The International Research School of Planetary Sciences

A private not-for-profit Foundation of the Università d'Annunzio, Pescara, Italy

Gian Gabriele Ori and Monica Pondrelli

The charter of the Foundation

- Perform scientific and technical activities analysis in the planetary systems including Earth
- Organise and support higher education in Planetary Sciences of the Università d'Annunzio
- Collaborate with space agencies and industries to further the planetary exploration
- Provide unconventional and attractive environments to young scientists
- Grow out industrial activities in fields related to the Earth environments and the Planetary bodies
- Pursue the excellence in science and ethic

The current team in June 2022

Enrico Flamini

Gian Gabriele Ori

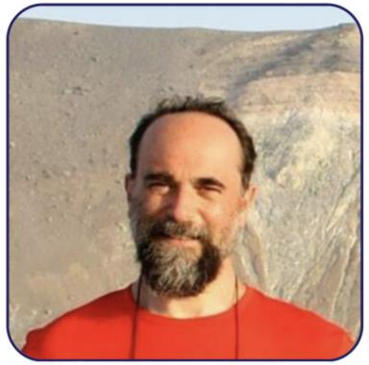
Monica Pondrelli

Goro Komatsu

Giuseppe Mitri

Francesco Salese

Aino Kirillova



Andrea Pacifici

Ida Dell'Arciprete

Daniela D'Alleva

Giuseppe Calabrese

Osip Kokin

Barbara Cavalazzi

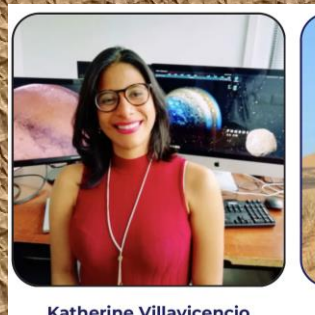
Stefania Celenza

Alessio Murana

Camilla Cioria

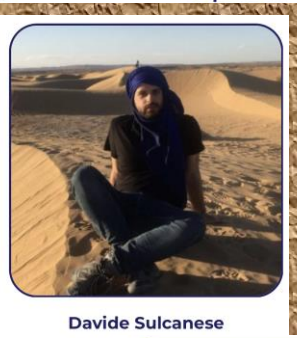
Elettra Mariani

Claudio Orlanducci



Katherine Villavicencio

Gianluca Chiarolanza



Davide Sulcanese

Veronica Camplone

Adriano Tullo

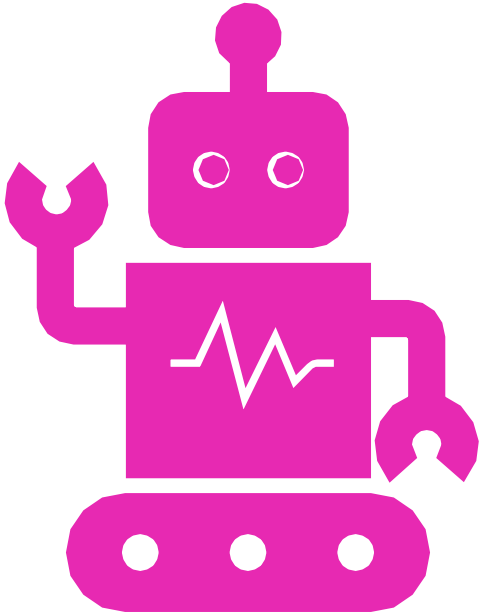
Francesca Mancini

Mafalda Ianiri

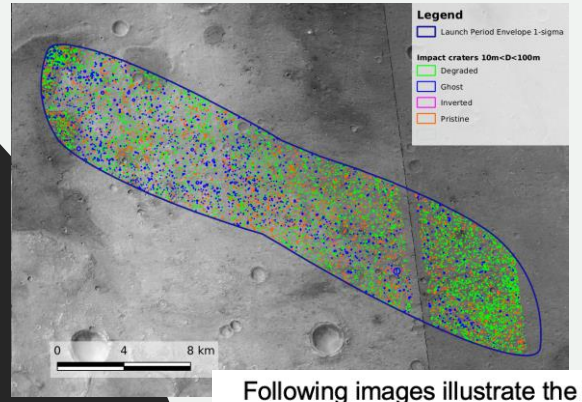

Magellan
Mars 96
Mars Reconnaissance Orbiter
Cassini
ExoMars 2016
Juice
Prisma
Veritas
ExoMars 20??
IRSPS
INTERNATIONAL
RESEARCH
SCHOOL
OF
PLANETARY
SCIENCES
EnVision
ERS 1 - 2
Bepi Colombo
Mars IceMapper
Mars Express
COSMO SkyMed

