Mapping Matters

Your Questions Answered

The layman's perspective on technical theory and practical applications of mapping and GIS

By Qassim A. Abdullah, Ph.D., PLS, CP

Q: Our current orthoimages and planimetric data were produced using NAD83 as the datum. However, we have historical data from previous update cycles that is projected with NAD27 datum. We would like to use the historical data for change detection. Is it possible to reproject the historical data from NAD27 to NAD83?

Anonymous, Frederick, MD

Dr. Abdullah: Before I address this question, I would like to elaborate on the issues of maintaining or producing geospatial products in the old horizontal datum "North American Datum of 1927". I do not recommend that anyone maintain or produce geospatial data in this old datum for today's needs. The reasons behind my strong stance on this subject follow:

- NAD27 is inaccurate as it is based on a network of controls that were surveyed using triangulation techniques with too few baselines and azimuth observations for adequately minimizing error accumulation when moving from one end of the country to the other. This resulted in significant biases and distortion in the network of the surveyed monuments. However, it was the right thing to do then, considering the surveying practices and technologies available at the time. Satellites and GPS technology have resulted in a denser and more accurate network for adjusting and defining the parameters of the newer datum, NAD83. In establishing the NAD83 datum, space-based techniques (VLBI and Doppler), as well as electromagnetic distance measuring (EDM) equipment were utilized to control the accumulation of errors in the network.
- The Clark ellipsoid, which is used for NAD27, is a local ellipsoid designed to best-fit the North American continent with its center located in Meades Ranch, Kansas. This makes it incompatible with the GPS system which uses the well known Geodetic Reference System of 1980 (GRS80), adopted by the International Association of Geodesy (IAG).
- Due to the added quality and enhanced density of the ground monuments (thanks to VLBI and Doppler) used in its adjustment, NAD83 is considered a more accurate datum to use in presenting geospatial data in the United States and Canada. This is especially true when you add the benefits of using the same ellipsoid (GRS80) that is used by the GPS.

Despite these reasons, some agencies still use and maintain maps in the old NAD27 datum. What's worse, vendors who produce these updated maps, must actually degrade the data being generated using today's advanced data acquisition, sensor orientation, and digital mapping technologies to match the inaccuracies of maps produced decades ago. The common argument to support creation of new maps in this antiquated datum is one of inconvenience: moving cadastral and parcel information originated using NAD27 to a different datum and coordinate system will disturb operations. My advice to these decision makers is to embrace new technologies and move a step forward by once and for all updating old data to match the highly accurate NAD83 datum with its latest HARN adjustments. Doing so opens the door for wider utilization of data by different agencies and individuals who are trying to stay at the cutting edge of today's geospatial information revolution.

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Dr. Abdullah is the Chief Scientist at EarthData International, Inc, Frederick, MD.