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PIANO NAZIONALE
DI RIPRESA E RESILIENZA



ISTITUTO NAZIONALE
DI GEOFISICA E VULCANOLOGIA

WP 9

Coordinator
Vincenzo Romano
Advisor
CTS COS



MEET
MONITORING EARTH'S
EVOLUTION AND TECTONICS

Platform for Earth Observation from Space

Speakers:
Massimo Musacchio
Carlo Marcocci

Assigned Budget: 3.58 M€

First slide



WP9 aims to realize a common platform of data and products of Earth observation from space, an important and challenging effort in one of the most promising scientific disciplines for hazard assessment and mitigation.



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The consortium



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UNIVERSITÀ
DEGLI STUDI DI BARI
ALDO MORO



Consiglio Nazionale delle Ricerche
CNR-IREA, CNR IGG



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DI NAPOLI FEDERICO II



MEET
MONITORING EARTH'S
EVOLUTION AND TECTONICS



ISPRA
Istituto Superiore per la Protezione
e la Ricerca Ambientale



ROMA
TRE
UNIVERSITÀ DEGLI STUDI



Università
di Genova



OGS
Istituto Nazionale
di Oceanografia
e di Geofisica
Sperimentale



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Goal 1

Updating of observation networks and laboratories

Goal 2

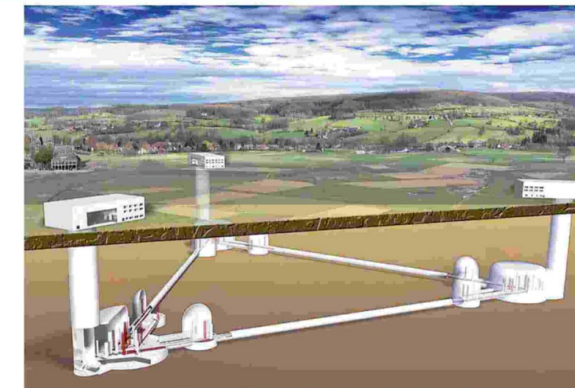
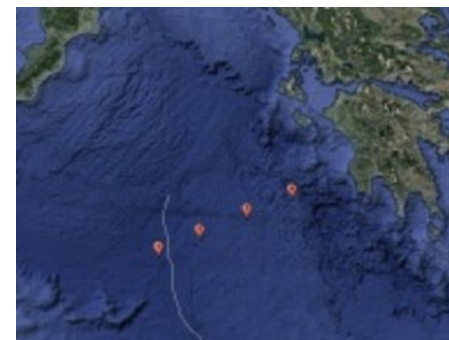
Construction of two natural observatories (Pizzi Deneri and Sos Enattos)

Goal 3

New implementations of scientific instrumentation
(Messina and Irpinia)

Goal 4

Integration of the new resources at an international level, also
through the implementation of the Italian Portal for Earth
Sciences.





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The PNRR-MEET is an **opportunity to renew** a large Research Infrastructure and to make it available to the entire Scientific community according to principles codified at European level (e.g. **Open Science**, FAIR).

The project is related to **basic research** with **state-of-the-art** instrumentation.

The fallout is also for **applications to society**.

The immense instrumental heritage is worth to **preserve for long-term. Sustainability policies** and choices are needed for the future.



