Capabilities and Potential of RPAS System in an Industrial Environment

6th MILITARY METROLOGY FOR AEROSPACE SYMPOSIUM

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A simple Drone definition

:

A Drone is a tool that uses an intelligent sensor to acquire information

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RPAS MULTICOPTER AND RPAS FIXED WING

Pilot in VLOS Flight

Height 120 mt

Range 500 mt

Time of Flight 20/30 minutes depend on weight of RPAS and capacity of batteries

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Sensors/ Payloads

Sensors are video camera, Termographic, Infrared, Multispectral, Lidar/Laserscan, Weight are between 800 gr and 2 kg, installed in a Gimbal maximum 3 sensors

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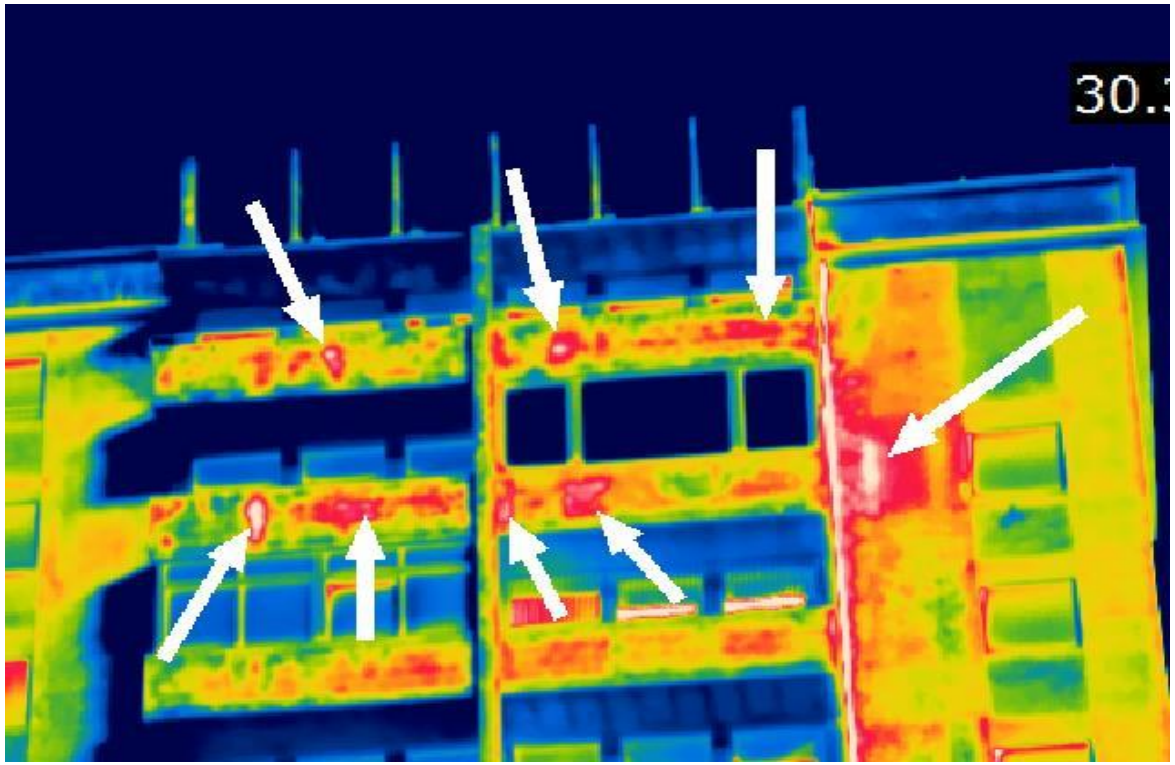
Sensors in industrial environment

Payloads are sensors intelligent with video camera makes aerial photogrammetry and termography



