FACT SHEET:
NASA'S FUTURE PLANET-FINDING MISSIONS

NASA's Origins Program includes a series of missions to answer the questions: "Where did we come from? Are we alone?" A major goal of the program is to search around nearby stars for Earthlike planets that may harbor life. The following NASA missions will help achieve that goal.

SPACE INFRARED TELESCOPE FACILITY: The fourth and final mission under NASA's Great Observatories program, this telescope will use infrared, or heat, radiation to study the early universe, old galaxies and forming stars, and detect and characterize dust disks around stars where planets may be forming. This information may help identify potential targets for subsequent planet-finding missions. Managed by NASA's Jet Propulsion Laboratory (JPL). Scheduled for launch in January 2003.

KEPLER: Will search for planets with the "transit" method. A one-meter diameter (39-inch) telescope equipped with the equivalent of 42 high quality digital cameras will steadily monitor 100,000 stars, looking for planets that cross the lines-of-sight between Kepler and their parent stars. The transiting planets reduce the star's brightness by a small fraction for a few hours. The periodic signature of these "transits" can be used to detect Earth-like planets and determine their sizes and orbits. Managed by NASA's Ames Research Center. Scheduled for launch in 2007.

SPACE INTERFEROMETRY MISSION: Will very precisely measure the distances to stars throughout our Milky Way galaxy and will detect the wobble of stars due to the gravitational tug of orbiting planets. The mission will reveal whether the architecture of planetary systems like our own, with rocky planets in the habitable zone, is common or rare in our galaxy. The mission will pinpoint specific nearby stars for subsequent planet-finding and life-finding missions. Managed by JPL. Scheduled for launch in 2009.

TERRESTRIAL PLANET FINDER: Will directly detect and analyze the light of planets orbiting nearby stars. At visible wavelengths, an Earth is more than 1 billion times fainter than its parent star; at infrared wavelengths, it is more than 1 million times fainter. The mission will take family portraits of stars and their orbiting planets up to 45 light years from Earth. Will use either an infrared interferometer (two or more Hubble-sized telescopes separated by 100-300 feet) or an optical coronagraph (a specially instrumented, ultra-precise telescope two to four times the size of Hubble). It will look for planets and also look for chemical signatures, such as oxygen, carbon dioxide, water vapor and ozone, of habitability, or even of life itself. Managed by JPL. Scheduled for launch in 2015.

KECK INTERFEROMETER: The world's most powerful ground-based telescope system, created by linking two 10-meter (33-foot) telescopes on Mauna Kea in Hawaii. It will study dust clouds around stars where planets may be forming and may provide the first direct detection of light from Jupiter-like planets outside our solar system. Managed by JPL. The Keck Interferometer is currently operating.

THE LARGE BINOCULAR TELESCOPE INTERFEROMETER: Two 8-meter (26-foot) telescopes on Mount Graham, Arizona will be connected. The system will be capable of imaging many faint celestial objects with 10 times the resolution of the Hubble Space Telescope. Will identify faint dust clouds around other stars that might hinder planet-finding missions. Managed by the University of Arizona, Tucson in conjunction with multiple international partners. The telescope is scheduled to begin operations in 2004.

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