MEET
MONITORING EARTH'S
EVOLUTION AND TECTONICS



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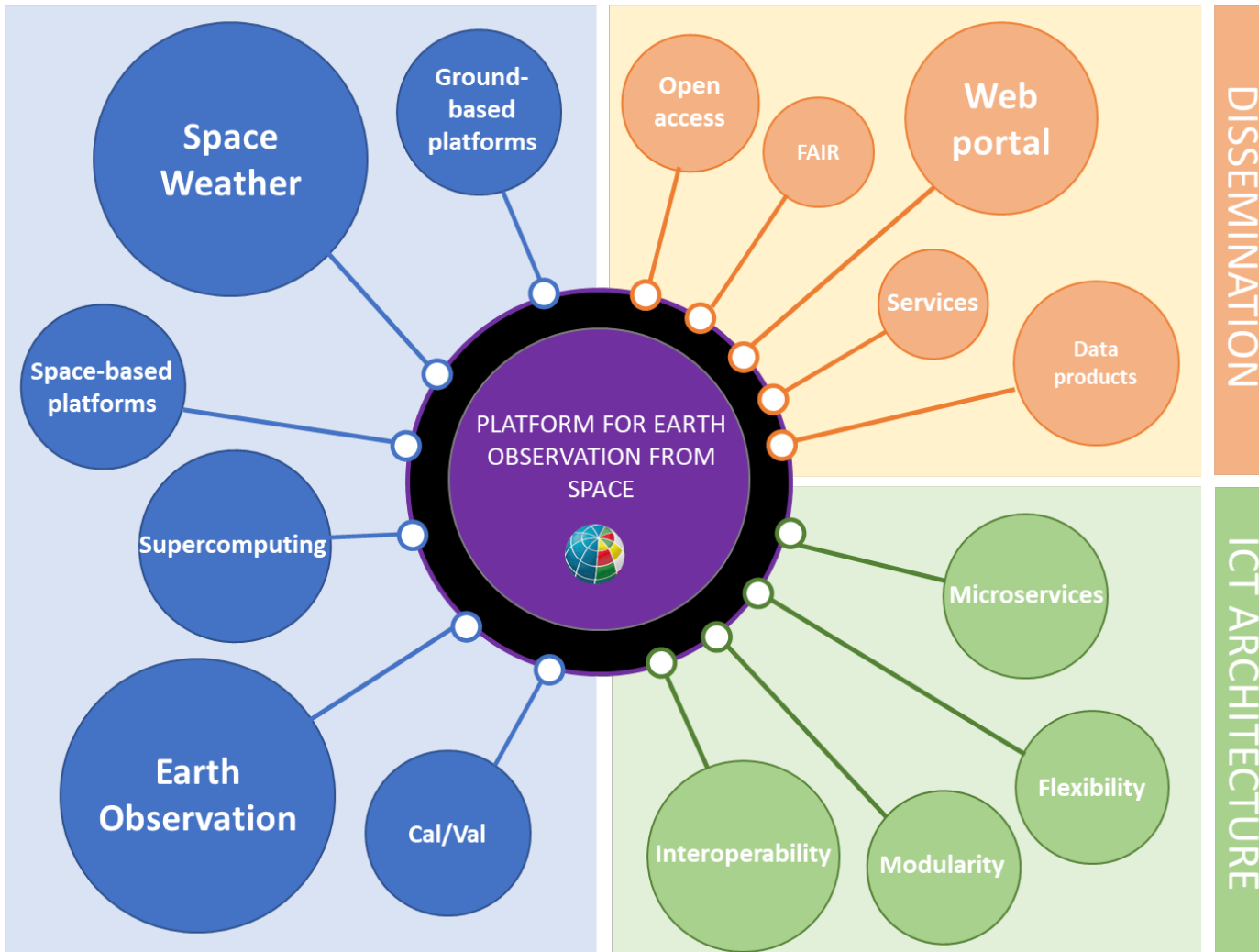


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MODULES AND THEMATIC AREAS



The WP9: Platform for Earth Observation from space

COS | CENTRO OSSERVAZIONI
SPAZIALI
DELLA TERRA



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istituto per il rilevamento
elettromagnetico dell'ambiente