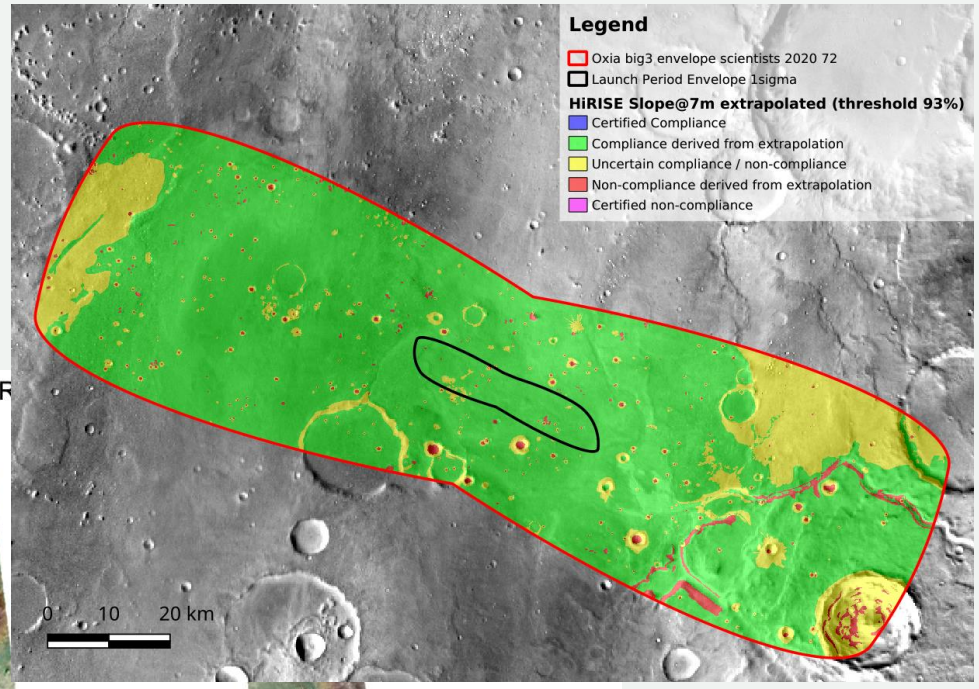
Research subjects

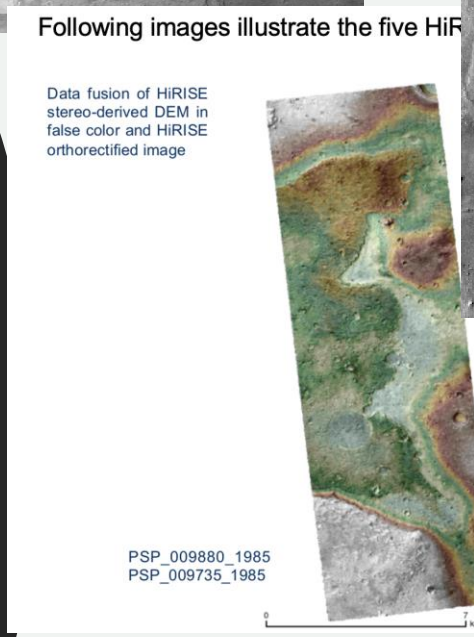
- Geology
- Astrophysics
- Exploration (robotic operations, human settlement and operations, landing site, mapping)
- Space architecture
- Ibn Battuta Center
- Mars (Planetary) analogues

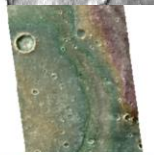


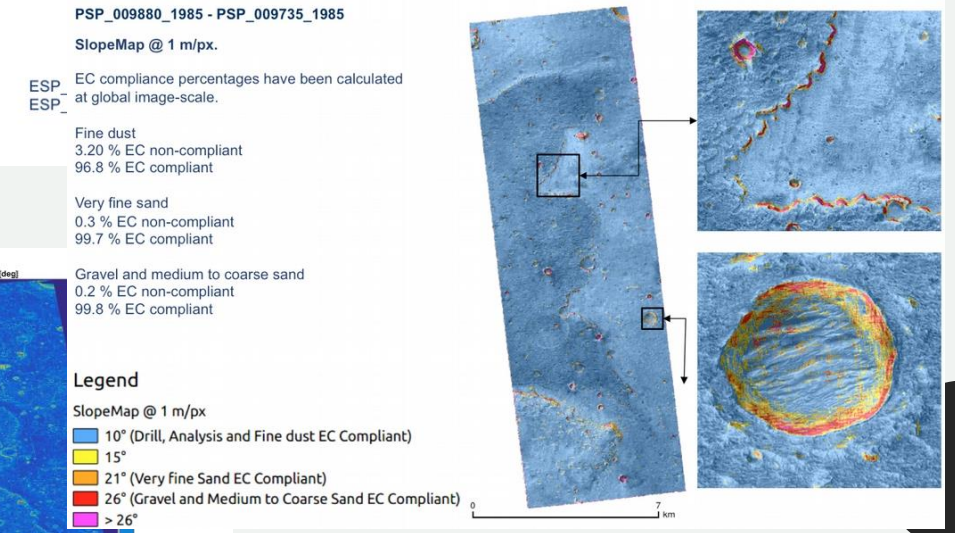
ExoMars landing site analysis and certification

