This approach also employs a novel technique that enables storage of the majority of data on the cloud and some data locally. This feature is used to store the most recent data locally in order to guarantee utmost reliability in case of an outage or disconnect from the Internet. This also obviates any changes to the software that generates the most recent data set as it still has the same interface to the file system as it did before updates.

This software provides a seamless integration between existing software tools that would enable any mission across NASA to leverage the capability with minimal customization. It also unleashes a virtually limitless amount of storage and delivers it to projects without having to worry about provisioning, managing, and backing up large storage arrays.

The software integrates with Amazon Simple Storage Service (Amazon S3) service to provide the aforementioned solutions. By integrating with S3, unprecedented durability is delivered to the storage system with 99.999999999% data retention rate. Furthermore, it is a self-healing replication system that repairs objects automatically if they are ever lost. Since data is stored on a per-object basis rather than a file system mount, correlated loses of objects are extremely unlikely and recovery of each object is fast. This also reduces reliance on a single file system, where an outage can take the system offline for extended duration. The solution, built on cloud computing technology, reduces MER Maestro's storage costs by over 80%. Most importantly, the solution is completely server-side, providing a seamless integration with existing clients without modifying any of their code or redelivering code.

An HTTP proxy was built that enables clients to access large amounts of data on S3 securely, and without any changes to existing software. The proxy caches information and is capable of accessing data from local channels as well as on S3. This enables the proxy to serve the most recent data from local storage, while the older archived data is retrieved on-demand from S3. The data stored on S3 is private and can only be accessed by the proxy. Furthermore, the proxy authenticates its users through JPL LDAP, and verifies their membership in a specific group before giving them access to the data.

This work was done by George W. Chang, Mark W. Powell, John L. Callas, Recaredo J. Torres, and Khawaja S. Shams of Caltech for NASA's Jet Propulsion Laboratory. For more information, contact iaoffice@jpl.nasa.gov.

This software is available for commercial licensing. Please contact Daniel Broderick of the California Institute of Technology at danielb@caltech.edu. Refer to NPO-48189.

WMS Server 2.0

NASA's Jet Propulsion Laboratory, Pasadena, California

This software is a simple, yet flexible server of raster map products, compliant with the OGC WMS 1.1.1 protocol. The server is a full implementation of the OGC WMS 1.1.1 as a fastCGI client and using GDAL for data access. The server can operate in a proxy mode, where all or part of the WMS requests are done on a back server.

The server has explicit support for a colocated tiled WMS, including rapid response of black (no-data) requests. It generates JPEG and PNG images, including 16-bit PNG. The GDAL back-end support allows great flexibility on the data access.

The server is a port to a Linux/GDAL platform from the original IRIX/IL platform. It is simpler to configure and use, and depending on the storage format used, it has better performance than other available implementations.

The WMS server 2.0 is a high-performance WMS implementation due to the fastCGI architecture. The use of GDAL data back end allows for great flexibility. The configuration is relatively simple, based on a single XML file. It provides scaling and cropping, as well as blending of multiple layers based on layer transparency.

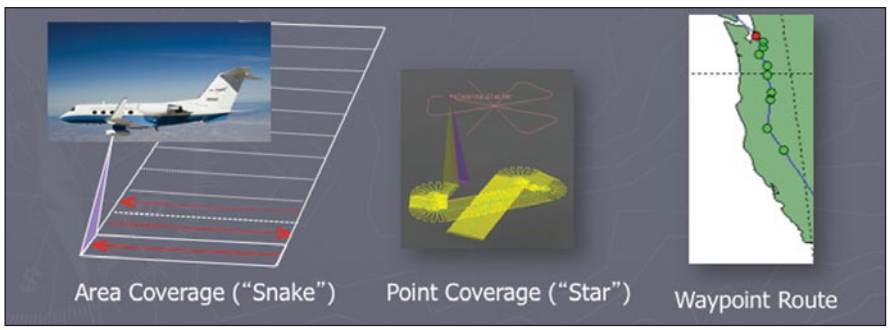
This work was done by Lucian Plesea and James F. Wood of Caltech for NASA's Jet Propulsion Laboratory. For more information, contact iaoffice@jpl.nasa.gov.

This software is available for commercial licensing. Please contact Daniel Broderick of the California Institute of Technology at danielb@caltech.edu. Refer to NPO-48330.

I-FORCAST: Rapid Flight Planning Tool

NASA's Jet Propulsion Laboratory, Pasadena, California

I-FORCAST (Instrument – Field of Regard Coverage Analysis and Simulation Tool) is a flight planning tool specifically designed for quickly verifying the feasibility and estimating the cost of airborne remote sensing campaigns (see figure). Flights are simulated by being broken into three predefined routing algorithms as necessary: mapping in a snaking pattern, mapping the area around a point target (like a volcano) with a star pattern, and mapping the area between a list of points.



Three **Possible Scencarios** were identified. This tool can handle all three as well as combinations.