

High Definition Survey Services for Surveying, Engineering, and Construction

**Cullinan Engineering Co. Inc., a surveying leader throughout New England,
looks to the future with High Definition Survey Services.**

Established in 1940, Cullinan has developed a reputation for providing quality civil engineering, surveying, and transportation design services to public and private sector clients throughout New England. We are pleased to announce the addition of our new High Definition Survey (HDS) Division to complement our growing list of surveying services. We are positioned for tomorrow's competitive market, and remain at the forefront of cutting edge technology.

The Technology



Cullinan utilizes a portable, high definition survey (HDS) system that captures, visualizes, and models complex structures & sites with an unprecedented combination of completeness, speed, accuracy, and safety. From up to 100 meters away, our surveyors simply orient the scanner toward the scene, select the desired measurement area & resolution, and then auto-scan at speeds of 1,200 points per second. This HDS system remotely captures complete natural surface geometry of exposed surfaces in minutes in the form of dense, accurate "3D point clouds", ready for immediate use. With spacing between points as accurate as 1 mm, and with every 3D point accurate to 6 mm, Cullinan can capture a high level of detail for your project. This surveying advantage is critical for architects, contractors and facility managers.

The Cullinan / HDS Technology Advantage

HDS Technology offers many advantages over traditional survey methods, and:

- Helps reduce construction errors / delays, field re-work, and, therefore, overall project costs.
- Creates as-built records / surveys for difficult facilities and inaccessible areas.
- Provides detailed as-built and topographic surveys for precise site profiles and volume calculations.
- Can be used indoors or outdoors.
- Is eye-safe.
- Does not interfere with on-going facility operations or construction activities.

AUBURN

200 Auburn Street
Auburn, MA 01501
P: 508-832-5811 F: 508 832-5799

CAMBRIDGE

501 Cambridge Street, 2nd Floor
Cambridge, MA 02141
P: 617-679-1601 F: 617-617-679-1922

LAKEVILLE

Lakeville Corporate Park
10 Riverside Drive, Lakeville, MA 02347
P: 508-946-9911 F: 508-946-9955

Surveying Applications

Cullinan's surveyors can utilize the HDS system without disrupting on-going site operations. HDS technology yields 3D measurements and results immediately in the field, and provides a spontaneous snapshot for ongoing fieldwork and modeling activities. Cullinan uses HDS technology for:

- Engineering surveys
- As-builts of buildings and facilities
- Profiles, volumes, and area calculations
- Topographic detail surveys
- Fabrication and construction inspection
- Conceptual design and interference checking

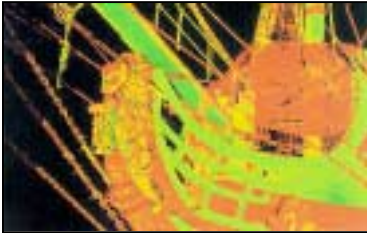
The application of laser scanning technology has been used to produce 3D mapping of:

- Antennas
- Piping & industrial facilities
- Highway construction projects
- Topographic surveys
- Historic building facades and interior details
- Mining sites and waste dumps
- Quality control for the ship building industry
- Modeling sets for movie special effects
- Mapping archaeological sites
- Bridges
- Planning highway cut sections

Cullinan can save time and add value to your project.

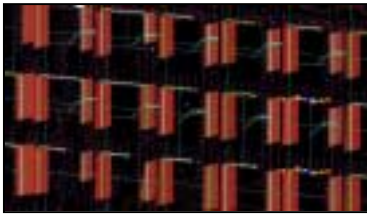
Representative High Definition Survey Projects

Cullinan has utilized our HDS system for the following projects:



HMS Rose at the Newport Shipyard, Newport, RI:

Cullinan completed a high definition survey of the exterior of the HMS Rose, a replica of an 18th century Royal Navy Frigate. Cullinan captured a rich 3D point cloud that was used by a motion picture company to make computer-generated models of the ship for replication on a movie set. Cullinan captured the contours of the entire ship, rather than just the hull, and completed the field work in just one day. Our scan is featured in the movie *Master & Commander: The Far Side of The World*, starring Russell Crowe.



Window As-Builts for Simmons Hall at MIT, Cambridge, MA:

Cullinan was contracted to locate over 2,800 windows so prefabricated window boxes could be installed in plumb columns. The locations were also used to ensure proper spacing between the windows so a prefabricated metal exterior facing could be fastened to the building. Utilizing our HDS system, Cullinan located all 2,800 windows in one week; conventional surveying methods would have taken over 18 weeks.