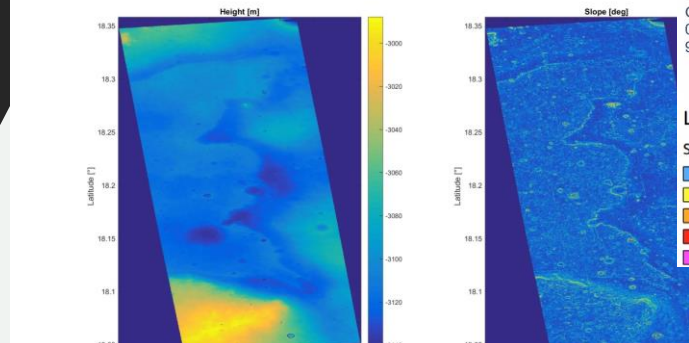






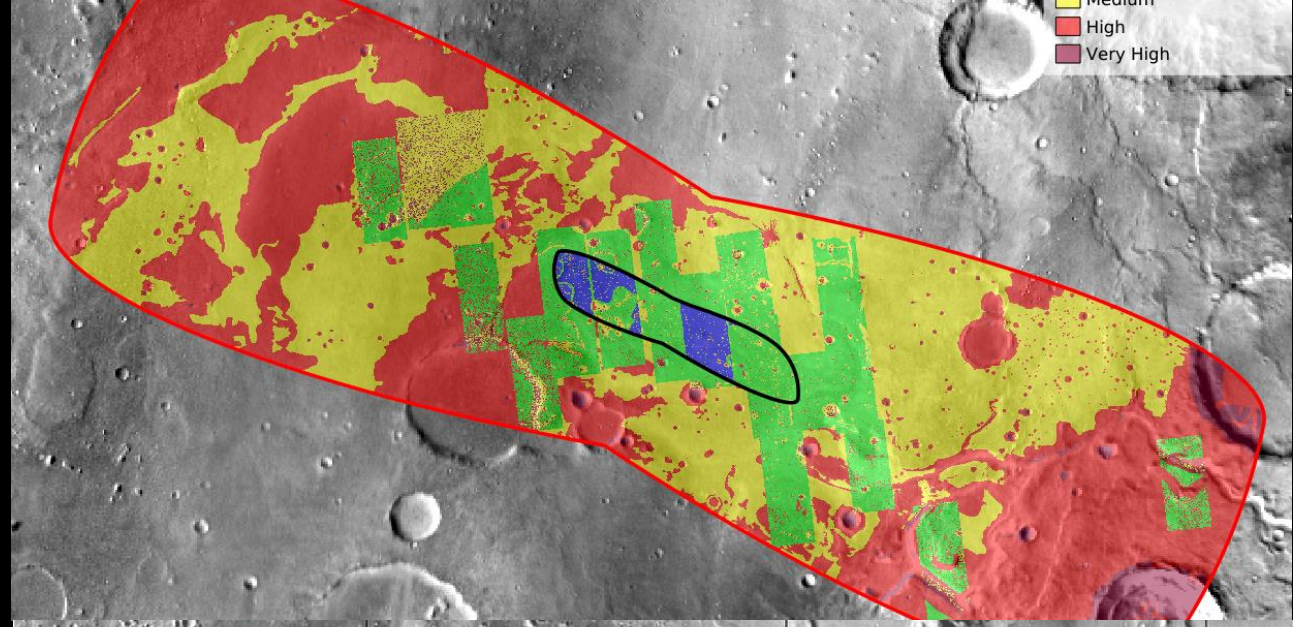


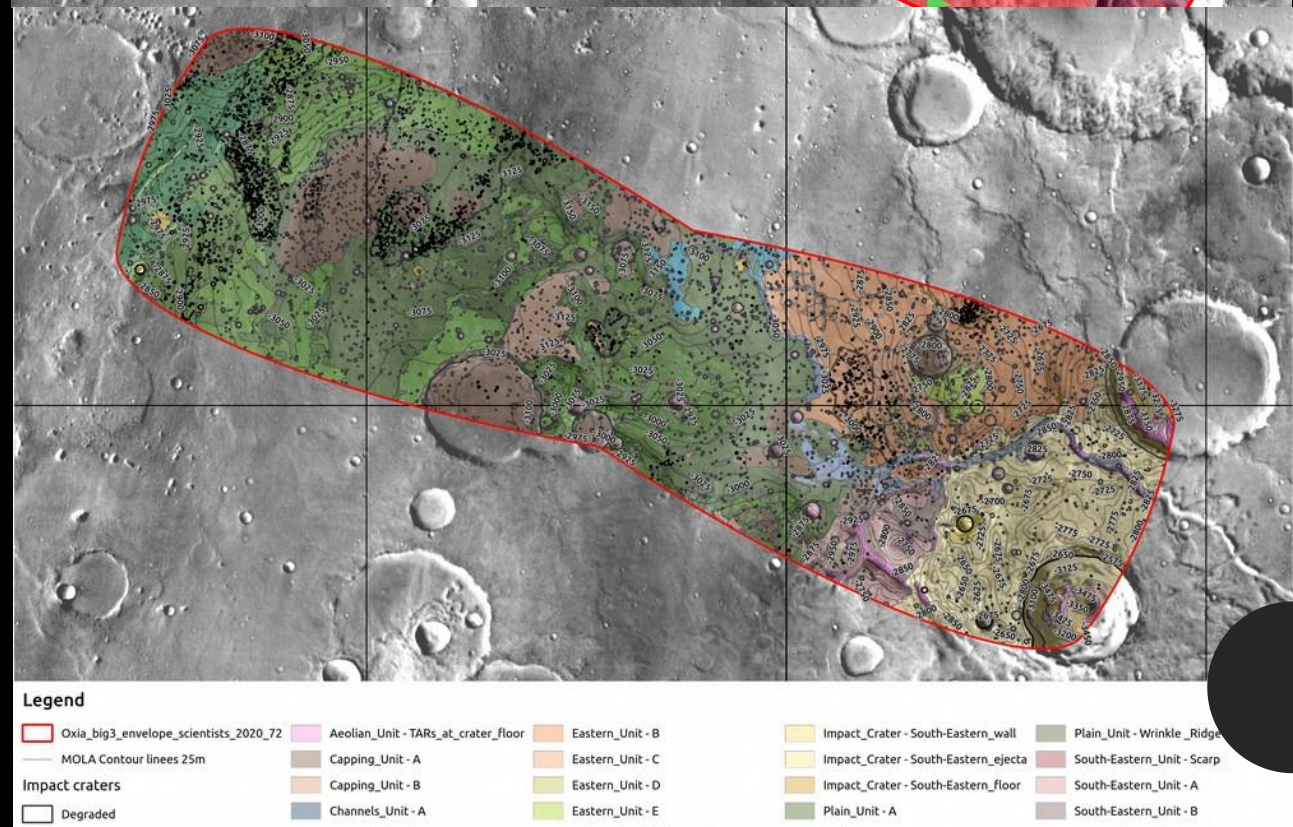




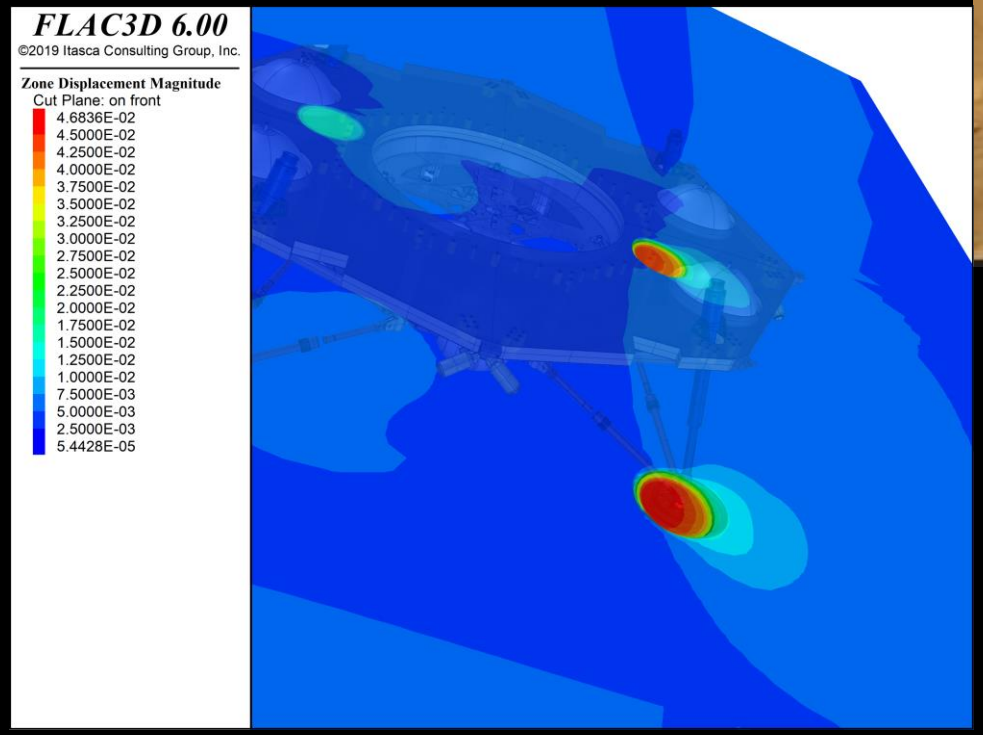
Hazard Map

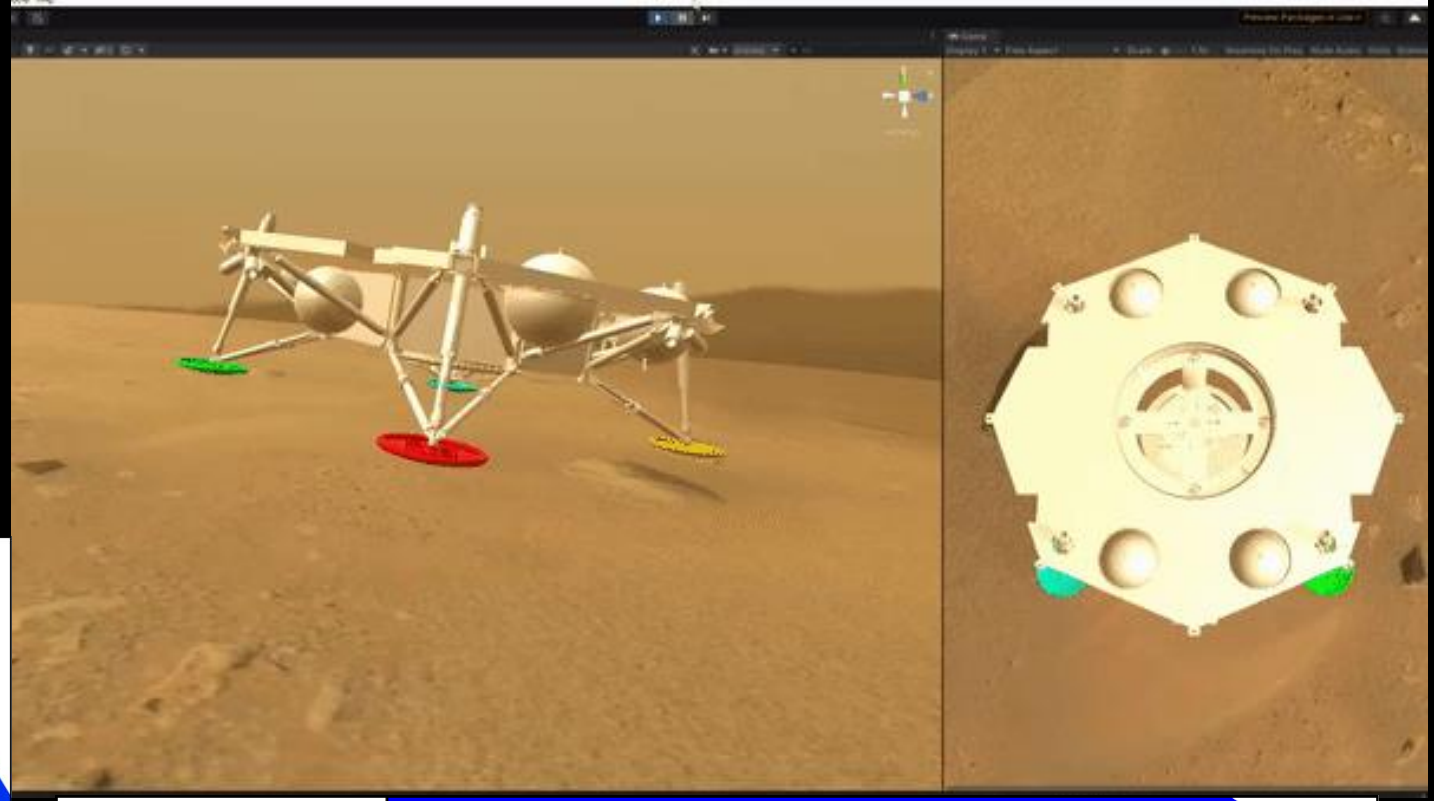
Geological Map

