

YellowScan

Designed to innovate.

By **Tristan Allouis, PhD.**

YellowScan co-founder and CTO



Planetary Topography Using Mobile Lidar: Applications and Challenges.



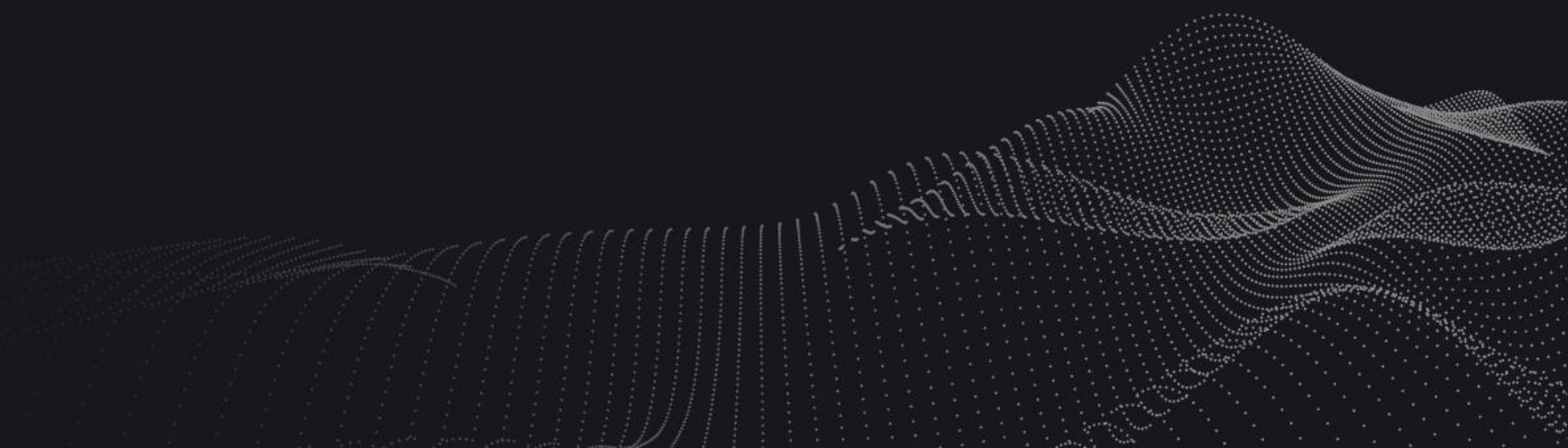
EPIC Meeting on Photonics at the Final Frontier at European Space Agency

2022/09/13

A Few Words About YellowScan.

YellowScan

Designed to innovate.



YellowScan Company.



We design, develop and produce **3d mapping instruments** for drones, based on lidar and imaging technologies

Pioneer of UAV lidar mapping, since 2012

50+ employees on 4 continents:
Headquarter in **France**, subsidiaries in **USA** and **Japan**, office in **Australia**,
and a worldwide network of distributors.

Research and Development is at the heart of all our projects.



LiDAR Sensors

Top of the class sensors selection & tests.
Integrated, versatile
& robust design



Software

Real-time data synchronization &
processing. System accuracy & precision,
Open format,
CAD/GIS-ready



Calibration

Aerial remote sensing & RPAS experts
Boresight angles etc.



Technical Support

Hands-on assistance, survey planning &
operations, data classification, accuracy
assessment, quality control

Our Mapping Instruments.

From 0.75 kg to 3.5 kg

Laser Scanner

GNSS-aided
Inertial and Navigation System

Optional Camera Module

Data Storage

Battery



Our Processing Software.



*Generate geo-referenced point cloud right after flight
And improve 3d models using the software modules:*



Strip adjustment

A point cloud enhancing toolbox



Terrain

Generate your DTM in just a few clicks



Colorization module

Colorize and texturize your point cloud with simultaneously captured pictures



Forestry

Tree inventory, biomass estimation, tree height measurements, get all the data you need for your forest management.

Power lines

Secure your power lines and plan the trimming of offending vegetation with 3D data.

Civil engineering

Plan excavation & backfill, follow your construction sites and stockpiles with real-time aerial imagery from lightweight UAV.

Mining

Manage raw material inventory or site development.