Land Court Condominium As-Built at the Belvedere Condominiums, Boston, MA:

Cullinan completed existing conditions survey, provided property line plans, and performed construction layout for this building, one of Boston's premiere condominium complexes. Cullinan also completed site as-builts and depicted all building features utilizing our HDS system. With the rich 3D point cloud captured on-site, Cullinan was able to easily relate the building overhangs to the property lines. These activities were conducted in a congested construction zone, and the entire building was located in just eight hours.



Surveying at the East / West Office Buildings, World Trade Center, Boston, MA:

Cullinan was contracted to obtain locations of a viaduct and the adjacent site for the design of this new mixed-use building. The tunnels below grade were located so the caissons of the new building could be strategically placed between the tunnels. Cullinan utilized our HDS system to collect locations of the viaduct, tunnels, site, and West Office building. The viaduct and underground tunnels were geo-referenced together to make one 3D model, which was referenced to State Plane Coordinates. On a second project, Cullinan obtained locations of the West Office Building's roof overhang for a property line survey. Project challenges included working around a congested construction site, obtaining MassPike permitting, and obtaining enough control data to stitch together over 100 scans.

AUBURN

200 Auburn Street
Auburn, MA 01501
P: 508-832-5811 F: 508 832-5799

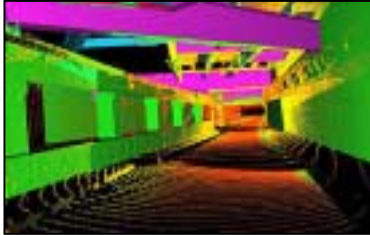
CAMBRIDGE

501 Cambridge Street, 2nd Floor
Cambridge, MA 02141
P: 617-679-1601 F: 617-617-679-1922

LAKEVILLE

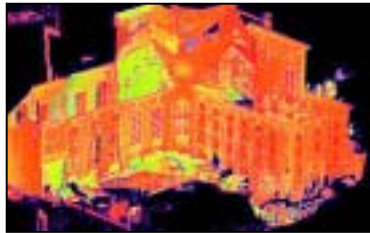
Lakeville Corporate Park
10 Riverside Drive, Lakeville, MA 02347
P: 508-946-9911 F: 508-946-9955

Representative High Definition Survey Projects, Continued



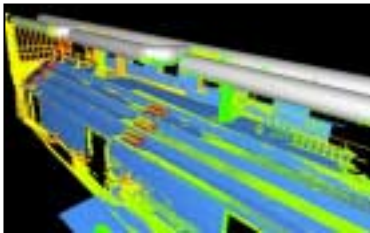
Massachusetts Turnpike Authority, Various Locations in Massachusetts:

Utilizing our HDS system, Cullinan marked grid column lines on the east and west walls on the MassPike in the Prudential Center Tunnel in Boston, and also performed a ledge outcrop survey on the MassPike in Westborough. Cullinan has provided surveying, mapping, and CAD services to the MTA since 1963, and continues to provide detailed data collection / mapping and construction control for bridge, site design, and highway construction projects along the Turnpike's 135 miles of highway.



Former Charles Street Jail Site, Boston, MA:

In support of Cambridge 7 Architects, Cullinan collected locations of the exterior & interior walls, created a 3D terrain model of building facades, and created 3D polyline sections through the building in the vertical & horizontal plane. This former jail is being converted into a hotel.



Central Athletic Facility at MIT, Cambridge, MA:

Cullinan performed construction layout, monitoring, and interior 3D laser scanning relative to the construction of this new athletic complex. Cullinan has performed survey projects at various campus facilities and academic buildings for MIT over the past 22 years, including property line, topographic, utility surveys, grades for street reconstruction, and utility relocation. Our surveys support the preparation of the Master Plan of MIT properties, which is a continuing effort as new surveys are completed and recorded into the campus master plan.

To schedule a high definition survey demonstration, please contact khogdson@cullinaneng.com.

For information on our full range of civil engineering, land surveying, and transportation design services and projects, please visit www.cullinaneng.com.

AUBURN

200 Auburn Street
Auburn, MA 01501
P: 508-832-5811 F: 508 832-5799

CAMBRIDGE

501 Cambridge Street, 2nd Floor
Cambridge, MA 02141
P: 617-679-1601 F: 617-617-679-1922

LAKEVILLE

Lakeville Corporate Park
10 Riverside Drive, Lakeville, MA 02347
P: 508-946-9911 F: 508-946-9955