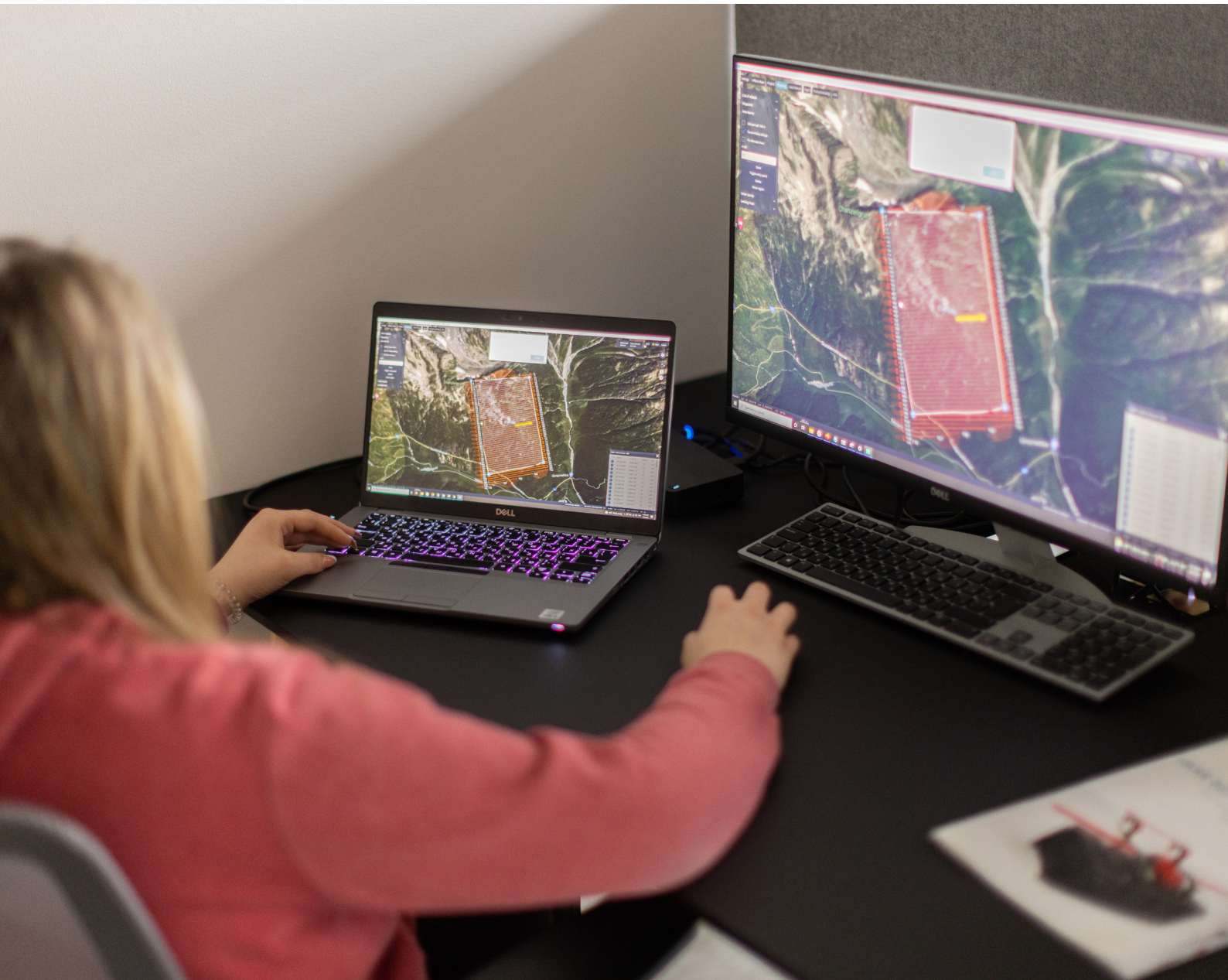
FIXAR™

FIXAR 007 UAV LiDAR SYSTEM FOR THE MOST ACCURATE 3D MAPPING



What Is LiDAR?

Aerial laser scanning of the terrain with the use of FIXAR 007 is one of the fastest and most precise methods to obtain data on the true surface of the earth, particularly, in remote locations and forested areas.

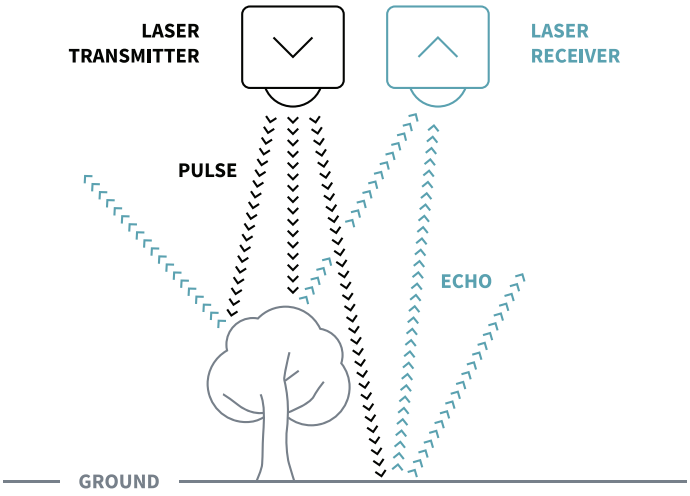
In recent years, the technology has significantly developed and has become more affordable and therefore becoming widely popular and available for efficiently performing tasks in such labor-intensive areas as engineering and geodetic surveys, especially over dense vegetation cover and rugged terrain, cartographic and surveying works, design of a field irrigation system, studies of archaeological facilities under a dense forest canopy, etc.

