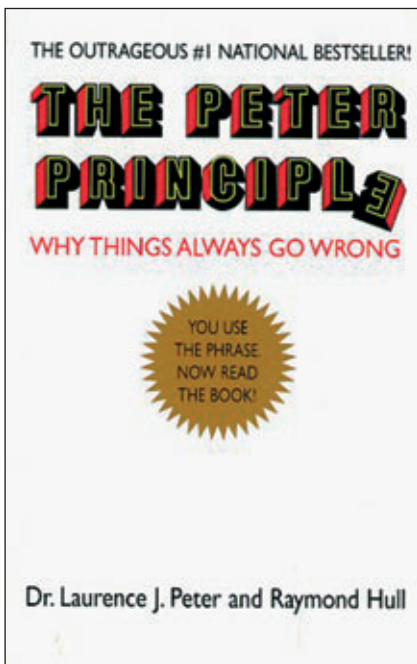


The Geospatial Peter Principle

Why GIS Needs Surveyors

Many professionals rely on GIS technology to solve specific problems and answer defined business needs. Over time, additional applications are added and connected to the GIS that provide enhanced and new capabilities, however these new functions may have outpaced or outgrown the system, hardware, software and data. Hardware manufacturers and software companies keep up with these needs, but what about the data in GIS?

By Brent Jones



Not Qualified

In his book, 'The Peter Principle', Laurence Peter stated: "In a hierarchy every employee tends to rise to his level of incompetence." While Peter was referring to being promoted until you eventually rise to a position you are not qualified to perform, the principle can also apply to the data in a GIS. A GIS is constructed to solve a specific set of problems and geospatial data is developed for the system, focused on these specific functions. Over time, more applications and functions are added to the GIS until the data is not fit for the new applications and functions. The specifications for the data were developed for the original functions, but not all of the additional add-ons. The GIS functions have risen to a level where the existing

data cannot properly return the desired result—this is the Geospatial Peter Principle.

Investment in Data

When new applications are added to a GIS, the data may be unfit for those applications for a variety of reasons, including lack of attributes, missing features, or inadequate spatial accuracy. The investment in data for a GIS is great and organizations generally cannot justify gathering a completely new dataset and tossing out the existing data when new applications are added. What is needed is a process to incrementally improve the quality of data in GIS, including the spatial accuracy of the existing data. Surveyors are the logical contributors, but many surveyors have not embraced GIS technology for a variety of reasons—such as the fact that existing data in GIS does not have adequate positional accuracy for survey functions, parcel record measurements are not maintained, reliable survey data is manipulated and its benefits lost, and the data in the GIS is not tied to survey control.

Parcel Network

New technology addresses these issues. Consider land parcels as a network—a compilation of lines constructed from the dimensions from plans and deeds (record measurements). This parcel network looks like a piece of fabric where each of the parcel lines appears as a thread in the fabric. Next picture points of this fabric pinned to the ground with accurate GPS observations. This forms the basis of the parcel fabric. Now imagine a least squares adjustment of the fabric record measurements between the fixed GPS control points. The result is a sur-

vey controlled representation of the parcel record in a GIS. The parcel fabric technology engages surveyors to participate in the GIS community and use their expertise in measurement to incrementally update the spatial accuracy of data in GIS without costly whole-sale updating.

Displacement Parameters

The parcel network can be adjusted based on field and record measurements, but other data in the GIS will no longer be in its relative position to the parcel network. New technology also exists to adjust the other GIS data using the same displacement parameters that were derived from the least squares adjustment of the parcel fabric adjustment.

This methodology is easily adopted by GIS professionals for spatial data improvement of all data in a GIS. New surveys—plans, descriptions, subdivisions, control, etc.—can be entered into a GIS, improving existing GIS data through least squares adjustment. While using this parcel fabric methodology to manage data presents opportunities for surveyors to participate in the GIS community, it also presents opportunities for the GIS community to utilize the expertise of surveyors.

Larger Datasets

GIS technology creates efficiencies, promotes better decision-making, and helps us better manage our manmade and natural resources. This will continue and the demand for larger datasets with more accurate data will grow in turn to meet the data needs of new GIS functions. Fortunately, systems are in place today to combine GIS software technology with surveying technology and for surveyors to participate with the GIS professional to meet this demand and eliminate the Geospatial Peter Principle.

Brent Jones (bjones@esri.com) is the Surveying Industry Manager at ESRI, and the President Elect of the Geospatial Information & Technology Association.