manned landmarks generated per image allow for automatic detection and elimination of bad matches. Attitude and position can be generated from each image; this image-based attitude measurement can be used by the onboard navigation filter to improve the attitude estimate, which will improve the position estimates.

The algorithm uses normalized correlation of grayscale images, producing a relative position estimate that can be used to refine the attitude estimate. The attitude estimate, together with the relative position estimate, provide the attitude and position of the spacecraft. The attitude and position can be generated from each image; this image-based attitude measurement can be used by the onboard navigation filter to improve the attitude estimate, which will improve the position estimates.

Web-Based Environment for Maintaining Legacy Software

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“Advanced Tool Integration Environment” (ATIE) is the name of both a software system and a Web-based environment created by the system for maintaining an archive of legacy software and expertise involved in developing the legacy software. ATIE can also be used in modifying legacy software and developing new software. The information that can be encapsulated in ATIE includes experts’ documentation, input and output data of tests cases, source code, and compilation scripts. All of this information is available within a common environment and retained in a database for ease of access and recovery by use of powerful search engines. ATIE also accommodates the embedment of supporting software that users require for their work, and even enables access to supporting commercial-off-the-shelf (COTS) software within the flow of the experts’ work.

The flow of work can be captured by saving the sequence of computer programs that the expert uses. A user gains access to ATIE via a Web browser. A modern Web-based graphical user interface promotes efficiency in the retrieval, execution, and modification of legacy code. Thus, ATIE saves time and money in the support of new and pre-existing programs.

This program was written by Michael Tiggges of Johnson Space Center; Nelson Thompson, Mark Orr, and Richard Fox of Dynacs, Inc.; and Rich Rohan of Lockheed Martin Corp. Further information is contained in a TSP (see page 1). MSC-23810-1

Information Metacatalog for a Grid

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SWIM is a Software Information Metacatalog that gathers detailed information about the software components and packages installed on a grid resource. Information is currently gathered for Executable and Linking Format (ELF) executables and shared libraries, Java classes, shell scripts, and Perl and Python modules. SWIM is built on top of the POUR framework, which is described in the preceding article. SWIM consists of a set of Perl modules for extracting software information from a system, an XML schema defining the format of data that can be added by users, and a POUR XML configuration file that describes how these elements are used to generate pe-