

LABORATORY: CNR ISPC - AIRLAB

NAME OF THE INSTRUMENT

LiDAR system on drone

GENERAL DESCRIPTION

The system consists of a laser scanner with full waveform technology conveyed by a hexacopter drone, managed remotely with radio control. It is designed for applications in the field of archaeological prospecting, documentation of cultural heritage such as archaeological sites, architectural monuments, the detailed survey, and the study of landscape contexts, with particular reference to areas covered by vegetation.

Compared to other remote sensing systems based on passive sensors (VNIR, IRT), thanks to the possibility of penetrating inside the vegetation, filtering it, it allows to identify sites of archaeological interest or archaeological remains in densely wooded areas, including tropical forests.

In non-vegetated or scarcely vegetated areas, the added value of LiDAR compared to optical sensors is given by the possibility of obtaining detailed digital models of the terrain, for cartographic use, for the study of geomorphology and the analysis of microtopography from which to extract information of archaeological interest.

The system can be used for the realization of 3d models of landscapes, monumental complexes, archaeological sites, aimed at knowledge, conservation, enhancement, risk assessment with reference to landslides, illegal excavation activities.

An optimal use of the system is to integrate it with other remote sensing data acquired by active and passive sensors on an aerial and satellite platform for multi-scale and multi-sensor applications.

TECHNICAL DETAILS

The system consists of a hexacopter drone equipped with a laser scanner with full waveform technology.

Below are the technical specifications of the drone and the cameras.

1_Drone hexacopter.

Maximum operating distance not less than 50 meters;

Payload not less than: 1.30 kg

Minimum flight time: 34 minutes without payload and 24 minutes with maximum payload

2_LiDAR

Sensor Accuracy / Accuracy = 15mm / 10mm

N.5 return echoes for each single laser beam

Maximum measurement rate up to 100,000 measurements / s -> FOV up to 360 °

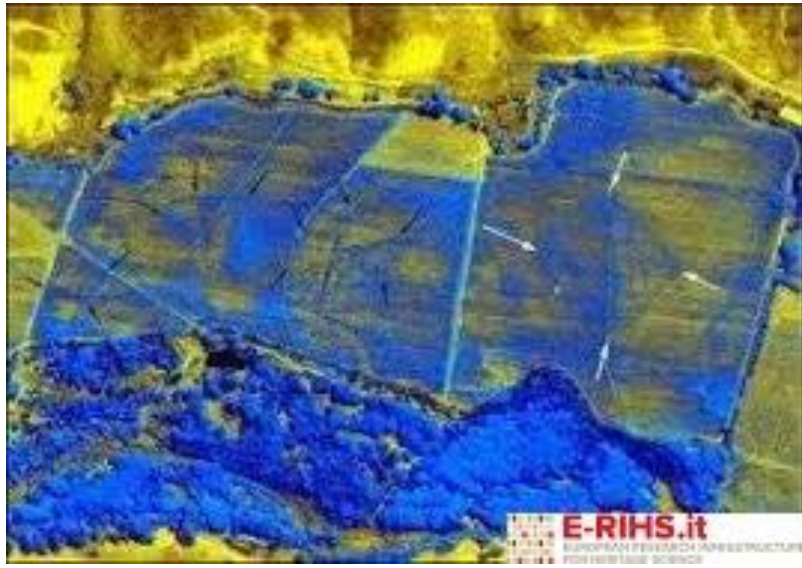
Max range - target reflectance 60% = 250m

Max range - target reflectance 20% = 150m

Minimum range = 3m

Inertial platform IMU APPLANIX APX15

Camera with 16 mm lens (included).



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