Archeology

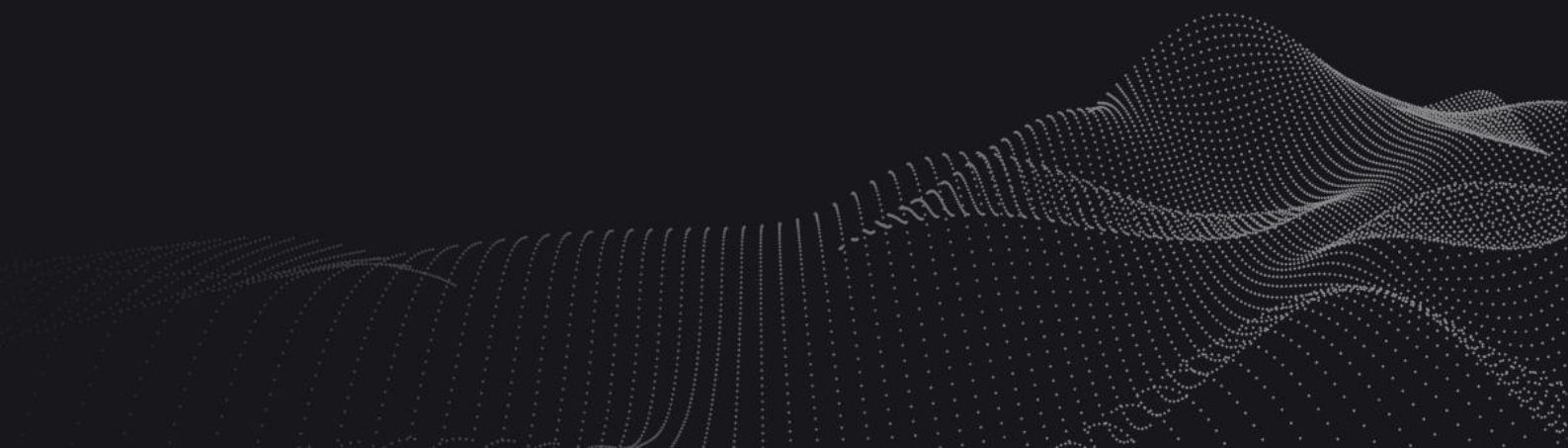
Discover the ancient ruins buried under vegetation.

Professional Users From Various Industries.

How Lidar Can Support Planet Exploration.

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Stakes of Surface and Underground Mapping.



Precise and comprehensive 3d maps would help:

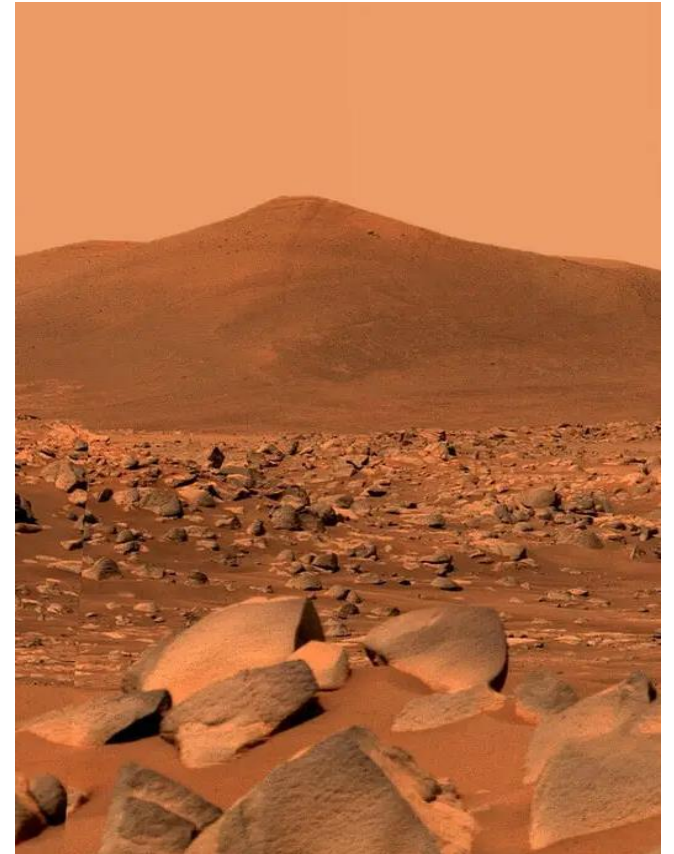
Facilitating **mobility** during planet exploration

