Regional Symposium
in Redu | Wallonia
Thursday, 2nd June 2022

The Technological District | *TeRN* and Aerospace Cluster | *CLAS* of Basilicata Region

Antonio Colangelo | President of TeRN Technological District of Basilicata Region

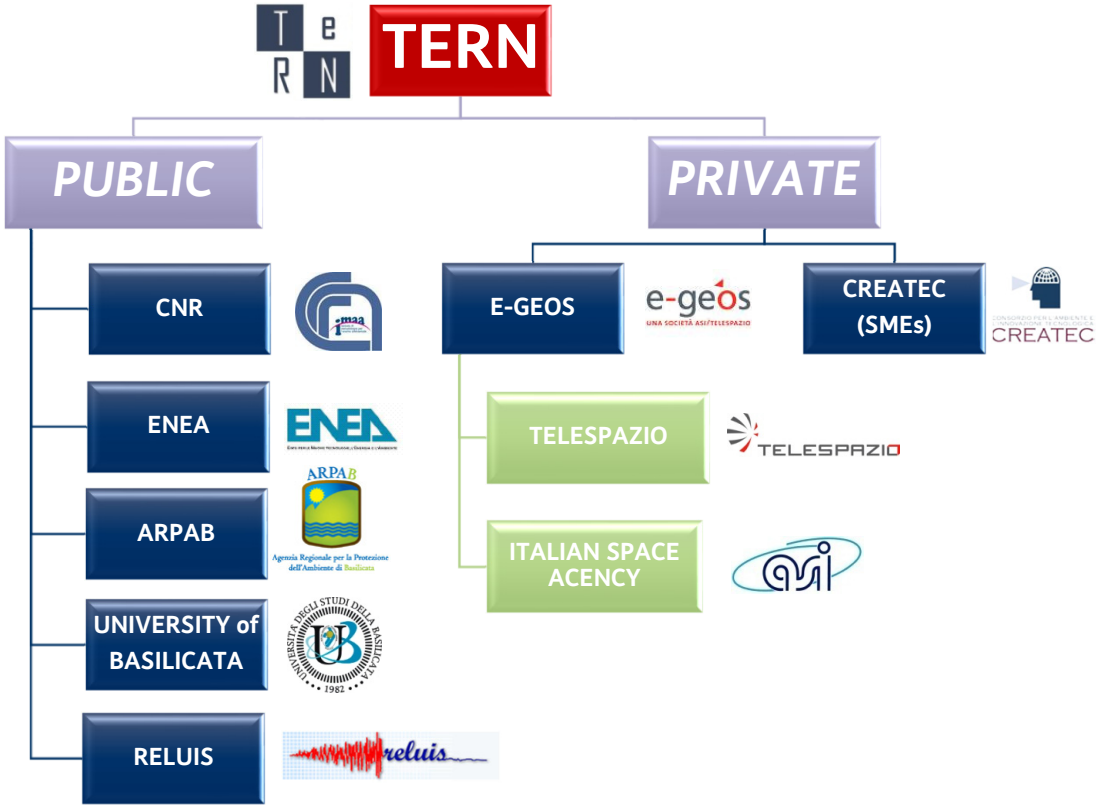
Valerio Tramutoli | Professor of Satellite Remote Sensing of Environment at University of Basilicata and Chair of TeRN scientific and technical Committee

Raffaele Santangelo | Deputy Program Manager for TeRN at Enterprises Network «Mille Infrastrutture»

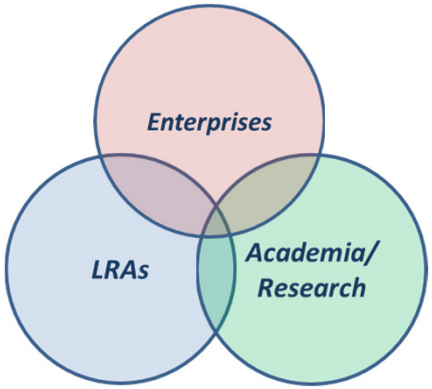
TeRN and evolution of Basilicata aerospace sector

PUBLIC – PRIVATE PARTNERSHIP AND TRIPLE-HELIX CLUSTER

The Technological District | ***TeRN*** and Aerospace Cluster | ***CLAS*** of **Basilicata Region**



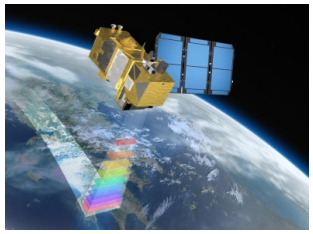
The **TRIPLE-HELIX ORGANIZATION** Research | Local Authorities | Enterprises of the Consortium is in agreement with the European policies which concern technological Clusters



