

bility, and programmability of a general-purpose Manycore processor. This combination of an FPGA with a Manycore processor, with both components being concurrently used for processing, has yet to be done for space applications.

This architecture is also useful for embedded robotic applications such as rovers. The FPGA/Manycore combination allows the end user to place tasks on

either the FPGA or the Manycore processor, based on the strengths and weaknesses of each component.

*This work was done by Carlos Y. Villalpando, Garen Khanoyan, Ryan A. Stern, Raphael R. Some, Erik S. Bailey, John M. Carson, Geoffrey M. Vaughan, Robert A. Werner, Phil M. Salomon, Keith E. Martin, Matthew D. Spaulding, Michael E. Luna, Shui H. Motaghedi, Nikolas Trawny, An-*

*drew E. Johnson, Tonislav I. Ivanov, Andres Huertas, and William D. Whitaker of Caltech; and Steven B. Goldberg of Indelible Systems, Inc. for NASA's Jet Propulsion Laboratory. Further information is contained in a TSP (see page 1).*

*The software used in this innovation is available for commercial licensing. Please contact Dan Broderick at Daniel.F.Broderick@jpl.nasa.gov. Refer to NPO-48786.*

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## DOT Transmit Module

*NASA's Jet Propulsion Laboratory, Pasadena, California*

The Deep Space Optical Terminal (DOT) transmit module demonstrates the DOT downlink signaling in a flight electronics assembly that can be qualified for deep space. The assembly has the capability to generate an electronic pulse-position modulation (PPM) waveform suitable for driving a laser assembly to produce the op-

tical downlink signal. The downlink data enters the assembly through a serializer/deserializer (SERDES) interface, and is encoded using a serially concatenated PPM (SCPPM) forward error correction code. The encoded data is modulated using PPM with an inter-symbol guard time to aid in receiver synchronization. Monitor

and control of the assembly is via a low-voltage differential signal (LVDS) interface.

*This work was done by Kevin J. Quirk, Jonathan W. Gin, Adit Sahasrabudhe, Ferze D. Patawaran, Danh H. Nguyen, and Huy Nguyen for NASA's Jet Propulsion Laboratory. For more information, contact iaoffice@jpl.nasa.gov. NPO-47723*