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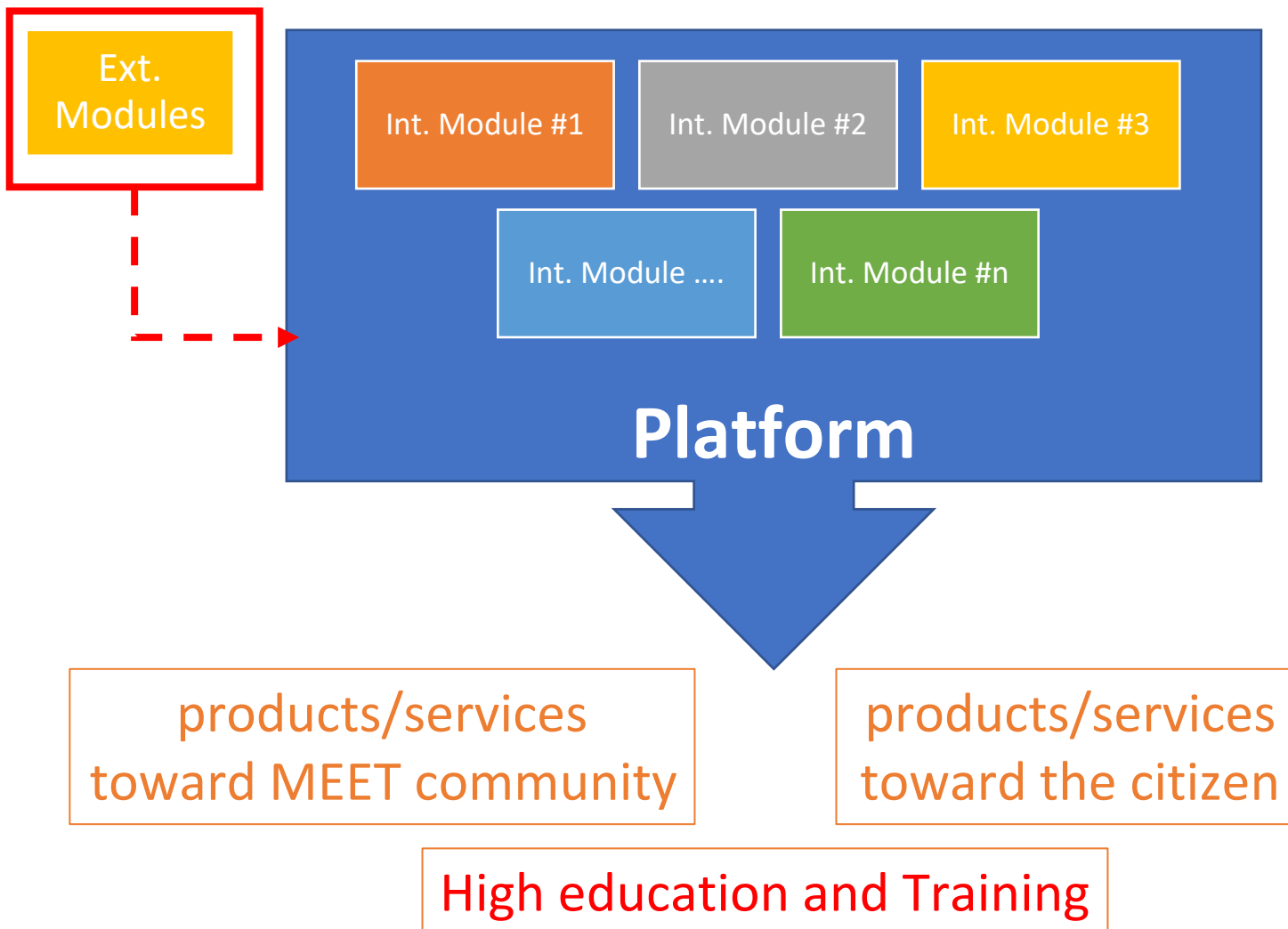
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External Modules (and sub modules) provide products/services to the Platform by using their own resources enlarging the capability of the platform in furnishing products toward the user community

Internal Modules (and sub modules) generate and provide products/services to the user community by using shared resources ensuring the capability of the platform in furnishing products