LiDAR (Light Detection and Ranging) is a remote sensing technology using fast laser pulses to construct a digital terrain model (DTM) or a digital terrain model (DTM) for three-dimensional mapping.

Following innovations from leading LiDAR manufacturers such as Velodyne, the cost and size of the equipment allows the laser scanning system to be integrated with the FIXAR 007 UAV platform, obtaining as a result a precise and accurate 3D point cloud with reference to the GPS coordinates.

In Short:

- Uses laser light to determine the distance between a sensor and an object, whether on the ground or in the air.
- Penetrates through dense obstacles, including tree crowns, artificial objects and bushes on the ground.
- Captures the points of laser reflection (PLR), which then can be used to create detailed models of the terrain and objects.



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Difference Between LiDAR Technologies and Photogrammetry

It should be understood that photogrammetry and laser scanning are not interchangeable technologies. Each of the data collection methods has a number of advantages and disadvantages depending on the objectives.

Photogrammetry is the process of obtaining metric properties of objects, spatial coordinates of object points from photographic images taken from different positions. A precise three-dimensional model of the territory is built based on a variety of images, received elements of external and internal orientation of the camera, coordinates of the photography centers, with the help of the photogrammetric software. The main purpose is to digitize the reality for geodetic surveying and mapping.

The main advantage of using the aerial laser scanning technology is obtaining points of laser reflection from the earth's surface in the forested/overgrown terrain sectors, and, therefore, the ability to build a digital terrain model (DTM). Whereas, by using the photogrammetry technology, it is possible to obtain only the surface that was recorded in the pictures, i.e. it is impossible to build a digital terrain model for the forested terrain sectors according to the photogrammetry technology. The surface will be built over the tree crowns and will be a digital terrain model.

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LiDAR is also capable to penetrate through gaps among the foliage and capture small details. In this case, the laser pulse will identify gaps within the vegetation and precisely measure how dense it is, and the ground topography below it. Whereas, photogrammetry depends on the collected images and reconstructs only those things that are visible on the surface.

Key Advantages of LiDAR Technology

- **High vertical resolution and accuracy**
- **High point density in vertical targets**
- **Penetrates through high canopy areas**
- **Reconstructs complex and irregular objects, i.e. vegetation and power transmission lines**
- **3D map available upon landing**
- **Performance of work takes less time (wider capture bandwidth)**
- **Works both day and night**

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Industries That Benefit From Laser Scanning With LiDAR

FORESTRY

Mapping by means of the LiDAR system is a single method to penetrate into the vegetation to create a digital terrain model (DTM) and obtain information through the tree crowns to identify tree species, measure the height and size or information about the wood volume per hectare.

PRECISION AGRICULTURE

Mapping by means of the LiDAR system is a single method to penetrate into the vegetation to create a digital terrain model (DTM) and obtain information through the tree crowns to identify tree species, measure the height and size or information about the wood volume per hectare.

MONITORING OF POWER TRANSMISSION LINES (CORRIDOR MAPPING)

Detailed information on the location and condition of high voltage power cables and their supporting cables may be derived from the cloud of points. This allows surveyors to analyze the detailed structure of the power line corridor, including vegetation, roads and houses, and determine potential risks.

MINING INDUSTRY

Mining companies mainly use photogrammetry to map mines, but it presents some limitations as it takes time to process data and create a detailed map. Poor luminosity because of the cloudy weather and dense vegetation also contributes to a lack of data.

CONSTRUCTION INDUSTRY

Construction industry professionals use LiDAR to carry out surveys during the construction planning to create accurate and detailed plans and documentation, monitor and forecast construction impacts, and record conditions at any stage of the construction project.

ARCHEOLOGY

Archeological objects are usually found in remote locations under severe weather conditions, extreme heat or cold and hidden under sense vegetation or sand. LiDAR technology penetrates through covered terrain and identifies the objects being searched what would have remained hidden from the human eyes for many years.

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FIXAR 007 Complex Solution Configured With LiDAR

With a reliable and robust design, high cargo capacity up to 2 kg and a large range of up to 30 km (configured with a LiDAR sensor), the vertical take-off and landing UAV FIXAR 007 is ideal for efficient laser scanning.

Unlike large aircrafts, FIXAR 007 is affordable, easy to operate, offers a fully autonomous platform, and does not require deeper knowledge of UAV piloting.

