



# STREAMLINING

An aerial mapping and photogrammetry firm discovers that new GIS software allows for faster and easier delivery of imagery.

## the Process

By  
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Imagery has historically held an important place in geographic information system (GIS) software. Whether serving as a natural background for GIS applications, for direct interpretation of data, processed for statistics and analysis, or as the source for many vector maps, imagery has many demands placed upon it. While huge volumes of imagery from many sources exist today, accessibility to this data poses a challenge, and as a result, only a fraction of what is available is actually accessed. Increasing access to the images increases their value, and since images are a snapshot in time, the faster they are made available, the more useful they are to those who need them.

As the volume of imagery increases, GIS organizations feel pressured to find solutions to provide this data to their users as quickly as possible. Often, the same source data is

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copied and processed several ways to produce different representations or image products, including multiple band combinations, enhancements, and vegetative indexes.

A company who understands this well is Sanborn, located in Colorado Springs, Colorado. Sanborn first became known back in 1866 through its finely detailed fire insurance maps, which were so well created they are actually still used today. Now part of the DMG Information Group of companies, owned by the United Kingdom-based Daily Mail and General Trust, Sanborn continues to provide geospatial solutions to its clients. Government agencies and companies in environmental management, national mapping, utility, and energy markets rely on them for their mapping needs.

Sanborn was the first commercial mapping firm to develop and implement a system for producing digital orthophoto imagery without distortion. Sanborn's images include surrounding streets and other cultural features not ordinarily visible in standard orthophotos, obtained using a method they developed called Method for the Elimination of Terrain and Relief Displacement in Orthophotography (METRO). This type of imagery is being used by a significant number of GIS users as a useful data base layer for topographic, planimetric or cadastral mapping, utility data capture, and accurate project analysis and design implementations. These images are created as both second-generation imagery for clients requiring geo-referencing to their original GIS data as well as first-generation orthophotos of the highest accuracy.

### Larger Projects Mean More Terabytes

Many of Sanborn's imagery projects cover large areas with many customer stakeholders. Customers include large counties such as Maricopa County, Arizona, councils of government, and statewide initiatives. The average delivery size of an imagery project is 144 gigabytes for one area to 4.4 terabytes for up to 30 delivery areas, based on an average tile size of 2,000 by 3,000 feet for a delivery area size of 2,000 tiles, the equivalent of 400 square miles. Sanborn's delivery format is RGB with a six-inch pixel size. Processing hundreds of terabytes of orthophotos per month for customers like these required Sanborn to find a solution for clients who need massive amounts of imagery for their applications without extensive preprocessing or alteration of source data.

Sanborn chose ArcGIS Image Server software from Redlands, California-based GIS company ESRI. Part of ESRI's ArcGIS family of products, ArcGIS Image Server provides fast access to large quantities of file-based imagery. Sanborn was attracted to its ability to process on-the-fly and on-demand. The specialties of the two companies led Sanborn to become

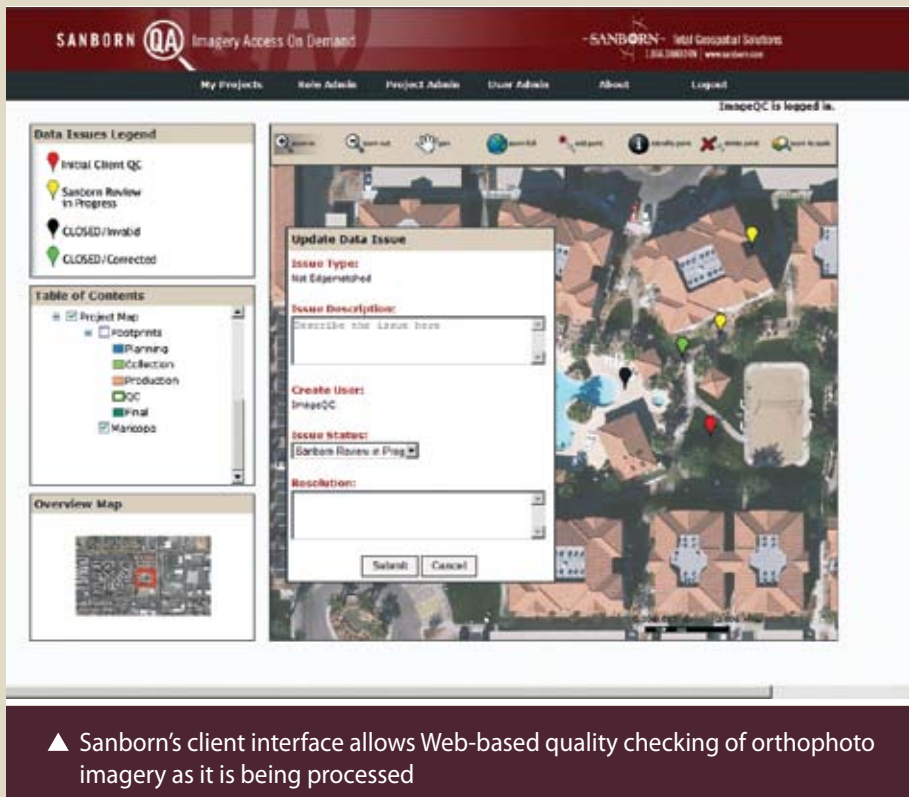
an implementation partner of ESRI's. "This allows Sanborn to offer our clients a solution that gives them the images they require immediately and with consistency," says John Copple, chief executive officer of Sanborn.