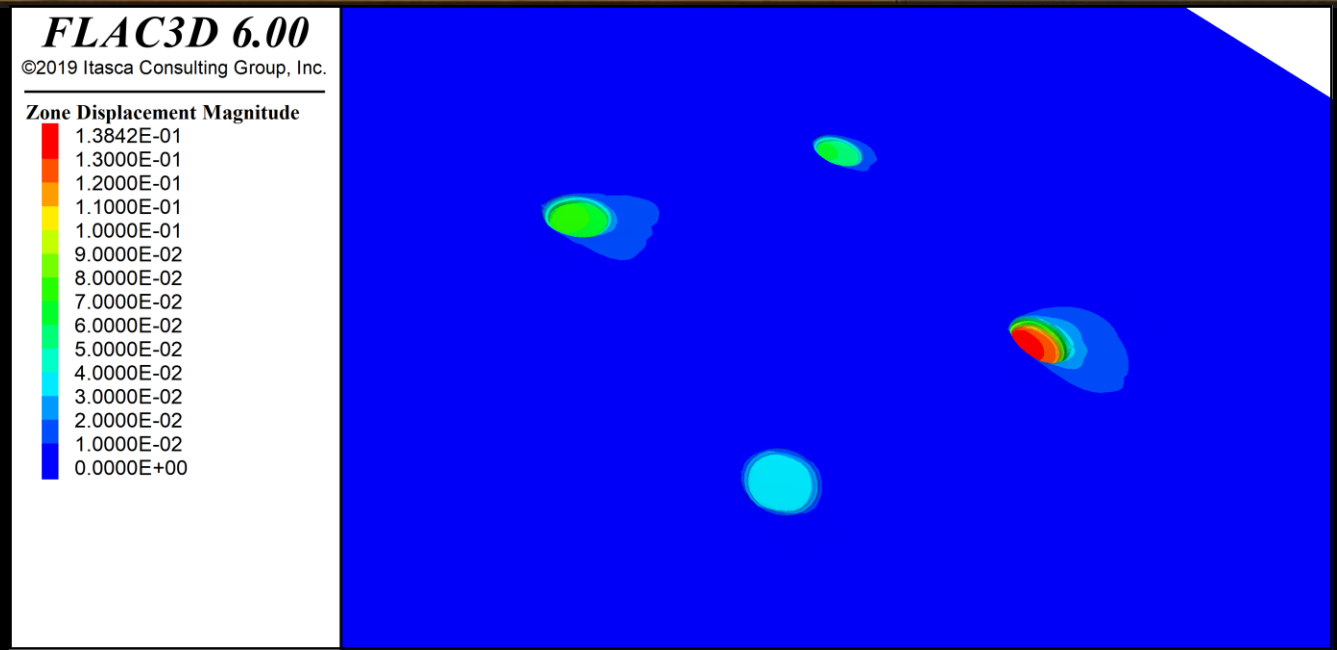




Computer simulations







Comparison of geotechnical parameters

Measured values are within the range of values estimated for the Regolith unit, showing the **suitability of the soil for landing simulations**.

