

# DATA DEVELOPMENT

## Scanning

Most organizations that are intent on implementing GIS or FMIS technology have data of their own that needs to be converted to a format that is compatible with the system under development. Much of this data is normally in hard copy format. As-built drawings include not only the locations of features that need to be vectorized, but also attribute data that needs to be incorporated into the dataset. There are really two reasons to scan available hard copy sources. First, it is common to scan documents in order to preserve them from further deterioration. Often these scans can be and should be linked to the features that are depicted thereon. Scans can be done in binary, grayscale, or full color at a variety of resolutions depending on the quality of the original and the intended use in the system.



Second, documents that are scanned can be “registered” to the selected coordinate system of the GIS or FMIS. When this is done, the scanned image can be overlaid on the remainder of the base data in the system and can often be used as a source from which vectorization and attribution can be accomplished. A secondary benefit from this is that the registered raster image can be preserved in a format that is readily accessible in the GIS or FMIS.

Spatial Systems has been scanning documents for these purposes since its inception in 1995. We offer scanning of all size documents in binary, grayscale, and full color at resolutions ranging from 50 to over 400 dpi. We also offer registration of the resulting raster images as necessary. Further, we offer scanning of smaller scale documents, including film (aperture cards) based document storage systems, and letter or legal sized paper.

## Acquisition/Processing

Some data is derived from remote platforms like satellites, small planes, and helicopters. Satellite imagery is typically of a lower resolution and is suitable only for large scale applications. In a statewide, countywide, or municipal environment, it is not uncommon to utilize digital aerial photography with a resolution of as little as three inches—that is each pixel or dot in the image represents an area on the ground three inches by three inches in size. All imagery can be obtained in either grayscale or color format.



A relatively new technology that is used for deriving elevation data is Light Detection and Ranging (LiDAR). LiDAR systems utilize aerial mounted lasers that fire at between 30khz and 200khz (30,000 to 200,000 times per second). The laser bounces off the first thing it hits and the reflection is detected by a sensor on the plane. The time it takes for the light pulse to travel from the plane to the object below and back determines the distance between the plane and the object. The plane is equipped with precise navigation equipment that tracks the location and elevation of the laser, from which the elevation of the ground can be determined with remarkable precision. From this imagery and LiDAR data, Spatial Systems can derive locations of visible items and elevation data accurate enough to allow us to produce one foot contours to national map accuracy standards.

Spatial Systems assists our clients in writing the specifications for the acquisition, procuring, and subcontracting for this data; provides processing of the resultant data and development of deliverables, performs QA/QC services on the data, and delivers final workproduct to our client.

## Vectorization/Attribution

### Vectorization Services

Traditionally, paper documents have been used to clarify and store data. A wide range of industries including utilities, land records, and transportation have previously kept their data in a paper format. These paper documents are frequently old, fragile, illegible, vulnerable to destruction or misplacement (even theft!), space consuming, and not viable for useful automated data analysis. The scanning and vectorization process allows these paper documents to be brought into the digital environment and converted into GIS or FMIS data layers.

Unique data such as parcels, utility pipes, town/county boundaries, shorelines, and street centerlines or internal features like walls, doors, electrical or HVAC infrastructure, etc. can all be accurately vectorized into a GIS or FMIS from these original documents.

#### ***New Data***

Spatial Systems can help your organization create high quality and highly accurate GIS or FMIS data layers from the beginning. Data such as street centerlines can be created to accurately reflect digital orthophotography or county boundaries can be defined by current zip code partitioning. Building electrical systems can be vectorized and the outlets associated with specific breakers in the panel box can be identified.

#### ***Existing Data***

An organization's data analysis is only as good as the data they have. Outdated GIS or FMIS data layers provide organizations with inaccurate and time wasting analysis. As infrastructure changes, so does all of its associated features. Outdated data quickly leads to inaccuracies. Using the latest digital imagery, Spatial Systems can modify the location, placement, or boundaries of features to better reflect their new or current spatial dimensions.

### Attribution Services

The usefulness and quality of your data is not only affected by the spatial accuracy, but also by the values associated with the data. Organizations cannot determine the importance of spatial data if there is no linkage to the non-spatial values that describe them.

Spatial Systems can improve the quality of your data with our attribution services. Data fields can be customized to fit an explicit need of your organization or they can be created to follow a set of nationally defined standards in a specialized domain.

Both our vectorization and attribution services are checked with Quality Assurance/Quality Control methods to ensure the highest accuracy and quality of work for our clients.

## Field Investigation

Often, documents that are available for conversion do not contain up to date information or information that is complete enough to satisfy the needs of the intended user. At times, there is simply no substitute for getting into the field and collecting additional information. Spatial Systems Associates can provide the resources necessary to collect this data, whether inside or outside of the envelope of the building infrastructure. Examples include verification of points of egress for addresses associated with street centerlines; location of manholes or valves; invert elevations; verification of the existence and location of interior walls, doors, windows; tracing which electrical outlets are connected to which circuit breaker; the locations and connectivity of HVAC components, etc.



For more information on converting your data into a digital format for use with GIS or FMIS technology or updating existing GIS and FMIS data layers, please contact our sales team at [sales@spatialsys.com](mailto:sales@spatialsys.com).