Understanding past **hydrology**

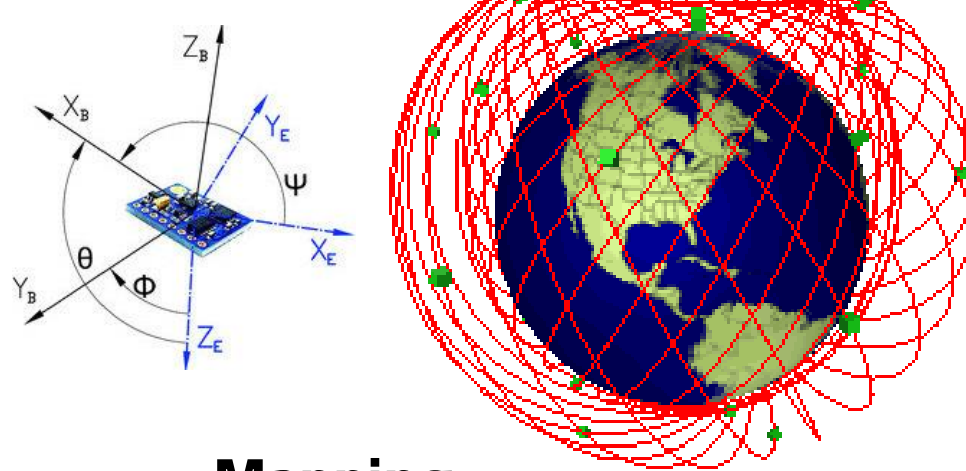
Supporting **geology** research

Seeking Human **shelter**

Searching for **life presence**



Mapping, the Earthling Way.



Sensing

+

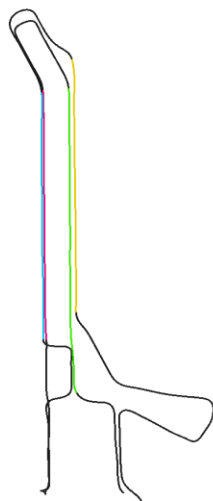
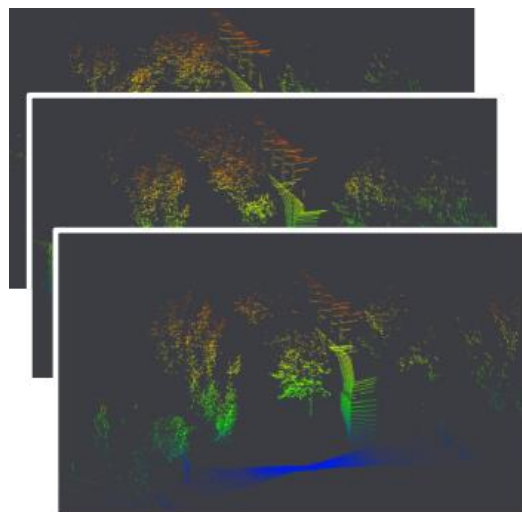
Localizing

=

Mapping

Lidar, Camera...