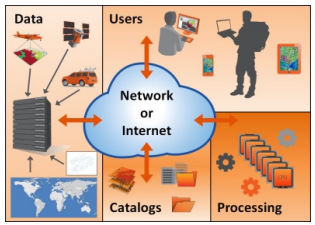
TeRN established in 2005 – Program Agreement: Italian Ministry of Education, University and Research, Italian Ministry of Economy and Finance and Basilicata Region | www.tern.it

TeRN in a nutshell

ACTIVITIES



Development and integration of ground, aerial and satellite-based EARTH OBSERVATION TECHNOLOGIES for studying, monitoring and mitigation of natural and environmental hazards including NON-DESTRUCTIVE DIAGNOSTIC TECHNIQUES for strategic civil infrastructures



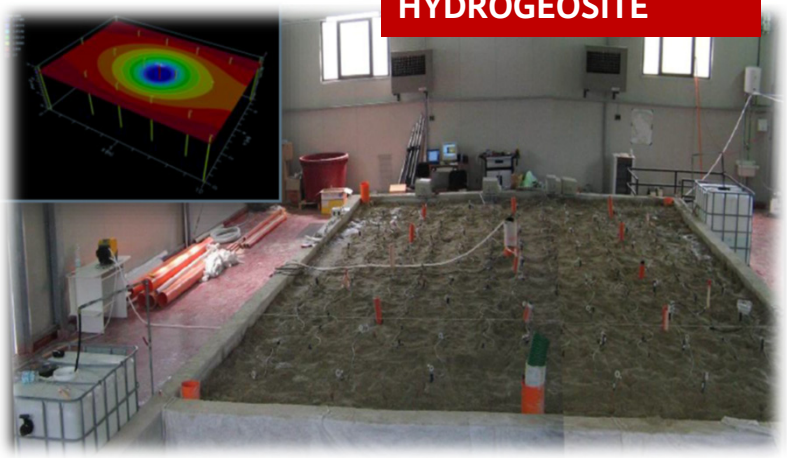
ICT TECHNIQUES AND SOLUTIONS for the integration, sharing and interoperability of the geospatial data from heterogeneous sensors and platforms.

Since the beginning (2017), TeRN has been selected by the EC both as Copernicus Academy than as Copernicus Relay. TeRN as Copernicus Relay & Academy is working to inform and engage about the Copernicus program services promoting a wider use of its information resources and data . Moreover, has been organized training courses on Copernicus for regional stakeholders (public authorities and companies)

TeRN in a nutshell

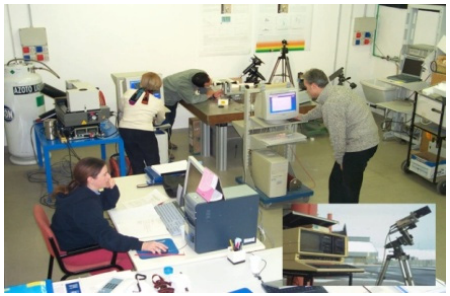
INFRASTRUCTURES @ **UNIVERSITY OF BASILICATA** and **NATIONAL COUNCIL OF RESEARCH** (POTENZA City)

HYDROGEOSITE



SATELLITE RECEIVING AND PROCESSING FACILITIES

ATMOSPHERIC OBSERVATORY



MOBILE LABS

TeRN in a nutshell

INFRASTRUCTURES @ **ITALIAN SPACE AGENCY** | ASI (MATERA City)

- Remote Sensing
- Geodesy
- Copernicus Core Ground Segment

TeRN in a nutshell

INFRASTRUCTURES @ **SME and Large Companies** (POTENZA and MATERA Cities)

Telecomunications

Airborn instruments

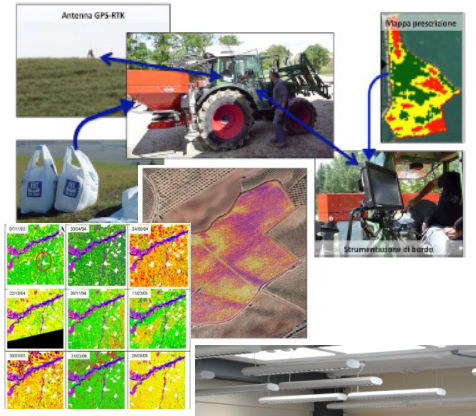
CREATEC

Earth Observation

Web services

STAC
(Space Technologies and Application Centre)
THE REGIONAL RESEARCH INFRASTRUCTURE IN THE AEROSPACE SECTOR

- **Space-based services for SMEs and public administrations**
- **High specialization** in:
  - Monitoring and mitigation of natural, environmental and industrial risks
  - Cultural heritage protection
  - Smart Agricolture
- **Start-up incubator**
- **Education on space-technologies for SMEs and LRAs professionals**



FORMAT-EO Summer School (Leicester 2013, 2014)

STAC - LABS

- **SAC (Satellite Application Centre)**
  development of Level-2/3 EO products/services for SMEs and LRAs

- **ARA (Aerial Robotics Arena)**
  out-door and in-door arenas for development and test of robotized/active drones for application in civil protection, infrastructures monitoring, environmental studies.

