

NASA's Terrestrial Planet Finder Mission  
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ABSTRACT

The list of known exo-planets is now well over 100 and is growing almost daily. To date, our knowledge of these objects is based primarily on indirect evidence from ground-based observations using techniques such as radial velocity measurements. Techniques are currently under development for direct detection and characterization of planets from future space based observatories. NASA's Terrestrial Planet Finder (TPF) mission will study all aspects of planets outside our solar system: from their formation and development in disks of dust and gas around newly forming stars to the presence and features of those planets orbiting the nearest stars and ultimately to their suitability as an abode for life. By combining the high sensitivity of space telescopes with revolutionary starlight suppression and imaging technologies, TPF will collect reflected and/or emitted light from planets as small as the Earth in the habitable zones of distant solar systems and measure their size, temperature, and orbital properties. In addition, TPF's spectroscopy will allow atmospheric chemists and astrobiologists to use the relative amounts of gases such as carbon dioxide, water vapor, ozone and methane to find whether a planet someday could or even now does support life. The TPF observatory will take the form of either a large telescope with visible/nir coronagraph or a long-baseline nulling mid-infrared interferometer. NASA in coordination with ESA, is performing focused science and design concept studies and technology development for both architectural classes. Selection of the TPF architecture is planned for 2006, based on the science and technology progress of the next three years. The mission is planned for implementation as a joint NASA/ESA project with a launch in the middle of the next decade following the James Webb Space Telescope.