Sanborn uses ArcGIS Image Server to diminish the interval between when an image is collected and when it is available to users. Traditionally, image processing and distribution were considered two separate stages in image use. Imagery was first processed and mosaicked into a large dataset and then put on servers for dissemination. This separation has caused many problems such as long preprocessing and loading times and data redundancy that exacerbates data storage issues and hinders efficient data management. Now, these two stages combine into one. The data received from an imagery supplier can be directly served. This enables administrators to maintain only the primary imagery, while creating multiple specialized products on the fly when required. This is a significant and unique paradigm shift in how imagery is managed, processed, and distributed.

Using ArcGIS Image Server, Sanborn created Sanborn Quality Assurance (QA), a client imagery interface that facilitates Web-based quality checking of Sanborn created orthophoto imagery products. Clients can view imagery through a standard web browser as the image is being processed and add digital "issue points" to areas within the imagery they feel may require attention. The ability to do this while Sanborn is processing the imagery simplifies data management and reduces the redundancy of the data as well as the delay in making the imagery accessible.



▲ A representation of Landsat 1G satellite imagery served directly by ArcGIS Image Server



▲ Sanborn's client interface allows Web-based quality checking of orthophoto imagery as it is being processed

This real-time error reporting improves the Sanborn-to-customer interface by performing quality assurance reviews online as soon as the data is processed rather than waiting for the orthophotos to be processed and delivered on CD or other storage devices. The online QA tool also reduces quality check error rates while ensuring customer requirements are met. This in turn, shortens customer delivery schedules and gives clients the highest quality possible.

### Imagery Available Sooner

Clients can review orthoimagery as soon as it's finished processing. Users are granted entry to the image Web application via secure login privileges to access a particular project. Clients may add to the project QA flags that require additional review, and these become immediately available inside the main GIS for viewing by Sanborn's production staff. Here they are immediately available for technicians to review and resolve. These digital issue points give clients the ability to efficiently describe errors, and in turn, they can make fast, responsive changes to the imagery such as color balancing and edge-matching. A reporting tool gives up-to-the-minute quality control status of the project. This makes the problem resolution process more streamlined, assisting in a problem-free resolution process.

All imagery is served from a central image server to the client-side computer within a mapping interface in a standard Web browser format. ArcGIS Server 9.2 authors map documents that contain the image server data and QA/QC features classes. ArcGIS Server ADF functionality gives Sanborn map navigation and feature editing. Edit call type buttons control edit call digitization.

ArcSDE technology provides access to the data, including stored QA/QC points. Using this solution, the QA/QC points are immediately ready for status and resolution, and updates to the points by the QA team are available online.