Modules for Space geodesy and SAR products

Modules for Optical products

Modules for Space Weather products and LAIC

Module for Calibration and Validation products



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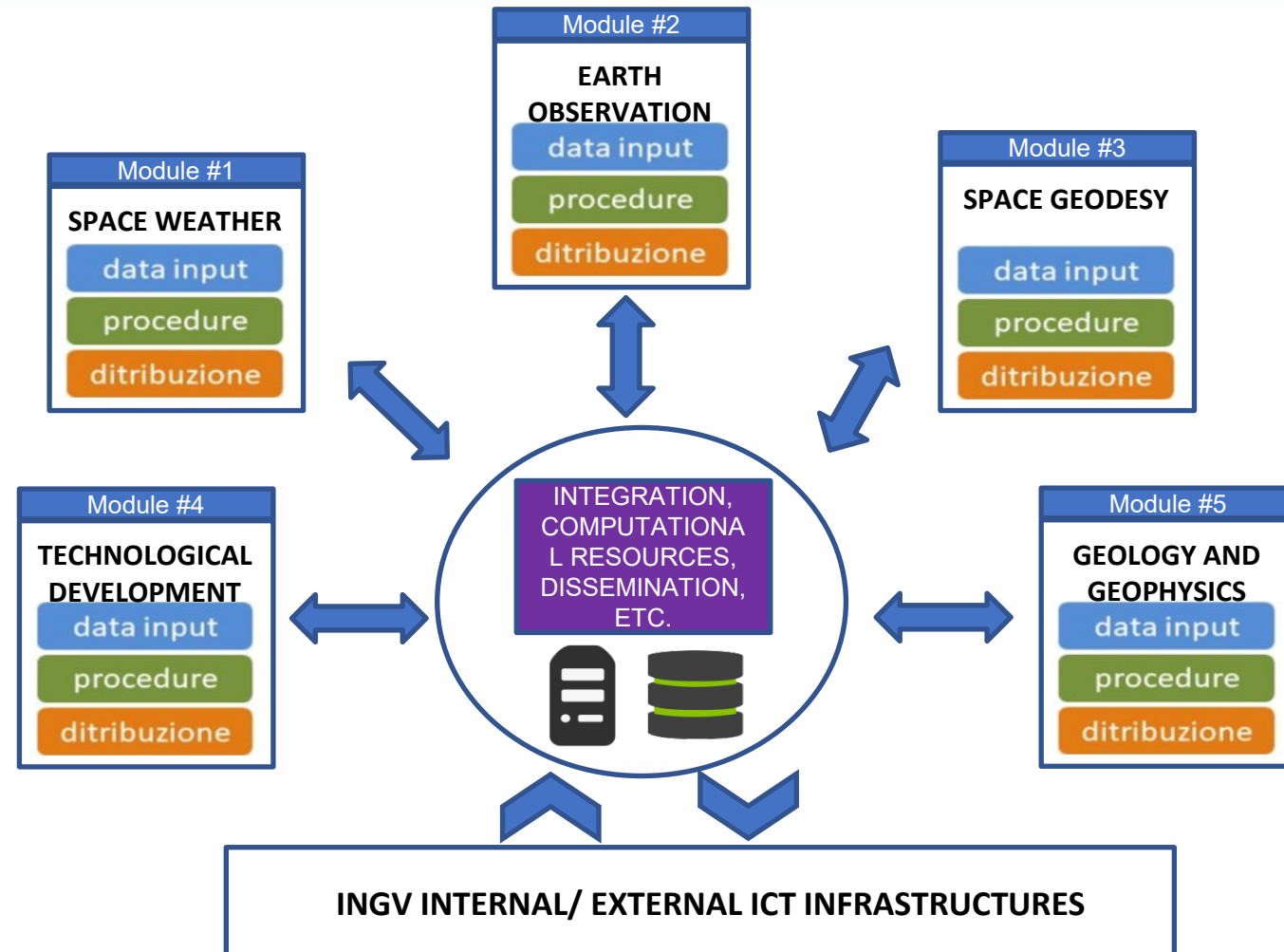
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The IT infrastructure for the COS should be able to:

- **integrate** data, products and services from the different operative modules of the COS.
- provide **computational resources** to the operative modules.
- pave the way towards development of **higher value** products and services.
- provide a common framework for the data/products/services **dissemination**