- **3C (Cloud Computing Centre)**
  development of applications fo AI and IoT to EO big data

TeRN in a nutshell

APPLICATIONS @ **The living catalogue of product and services of the Basilicata Space Sector**

Networking and Internationalization of Basilicata Space technologies

Networking and Internationalization of Basilicata Space technologies

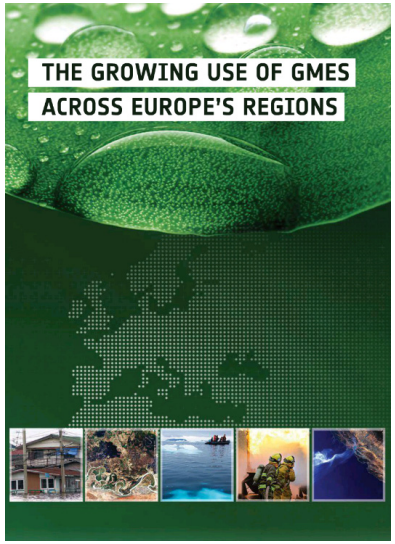
Catalogo NIBS.pdf (tern.it)

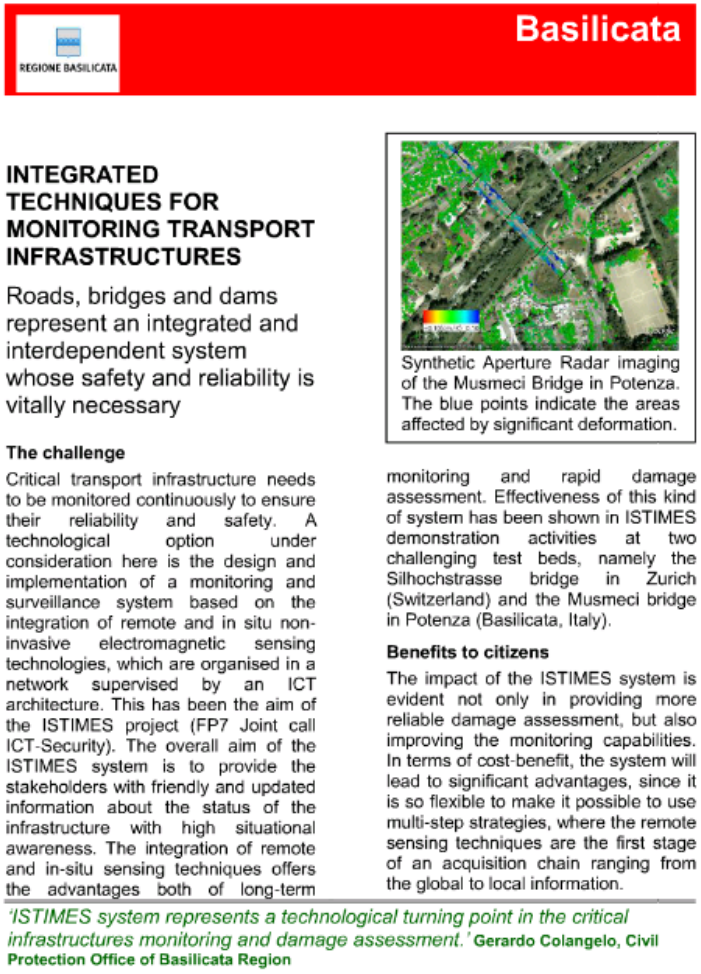
Basilicata STS Catalogue

Product and Service Catalogue of the Basilicata Space Technology Sector

TeRN in a nutshell

APPLICATIONS @ **The best practices from Basilcata Region in NEREUS/ESA pubblications**





Integrated Space&Ground-based techniques for monitoring strategic infrastructures:

one example of best practice from Basilicata

(**ISTIMES** EU Project)

TeRN in a nutshell

APPLICATIONS @ **The best practices from Basilcata Region in GMES4REGIONS pubblication**

GMES4REGIONS AND LOCAL AUTHORITIES

WINDOW ON GMES | Portraits of GMES users

A GMES4REGIONS PUBLICATION

Discover what GMES can do for European regions and cities

FOCUS ON GMES BENEFITS FOR LOCAL GOVERNMENT AND FOR GROWTH AND JOBS

Institutional corner

Gerhard Stahl, Secretary General of the Committee of the Regions, explains why the alliance of GMES and regions is of mutual benefit

Henri Malosse, President of the European Economic and Social Committee, details his vision of GMES.

