Mobile LIDAR technology expanding rapidly

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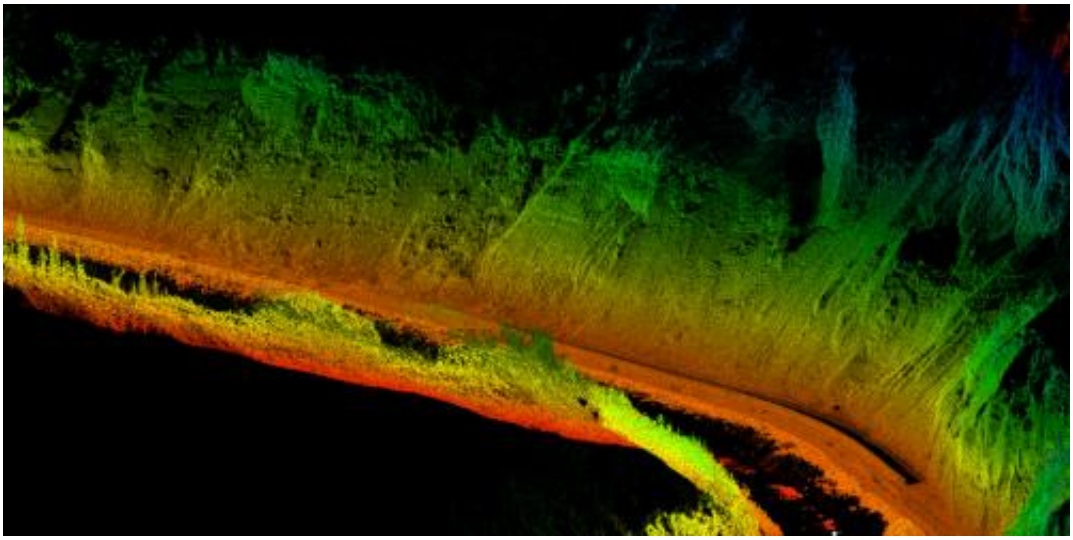

Mobile LIDAR was used to make this image of Glitter Gulch near Denali National Park in Alaska, with some nearby unstable highway slopes. Credit: Oregon State University

(Phys.org) —Imagine driving down a road a few times and obtaining in an hour more data about the surrounding landscape than a crew of surveyors could obtain in months.

Such is the potential of mobile LIDAR, a powerful technology that's only a few years old and promises to change the way we see, study and record the world around us. It will be applied in transportation, hydrology, forestry, virtual tourism and construction – and almost no one knows anything about it.

That may change with a new report on the uses and current technology of mobile LIDAR, which has just been completed and presented to the Transportation Research Board of the National Academy of Sciences. It will help more managers and experts understand, use and take advantage of this science.

The full exploitation of this remarkable technology, however, faces constraints. Too few experts are trained to use it, too few educational programs exist to teach it, mountains of data are produced that can swamp the computer capabilities of even large agencies, and lack of a consistent data management protocol clogs the sharing of information between systems.

"A lot of people and professionals still don't even know what mobile LIDAR is or what it can do," said Michael Olsen, an assistant professor of civil engineering at Oregon State University, and lead author of the new report. "And the technology is changing so fast it's hard for anyone, even the experts, to keep up.

"When we get more people using mobile LIDAR and we work through some of the obstacles, it's going to reduce costs, improve efficiency, change many professions and even help save lives," Olsen said.

LIDAR, which stands for light detecting and ranging, has been used for 20 years, primarily in aerial mapping. Pulses of light up to one million times a second bounce back from whatever they hit, forming a highly detailed and precise map of the landscape. But mobile LIDAR used on the ground, with even more powerful computer systems, is still in its infancy and has only been commercially available for five years.

Mobile LIDAR, compared to its aerial counterpart, can provide 10 to 100 times more data points that hugely improve the resolution of an image. Moving even at highway speeds, a technician can obtain a

remarkable, three-dimensional view of the nearby terrain.

LIDAR can capture considerable data on nearby terrain, as seen in this image of an ordinary highway. Credit: Oregon State University

Such technology could be used repeatedly in one area and give engineers a virtual picture of an unstable, slow-moving hillside. It could provide a detailed image of a forest, or an urban setting, or a near-perfect recording of surrounding geology. An image of a tangle of utility lines in a ditch, made just before they were backfilled and covered, would give construction workers 30 years later a 3-D map to guide them as they repaired a leaking pipe.

Mobile LIDAR may someday be a key to driverless automobiles, or used to create amazing visual images that will enhance "virtual tourism" and

let anyone, anywhere, actually see what an area looks like as if they were standing there. The applications in surveying and for transportation engineering are compelling, and may change entire professions.

Just recently, mobile LIDAR was used to help the space shuttle Endeavour maneuver through city streets to reach its final home in Los Angeles.

Some of the newest applications, Olsen said, will have to wait until there are enough experts to exploit them. OSU operates one of the few programs in the nation to train students in both civil engineering and this evolving field of "geomatics," and more jobs are available than there are people to fill them. Due to a partnership with Leica Geosystems and David Evans and Associates, OSU has sufficient hardware and software to maintain a variety of geomatics courses. But more educational programs are needed, Olsen said, and fully-trained and licensed professionals can make $100,000 or more annually.

Other nations, he said, including Canada, have made a much more aggressive commitment to using mobile LIDAR and training students in geomatics. It is critical for the U.S. to follow suit, Olsen said.

Provided by Oregon State University