



Building a comprehensive GIS database for Iraq

—by Ilse Genovese

A delegation of five professionals from Iraq's Ministry of Water Resources' Survey Division and GIS Center was hosted by NOAA/NGS in September. Their visit was an outgrowth of an effort involving NGS and the U.S. Army Corps of Engineers in Iraq to modernize Iraq's geodetic reference datum. The visit was organized by the State Department, as part of efforts to transition infrastructure in Iraq from the U.S. Army to Iraqi civilian institutions. During the visit, the Iraqi personnel were introduced to a range of activities involved in designing and implementing a comprehensive cadastral database. The U.S. hosts remarked on the outstanding geodetic capability the departments represented appear to have; what they lack are tools that will allow them to develop a high-accuracy, contemporary reference frame.

Apart from participating in working sessions at NOAA/NGS detailing Continuously Operating Reference Systems (CORS), High Accuracy Reference Networks (HARNs), geoid models, datum transformations, and GPS data analysis, the Iraqi delegation also made courtesy calls to various other government agencies and to ACSM. Currently, Iraq has no formal professional organization for surveyors. The visit to ACSM, spearheaded by Dave Doyle, chief geodetic surveyor of NOAA/NGS, was part of an effort to introduce the Iraqi delegation to all the aspects involved in developing a robust system for capturing and distributing geospatial information. A crucial aspect in that exchange, according to Doyle, is a mechanism for two-way exchange of information between the public and private sector—professional associations.

At ACSM, Executive Director Curt Sumner briefed the visitors on the entire spectrum of disciplines represented by the ACSM Congress. He highlighted the existence of 50 different

state laws governing the principles and practice of surveying and mapping and the work being done to achieve some unity in licensing requirements across states. He also explained that boundary surveys have historically been the main preoccupation of U.S. surveyors, as land ownership and protection of that ownership is a big issue in the U.S. He also pointed out the differences between the metes-and-bounds method of defining property boundaries (as done in the 13 original colonies) and the public land system, which is based on a rectangular grid.

NOAA/NGS helps connect local surveys via established horizontal and vertical datums. It is this expertise that the Iraqi professionals stressed they need to build a comprehensive cadastral database for their country. They reported the most pressing challenges they currently face are defining an accurate datum and converting old coordinates to a new geocentric system. The current security situation makes this work difficult, however, as their ability to move freely is severely limited. Furthermore, the Ministry does not currently have sufficient sophisticated GPS receivers to develop large-scale survey projects. Handhelds are common, but even though GIS software is available for building the database, the first thing the software asks is, "What's your country's datum?"

Sumner cautioned that measurements derived by surveying the land and those shown on a GIS map may not agree. Hence, one of the urgent tasks for the American surveyors is promoting an understanding among GIS users about which data are deemed accurate and reliable and which are not acceptable for portraying land boundary

The Iraqi delegation meeting with ACSM's Executive Director Curt Sumner. Bill Henning and Dave Doyle of NOAA/NGS and Dennis Brandon of the U.S. Army Corps of Engineers accompanied the delegation.



information and for the design, modification, and construction of improvements to real property.

U.S. is fairly well coordinated on the horizontal level, but on the vertical, we still have many problems. Answers are urgently needed to such questions as, What's appropriate in a given GIS mapping situation? Do I need a license to perform such work? Does the work of people who possess no professional training for GIS mapping present harm to the general public? "GIS software developers don't worry whether it works on the ground," Sumner said, "and so it's up to us, surveyors and GIS professionals, to make it work always and everywhere."

"It's in such national inter- and intra-profession debates as on the survey-GIS "interoperability" that professional organizations play a particularly important role," remarked Doyle. "ACSM interacts with both the private and public sectors, and, as a result, it inherently has a better grasp of the issues involved."

Defining GIS mapping within the practice of professional surveying is high on ACSM's priority list. The U.S. Congress is working on advancing the adoption of a suitable definition, and ACSM is fully involved in the process.

Several efforts are underway at the federal and state levels to build comprehensive GIS databases, but the problem, of course, is the quality of the metadata, which is often questionable, not known, or ignored. GIS data do not "respect" political boundaries, so the data flowing into these databases [with the exception of NGS' geodetic grid] are of various, often dubious, quality.

The Iraqi delegation cited similar problems in their work with poor data quality. Nevertheless,

their goal is to build a comprehensive GIS for the entire country. In the forefront of this effort is the GIS Center, which plays a leading role in Iraq in the use of remote sensing, and the Surveying Division, which is responsible for producing thematic and cadastral maps. The visit to the U.S. was intended to broaden Iraqi expertise in database building and sharing of data at the government level.

Among other things, the Iraqi surveyors wanted to know how best to transfer old information into their new cadastral database. "That's where a professional organization such as ACSM comes in," said Doyle. "New surveying and GIS technology is pouring into the market. What better place to introduce the new concepts on which this technology relies than a national professional association?"

ACSM embodies the mechanism whereby users can tell vendors what they need. As a non-governmental entity, ACSM can also query the suitability of a given product for a particular public application.

Professional societies provide a vital service to the public and private sectors in terms of feedback, information sharing, and protection of the public good. The ACSM Congress is a forum where all of us can voice concerns and share experiences across disciplines—surveyors, geodesists, cartographers, GIS professionals. It's a forum where policy makers talk to technology companies and users of the technology. As such, professional societies such as those represented within ACSM are influence brokers in the transnational quest to build strong geospatial databases and communities.