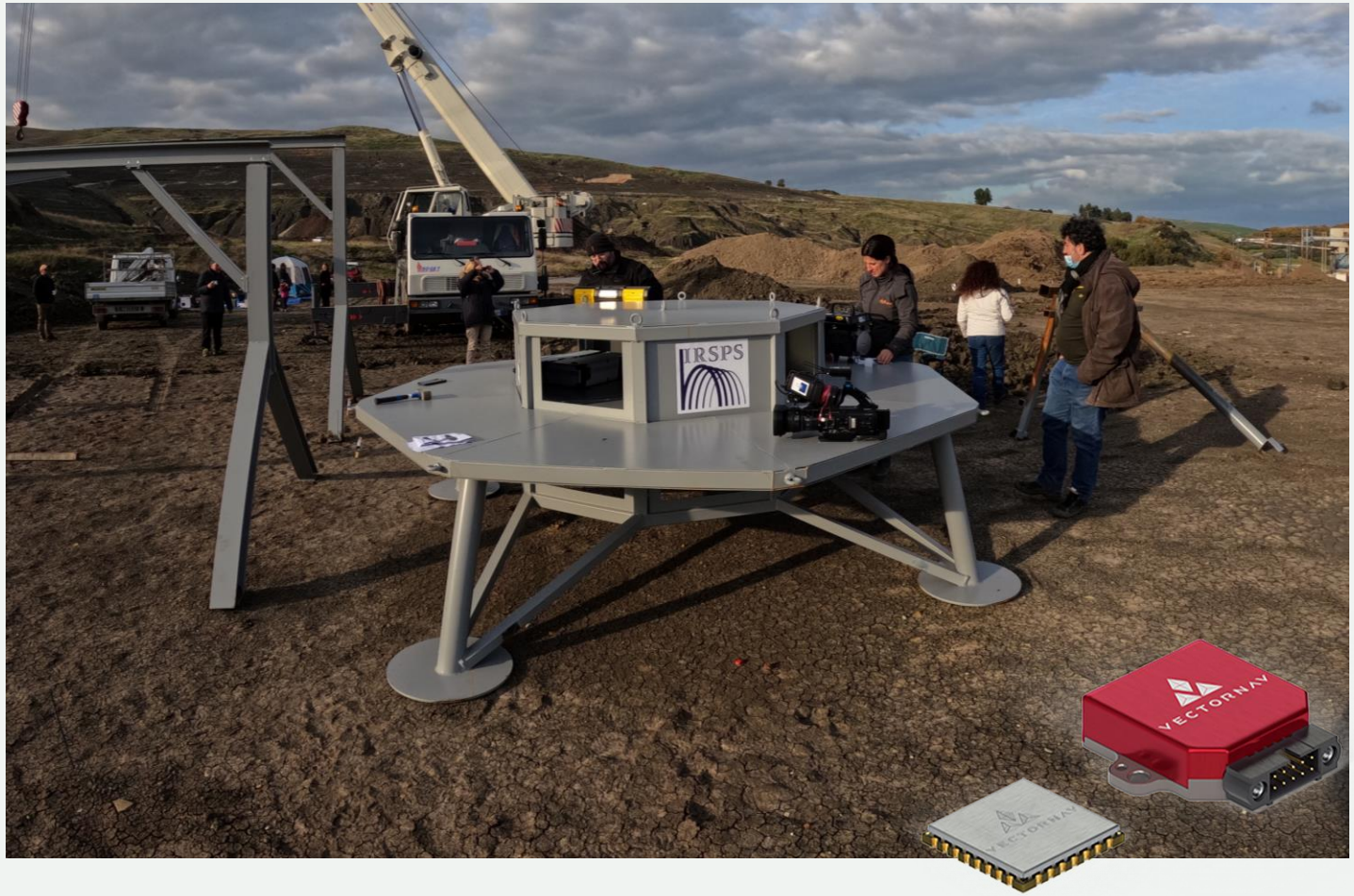
Parameter	Mars Regolith unit	Test range (*Residual strength*)
Bulk density (kg/m3)	1200 - 1600	1938
Cohesion (kPa)	0.2 - 7	18 (*0*)
Friction angle (deg)	20	13 (*10*)
Young's Modulus (MPa)	7.5 - 70	11.1
Poisson's Ratio	0.22 - 0.4	0.44
Bulk Modulus (MPa)	4 - 42	30.8
Shear modulus (MPa)	3 - 29	3.85
Terzaghi Load Bearing Capacity (kPa)	10 - 365	280.5 (*6.7*)

