Planetary missions are characterized by the need to receive, process, transmit, and archive remotely sensing data to geographically extended science and engineering teams. Operations for a single mission may last only a few days or may extend for several decades. In recent years, developments in sensor technology have provided instruments with increased resolution, wavelength sensitivity, and decreased sampling intervals. Spacecraft operations are constrained by the limitations of on-board: power, processors, storage, and communications bandwidth.

Planetary missions must operate in a hostile environment with radiation hardened technology. Transmission distances vary from 100 million to 1 billion kilometers. Power constraints for future missions will be mitigated by the increased size of solar arrays and Radioisotope Thermoelectric Generators (rtg's). The next generation of Earth orbiting satellites will provide Planetary Missions with faster radiation hardened processors, and storage devices. These new technologies will have no effect on bandwidth issues. Bandwidth is controlled by three factors: transmitter power, wavelength, and communication distance. Signal strength falls off as $1/r^2$. JPL operates the Deep Space Network (DSN), a global set of large antennas to provide continuous monitoring of the signals from space.

The data collected from all planetary missions is sent from the DSN to JPL's Image Processing Laboratory (IPL). It is the responsibility of IPL to receive, label, process, store, transmit, and archive spacecraft instrument data for Planetary Missions. Science and Engineering Team members are located in industry, academic, and government centers all over the world. Spacecraft are designed to operate with only a few hours of power margin. The mission Science and Engineering Teams must receive constant updates on instrument health, pointing, and data.

In this paper, we describe the steps required to provide instrument health, pointing, and data in a cost effective fashion that maximizes the use of automation, parallel processing, and data subscription services. The elements of this system include: 1. Telemetry Processing System (TPS), 2. Raw Science Data Server (RSDS), 3. Visualization and Analysis Test-bed (VAT), 4. File Exchange Interface (FEI), and 5. the Planetary Data System (PDS).