Configured with the modern laser scanning technology LiDAR, this solution enables to perform time-consuming tasks faster and more accurately, enabling the creation of precise models of complex structures and surfaces in the form of three-dimensional point clouds.

Obtained data can be directly imported into the relevant post-processing software, for example TerraSolid, Cloud Compare, GlobalMapper, Credo 3D scan, Lastools.

KEY ADVANTAGES OF FIXAR 007 SOLUTION

High cargo capacity up to 2 kg (4.4 lb)

Resistance to severe weather conditions (-30 °C to +60 °C | -22 °F to 140 °F)

User-friendly xGroundControl Station software

VLOS & BVLOS solution

Launcher and parachute independent VTOL drone

High performance – Flight distance up to 60 km (37.2 mph)

Hardware and software made in EU

Fully autonomous from take-off to landing

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Examples of Obtained Models:

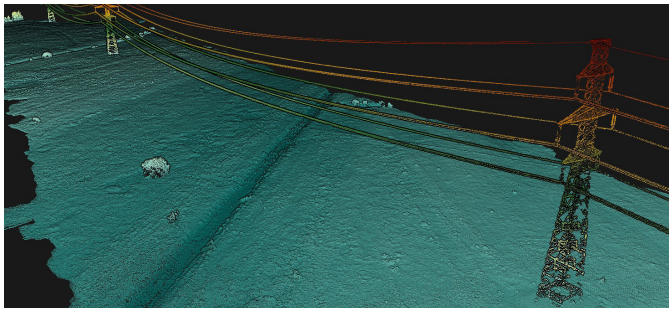

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Image 1: 3D point cloud of powerlines captured with FIXAR 007 equipped with YellowScan Mapper+OEM and processed with YellowScan CloudStation.

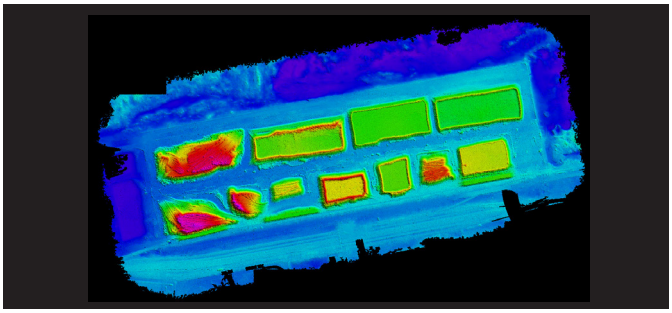

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Image 2: Digital terrain model to calculate the earth fill volume.

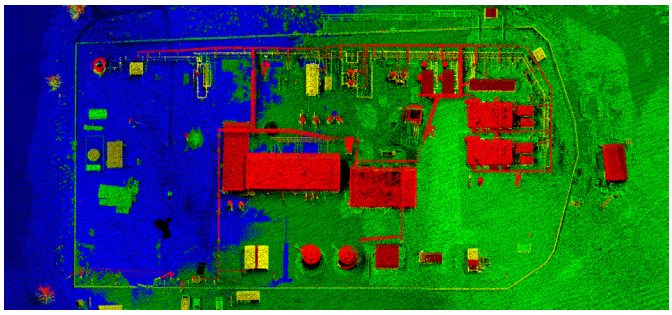

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Image 3: Dense point cloud of the industrial object displayed along the height.

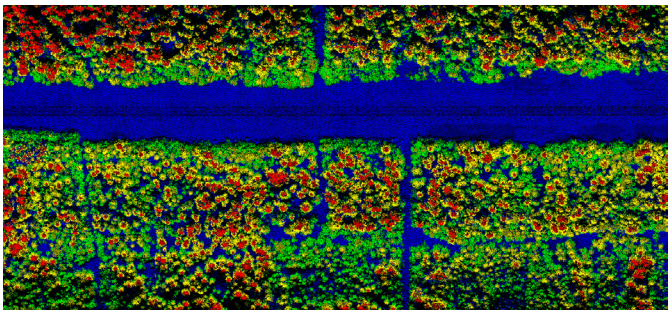

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Image 4: Dense point cloud of the forest area displayed along the height.

YellowScan Mapper+OEM

YellowScan Mapper+ OEM is the next generation of integrated lidar solution with Livox and Applanix technology.

This LiDAR System is particularly lightweight with long range capabilities, high-end point density, as well as advanced accuracy and precision for easy and fast UAV LiDAR mapping.

Technical specifications:

Laser Scanner: LIVOX AVIA
AGL recommended: 100m
Precision (1): 2.5 cm
Accuracy (2): 3 cm
Scanner field of view: 70.4°
Shots per second: 240k
Echoes per shot: Up to 3

(1) Precision, also called reproducibility or repeatability, accounts for the variation in successive measurements taken on the same target. Here precision value is obtained by averaging the precision from 3 flight levels @60, 90 and 120mAGL. At each flight level, the precision is considered as the mean value of absolute elevation differences between 2 flight lines recorded in opposite directions over a nadir-located 40m² hard surface area.

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