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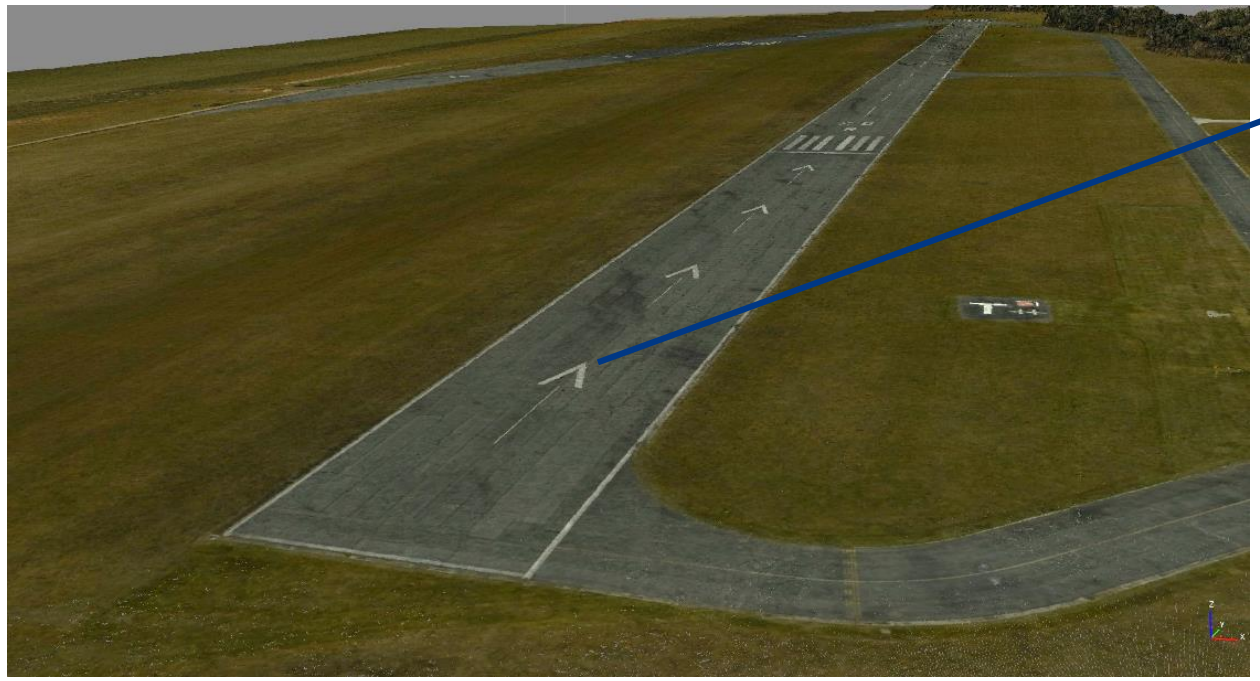
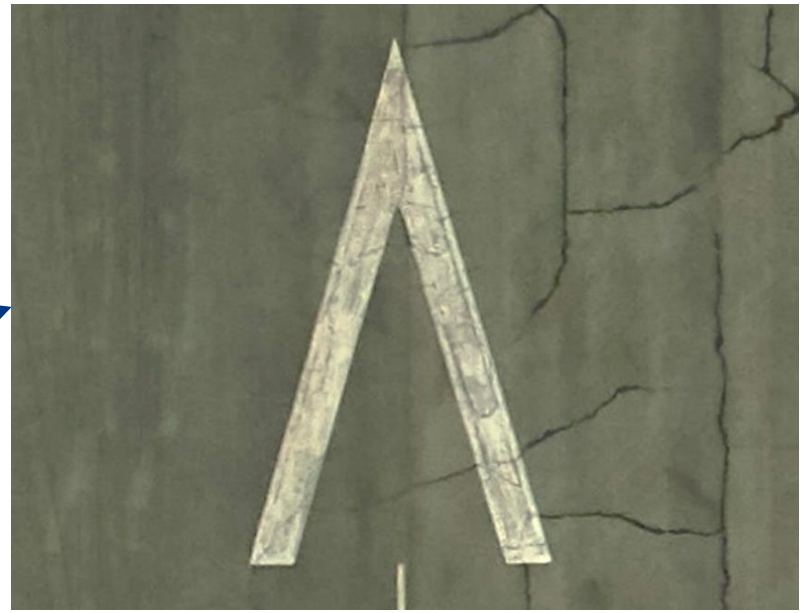
Identification of surface anomalies

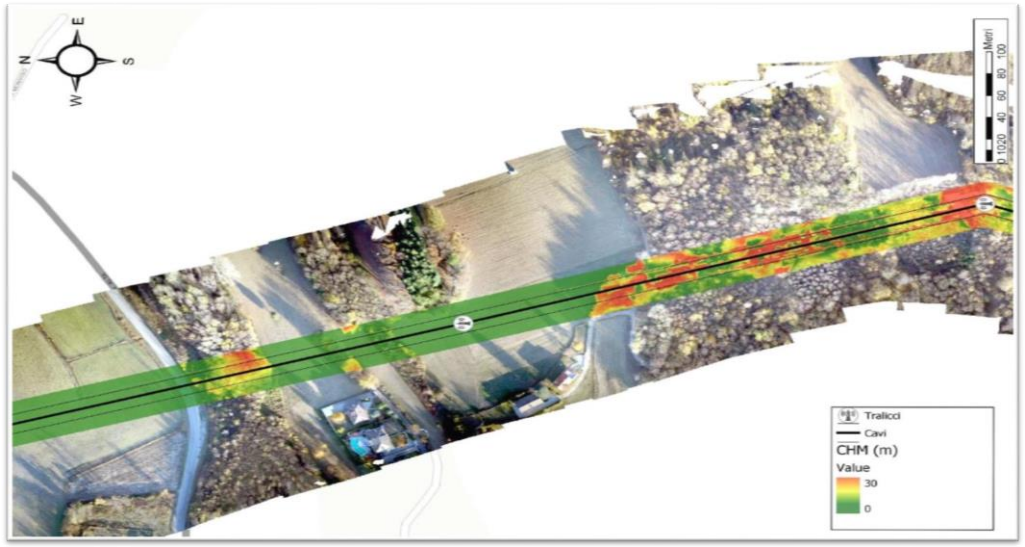
The resolution of images with Ground Sample Distance (GSD) close to 1 cm/pixel allows to identify surface anomalies





