Lockheed Martin Space Interferometry Mission Teams Receives NASA Award

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A NASA Group Achievement Award has been presented to the Space Interferometry Mission (SIM) metrology beam launcher development team, a collaboration between the Lockheed Martin Space Systems Advanced Technology Center (ATC) and NASA's Jet Propulsion Laboratory (JPL). The award certificates, signed by NASA Administrator Sean O'Keefe, cite "outstanding accomplishment in the development of a new class of picometer laser metrology beam launcher, which will help enable the Space Interferometry Mission."

"We're very pleased and proud to be recognized for this accomplishment," said Mike Margulis, Space Systems SIM program manager. "Our beam launcher technology provides an accuracy two orders of magnitude beyond the current state of the art, and will most certainly contribute to the success of the SIM mission." The Lockheed Martin members of the SIM metrology beam launcher development team honored are: Larry Ames, Willy Anderson, Stephanie Barrett, Robert Barrett, Ray Bell, Robert Benson, Gene Cross, Larry Dries, Kalyan Dutta, Florence Escueta, Margaret Garcia, Dexter Girton, Bau Ho, Todd Kvamme, David Leary, Roger Montross, Patrick Perkins, Mark Scott, Timothy Van Eck, and John Woo.

The beam launchers enable measurement of the variation of 10-meter optical pathlengths on SIM with accuracy in the tens of picometers. For a sense of scale, a hydrogen atom is about 100 picometers in size. The beam launchers use a technique called heterodyne interferometry to measure optical path length with a beam of infrared laser light. After reflection off of retroreflectors (corner cubes) at the ends of the optical path, the laser light is returned to the beam launcher where it is mixed with a reference signal to produce the measurement of the variation in length of the optical path.

SIM, a major observatory in NASA's Origins Program, will be the agency's first space interferometer designed specifically for measuring the positions of stars. The ATC and JPL beam launchers are crucial in providing exact information on the positions of the telescopes, information that is fundamental in achieving the position measurements of objects on the sky. The technique of interferometry, as used on SIM, will combine the light waves from two sets of four one-foot diameter telescopes arrayed across a 10 meter (33- foot) boom. The combined light waves will "interfere" or blend together to achieve position measurements on the sky with accuracies approaching one micro-arcsecond. To place this in perspective, one micro-arcsecond corresponds to the width of toothpick viewed from a distance of 200,000 km (125,000 miles).

SIM's precision astrometry will allow scientists to look at the 100 or so nearest stars and determine, by inference, whether planets accompany those distant suns. Just as the Moon exerts tidal forces on the Earth, and the planets in our solar system cause the Sun to wobble slightly from side to side, a planet circling another star will cause it to jiggle in its orbit.

SIM will not have the sensitivity to detect directly a planet orbiting a nearby star, because its reflected light would be far too faint. Instead, using precise positional measurements, SIM will be able to measure a star's wobble -- a telltale perturbation that would herald the presence of one or more planets orbiting the star. Using SIM's precision optics, planets that range in size from Uranus to Jupiter will be easily detectable, and even a small planet the size of Earth could be inferred around a star up to 30 light years away.

SIM is managed by the Jet Propulsion Laboratory in Pasadena, Calif. for NASA's Office of Space Science, Washington, D.C.

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