



# USING LIDAR TO SOLVE INDUSTRY CHALLENGES

CHERIE DARNEL EXPLAINS HOW ADVANCES IN LIDAR SOFTWARE AND SENSOR TECHNOLOGY CAN HELP PROFESSIONALS IN A VARIETY OF INDUSTRIES MAKE MORE INFORMED DECISIONS

Now, more than ever before, geospatial data is readily available and used by professionals in a variety of industries for everything from monitoring the effects of urban development to evaluating biodiversity. Two-dimensional imagery and data has been commercially accessible for many years, and continues to be widely used while providing meaningful context about a geographic area or feature. Today, professionals across industries are beginning to also include three-dimensional sources of information, including increasingly popular LiDAR data, to their geospatial workflows because of its inherent, photorealistic qualities, providing a more complete visual reference about a particular area of interest.

## What is LiDAR?

LiDAR (Light Detection and Ranging) is used to derive various geospatial products when analyzing a region of interest. LiDAR-derived products, such as 3D features and elevation maps, all contribute to important geographic awareness. LiDAR data is collected from a sensor utilizing a pulsating light, usually a laser, to measure the distance to specific points on the Earth's surface. Because LiDAR data can precisely render the 3D shape, geometry, and geographical position

of locations, its use among the geospatial community has become much more common.

And, there are more LiDAR sensors than ever before because of the wide variety of applications for LiDAR data. Newer LiDAR sensors have improved the quality and accuracy of the data they provide, leading many to use LiDAR as a mainstream mapping tool. However, with greater quality and accuracy comes the challenge of analyzing LiDAR data sets, which can be too large to process using traditional software methods. In order to effectively analyze these large LiDAR data sets, users need a solution specifically designed to address this unique data format.

## Advances in LiDAR Software Technology

LiDAR processing and analysis software has advanced over the years from simply managing massive amounts of LiDAR data, to visualizing the data, to ultimately analyzing and exploiting it. For example, E3De™, a new LiDAR software solution from Exelis Visual Information Solutions ([www.exelisvis.com/E3De](http://www.exelisvis.com/E3De)), provides users with an interactive environment to extract important information from LiDAR data. E3De provides tools to ingest LiDAR data, to create realistic 3D visualizations,

extract 3D features from a scene, or produce 3D products and layers. Results can be included in a GIS for mapping applications, fused with 2D data for further analysis, or used to create a variety of geospatial products for use in decision making.

Information extracted from LiDAR using E3De can be included in geospatial analysis products for mapping fire fuels, creating forest inventories, monitoring vegetation encroachment and completing right-of-way analyses. E3De also streamlines the overall geospatial process by making it seamless to export results to a variety of geospatial tools, such as ENVI image analysis software and the ArcGIS® platform.

### Industry Applications of LiDAR Data

The advances in LiDAR software and sensor technology have enabled users to visualize and manipulate LiDAR data in new ways, attracting professionals in a variety of industries to explore how LiDAR can help solve their unique challenges.

