hewitt, MIT; Cambridge; Joseph Lazio, Naval Research Laboratory, Washington).

"The number, range, and quality of the proposals submitted indicate very powerfully the level of enthusiasm in the community for addressing frontier astrophysics research and employing the very latest technologies," said Jon Morse, division director for Astrophysics, NASA Headquarters. "This early investment directed toward the decadal study will pay off in the coming years."

The studies' results are expected in March 2009. Concepts that rank highly in the decadal survey may result in missions that would launch after the suite of missions in development such as the Gamma-ray Large Area Space Telescope, scheduled to launch in May, the Kepler mission, scheduled to launch in 2009, and the James Webb Space Telescope, scheduled to launch in 2013.

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