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Surveyors and GIS Professionals Reach Accord

After 13 months of negotiation, representatives from five Surveyor professional organizations and two GIS organizations reached agreement on changing the NCEES Model Law that defines the practice of surveying for which licensure is required. The NCEES (National Council of Examiners for Engineering and Surveying) is comprised of representatives from each state's Board of Registration, and provides guidelines for state laws concerning professional licensure.

PROCESS - BACKGROUND

The representatives to the multi-association Task Force (organized by the ASPRS) met 32 times by teleconference in a conscious effort by all members to understand and appreciate the varying perspectives on issues and practices among the represented disciplines. Over 650 professional hours were invested. The result of these negotiations is a broad-based consensus on a series of recommendations for NCEES concerning the legal responsibilities of professional surveyors with respect to the use of Geographic Information Systems (GIS) and Land Information Systems (LIS).

The GIS-related concerns included a general perception that the language of the current NCEES Model Law on Surveying can be interpreted to over-reach the legitimate professional jurisdiction of the practice of surveying with regard to the creation and maintenance of maps and databases in Geographic Information Systems.

Surveyors' concerns, recognized by all the Task Force members, were that GIS/LIS tools are potentially being used by non-licensed practitioners in activities that clearly fall within the long-established responsibility of the licensed surveyor.

The goal of the Task Force was to recommend modifications to the NCEES Model Law that would clearly identify those activities requiring the services of a registered professional, in order to safeguard the public health, safety and welfare. The resulting recommendations have gained the support of each of the seven participating associations.[1] During the Fall and Winter of

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1 The seven participating organizations were
ACSM - American Congress on Surveying and Mapping
ASCE - American Society of Civil Engineers
ASPRS - American Society for Photogrammetry and Remote Sensing
MAPPS - Management Association for Private Photogrammetric Surveyors
NSPS - National Society of Professional Surveyors
NSGIC - National States Geographic Information Council
URISA - Urban and Regional Information Systems Association

2001-2002, a sub-committee of the NCEES reviewed the recommendations, and has indicated its intention to recommend acceptance by the NCEES at its next meeting in Summer, 2002.

CURRENT LAWS

All 50 states have professional licensing laws that define the "Practice of Survey." Their definitions vary, but generally, they include the creation, preparation, and modification of certain types of data which requires licensure of the person in responsible charge. The data referred to include the contour of the earth's surface, the position of fixed objects thereon, the elevation of fixed works embraced within the practice of civil engineering, the location of property lines or boundaries of any parcel of land, rights-of-way, easement or alignment, and the position of any monument or reference point which marks a property line boundary. Such data exist in most public agency GIS "framework" layers.

A literal interpretation of many such laws would conclude that agencies with GIS basemaps that are not supervised by licensed surveyors are in violation. GIS Professionals regard these laws as exclusionary – prohibiting them from doing the work they have been conducting historically.

Traditional survey map products such as subdivision plats, legal records of parcel boundaries, or construction grading plans are clearly the surveyors' purview. But what about commercially available road maps that show the location of "fixed works" (streets, bridges, etc.), Assessor's tax maps that show the boundaries of parcels, or watershed drainage maps showing contours of the earth's surface? These maps, and the many other similar maps, are being created and used in GIS for inventory and analysis. They are not used to define the authoritative location of boundaries or fixed works.

Many surveyors concede that the law ought only apply to "survey products" (which these examples are not), nevertheless the wording of many state laws, and the national model law, do not indicate such flexibility of interpretation. This is the reason for the Task Force's assembly and recommendations.

GIS basemaps are referential. They are not the legal record of original survey measurements. They are representations or reproductions of information taken from original documents. As such, GIS maps do not carry legal authority to determine a boundary or the location of fixed works, and therefore, they need not be supervised or regulated as survey products.

