JMARS: A MULTIMISSION DATA FUSION APPLICATION. N. S. Gorelick, M. Weiss-Malik, B. Steinberg, S. Anwar, Arizona State University, Mars Space Flight Facility, P.O. Box 876305, Tempe, AZ, 85287-6305, (jmars@themis.asu.edu).

Introduction: The combined data sets from the Viking, Mars Global Surveyor, and Mars Odyssey missions provide a tremendous wealth of information that can be difficult to use collectively. Arizona State University has developed a package, called JMARS, that provides seamless integration of these existing data sets in a client-server model useful for both mission planning and targeting purposes, as well as data analysis.

Features: JMARS is a Java-based package that provides a layered system, whereby data from different sources can be extracted, colorized, scaled, blended, merged, and superimposed on one another. For instance, MGS-MOC narrow angle images can be displayed on top of Odyssey THEMIS thermal infrared images, all of which can be presented in the context of the surrounding MOLA topography. The server portion of JMARS handles the computational heavy-lifting of reading and resampling these various data sets to a common system, then transfers only the relevant, projected portions of each data set to the client application. A variety of special-purpose layers within the client provide instrument or application specific controls to perform specialized tasks such as geodetic distance measurement, thermal image temperature readout, elevation profile extraction, etc.

The JMARS servers currently support more than 15GB of map data including: the Viking MDIM; the MGS-MOLA shaded relief map; the MGS-MOC wide-angle mosaic; the Tanaka geologic map; the MGS-TES thermal inertia, albedo and mineral maps; and Odyssey THEMIS mosaics. Additionally, instrument specific layers handle hundreds of gigabytes of individual Viking, MOC narrow-angle, and THEMIS visible and infrared images.

Architecture: The JMARS system is built with a thin user-interface client which communicates to a set of servers via the Internet. Communication between the client and the servers uses standard Web protocols (e.g.: HTTP, SSL) to provide data in a simple and secure method.

The client requests data from the servers based on a location and projection selected by the user. The server extracts data from various image and map data sets, geometrically projects the extracted pieces, and returns them to the client. The client collects and displays these pieces, providing controls for colorizing, enhancement, blending, etc. Additional controls in the client provide numerous other application specific features based on the dataset being viewed.

Simplified versions of the application have been written to CD-ROM for use in K-12 environments. These versions are self-contained and don't access the network servers, but instead use a set of pre-projected images selected to cover a small region of interest.

System Requirements: The JMARS client is designed to be small, but can accumulate a lot of data from the server with heavy use. Therefore, a system with 512MB of RAM is recommended as a minimum. A 24 bit video sub-system is required, and a resolution of 1024x768 is a suggested minimum. JMARS was developed using Java to capitalize its cross-platform capabilities. The Java version 1.4 runtime environment is required. Additional features are available if the Java Advanced Imaging package is also installed.

Future Plans: JMARS has been designed to easily incorporate data products from future missions, including Mars Express and the Mars Reconnaissance Orbiter. The client-server architecture utilized will facilitate the inclusion of these new data sets with a minimal amount of effort.

Availability: A public version of JMARS can be freely downloaded from the ASU Web site http://jmars.asu.edu. User registration is required.