GNSS, Inertial measurement unit





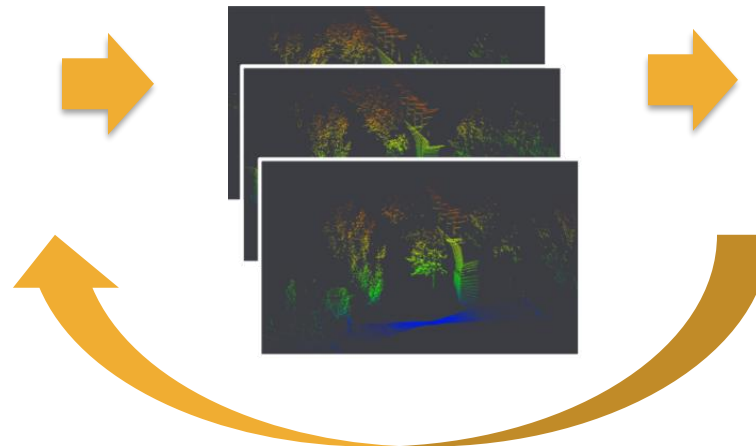
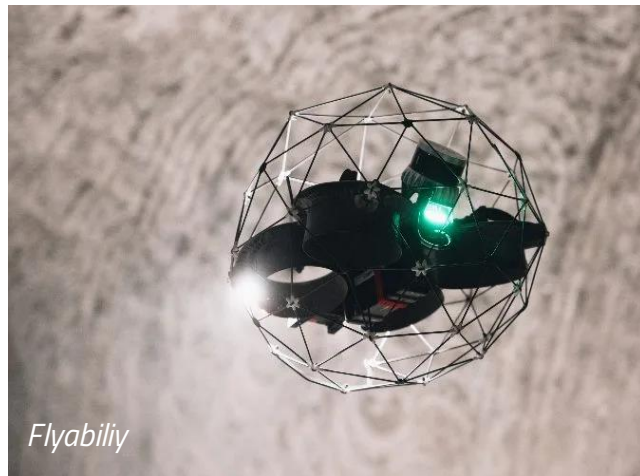
Mapping GNSS-Denied Environment.

Simultaneous localization and mapping (SLAM)

Match successive sensor data to **build a map** and retrieve the **rover position** within this map

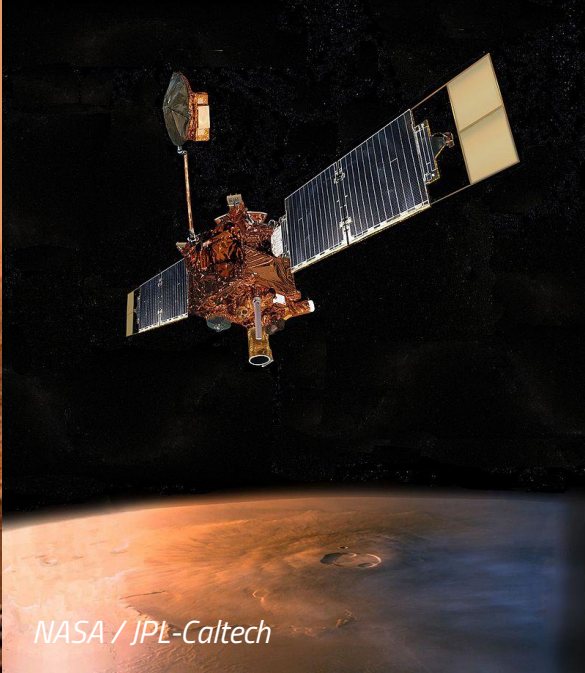
The resulting map can also be fed into the drone's **autopilot** for collision avoidance

