ger operations (producing integer output) and uses multiplications sparingly. Separate code is used for each possible number of spectral bands, including numbers for which fast DCT functions are not normally implemented. The DCT output is scaled so that, if the original images have a bit depth of at most 12, the transformed images are guaranteed to have a dynamic range appropriate for compression by the ICER software on the MER rovers. The resulting transformed bands are compressed individually by ICER. To reconstruct the images, the transformed images are first decompressed by use of the decompressor for ICER, then the resulting reconstructed images are passed to an inverse-DCT subprogram, which reconstructs the various spectral bands.

This work was done by Matthew Klimesh and Aaron Kiely of Caltech for **NASA's Jet Propulsion Laboratory**. *Further information is contained in a TSP (see page 1).*

This software is available for commercial licensing. Please contact Karina Edmonds of the California Institute of Technology at (626) 395-2322. Refer to NPO-40835.

Compressing Image Data While Limiting the Effects of Data Losses

NASA's Jet Propulsion Laboratory, Pasadena, California

ICER is computer software that can perform both lossless and lossy compression and decompression of gray-scale-image data using discrete wavelet transforms. Designed for primary use in transmitting scientific image data from distant spacecraft to Earth, ICER incorporates an error-containment scheme that limits the adverse effects of loss of data and is well suited to the data packets transmitted by deep-space probes. The error-containment scheme includes utilization of the algorithm described in "Partitioning a Gridded Rectangle Into Smaller Rectangles" (NPO-30479), *NASA Tech Briefs*, Vol. 28, No. 7 (July 2004), page 56. ICER has performed well in onboard compression of thousands of images transmitted from the Mars Exploration Rovers.

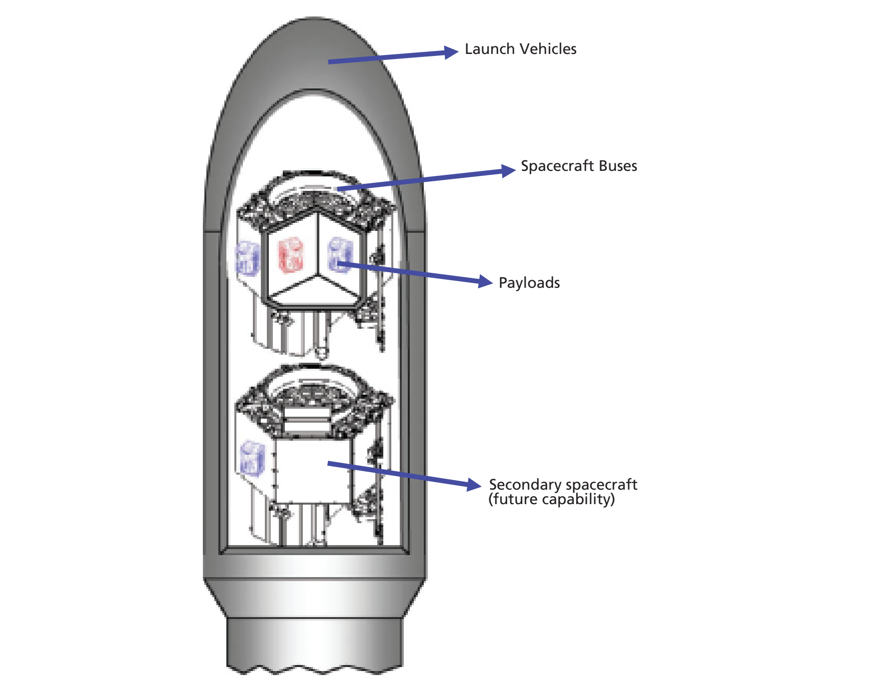
This program was written by Aaron Kiely and Matthew Klimesh of Caltech for **NASA's Jet Propulsion Laboratory**. *Further information is contained in a TSP (see page 1).*

This software is available for commercial licensing. Please contact Karina Edmonds of the California Institute of Technology at (626) 395-2322. Refer to NPO-40982.

Flight Operations Analysis Tool

NASA's Jet Propulsion Laboratory, Pasadena, California

Flight Operations Analysis Tool (FLOAT) is a computer program that partly automates the process of assessing the benefits of planning spacecraft missions to incorporate various combinations of launch vehicles and payloads (see figure). Designed primarily for use by an experienced systems engineer, FLOAT makes it possible to perform a preliminary analysis of trade-offs and costs of a proposed mission in days, whereas previously, such an analysis typically lasted months. FLOAT surveys a variety of prior missions by querying data from authoritative NASA sources pertaining to 20 to 30 mission and interface parameters that define space missions. FLOAT provides automated, flexible means for comparing the parameters to determine compatibility or the lack thereof among payloads, spacecraft, and launch vehicles, and for displaying the results of such comparisons. Sparseness, typical of the data available for analysis, does not confound this software. FLOAT effects an iterative process that identifies modifications of parameters that could render compatible an otherwise incompatible mission set.



The **Database Overview** shows current and future capabilities.

This program was written by Robert Easter, Linda Herrell, Richard Pomphrey, James Chase, Julie Wertz Chen, Jeffrey Smith, and Rebecca Carter of Caltech for **NASA's Jet Propulsion Laboratory**. *Further information is contained in a TSP (see page 1).*

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