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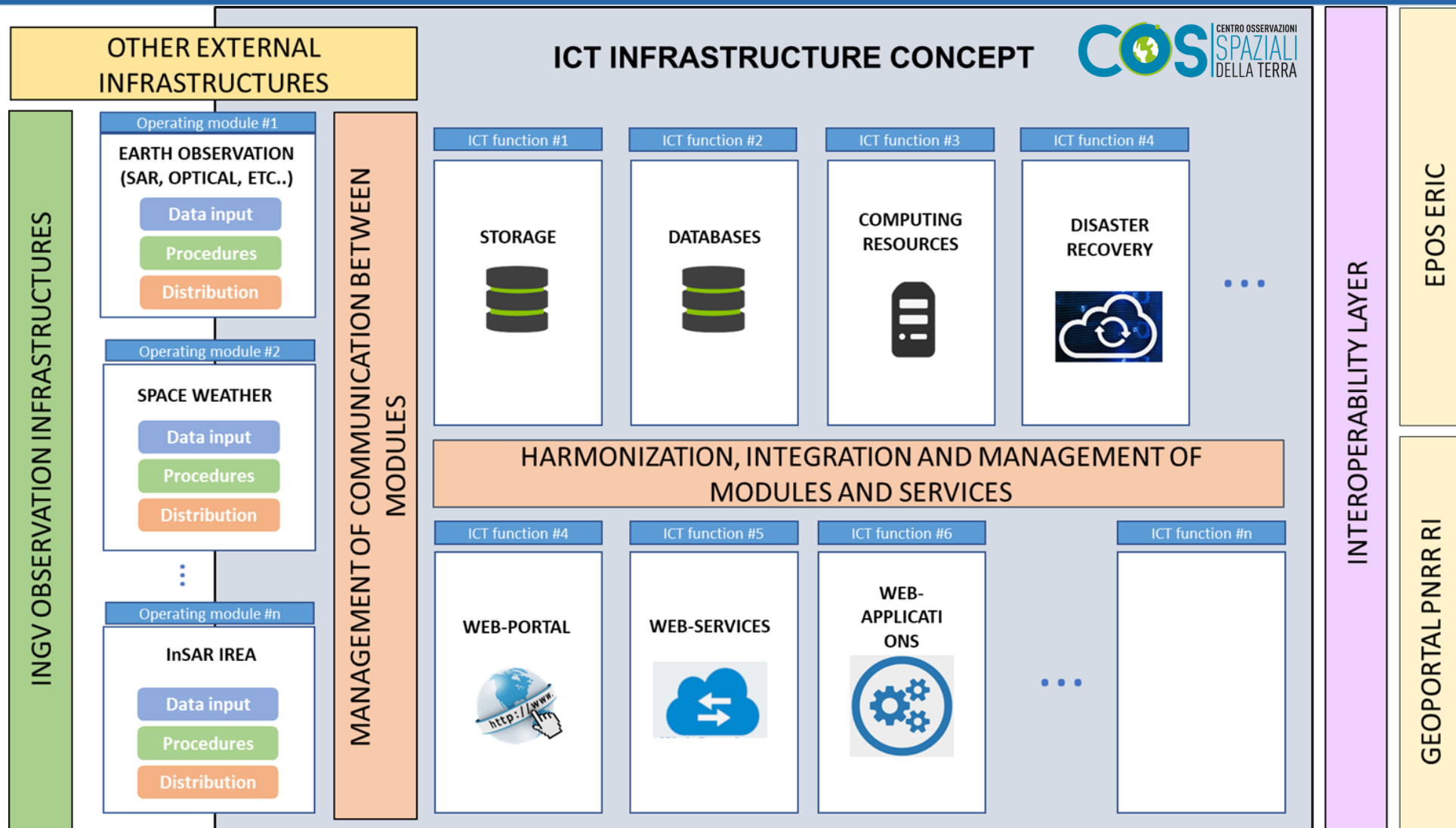
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The infrastructure principles

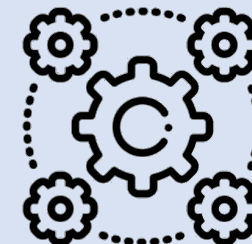
MODULARITY



New COS modules, both thematic or related to new service modules can be easily added to the platform

INTEROPERABILITY

Services for accessing and consulting data are in agreement with the international standards. Infrastructure allows interoperability with other platforms (PNRR RI Geo-portal, EPOS, Data registry, etc)



FLEXIBILITY

The infrastructure is easily scalable and its deployment is adaptable to different needs and systems (local infrastructure, distributed nodes, hybrid cloud, etc.)



kubernetes



OPEN



It's developed with open source software and oriented to a data FAIR (Findable, Accessible, Interoperable, Reusable) approach