Airplane sensors for remote sensing: ground monitoring

The sensor returns a digital tridimensional map that allows to make geometric elaborations. Moreover, it identifies interferences on the route, the vegetation, the hydrological events and the property borders.



SKYMETRY

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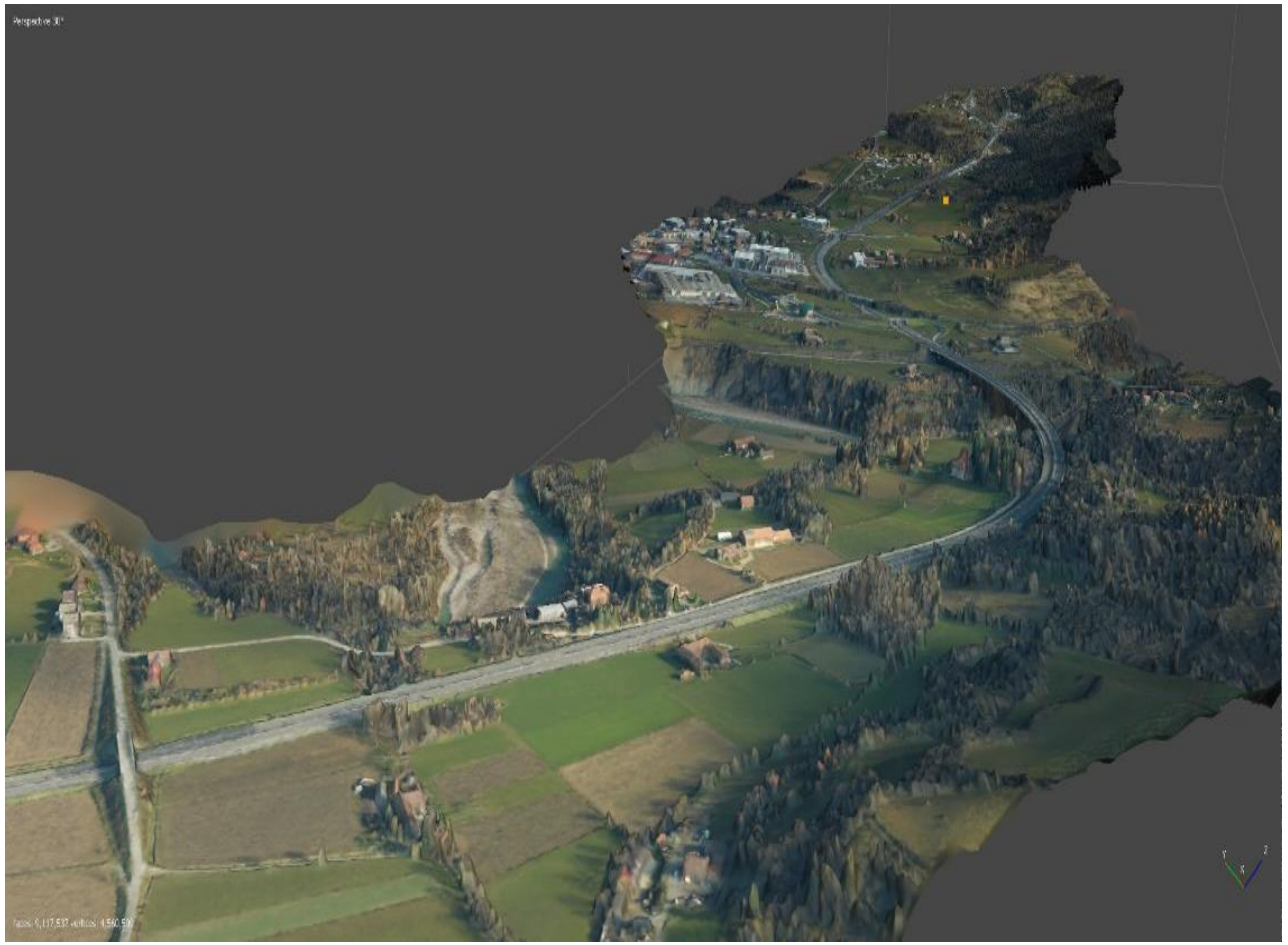
Monitoring of hydrological events



The photogrammetry sequence allows, once the flying mission has ended, to elaborate an orthographic map and a 3D model which is measurable in order to analyze differences between areas.

