# APPENDIX H — PICTOMETRY EXPLANATION

Pictometry, a small technology firm headquartered in Rochester, NY, creates libraries of a revolutionary new form of digital, full color aerial imagery and geo-spatial information. Pictometry captures every square foot of an area from as many as twelve directions, typically with pixel resolutions ranging from two feet to 6 inches. While Pictometry libraries consist of nadir (straight down) images like ordinary aerial imaging, over 80% of the images are oblique (taken from angles) so that features can be easily seen in their entirety. These images reveal the front, back, and sides of objects of interest rather than just their tops. Within seconds, a user can literally view and analyze any house, building, intersection, fire hydrant, tree or any feature in the photographed area from their laptop or workstation. Pictometry delivers its image libraries with a set of software tools that, for the first time in the commercial market, permit users to easily measure and annotate the oblique images.

This new technology is dynamically changing the use of visual information systems in the following ways:

- **Geo-referenced oblique images** – Pictometry has broken new ground on providing photorealistic oblique images that can still be accurately geo-referenced down to the pixel level.
- **Instant recognition of any location** – Because of their oblique nature, Pictometry images do not require photo-interpretation skills in order to recognize features in the image. The data is presented from a view we are all used to seeing.
- **Client image library** – Pictometry has created a centralized storage and delivery system that allows all of the images captured to be stored in a central repository and quickly queried at the click of a mouse to find all images that point to a region of interest.
- **Easy and intuitive** – Pictometry's Electronic Field Study™ software (EFS) has been designed to be both powerful and easy to use, features that are important to first responders. With very little training, users can become immediately productive with EFS. GIS expertise is not required.
- **Intelligent Images**™ – Pictometry's all-digital, fully geo-referenced images include all the data necessary to use the images without any required knowledge of coordinate datums or projection systems. A user need only double click on an image and EFS does the rest.
- **High resolution** – Pictometry's high-resolution images allow viewers to see detailed information of building attributes such as doors, windows, number of floors, and building composition. Users can also inspect and easily identify roads, water sources, manholes, and many other neighborhood area features.
- **Renewable image libraries** – Pictometry's image libraries are periodically refreshed, allowing customers to analyze changes that have taken place over time.

Applications for Pictometry are wide-ranging. From engineering firms and community planning departments, to first response agencies and homeland security measures, Pictometry provides visual intelligence that lets users see almost everywhere, measure anything, and plan everything. Typical uses include: public safety, E911, transportation, tax assessment, environmental, homeland security, community planning, utilities, real property, engineering, and public health.

Among its many features, Pictometry provides users with the capability to:

- Measure the length, width, and height of any feature in an image
- Click on any feature in an image and get its geo-coordinates and/or elevation
- Determine the bearing of a road and angles of intersecting roads or physical features
- Automatically calculate perimeter, acreage or square footage of any area or building
- Annotate images with text, lines, circles, and other symbols
- Overlay shape files and other geo-referenced data directly over all images, such as street centerlines, subway lines, plume clouds, parcel boundaries, and jurisdictional boundaries
- Create/distribute sub-libraries of images for jurisdictional or geographical specialty use
- Attach an unlimited amount of text, raster, or vector data to features within the images (such as attaching floor plans, IPEX virtual tours, and other important information to buildings viewed on the image)
- Take inventories of features, such as light poles or building entrances, and export that data to a file, a database, or another shape file
- Use Pictometry's change analysis software to easily identify and analyze change over time
- Incorporate other georeferenced files into the library, including already existing images such as USGS DOQQs.

These features are in addition to the typical image manipulation capabilities, including zoom, pan, and split screen display.

Pictometry's patented capture system guides the pilot onto flight lines, fires the camera at pre-determined locations (as often as every 3 seconds), records, and merges the image and navigation data and continually monitors the system to ensure and improve quality. Pictometry uses optimized direct georegistration equations to provide accurate images at minimal cost. Pictometry has created a number of innovations to improve this process, including a tessellated ground plane to improve oblique image accuracy and a new digital camera calibration process.

Community images are captured with a 2-foot ground sample distance and neighborhood images are captured with a 6-inch ground sample distance. Pixel

placement accuracy is based on the combination of a number of factors, including ground sample distance, terrain, and elevation model accuracy. Typically, Pictometry achieves 2- to 5-meter pixel placement accuracy with USGS DEMs in hilly terrain, but has achieved sub-meter accuracy with LIDAR data in less varied terrain. Pictometry is conducting a large scale collection of control points to produce a statistically significant sampling of the accuracies we have achieved to date, correlated by ground sample distance, terrain, and elevation model. This will allow customers to predict the accuracies Pictometry will be able to obtain with their capture conditions. In all cases, Pictometry has achieved very accurate distance measurement accuracies. For shorter distances, Pictometry measurements are within 1% of their true measurements and this improves with longer measurements.

Pictometry images are stored using a mix of industry standard and proprietary formats. The image raster data is stored in an industry standard image file format such as JPEG, TIFF or MrSID. The image geographic and capture data is stored in Pictometry's proprietary image trailer format. However, orthogonal images can have their geographic data stored in ESRI's world file format as well. Pictometry's image trailers allow the images to be organized into Client Image Libraries and accessed through Pictometry's Image Warehouse utilities. The warehouses can be on locally accessible disk volumes.

Pictometry solutions can be used as stand alone applications or as part of a comprehensive solution. The EFS software is easily integrated with other applications. Pictometry can be integrated with emergency command center software, E911 dispatch system, incident management applications, automated vehicle locater systems, and remote sensing systems. It integrates with GIS applications, including ESRI's ArcIMS and SDE.

Pictometry's Electronic Field Study software will run on most Windows platforms. Pictometry specifically tests compatibility with Windows 98, NT, XP and 2000. Installation alternatives include both server-based and browser-based applications.

Pictometry's initial approach to the market has been to sell to counties. Current inventory includes over 100 counties. Pictometry has begun to attract interest at the State level; its first State-wide contract is with Massachusetts. On the federal side, Pictometry has contracts with the Department of Energy, The U.S. Census Bureau, and the Capitol Police. Pictometry's expertise with digital imagery had resulted in a contract with the U.S. Geological Survey for a digital camera calibration system for aerial sensors, which was successfully installed at the USGS Eros Data Center. In addition, Pictometry has a CRADA with the USGS to explore applications within the Federal government for our new technology.