Virtual Planetary Analysis Environment for Remote Science


All of the data for NASA’s current planetary missions and most data for field experiments are collected via orbiting spacecraft, aircraft, and robotic explorers. Mission scientists are unable to employ traditional field methods when operating remotely. We have developed a virtual exploration tool for remote sites with data analysis capabilities that extend human perception quantitatively and qualitatively. Scientists and mission engineers can use it to explore a realistic representation of a remote site. It also provides software tools to “touch” and “measure” remote sites with an immediacy that boosts scientific productivity and is essential for mission operations.

Viz, the 3D visualization environment developed at Ames, was used by the Mars Exploration Rovers (MER) mission to enhance situational awareness and support decision making activities. Building on that experience and leveraging new technologies in graphics hardware and software, the AISRP Planetary Spatial Analyst project set out to build a prototype of a virtual planetary analysis environment for remote science. Our software was developed for four use cases: developing the walking capabilities of the lunar robot, ATHLETE, automated data assimilation and flight planning for multi-platform Earth observation missions, the Phoenix Mars Lander mission, and the Mars Reconnaissance Orbiter mission. The resulting prototype is an extensible software library called Mercator. It was developed in Java using the Eclipse Rich Client Platform and thus is compatible with NASA’s Ensemble mission ground data systems software framework. Mercator is a multi-platform (PC, Mac and Linux) application that runs on nearly any computer with a capable graphics system, including most modern laptops.

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