

Presented at 2006 ESRI Southeast Regional User Group Meeting

Converging Professions Hit a Little Turbulence

By Janet Jackson, GISP and Randy Rambeau, PLS

CONVERGING PROFESSIONS HIT A LITTLE TURBULENCE

Pavement and asset management at an airport is a big job, and that's where GIS can really help. But first, you have to get the airport base map information into a useable format that can be imported into a GIS ready for analysis. That involves obtaining a basic survey, flying aerial photos, performing highly accurate stereo mapping followed by a quality digital translation from CAD into GIS.

This presentation will highlight how all the different professionals (GIS, CAD, PLS and Photogrammetrists) worked together to achieve a successful project. But not all aspects were successful from the beginning. As the project "lifted-off" each group realized that they had to learn and understand the other's roles and professional responsibilities in order to do *their* jobs. Once our basic turbulence was discovered and a plan was in place it was smooth flying for the rest of the project!

TAXIING TO THE RUNWAY

Combining various disciplines to execute a single project can sometimes create a bit of turbulence. Take the disciplines of surveying and GIS, for example. The professions vary dramatically. Surveying has been recognized for centuries, while GIS is a new profession only three decades in the making. Surveyors use proven scientific mathematical methods in their approach, while GIS professionals rely on accepted practices developed through education and experience.

The engineering and surveying firm of McKim & Creed recently merged these two professions for a pilot project that enhances safety and allows for quick and efficient regulatory reporting at an airport facility. The objective of the project was to provide high-quality base-mapping information that airport officials could use for height analysis, pavement management, environmental statements and annual inspections. To meet the objective, all existing field assets, such as edge of pavement, two-foot contours, building footprints, runway lights, signage and holding lines, had to be mapped and stored in a central repository (GIS).

The complexity of merging survey-quality control field and aerial data into a final GIS data layer presented the perfect opportunity for the surveying and GIS professions to work together on this assignment.

BECOMING AIRBORNE

The professionals piloting this project were to provide the client with:

- a smooth takeoff, provided by effective communication and professional procedures,
- seamless connections, in form of compatible software and congruent data preparation and transfer,
- and a flawless landing: the best-quality deliverable at a reasonable cost.

To accomplish this, the survey field crews and photogrammetrists on our team were tasked with:

- obtaining new aerial photography of the site at an altitude suitable to map details,
- acquiring X/Y/Z coordinates,
- performing stereo compilation for the planimetric features and topographic mapping, and
- preparing and transferring data from CAD to GIS.

Their equipment included an aerial camera, survey-grade RTK/GPS units, electronic total stations and data collectors, and a DVP Softcopy™ system.

The GIS professionals on our team were responsible for:

- designing the database,
- providing graphical support,
- collecting feature data,
- conducting spatial analysis, and
- preparing and transferring data from CAD to GIS.

GIS equipment included ESRI ArcGIS Spatial Analyst, Application Builder, ArcPad, Tough Book laptops, and Trimble Pathfinder mapping grade GPS units.

To ensure the highest level of accuracy, all base-mapping data was collected under the direction of a licensed surveyor. And while the surveyors were busy outside gathering base-mapping information, the GIS professionals were back at the office organizing a highly-customized geodatabase that supported the project's objectives by creating a "place holder" for each piece of collected data.

CHECKING THE RADAR

After we were cleared for take-off by the client, we had to make sure our team didn't experience gate hold and taxi delay caused by miscommunication and a lack of understanding about each discipline's roles and responsibilities. Our radar showed a chance of turbulence in the form of challenges, which we proactively circumnavigated with solutions whenever possible.

Challenge #1: Every team member had to understand his or her task and assignment and how it related to overall project success.

Solution: We wrote a clearly-defined, step-by-step work plan that was shared with the entire team at the very beginning of the project. A combined project kick-off helped the entire team understand each other's tasks and how those tasks fit into the big picture. We tracked assignment progress with Microsoft Office™.

Challenge #2: Team members hadn't worked together before and brought with them their own styles and vocabularies.

Solution: We held frequent meetings to discuss progress and challenges. Project limits were illustrated with large graphic examples, which gave everyone a clear understanding of what the other was talking about. In addition, we cross-trained teams to acknowledge, understand and accommodate different points of view.

Challenge #3: Not all team members were familiar with the various data formats.

Solution: We conducted lengthy and informative discussions about software and export/import options, and agreed on standardized formats and procedures.

Challenge #4: Data transfer had to be consistent.

Solution: Upfront, we established data transfer protocol and developed a clear set of mapping guidelines. We agreed that all features would be mapped as singular entities, and established a rule of no gaps between line segments.

MAKING A SMOOTH LANDING

This pilot project was successfully completed within the established timeframe and budget. The GIS developed in this project allows aviation officials to perform the following spatial applications:

- **Height analysis:** Now that cell phone use has become widespread, so has the problem of locating cell towers in areas that do not interfere with flight approach plans. The GIS spatial analysis graphically shows the areas in which cell towers can be safely located.
- **Pavement management:** The data can be easily imported and exported via shapefile extensions to numerous software programs designed specifically for pavement management.
- **Environmental statements:** Customized graphical reporting (maps) can be accomplished very efficiently to enhance any written report required for regulation purposes.

- **Yearly inspections:** The GIS can be used to track updates to aviation property, infrastructure and surrounding conditions.

C.D. Jackson, special assistant to President Eisenhower, once said, "Great ideas need landing gear as well as wings." To successfully complete this project, we made sure we had the land gear in place before we ever took off. We clearly defined tasks and assignments so all team members knew what was expected of them from the very beginning. We held frequent meetings to review progress and challenges, cross-trained teams, and used graphic examples to enhance communication. And finally, we agreed on standardized formats and procedures upfront.

The result is a project that allows for quick and efficient regulatory reporting and, most importantly, enhances airport safety.

AUTHOR INFORMATION

Janet Jackson, GISP, GIS Manager and Randy Rambeau, PLS, Survey Manager

McKim & Creed, P.A.

200 MacKenan Court, Cary, NC 27511

919.233.8091, FAX: 919.233.8031

jjackson@mckimcreed.com, rrambeau@mckimcreed.com