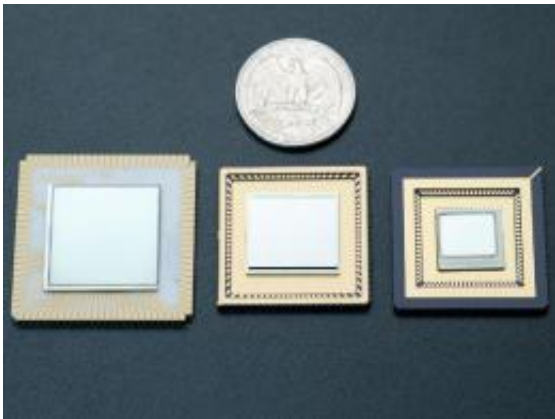


NASA develops new game-changing technology

November 18 2011, By Priscilla Vega



This picture shows three High Operating Temperature Infrared Sensors, mounted on leadless chip carriers. Credit: NASA/JPL-Caltech

Two NASA California centers have been selected to develop new space-aged technologies that could be game-changers in the way we look at planets from above and how we safely transport robots or humans through space and bring them safely back to Earth.

NASA's Jet Propulsion Laboratory in Pasadena, Calif., will use advanced compound semiconductor materials to develop new technologies for the High Operating Temperature Infrared Sensor Demonstration. The higher the temperature at which an infrared detector can operate, the less power is required to cool it. Reduced power needs can translate into operational cost and system weight savings. If successful, this sensor technology

could be used in many future NASA Earth and planetary science instruments, as well as for U.S. commercial and defense applications.

"The [technology demonstration](#) effort is different in the fact that we're focused on affordability concurrently with performance," said Sarath Gunapala of JPL, who is project manager for the High Operating Temperature Infrared Sensor Demonstration. "This technology has excellent potential for transitioning from laboratory demonstration to NASA and commercial product lines."

The overall goal for this technology development effort is to achieve 100 percent cost savings as compared with traditional cryogenically cooled [infrared sensors](#). The weight and volume savings allow for more compact instruments -- an important consideration for a spacecraft's payload size and cost. This state-of-the-art technology also will have spinoff applications for commercial instrument manufacturers.

Seeking to radically change the way [heat shields](#) protect spacecraft during atmospheric entry, NASA's Ames Research Center at Moffett Field, Calif., is developing the Woven Thermal Protection System. The project is a revolutionary approach to thermal protection system design and manufacturing for [extreme environments](#). Ames is the lead center for the project, partnering with NASA's Langley Research Center in Hampton, Va.

Partnering with the U.S. textile industry, NASA is employing an advanced, three-dimensional weaving approach in the design and manufacture of thermal protection systems. Today, lightweight aircraft parts are being manufactured using similar weaving technologies. This will be expanded to include spacecraft heatshield applications. The system will enhance performance using advanced design tools with cost savings from a shortened product development and testing cycle.

"Woven TPS has the potential to significantly impact future NASA missions by changing heat shield development from a challenge to be overcome into a mission-enabling component," said NASA Langley's Ethiraj Venkatapathy, principal investigator of the project. "By delivering improved heat shield performance and affordability, this technology will impact all future exploration missions, from the robotic science missions to Mars, Venus and Saturn to the next generation of human missions."

NASA's Game-Changing Technology Division focuses on maturing advanced space technologies that may lead to entirely new approaches for the agency's future space missions while finding solutions to significant national needs. NASA Langley oversees project management of the Game Changing Technology programs.

Provided by JPL/NASA

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