



Geospatial Services

Digital Aerial Imaging

LiDAR Acquisition & Processing

Photogrammetric Mapping

GIS Consulting & Implementation

The technology behind our world-class geospatial data gathering and processing systems is simply unmatched.

Like everything else in our digital world, geospatial technologies are advancing at a rapid pace. MJ Harden continues to invest in powerful new data gathering and processing tools that provide performance, quality and value to our customers.

The DMC® (Digital Mapping Camera) Aerial Imaging System

Because the precision of the aerial imaging process determines the standard of quality for all subsequent image-based map products, MJ Harden utilizes the latest in digital aerial imaging technology, the Digital Mapping Camera (DMC®) system from Zeiss/Intergraph.

The DMC is a fully-integrated imaging and geospatial data capture system that incorporates several important sub-components into a powerful imaging platform.



- ▶ *Advanced Flight Management System*
- ▶ *8-head Camera with Imaging Control System*
- ▶ *Airborne GPS (ABGPS) Receiver/Data Recorder*
- ▶ *Inertial Measurement Unit (IMU)*
- ▶ *Forward Motion Correction (FMC) System*

The DMC system provides in-flight image verification that manages and synchronizes the simultaneous data capture processes to produce imagery of the highest quality, accuracy and versatility.

The ALTM (Airborne Laser Terrain Mapper) Gemini Multipulse LiDAR System

The ALTM Gemini system, from Optech Incorporated, is a fully-integrated LiDAR data capture system featuring state-of-the-art mission planning, flight management and data handling capabilities.

Multi-pulse technology allows the ALTM Gemini to capture 'dense' elevation data, which produces higher spatial accuracy (+/- 15cm or better) for modeling and mapping applications.



- ▶ *33 to 167 kHz Laser Pulse Rate*
- ▶ *80 to 4,000 meters Operating Altitude*
- ▶ *Scan Frequency of up to 100 Hz*

A fully digital workflow requires no intermediate conversion to generate digital X-Y-Z coordinates, allowing rapid turnaround of project data.



We help you gather, process, catalog and manage your geospatial information assets.

Our history of providing photogrammetric mapping products and services dates back over five decades. Milton J. Harden helped pioneer the use of photogrammetry in the U.S. while working with the U. S. Geological Survey, and eventually took his experience with this developing technology into private practice as the beginning of our mapping business. Over the years, we have carried on his legacy by continuing to advance the leading edge of geospatial science through innovation and imagination.



Our commitment to offer solutions that bring value to our customers through quality, accuracy, and schedule is backed by our parent company, GeoEye. As the world's largest provider of high-resolution commercial satellite imagery, GeoEye maintains an archive of millions of square kilometers of imagery from around the world.

MJ Harden has completed tens of thousands of mapping and GIS implementation projects, and we are known for performance and reliability throughout the many industries we serve.

Our geospatial services include:

- ▶ **Multispectral Digital Aerial Imaging**
- ▶ **Advanced LiDAR Acquisition and Processing**
- ▶ **Planimetric and Topographic Mapping**
- ▶ **Digital Orthophoto Imagery**
- ▶ **GeoEye™ Satellite Imagery**
- ▶ **Remote Sensing**
- ▶ **GIS Consulting, Implementation and Support**

From design/build engineering project support to facility asset management and advanced GIS solutions, we put our knowledge, experience and technology to work for you.



PANCHROMATIC

*Typical applications include:
Planimetric and Topographic Mapping,
Orthophoto, Engineering Design,
Change Detection, GIS Base Maps*



NATURAL COLOR

*Typical applications include:
Planimetric and Topographic Mapping,
Orthophoto, Engineering Design,
Change Detection, GIS Base Maps*

► **Digital Aerial Imaging and Processing**

MJ Harden provides high-resolution aerial imagery for photogrammetric mapping and other applications. Our *Digital Mapping Camera (DMC)* imaging system is the most versatile aerial imaging platform commercially available, and features advanced flight control and data capture technologies.

► **High Image Resolution**

Ground resolutions as small as 1½" per image pixel

► **One-Pass Multispectral Data Capture**

Simultaneously records Panchromatic (grayscale), Natural Color (RGB) and Color Infrared (CIR)

► **12-bits Per Pixel Radiometry**

4,096 values per pixel, compared to 256 values from traditional film-based aerial cameras

► **Airborne GPS (ABGPS)**

Records time stamp and coordinate position at each exposure

► **Inertial Measurement Unit (IMU)**

Captures accurate roll, pitch, and yaw data to record the orientation of the aircraft during flight

The radiometric and geometric capabilities of our imaging system produce image clarity, detail and accuracy not possible with conventional film-based aerial photography or other digital imaging systems.

