

Date: May 23, 2008

TO: - Dr. Sonya Cooper, Head
Engineering Technology and Surveying Engineering
- Dr. Rudi Schoenmackers
NMSU Associate Dean for Engineering Research

FROM: Earl F. Burkholder, PS, PE
NMSU Surveying Engineering Program

RE: Institute for Advanced Studies
Second Annual Teaming Conference
Gerald Thomas Hall – NMSU
May 22 & 23, 2008

I attended the IAS conference here at NMSU yesterday and today. Oh my.... It was really good. I'm glad I went. The purpose of the conference was to "identify specific opportunities that high-performance computing brings to New Mexico and to seed the self-organization of groups and collaborations to actively pursue these opportunities."

http://challenge.nm.org/archive/07-08/nmcac_071129.shtml

The conference was moderated by Robert Duncan, Director of IAS. Speakers included:

- Tom Bowles, Governor Richardson's Science Advisor
- Reed Dasenbrock, New Mexico Secretary of Higher Education
- Fred Mondragon, NM Secretary of Economic Development
- Salman Habib, Los Alamos National Laboratories
- Tom Davis, Dean of Instruction, Navajo Tech
- Lenny Martinez, Office of Governor, former VP of Sandia National Laboratories

Participants to the conference were asked to concentrate on 3 goals:

1. Identify applications for the New Mexico Computing Applications Center (NMCAC) to the educational and economic development of our State. Everyone was urged to look for and identify the "killer" application that would really make a difference.
2. Identify compelling areas for investment in Science & Technology (S&T) infrastructure within NM that will support our position as a center of innovation and discovery throughout the world today.
3. Continue to advance efforts to prepare collaborative large-scale proposals here in NM. Many talented persons described various possibilities in the break-out sessions.

The issue of working with large data sets involving spatial data was common to several applications. I mentioned the challenges of accuracy and interoperability between disparate spatial data sources but did not specifically promote the global spatial data model (GSDM) as being part of the solution. But, with recent publication of the 3-D book, I believe the time is right to promote the advantages and benefits of using the GSDM. It would be neat if the GSDM could be the "killer" application being sought.

Press Release

Date: May 12, 2008

FROM: Earl F. Burkholder, PS, PE eburkhol@nmsu.edu
NMSU Surveying Engineering Program

RE: Publication of book - "The 3-D Global Spatial Data Model"

A book, *The 3-D Global Spatial Data Model (GSDM): Foundation of the Spatial Data Infrastructure* was written by Associate Professor, Earl F. Burkholder, and published in April 2008 by CRC Press. It is for sale in the NMSU Bookstore for \$119.95 (shelved under local authors) or it can be purchased for less from various web sources such as Barnes & Noble or Amazon.com.

The book should be of interest to anyone who uses spatial data as related to surveying, mapping, photogrammetry, engineering, or navigation – especially in the context of geographic information systems (GIS) or global positioning systems (GPS). In the past, maps were drawn on paper and stored in a flat file. But, no more. As a consequence of the digital revolution, spatial data are now stored electronically and characterized as digital and 3-D. Many persons (novice and expert alike) routinely use digital spatial data.

The book is intended to be used as a college textbook, as a reference for spatial data applications, or in self-study by persons in various disciplines. Although the first two chapters are not easy reading, chapter 3 is really the comfortable place to start because it includes a review of basic mathematics and geometry related to surveying and mapping. Subsequent chapters build on that foundation and include topics of spatial data models, geometrical geodesy, physical geodesy, geodetic datums, satellite positioning, map projections, and error propagation.

The fundamental premise for the GSDM is that 3-D geospatial data are referenced to a single origin and that location anywhere on (or near) the Earth is defined in terms of rectangular Earth-centered Earth-fixed (ECEF) coordinates as defined by the U.S. DOD for tracking the GPS satellites. The GSDM enhances interoperability between disciplines worldwide because rules of solid geometry and vector algebra are applicable throughout.

The GSDM could be considered impractical because it goes beyond current practices of using separate origins for horizontal and vertical geospatial data. With that admission, the strengths of the GSDM are that it is applicable worldwide, rectangular 3-D coordinate differences are easier to use than traditional geodesy equations, and the GSDM supports a concise definition of spatial data accuracy.

Earl F. Burkholder is a New Mexico licensed professional surveyor (PS) and professional engineer (PE) who has taught in the Surveying Engineering Program at New Mexico State University (NMSU) since 1998. Additional information on the GSDM is posted at www.globalcogo.com.