ArcGIS Image Server is used for fast access to extensive imagery using on-the-fly server-based image processing. Built on fully scalable enterprise client/server

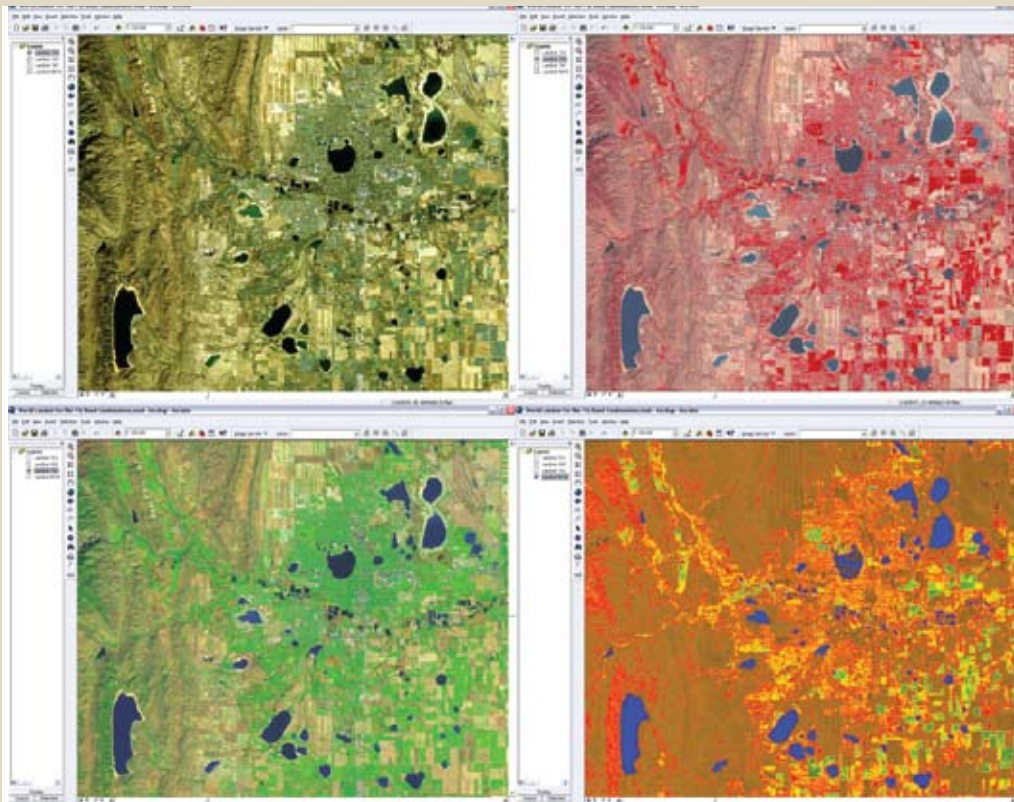
architecture, it offers multiplatform GIS/CAD/Web client access and direct access to many file formats and compression. Using the software, multiple imagery projects can be created from a single source.

Users of the system login online using a standard Web-based browser to access their project. Once logged in, the QA user is shown a list of projects they can access. By clicking a link from a pull-down menu called Map, the user opens the QA environment for their project. The initial map displayed shows the project status through colored pixels, green specifying tiles available for review, red for areas not yet available. The user can then add and view the current issue points for the project. Points are symbolized by status and can be selected to view more details.

Sanborn prototyped the system with customers from Colorado and Texas. Based on their prototype experience and customer feedback, the company is releasing a next-generation system for use by Maricopa County, Arizona. This county covers approximately 9,200 square miles, with an expected data delivery size of about 4.4 terabytes.

Implementing the system took approximately 150 man-hours, including initial design, purchasing, implementing software, customization, testing, and finally release. Sanborn QA requires nothing more than a standard Web browser and high-speed internet connection. After clients use the system and they are satisfied with the quality of the imagery, the project is delivered through turnkey ESRI Image Server delivery, on-demand data staging for after-flight review, or traditional hard drive or DVD.

According to Copple, "The instant online imagery review accelerates our quality assurance and quality control review. We have given our customers the option to completely eliminate physical shipping requirements for QC purposes." Sanborn has also found they have successfully reduced their clients' IT involvement and provided for a secure solution for project management. Using this solution, Sanborn clients get fast image access optimized to their require-



▲ Four different representations of Landsat 1G imagery served directly by ArcGIS Image Server

ments with improved image quality and image metadata. By serving data to their clients directly, Sanborn has realized an overall production-to-delivery time decrease of approximately 66 percent in some cases. Due to the schedule savings and increased QC accuracy, Sanborn can improve its responsiveness while saving the customer costly edit and deliverable delays.

“It’s now easier for us as a company to assign our resources and offer flexible, efficient delivery options to our clients,” says Mindy Brown, vice president of corporate marketing at Sanborn, in looking back. With the volume of information facing GIS organizations increasing all the time, this should help them increase their efficiency and improve quality. ↓

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