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Activity 9.1 - Strengthening of observational and ICT infrastructures
M. Musacchio (INGV)

Activity 9.2 - Platform design & development
C. Marcocci (INGV)

Activity 9.3

Space geodesy and SAR
products

M. Manunta (CNR)

Activity 9.4

Optical products

G. Ganci (INGV)

Activity 9.5

Space Weather and
LAIC products

C. Scotto (INGV)

Activity 9.6

Calibration and
validation products

E. Marotta (INGV)

Activity 9.7 - Training and Higher Educations
C. Cesaroni (INGV)



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Modules

Products

Synthetic Aperture Radar (SAR) Satellite Imagery

EPOS TCS SATD

On-Demand Processing

InSAR Deformation
Time Series

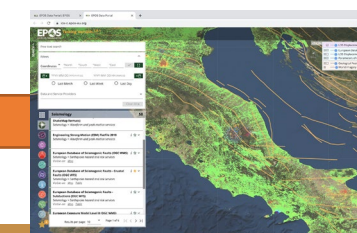
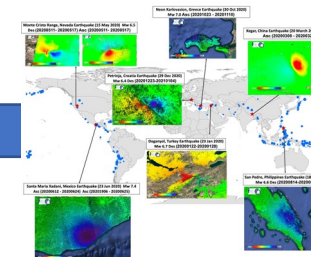
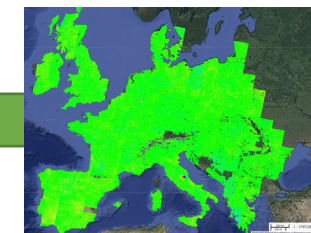
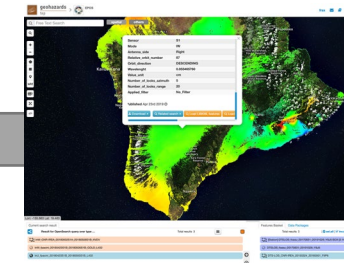
EPOS-ICS/COS-Module
Interoperability

Development of an environment
to host and share EPOS Satellite
Products interoperable with EPOS-
ICS and COS modules

Development of on-demand
unsupervised
InSAR processing tools for EPOS and
COS module products

Generation of InSAR time series, 3D
deformation and strain maps
through COS-SISTEM and EPOS TCS
SATD platforms

TCS SATD Data, Metadata, Services
integrated with EPOS and COS
platforms



EPOS &
Platform for Earth Observation from Space





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Modules

Products

Space Weather and multiparametric
data

PECASUS

SWESNET

Oblique Sounding

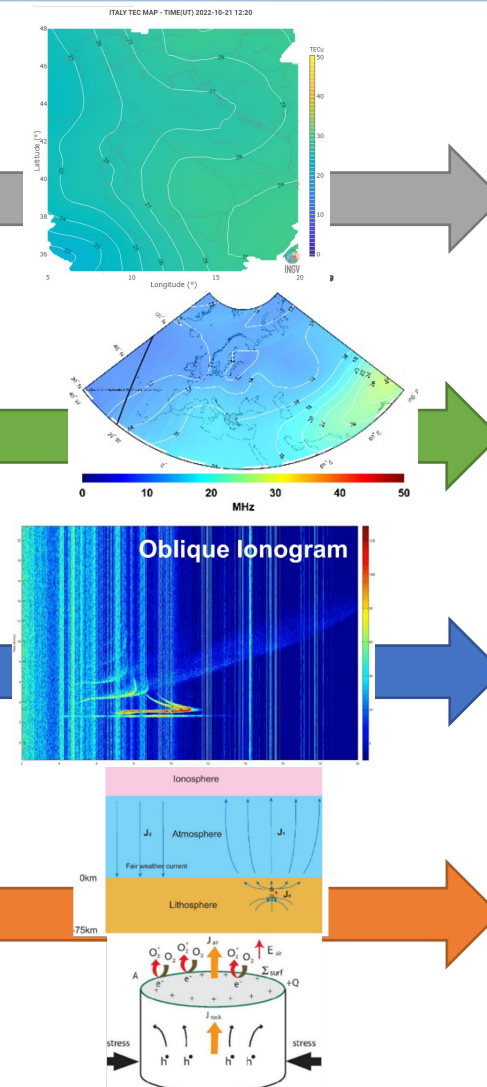
LAIC

Production of HF and GNSS space
weather products to ICAO

Production of Ionospheric Space
Weather Products to ESA

Information on the ionosphere even
in areas not accessible to the vertical
sounding, such as marine surfaces