► **LiDAR Acquisition and Processing**

LiDAR data capture and processing is typically used for terrain mapping, surface modeling, and for creating photogrammetric products. MJ Harden utilizes the ALTM Gemini LiDAR system. This high performance system improves on conventional LiDAR by incorporating dramatically superior data capture capabilities.

► **High Speed Data Collection**

Blazing fast 167kHz laser pulse repetition frequency with up to 4 measurable returns possible from a single outgoing pulse

► **Increased Data Coverage**

Provides dramatically increased data coverage and effective collection rate over other LiDAR systems

► **Superior Performance at All Working Altitudes**

Collection characteristics permit an effective range of 80m to 4000m above mean terrain (AMT)

► **Powerful and Flexible Post-Processing**

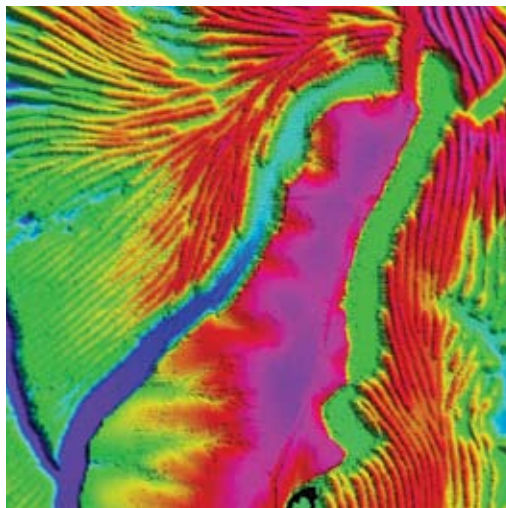
Advanced post-processing applications provide increased performance, quality and usability

The Gemini can be configured to fit a wide variety of project parameters. Variable pulse rates, swath widths and scan rates allow the sensor to be adjusted to accommodate the unique topography, land cover, and size and shape of each project.



COLOR INFRARED

*Typical applications include:
Vegetation Management, Natural Resources Management*



LIDAR

*Typical applications include:
Terrain Modeling, Surface Modeling, Topographic Mapping*



PLANIMETRIC MAPPING

*Typical applications include:
Impervious Surfaces, Landbase and Features Mapping*

► **Orthophotography and Photogrammetric Mapping**

Once the digital images are captured and integrated with the corresponding survey data, they move into a production workflow that is defined according to the specific requirements of the project. Final deliverables typically include one or more of the following products:

► **Orthophotography**

Aerial imagery that has been horizontally corrected to remove displacement caused by the terrain and the angle of view

► **Planimetric Maps**

Vector-based map layers that display the shape of features on the earth's surface (natural and/or man-made), such as property lines, structures, roads, bodies of water, etc.

► **Topographic Maps**

Vector-based map layers that utilize contour lines to represent the elevation of the earth's surface

These map products can be delivered in various scales and formats, and are used in a wide range of applications, from design/engineering projects to base maps for GIS asset management.

► **GIS Consulting, Implementation and Support**

The geospatial data management needs of every client are unique, and MJ Harden has a variety of resources and technologies that can be applied to your specific needs.

► **Implementation Planning**

Needs assessment, technology application and deployment all require a well-developed plan to be successful

► **Data Acquisition and Database Development**

Bring together new and legacy geospatial data into GIS-friendly formats that are easily accessible and manageable

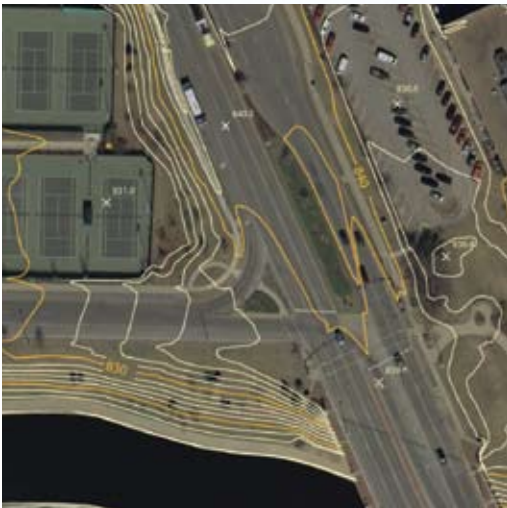
► **GIS Implementation**

Dependable solutions based on proper analysis of the past, present, and future operations

► **GIS Support Services**

Extensive experience with many varieties of systems provides a knowledge base for providing trustworthy, cost-effective support

MJ Harden's team of GIS consultants, photogrammetric mappers, surveyors and data management professionals apply proven technologies to help you develop, manage and maintain your geospatial assets.



TOPOGRAPHIC MAPPING

*Typical applications include:
Civil Engineering Design, Land Use Planning
and Development, Water Runoff Management*

GIS (Geographic Information Systems)

*Typical applications include:
Land Ownership Records, Utilities Management,
Emergency Services Management*

