

Not Your Grandfather's Map

A Brief Discussion of the History, Driving Forces, Impediments, Opportunities and Future Directions of GIS Technology's Evolution/Revolution

Presented by

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Most human endeavors are inherently spatial. The world we live in surrounds us with opportunities and challenges that are spatially dependent on “*Where is What?*” tempered by “*Why and So What?*” within cognitive contexts. In just three decades, GIS technology has revolutionized our perspective on what maps are, the information they contain and how we use spatial information. Our paper map legacy emphasizes accurate location of physical features for navigation and record-keeping. However, modern maps have evolved from guides of physical space into analytical and visualization tools for exploring spatial relationships and evaluating alternative perceptions and possibilities— a movement from emphasizing *description* to one emphasizing *prescription*. Our journey from the map room to the conference room has transformed maps from static wall hangings into interactive mapped data addressing complex spatial issues in entirely new ways. This new perspective marks a turning point in the use of maps— from one emphasizing physical descriptions of geographic space as spatial objects, to one of interpreting mapped data, simulating alternative scenarios and successfully communicating influences and impacts of spatially based factors. This presentation investigates the context, conditions and forces driving the transition from maps to mapped data, spatial analysis and beyond.

<http://www.innovativegis.com/basis/MapAnalysis/Topic27/Topic27.html>, GIS Evolution and Future trends



Joseph K. Berry is a leading consultant and educator in the application of Geographic Information Systems (GIS) technology. He is the principal of BASIS, consultants and software developers in GIS technology and the author of the “Beyond Mapping” column for *GeoWorld* magazine for over eighteen years. He has written more than two hundred papers on the theory and application of map analysis techniques, and is the author of the popular books *Beyond Mapping*, *Spatial Reasoning* and *Map*

Analysis. Since 1976, he has presented college courses and professional workshops on geospatial technology to thousands of individuals from a wide variety of disciplines. Dr. Berry conducted basic research and taught courses in GIS for twelve years at Yale University's Graduate School of Forestry and Environmental Studies, and is currently the W. M. Keck Visiting Scholar in Geosciences at the University of Denver and a Special Faculty member at Colorado State University. He holds a B.S. degree in forestry from the University of California, Berkeley, a M.S. in business management and a Ph.D. emphasizing remote sensing and land use planning from Colorado State University.

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- **Evolution of GIS** – Computer mapping (1970s), Spatial Database Management (1980s), GIS Modeling (1990s), Multimedia Mapping (2000s) ... Modeling and Multimedia are the focus of the presentation.
- **GIS Modeling** → Map Analysis – two broad categories of Spatial Analysis and Spatial Statistics; basic *Discrete* map features of Points, Lines and Polygons to *Continuous* Surfaces expressing spatial gradients of variable change.
 - **Spatial Analysis** – extends traditional GIS to analysis of *geographic context* investigating the contextual relationships within and among mapped data; e.g., simple Euclidian Distance “as the crow flies” to Effective Distance “as the crow walks”; travel-time and routing.
 - **Spatial Statistics** – extends traditional statistics to analysis of the *numerical context* of the geographic distribution of data; Spatial Interpolation and Spatial Data Mining investigating the numerical relationships within and among mapped data; e.g., precision agriculture and geo-business applications.
- **Multimedia Mapping** – changing how we access, interact and perceive maps; Map Delivery/Devices (e.g., handheld computers), Map Display (e.g., animation), Visualization (e.g., virtual reality) and Geospatial Multimedia (images/video linked to maps).
- **Future Directions** – revolutionary retooling in *Geo-referencing and Analytics* (2010s); current Cartesian referencing replaced by Hexagonal/Polyhedral referencing; analytic focus shifts from static coincidence relationships to Dynamic Flows.