Multiparametric data to study the
atmosphere-lithosphere coupling and
RF emissions



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Modules

Products

Visible and Thermal images/Field
data/Spectroscopy and Lidar data

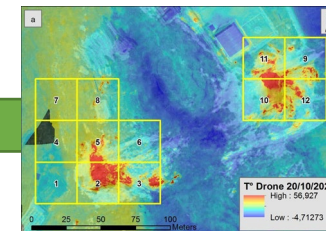
Legal procedures for
UAS

Authorizations to fly with UAS even
without a pilot on the field



UAS flights and Field
surveys

Visible and thermal images; SO₂
quantity and flow; properties of
volcanic plumes



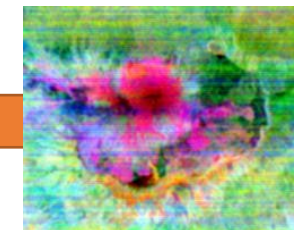
Laboratory activities

Engineering and implementation of
payloads for aerial platforms or
ground systems



Data comparisons

Calibration and validation of satellite
products to improve their accuracy



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Capacity Building
Workshops

Master in
collaboration with
Italian university

Training for
professional
stakeholders

October 2023 @ Broglio
Space Center, Malindi, Kenya

Capacity Building Workshop
on Space Weather and Low-
latitude Ionosphere



The Abdus Salam
International Centre
for Theoretical Physics

May 2023, MaSAG, Rome,
Italy

Mathematics for Signal
processing and Applications
in Geophysics and other fields



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SPACE EARTH
TECHNOLOGY

September 2023, Catania,
Italy

International Training School
on Convective and Volcanic
Clouds detection, monitoring
and modelling

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International Training School on
CONVECTIVE AND VOLCANIC CLOUDS (CVC)
detection, monitoring and modelling



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September 2023, L'Aquila,
Italy

International School of Space
Science on «Operational
Space Weather
Fundamentals»



International School
OF Space Science
L'AQUILA - ITALY

Consorzio Interuniversitario per la Fisica Spaziale



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- Participation to the Expoforum «New Space Economy» at Fiera di Roma 2022 and 2023 (WP9 flyer presented as well as several modules by flyers and seminars)
- Collaboration with:
 - PNRR “Partenariato Esteso Spazio”,
 - PNRR “Centro Nazionale di Ricerca in High Performing Computing”,
 - PNRR “Geosciences IR”,
 - “Azione di Accompagnamento for IRIDE Constellation”
 - PNRR PhD program «Corso di Dottorato Nazionale in Space Science and Technology» - a.y. 2022/2023
- Recruitment still in progress:
 - Welcome to: **Emanuele Pica** (Research Technologist at Rome) and **Marco Spina** (Research Technologist at Catania)
 - Missing: 1 Project Manager (failed), 1 CTER (in progress)
 - IREA: 2 Research Technologists (in progress)
- The ICT service bid is going to be concluded (deadline July, 6)
- The ICT hardware is in progress (it expected to be ordered within the 2023)
- The IREA procurement is in progress (it expected to be ordered within the 2023)



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- MEET is a challenging RI project with several administrative and technological issues
- WP9 platform is designed to be a tool to improve quality, level and visibility of our space-related products
- WP9 community is very large and enthusiast of the common infrastructure
- We fault in the Project Manager recruitment we hope this doesn't affect the success of the project (we will try to cover the gap with another recruitment process)
- We have also criticism for the approved training activity for cost eligibility
- The new IT team and the IT company will start to operate soon
- Active contribution by the COS modules is expected



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Thank you for your attention

...and thanks to COS



WP9 aims to realize a common platform of data and products of Earth observation from space, an important and challenging effort in one of the most promising scientific disciplines for hazard assessment and mitigation.