RPAS DEFINITION - ITALIAN CIVIL AVIATION AUTHORITY (ENAC)

Article 743 of the Italian Navigation Code, titled "Concept of aircraft", introduces in the definition of aircraft, the notion of remotely piloted aerial vehicle:

"Aircraft shall mean any machine designed for the transportation by air of persons or property. **Remotely piloted aerial vehicles are also considered aircraft,** as defined by special laws, ENAC regulations and, for the military, by decrees of the Ministry of Defence.

ENAC Regulation ED. 3 20 November 2019, as implementing art. 743 of the Italian Navigation Code, splits remotely piloted aerial vehicles in

Remotely Piloted Aircraft Systems and **Model Aircraft** for the purpose of applying the provisions of the Code.

RPAS UAS EASA REGULATION Reg. 1139/2019

To ensure the free circulation of drones and a level playing field within the European Union, EASA has developed common European rules. They contribute to the development of a common European market while ensuring safe operations and respecting the privacy and security of EU citizens.
The definition of drones is quite wide, as it includes all remotely piloted and autonomous aircraft: from small consumer devices used for recreation to large aircraft, used over very long distances for security or other critical operations.

"***Unmanned aircraft system' ('UAS') means an unmanned aircraft and the equipment to control it remotely;***

UAS operations shall be performed in the '**Open', 'Specific' or 'Certified' category.**

EASA Regulation

OPEN category - Low risk

NO-PRE APPROVAL

LIMITATIONS: 25 kg, VLOS, height <120m, system of zones

3 Sub-categories: fly over, close, far from people

General public

Model Flying

Photographers

SPECIFIC - Increased risk

Authorisation by NAA based on specific operation risk assessment (SORA)

Declaration in case of standard scenario; LUC

BVLOS operations (linear inspections, aerial work, …)

Transport of goods

CERTIFIED - Risk as manned aviation

Certification of UAS, approval of the operator and licensed pilot (unless autonomous flight)

Air Taxi
International IFR (cargo, passengers)
Package delivery over people

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HOW TO GET A RPAS DEGREE IN ITALY - RPAS PILOT CERTIFICATE

In order to pilot RPAS with RPA having operating take-off mass less than 25 kg , in VLOS operations it is necessary to hold the RPAS pilot certificate, issued by a recognized RPAS Training Centre approved by ENAC.

The RPAS Pilot need:

- To learn applicable rules of the air, basic aeronautical knowledge, safety aspects and relevant operational risks, by successfully attending a Theoretical Training Course with an approved Training Centre (16 HOURS).
- To attend a RPAS Flight Course of 4 hours and pass a practical examination (*Skill Test*) with an APR Examiner of an approved Training Centre.

EASA
European Aviation Safety Agency

ITALIA

ENAC
ENTE NAZIONALE PER L'AVIAZIONE CIVILE
ITALIAN CIVIL AVIATION AUTHORITY

A1-A3 OPEN

Operazioni non critiche

Attestato di Pilota di APR (Operazioni Non Critiche)

(Proof of completion of online training)

Nome: (First Name) **MARIO ALBERTO MARIA ERMANO**

Cognome: (Last Name) **ROSSI DE LA VEGA RIVEIRA SUAREZ**

ITA-RP-123456789abc

Data Scadenza: (Expiration date) **gg/mm/aaaa**

RPAS OPERATOR - EASA

LUC - LIGHT UAS CERTIFICATE

- Description of the UAS Operator's management system, including its *organisational structure and safety management system;*

- the name(s) of the responsible UAS operator's personnel, including the person responsible for authorising operations with UASs;

- a statement that all the documentation submitted to the competent authority has been verified by the applicant and *found to comply with the applicable requirements*.

Why we use a RPAS System

- Low cost
- Short term inspection results
- Upgraded level of safety & security on the industrial site
- Data outcome in a database format

THE RPAS WAY AHEAD

- Autonomous or Self-Guided Flying RPAS in VLOS (Fixed Wing),
- High Tech Sensors not only for Aerophotogrammetry or Termography but also Surveillence and Inspections on Pipeline Oil/Gas (Gas leakage or Oil leakage)
- Autonomous or Self-Guided Flying RPAS in Beyond Visual Line of Sight (more than 500 mt)
- RPAS for transport small goods
- Autonomous RPAS as small Shuttle (**Air Urban Mobility**)

Questions?

Thank you for your attention

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