UNLOCKING NEW POSSIBILITIES WITH AERIAL LIDAR TECHNOLOGY

Estimated read time: 4 min

KEY TAKEAWAYS

Light Detection and Ranging (LiDAR) is a remote sensing method that uses light in the form of a pulsed laser to measure variable distances to the Earth.

NGC has been using LiDAR to support its operations for many years, and has recently expanded its use to achieve greater efficiencies.

Light Detection and Ranging (LiDAR) is a remote sensing method that uses light in the form of a pulsed laser to measure ranges (variable distances) to the Earth.[1] Invented in the early 1960s, the concept of LiDAR was based on the principles of radar technology, but used light waves instead of radio waves. The development of airborne LiDAR systems in the 1970s further expanded the technology's applications and usefulness.

Its use grew in the 1980s and 1990s due to its ability to penetrate vegetation and provide high-resolution data. This made it an ideal tool for studying forests, coastlines, and other natural environments.

In early 2000s, NASA even began using airborne LiDAR for large-scale mapping projects, further demonstrating its potential for remote sensing applications.

The latest advancement in LiDAR technology is its integration with terrestrial vehicles (for Google street views, self-driving cars and advanced driving assistance systems) and Unmanned Aerial Vehicles or drones (for mapping and remote sensing).

LIDAR IN USE AT NGC

NGC's journey with LiDAR technology started in 2016. To satisfy NGC's strategic theme of "Strengthening Competencies", the surveyors in the Geospatial Information Services Department (GISD), decided to investigate the use of aerial methods of data acquisition.

With the support of NGC's leadership team, the GISD obtained its first small-scale DJI drone soon after. The team self-trained, developed operating procedures, conducted risk assessments and developed a relationship with the Trinidad and Tobago Civil Aviation Authority (TTCAA). At that time, there were no formal rules, guidelines or legislation to govern or regulate the use of Unmanned Aerial Vehicles (UAVs) or drones for commercial use in Trinidad and Tobago.

[1]https://oceanservice.noaa.gov/facts/lidar.html[17]

Over the past eight years, the team has had demonstrable success using drones for:

- Mapping
- Project construction progress reporting
- Asset integrity inspections
- Videography
- Live-streaming HSSE drills
- Coastal erosion monitoring
- Pipeline route design.

THE TEAM EVEN GENERATED REVENUE FOR THE COMPANY IN 2018 BY PROVIDING SERVICES FOR A PLANT TURNAROUND ON THE POINT LISAS INDUSTRIAL ESTATE.

A NEW CHAPTER FOR LIDAR

Building on the early success of the technology, the GISD has now gone a step further to acquire and implement 'Aerial LiDAR' technology.

NGC's Geomatics professionals have been researching this revolutionary technology for the past three (3) years. Aerial LiDAR systems have become safer, and more economical, efficient, and accurate. The team's research informed the acquisition of the DJI Matrice 300 (M300) RTK Drone and LiDAR sensor in 2024.

Since deployment, using strictly in-house hardware, software, and human resources, NGC conducted topographic surveys using this cutting-edge LiDAR technology on six (6) projects:

1. Phoenix Park Valve Station road rehabilitation
2. Phoenix Park Valve Station fence upgrade
3. Picton Interconnect hot tap enclosure
4. Manatee tie-in
5. Liquid Fuel Pipeline leak repair at the Guayamare River
6. Beachfield Condensate Storage Facility Project

This advanced model has offered the following advantages:

Safer working environment and risk reduction:
The inclusion of obstacle avoidance minimises the risk of collision with obstacles within the flight path. Surveyors can now capture data for areas that are inaccessible or which present substantial safety risk, such as waterlogged terrain, unstable slopes and densely forested areas. All that is required is a flight over the area of interest without physically entering the site.

Technology step-up:
This acquisition allows NGC to remain at the forefront, following global acceptance and institutionalisation of aerial surveying. The company is now one of just three agencies in the country that are actively using LiDAR technology.

Centre of excellence:
As occurred with previous acquisitions and implementation of smaller drones, this new technology cements NGC's position as a resource to support state agencies and academia. For example, in 2022:

1. The Ministry of Energy and Energy Industries requested virtual site visits using NGC's live-streaming capability

2. The Ministry of Tourism approached NGC about supplying drone photography for numerous sites around Trinidad and Tobago.

Return on investment:
Topographic surveying has two associated costs: fieldwork and data processing. The fieldwork is usually outsourced and costs twice as much as data processing. With the newer drone model, NGC has been reducing the outsourcing of the fieldwork element, thereby realising significant savings. Between June and December 2024, the drone helped the company save over $100,000.00, with LiDAR surveys conducted for six (6) projects.

A sustainable and green approach to Surveying:
Topographic field data can be acquired faster and more precisely by using fewer resources and decreasing the timeframe for data acquisition. It significantly expands the scope of information that can be gathered, thus allowing for greater efficiency over traditional methods.

People development:
The integration of new technology has led to competency development within the GISD department.

Keeping abreast of new technology continues to define the leaders in society. The benefits identified above clearly depict the advantages that can be derived from continued investment in drone and LiDAR technology, and its integration into other functions such as asset integrity management, emergency response, safety and security.

For its part, NGC's GISD will continue to champion the technology, leveraging it among other innovations to position NGC as an enterprising, forward-thinking state energy company. ■

CSR AND SUSTAINABILITY

As an extension of its efforts to build the local steelpan industry, NGC provided support to the Russell Latapy Secondary School's Steelpan Manufacturing Laboratory Programme, which was launched at the school in 2018 as part of the nationwide 'Pan in the Classroom' initiative. Under the programme, students are taught the rudiments of steelpan manufacturing.