### LiDAR in Defence and Intelligence

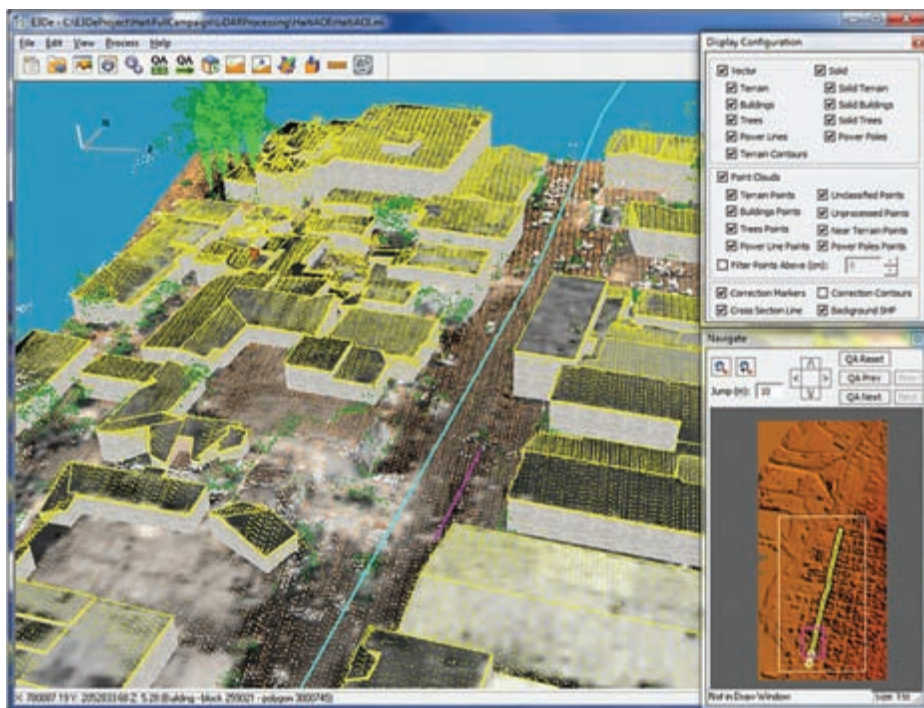
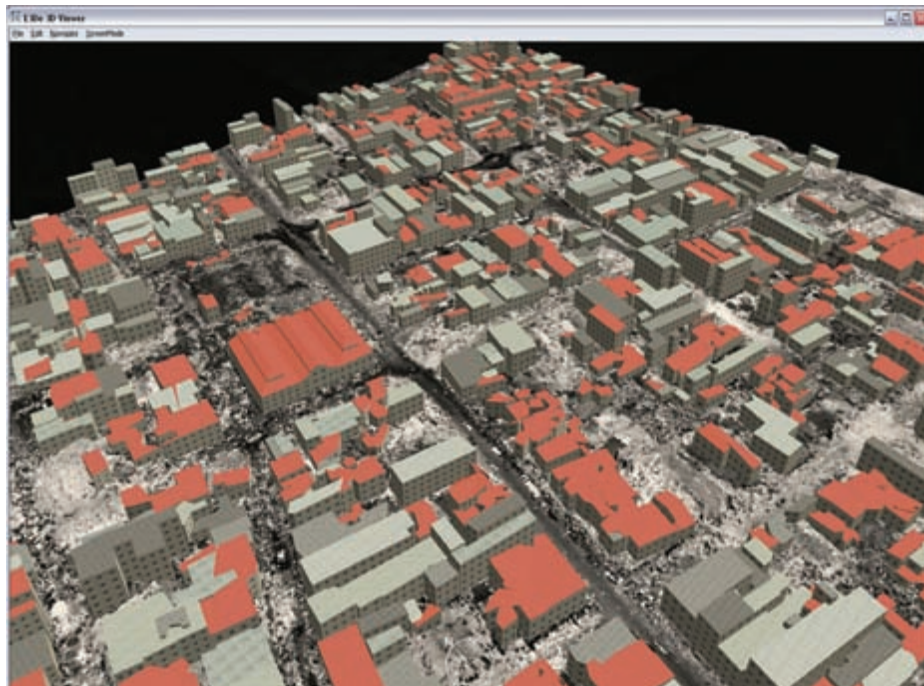
The defence and intelligence community uses LiDAR data and software analysis tools to develop a variety of geospatial products, create situational awareness and make critical decisions. Viewshed and line-of-sight studies that include LiDAR data help the forward deployed avoid dangerous hazards, select ideal locations for camps, and determine safe routes for lines of communication and troop movement. Additionally, image analysts can use LiDAR data to map buildings, canopy coverage and other vertical obstructions to determine safe helicopter landing zones.

### Environmental Monitoring with LiDAR

Many environmental-focused agencies, universities, and research institutes use both airborne and bathymetric (underwater) LiDAR data and analysis software to map shore, near-shore, shallow, and littoral habitats to comply with legislative conservation mapping mandates as well as land use planning. Many of these locations cannot be mapped with acoustic or optical data alone – making LiDAR an ideal solution. Another common application of LiDAR in the environmental industry is to create shoreline hazard assessments that map underwater hazards like rocks and sand bars, so vessels can safely navigate through the water.

### Information from LiDAR for Disaster Management

Using LiDAR data and advanced analysis tools to aid in disaster management gives emergency responders the ability to extract 3D features such as buildings, trees, power lines and power poles. This is extremely useful when planning evacuation routes, identifying a location for safe shelter, and in prioritizing



and locating geographical areas with the most urgent needs. In addition to extracting 3D features to assist in planning and relief efforts, LiDAR data used in combination with software tools allow image analysts to map hazardous areas that pose the most significant risk to personnel on the ground. Risks can include areas that have a high probability of landslides, trees that are dangerously close to falling onto power lines, or structurally unsound buildings that have the potential of collapsing. When rescue personnel have all this information available to them, they can efficiently plan disaster relief efforts so they can reduce injuries, save lives, prevent property loss, and restore crucial utilities like water and electricity to the affected communities.

### LiDAR Enhanced Products for Improved Decision Making

Today, information extracted from geospatial data plays a critical role in the decision making process of organizations. Professionals across industries look to LiDAR data and advanced processing and analysis tools, like E3De, for a more complete understanding of geographic areas of interest. Learn more about E3De software at [www.exelisvis.com/E3De](http://www.exelisvis.com/E3De) or watch a short video at [www.idl-envi.com/E3De-lidar](http://www.idl-envi.com/E3De-lidar).

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