

INTEGRATING GPS & TERRESTRIAL SURVEY DATA
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New Mexico Professional Surveyors – Llano Estacado Chapter
Ruidoso, New Mexico
August 13, 2005 - 8:00 a.m. to 5:00 p.m.

I. COORDINATE SYSTEMS AND GPS BACKGROUND

- A. Review of coordinate systems
- B. Summarize GPS concepts
- C. Describe GPS Results
- D. Datum issues: NAD27, NAD83, WGS84, and ITRF

Break 9:30 - 9:45 a.m.

II. SPATIAL DATA MODELS

- A. Introduction and overall description of data models
- B. Spatial data elements as related to plane surveying
- C. Examples of spatial models being used
- C. Description of 3-D Global Spatial Data Model (GSDM)

Break 10:45 - 11:00 a.m.

III. USING THE GSDM TO COMBINE GPS AND TERRESTRIAL SURVEY DATA

- A. Procedures for Combining GPS Data With Terrestrial Data
- B. Rotation matrix is the bridge
- C. Discussion of origin and local plane coordinates
- D. 3-D Coordinate inverse via spreadsheet and program
 - 1. Horizontal Distances – tangent plane ground distance.
 - 2. 3-D Azimuth, geodetic azimuth, and true azimuth

Lunch 12:00 - 1:00 p.m.

IV. FEATURES, FLAWS, AND LIMITATIONS OF 2-D/1-D MODELS

- A. Grid/ground distance dilemma
- B. Bearings, azimuths, and meridians – which direction is north?
- C. How does one handle elevations?

Break 2:15 - 2:30 p.m.

V. SURVEY PROJECT USING BOTH GPS AND TERRESTRIAL DATA

- A. Control points options and data sources
- B. Collecting GPS data – static and RTK
- C. Defining points and 3-D traversing using conventional equipment

Break 3:30 - 3:45 p.m.

VI. PUTTING THE PIECES TOGETHER:

- A. Example project from NMSU campus
- B. Assigning standard deviations to coordinates & traverse data
- C. Gratis software - BURKORD™
- D. Group discussion, course evaluation, and certificates