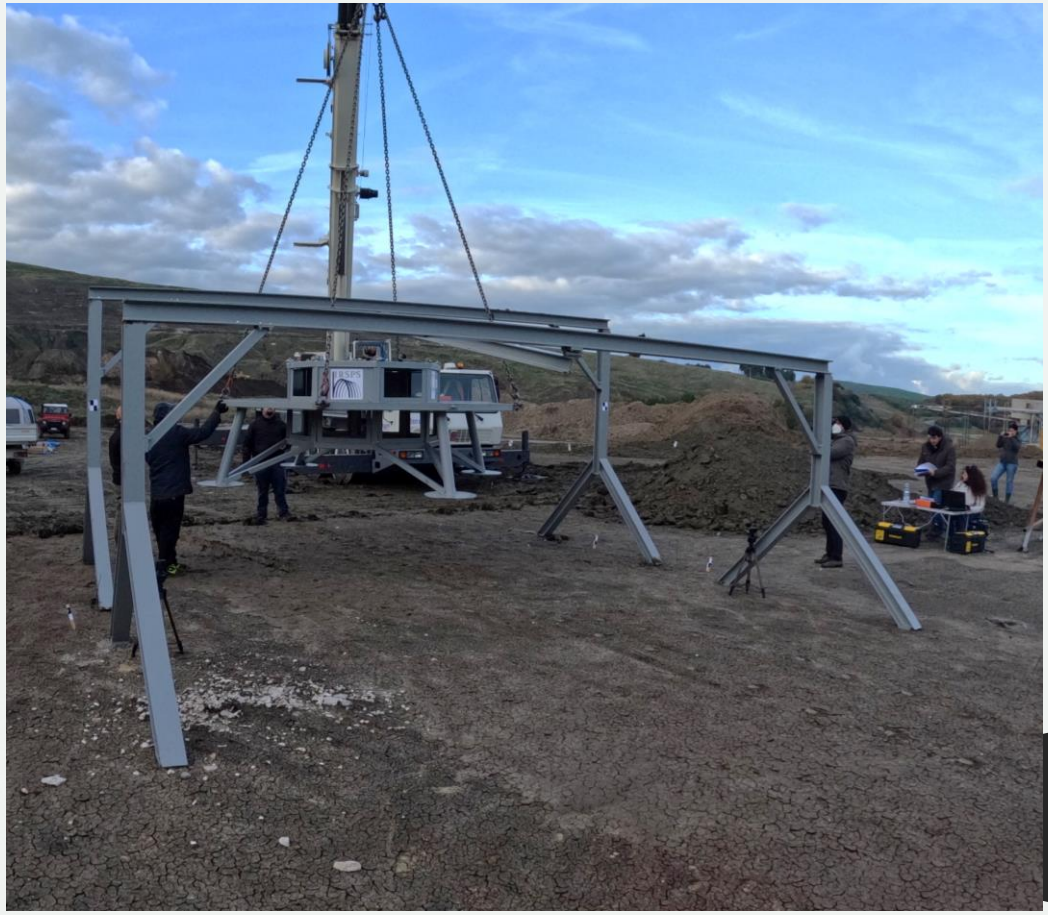
Lab tests performed: *bulk density estimation, grain size distribution, water content estimation, dried material bulk density, direct shear test, residual strength shear test, oedometer test.*

The mock-up has been designed to respect the dimensions of the Landing Platform. The structure (including foil and sensors) reached a mass of approximately **450 kg**, scaled to compensate for Earth's gravity.

LIDAR instrumentation has been used for each test to make **three point clouds**, one **before the test and two following**, (before and after removing the mock-up).

On-board: VectorNav VN-100 Autopilot Inertial Measurement Unit (**IMU**) (3-axis gyroscopes and 3-axis accelerometers ≥ 1 kHz), Wireless 2.4/5 GHz antenna, frontal camera.



