

Request for Feedback/Input for the Second Edition of:

The 3-D Global Spatial Data Model:

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Examples/Applications

It is anticipated that the Second Edition will contain material on the following projects.

- I. A least squares network/project will be included that incorporates both GPS data and terrestrial horizontal and vertical observations to the Skeen Hall Finial at NMSU. The model formulation will show how the data can be organized to obtain a linear least squares solution. Standard deviation of the finial position is included.
- II. Issues of network and local accuracies will be described based upon the least squares adjustment of a network of 16 GPS vectors computed from RINEX data downloaded from 9 Wisconsin CORS stations. Currently the answers being obtained appear to vary depending upon the brand of software being used.
- III. In 1930 the U.S. Supreme Court published a report containing a detailed description of the border between Texas and New Mexico along the Rio Grande River (approximately 30 miles) with precise NAD27 latitude and longitude positions for the monuments and NGVD29 elevations on the monuments published to 3 decimal places of feet. A local group of volunteers recovered a portion of those monuments and collected numerous GPS observations on them. Transforming those positions into the ECEF system provided an efficient method for comparing modern observations with the record positions.
- IV. The New Mexico Initial Point is a High Accuracy Reference Network (HARN) point in the NGS data base with reliable ECEF values. A class project at NMSU (see plat on page 327 of the First Edition) performed a GPS survey of Section 31, T23S – R1E, New Mexico Principle Meridian. A GSDM inverse between the SW corner of that survey and the New Mexico Initial Point dramatically shows how well the original layout of the New Mexico Principal Meridian was performed.
- V. In 1994 the National Weather Service needed to locate a modern “Next Generation Weather Radar” (NEXRAD) facility southeast of Tucson, Arizona. David Schurian, a good friend living in Tucson, contacted me and asked for help to determine the height of a shadow cast of the Sub-millimeter Telescope on Graham by a nearby mountain at the site. Stated differently, the objective was to prevent signals from the NEXRAD facility from polluting the observing environment at the observatory. We used GPS to determine the ECEF coordinates of key points and from those made the computations. See a write-up in the 1997 November/December issue of Professional Surveyor Magazine. See [map](#) of site and/or [profile](#) diagram.