RECOMMENDED PRINCIPLES

The task force debated at great length the difference between the licensure of practice and the control of the use of tools utilized in a practice. As is true with many sophisticated techniques and technologies, a layperson and a licensed practitioner may be able to accomplish what appear to be similar functions utilizing a common tool-set, and often the purposes for those activities may appear to parallel each other at a high level. Historically the guiding principle to determine whether an activity or function must be restricted to a licensed practice is if the public health, safety or welfare is at stake. Thus, the GIS/LIS-related functions were carefully analyzed to determine

whether such practice restrictions should apply, not based on the tool or technique used, but rather upon the service, product, or advice delivered. The criteria the task force used to distinguish between the use of GIS technology for survey purposes versus uses of GIS-based techniques for other purposes, included the following:

1. A distinction must be made in the use of electronic systems between making or documenting original measurements in the creation of survey products, versus the copying, interpretation, or representation of those measurements in such systems.

2. A distinction must be made according to the intent, use, or purpose of measurement products in electronic systems to determine a definitive location versus the use of those products as a locational reference for planning, infrastructure management, and general information.

3. GIS databases and maps prepared to be simply referential, representational, or diagrammatic portrayals of existing source documents (many of which were compiled by licensed professionals and are a matter of public record) should not automatically fall under the requirement for supervision by licensed professionals, unless the use of the databases and/or maps is intended that they serve as authoritative public records for geographic location.

4. GIS-based databases and maps that are intended to be used as the authoritative document to describe or determine the location of parcels, fixed works, survey monuments, elevation measurements, etc., must be compiled under the responsible charge of a Professional Surveyor or Land Surveyor.

5. Because geospatial technologies are changing very rapidly, references to specific technologies should be removed from the Model Law and State professional codes. The language of the Model Law should concentrate on the practices to be covered regardless of the technologies employed.

These principles, along with many explicit examples of GIS-related activities requiring the supervision of licensed Surveyors ("inclusions"), as well as examples of GIS-related activities that do not require the supervision of licensed Surveyors ("exclusions"), may be found in the complete report from the ASPRS Task Force on the following wwWeb site: *http://www.asprs.org/asprs/news/ncees_frame.html*.

The file name is “GIS/LIS Addendum to the Report of the Task Force on the NCEES Model Law for Surveying.”

OTHER CONSIDERATIONS

Neither Surveyors or GIS Professional have yet developed a systematic and consistent methodology for creating and maintaining area-wide basemaps. Surveyor Lee Hennes (a member of the Task Force) calls this "macro surveying," and acknowledges that it is very different from traditional surveying of individual parcels or tracts. Apocryphal stories abound in the Surveyor community recounting damage that results from the inappropriate use of maps. How can the public be protected from such a threat? GIS Professionals offer a number of recommendations:

- GIS mapped features should explicitly refer to the source documents from which they were compiled. Such linkage could be achieved by carrying a source document identifier in the database record of each mapped feature, or linking to scanned images of those source documents.

- GIS mapped features should contain explicit and easy-to-understand metadata. The public can be reasonably assumed to be protected if they are informed about the locational accuracy, currency, and method of compilation (lineage) of the data in a GIS.

- GIS maps and data should contain an explicit statement of intended use and disclaimer from other uses. Specifically, a disclaimer should say, "This is not a survey product." [2]

- GIS maps that have been adjusted (rubbersheeted) to create consistent, coherent display maps should retain the original mapped coordinates as feature attributes, as well as metadata describing the transformation adjustments that were made.

While chewing on basemap certification, one might also consider the implications of a "certified basemap." Would such certification usurp some of the legal authority for determining land ownership that currently resides with subdivision plats, deeds, and similar source documents? If so, a government-controlled GIS basemap would change the legal basis of boundary determination in this country. Such a change must be decided upon by explicit political expression, not simply as a technical consequence.

Certification of GIS Professionals also raises the implication of liability and responsibility. What liability would a Licensed Surveyor or licensed GIS Practitioner be willing to accept for potential "damages" caused by GIS data errors, or by the inappropriate use of GIS data?

If you have comments, please use the eForum sponsored by URISA at www.URISA.org/gispolicy.htm (item # 11), or contact the author.

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2 My personal favorite is the San Diego Water Company's "Caution: objects in the GIS may be closer than they appear "