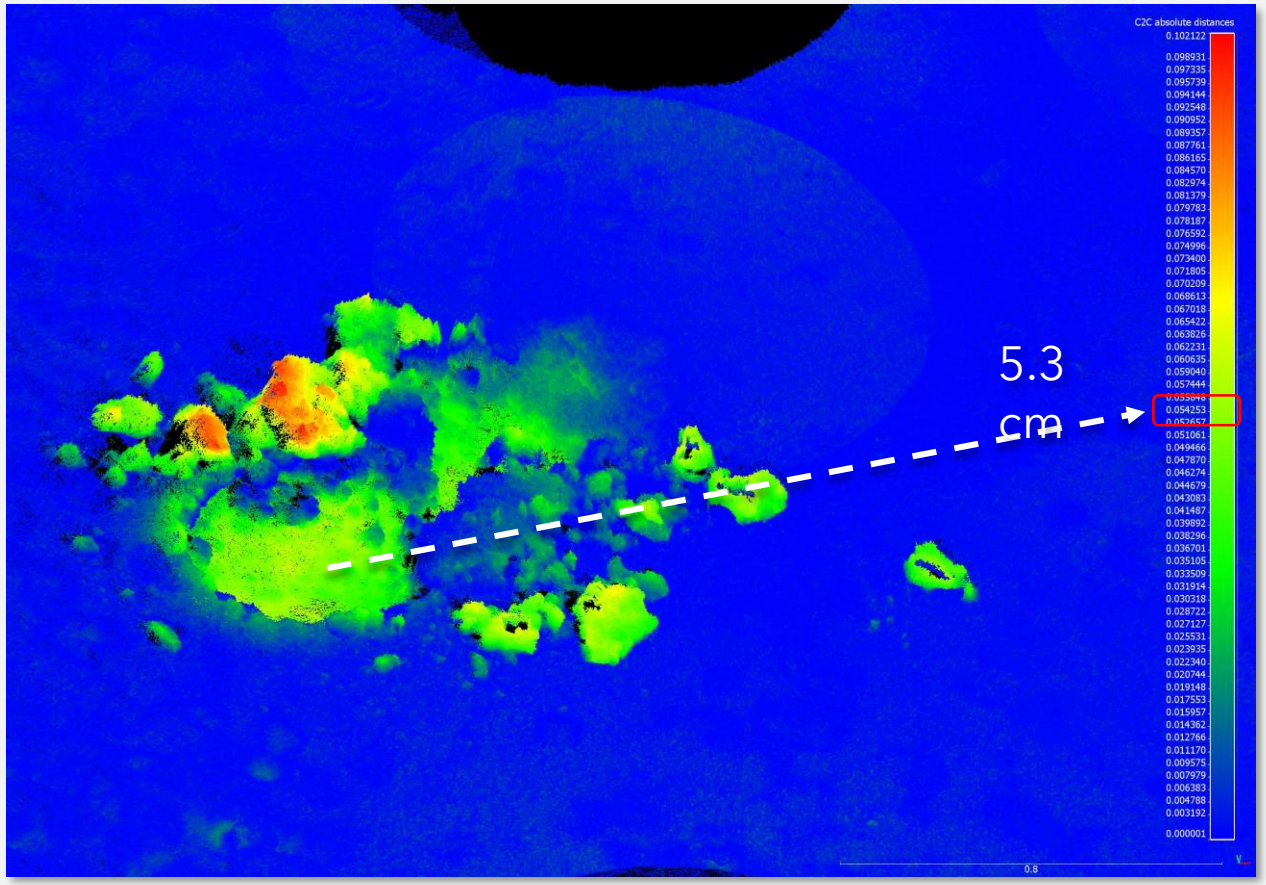



IRSPS
esa
IRSPS


IRSPS
esa

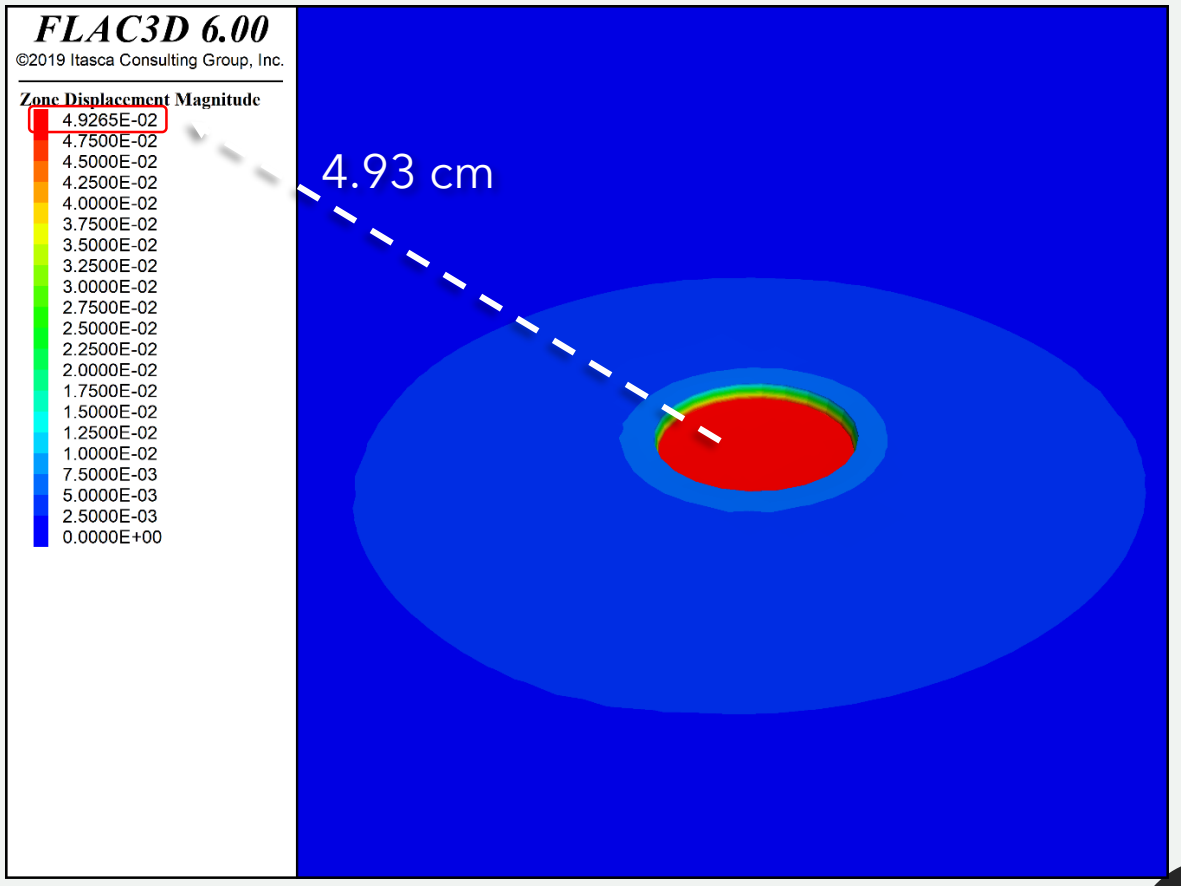
Comparison of surface deformation between field tests and FLAC3D replication

Surface deformation computed as Cloud-to-Cloud distance between the clouds before and after the tests



Test average surface displacement 5.3 cm

Replication of the Test 1



FLAC3D replication (cm) 4.93 cm

Percentage difference between field Test 1 and FLAC3D reproduction is **7.2% (3.7 mm)**

The field facility of the Ibn Battuta Centre in the Moroccan desert (at Arfoud)

Ibn Battuta centre

FlyRADAR

Analysis of the surface and near subsurface in with low-frequency SAR and sounder radar

