



# PROGRAM MANAGEMENT AND GEOLOGICAL SITE EVALUATION for the JPL-SCIGN Installation of 162 Permanent GPS Receiver Stations Throughout Southern California

## PROJECT DESCRIPTION

*Earth Consultants International (ECI)* was Program Manager for a \$3.4M contract to complete the installation of 162 permanent global positioning satellite (GPS) receiver stations throughout southern California. The project was coordinated under the Southern California Integrated GPS Network (SCIGN), a research consortium formed by representatives from various organizations including the US Geological Survey, University of Southern California, California Institute of Technology, Scripps Institute, JPL, NASA, and the Southern California Earthquake Center.

SCIGN's major objectives for the GPS array are to: 1) provide regional coverage to estimate earthquake potential throughout southern California, 2) identify active blind thrusts and measure local variations in strain rate, 3) compare these actual field measurements with models of compressional tectonics in the Los Angeles region, and 4) in the event of an earthquake, measure the permanent crustal deformations and the response of major faults to the change in strain. In order to provide for the sub-millimeter scale level of regional horizontal strain measurements desired with this system, the GPS monuments were designed as a quad-braced system drilled and grouted 10 meters into the subsurface. Local variations as a result of slope instability, lateral spreading or any other type of non-tectonic ground deformation were not desirable. Therefore, the installation locations had to be selected carefully.



GPS Monument



Enclosure of GPS Unit



Enclosures and Solar Panel



Monument and Enclosure Construction

## SOLUTION

*ECI* was responsible for the geological characterization of all sites prior to their construction. We conducted a site visit and reviewed available geological maps and reports to determine the bedrock or sediments anticipated to be encountered within 10 meters of the ground surface. Based on these data, we made recommendations regarding the preferred drilling method at each site. We reviewed aerial photographs to look for features indicative of landsliding, debris flows, flooding, or other geological hazards that could compromise the stability of the site. These data were used to prepare a Site Evaluation Report (SER) for each site. The SER included the satellite visibility (sky map) for the site as measured during the site visit, and identified proximal oil or water production wells, dams or other man-made features that could cause regional uplift or subsidence. Based on these data, *ECI* made recommendations to approve or reject a site. Ultimate decision regarding a site's viability were made by the SCIGN Site Selection Committee. *ECI* also assisted with identification of target sites, and helped negotiate land-use agreements with landowners.

As program manager, *ECI* was responsible for all administration aspects of the project, including technical management following NASA construction specifications, and financial and administrative management in accordance with JPL requirements. This involved preparation and submittal of monthly Contractor Financial Management Reports and Progress Reports, and attendance of Team Meetings.