Stitched to an existing geo-referenced map for proper **absolute positioning**



Global scale altimetry

Mars Orbiter Laser Altimeter

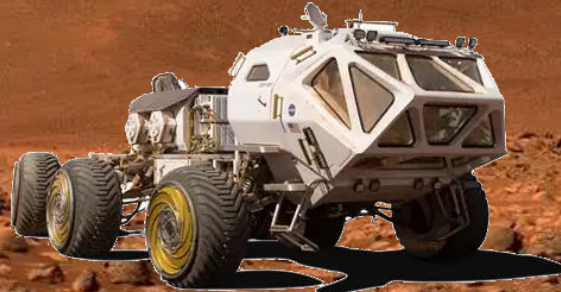


NASA / JPL-Caltech



Square kilometer-wide
detailed topography

Laser scanner on UAV



Route driving assistance

Laser scanner on rover



Lava tube mapping

Laser scanner on UAV



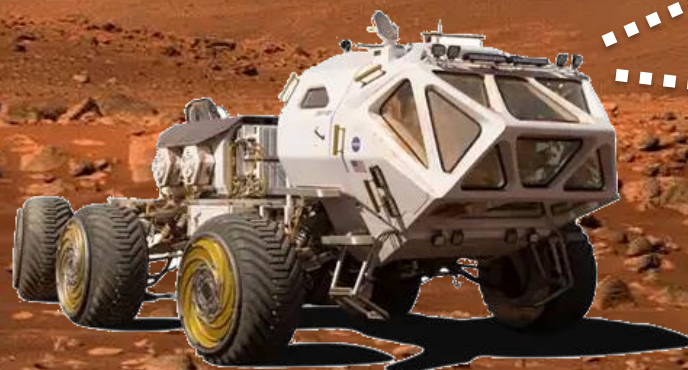
NASA / JPL-Caltech / ASU / MSSS

Path finder UAV



Real-time map transmission

Augmented Reality cockpit



Autonomous drone



Augmented Reality helmet





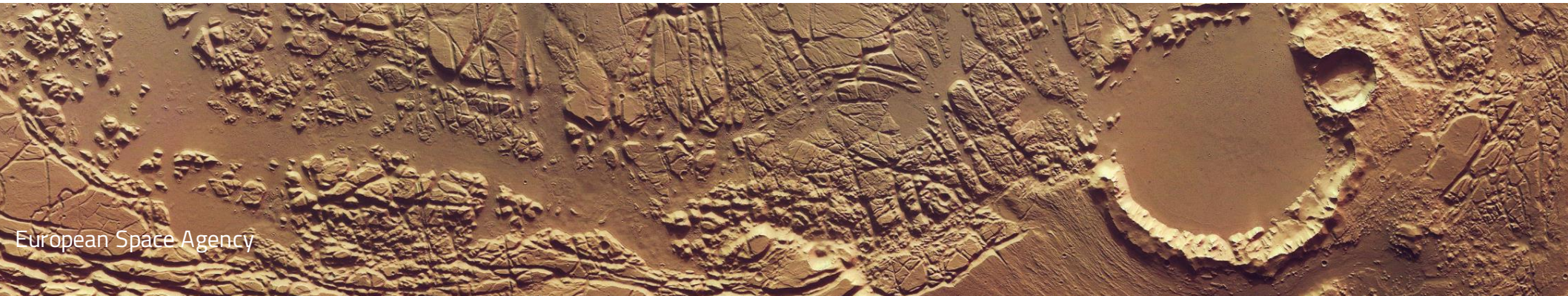
Challenges.

Flying a platform long enough in thin atmosphere

Miniaturizing mapping technology for maximum flight time

Addressing **power supply** requirements

Protecting instruments from solar energetic particles and galactic cosmic rays





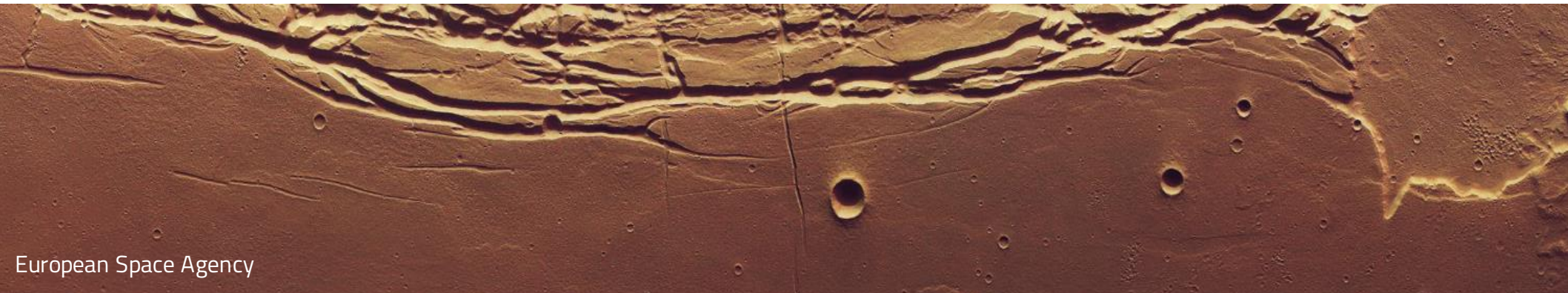
Finding Partners and Funding.

Thank you EPIC and ESA for the opportunity to present

We are looking for **partners** to develop the application:

- **Drone** manufacturer
- **Lidar** technology (SPAD Arrays / Flash LiDAR)
- **Space** borne technology experts

We are looking for a **financing** opportunity. What would be the right program?



Thank you for your attention.

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