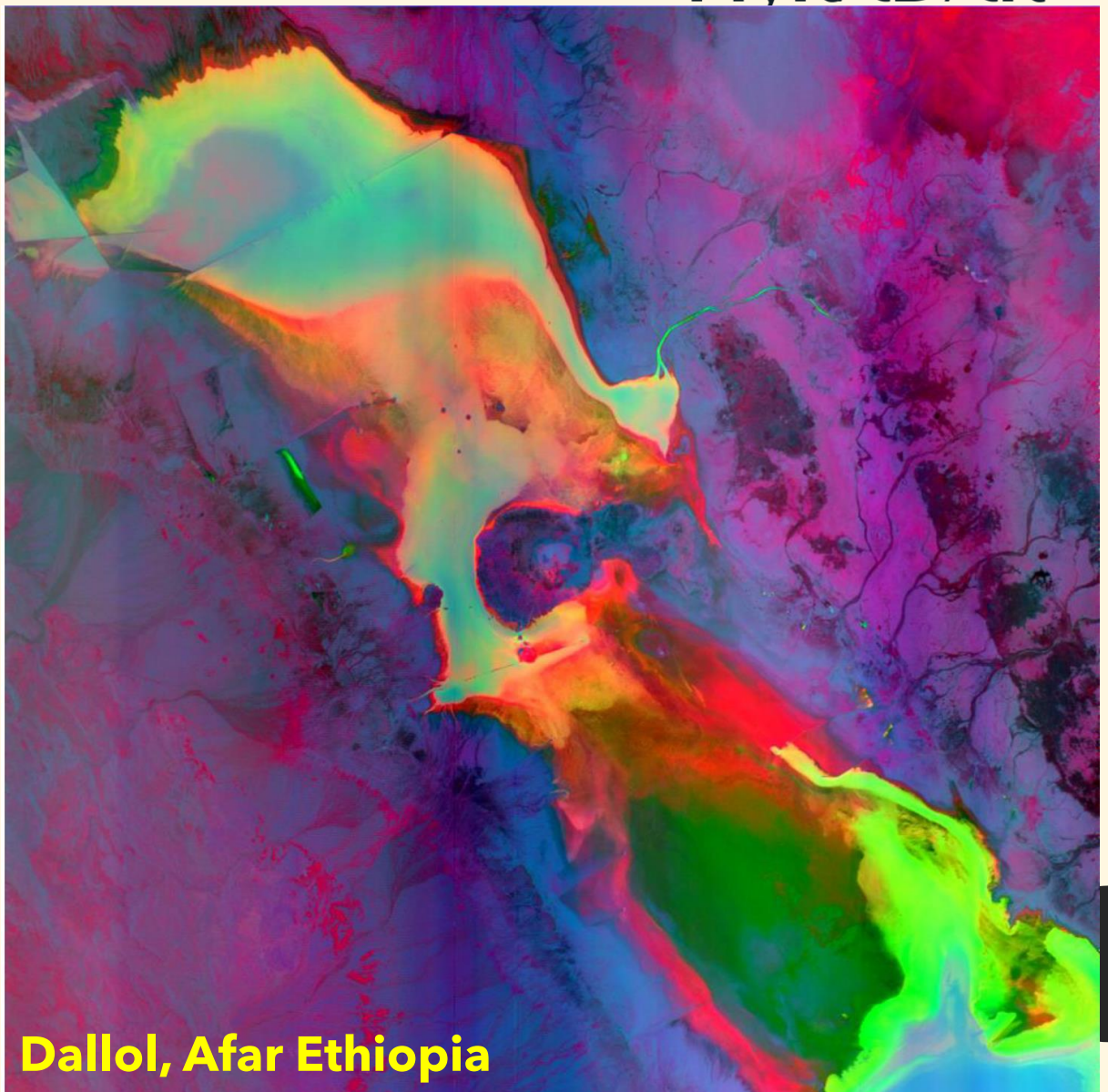
Planetary objects: Earth, Mars and Moon

Subsurface water search on Earth, Mars and Moon

Archeology and territorial and planning surveys

Search for pipelines, and other artefacts

High-resolution, cloud-free surveys with penetration capabilities



Test of the laser/altimeter for the EDL of ExoMars missions

INSURE


INSURE


DECOMMISSIONING OF
OIL&GAS PLATFORMS AND WIND FARMS
72%
45%

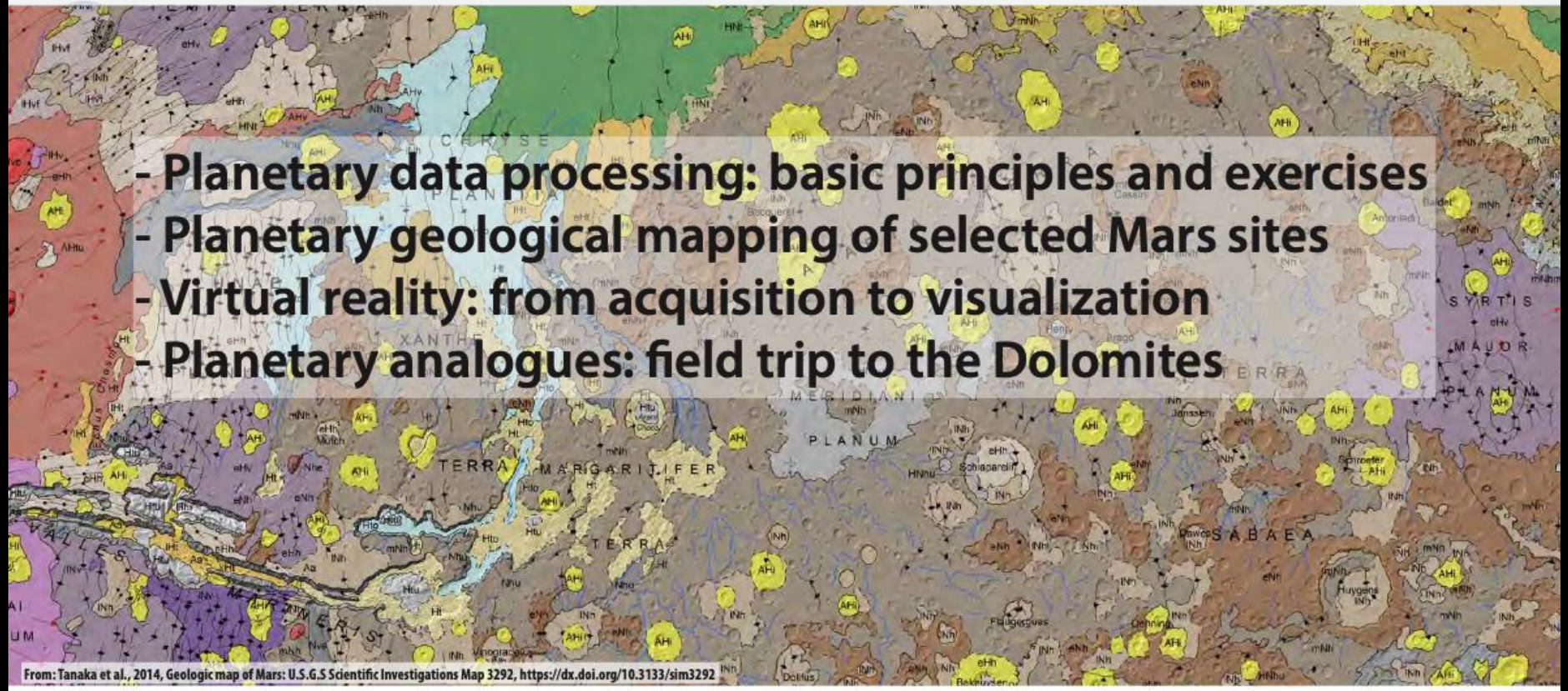

Università d'Annunzio in collaboration with
International Research School of Planetary Sciences
Pescara, Italy
Laurea Magistrale (Master)
in Planetary Geosciences
Languages: English
Mixed learning modes include distance and in-person education
2 years full-time
info@irsps.unich.it
www.irsps.eu/masters-degree-laurea-magistrale-in-planetary-sciences/

Co-funded by the
ERASMUS + Programme
of the European Union

GeoPlaNet

School on Planetary Geological Mapping and Field Analogues

26 September–8 October 2022, Pescara–Padova (Italy)



Nantes Université

1 2 90 UNIVERSIDADE D COIMBRA

U.PORTO

VR2Planets