Portraits of GMES users

Thirteen users at local or regional level recount their experience of using GMES products and services.

The SME corner

Four successful entrepreneurs share their story, their experience as well as their advice on how to build a business around GMES services.

OPINIONS ON GMES The added-value of GMES for regional and cross-border cooperation in Europe | *MyAir* services: a GMES contribution to public health **Thilo Erbertseder** | Monitoring Natura2000 habitats at local, regional and European scale **Stefan Lang** | GMES Urban Atlas develops urban planning applications at regional and city level **Tomas Soukup** | Earth Observation services to improve waste management at local level **Daniel Drimaco** | GMES services monitor ground instability for local authorities **Ren Capes** | GMES snow and land ice monitoring services **Thomas Nagler** | GMES services for local forest management **Mathias Schardt** | Using GMES to map and monitor landslides and ground subsidence **Fausto Guzzetti** | GMES services for renewable energies **Lucien Wald**

SPECIAL ISSUE GMES4REGIONS AND LOCAL AUTHORITIES

A GMES service for the timely detection of forest fires in Palermo province

THE CIVIL PROTECTION DIRECTORATE OF PALERMO PROVINCE (SICILY -ITALY) SYSTEMATICALLY USES AN ADVANCED EARLY FIRE DETECTION SYSTEM BASED ON THE RST-FIRES METHODOLOGY DEVELOPED BY THE UNIVERSITY OF BASILICATA AND CNR-IMAA. IT IS PRESENTLY DISTRIBUTED BY GEOSPAZIO-ITALIA AS PART OF ITS PROGRAMME FOR FOREST FIRE PREVENTION AND FIGHTING. THE ADDED VALUE OF SUCH A GMES SERVICE HAS BEEN DEMONSTRATED AFTER TWO YEARS OF TESTING, TUNING AND VALIDATION THROUGH THE *AVVISTA* PROJECT, FUNDED BY THE PARLERMO PROVINCE.

The Civil Protection directorate of Palermo Province. From left to right: Giuseppe BENIGNO, Head of the Technical and Organisational Office; Salvatore SERIO, The Director; and Girolamo CRIVELLO, Head of the Operations Management and Special Means office.

"One of the critical aspects of the whole fire fighting chain is timely identification of fire outbreaks. The prompt sighting and alerting of a fire, in fact, can allow for an immediate reaction of fire fighters who, intervening when fires are small, can extinguish flames in a more easy and effective way. Since 2008 Palermo Province decided to improve its fire fighting procedures by using advanced satellite technologies provided by the University of Basilicata and CNR-IMAA. Thanks to near real-time (every 15 minutes) provision of satellite-based active fires maps during the last two years, hundreds of fires were detected solely thanks to the satellite system and often identified well before traditional surveillance systems. Many hectares of forests were saved by this and, in one case, the service allowed the identification of pyromaniacs still in action!"

Salvatore SERIO

Basilicata Regional Contact Office (RCO)
More information on http://doris-net.eu/en/node/340
Contact: Carmela Cornacchia • rco_basilicata@tern.it • Tel: +39-0971-427275

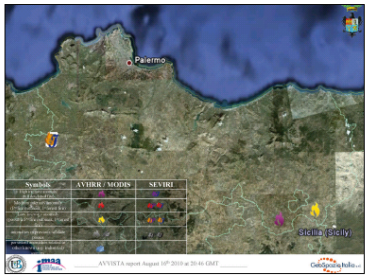
WINDOW ON GMES

An example of fast intervention: it took seven minutes to receive the anomaly from satellite, alert the airplane already overflying the area and receive confirmation of the presence of a fire outbreak. (Credits: Adnkronos, Repubblica.it August 28th, 2010).

A GMES SERVICE FOR TIMELY FOREST FIRE DETECTION

The service, based on the RST-FIRES methodology, uses 3 different satellite systems for providing fire alert maps. These are updated every 15 minutes and can be immediately visualised via a dedicated Google Earth plugin in the user's monitoring room. Specific software tools (and training for Civil Protection personnel) are provided for the identification of major or more dangerous events and to support decisions on priorities of interventions.

The unique capability of detection of very small fires also demonstrated its usefulness for controlling the timing of cleaning fires (prohibited during the hottest hours of the day) or to avoid their extension toward forested areas. In the top picture in red the SEVIRI ground resolution cell where a cleaning fire was identified on September 10th, 2010 by the RST-FIRES system, just close to a Special Protection Zone delimited by a blue line (Credits: M. Iato, Kumeta, Maganoce and Pizzo Parrino). In the bottom picture: the aircraft photo collected the day after confirming the correct detection of a cleaning fire (Credits: S. Giuseppe Jato - Palermo Province).



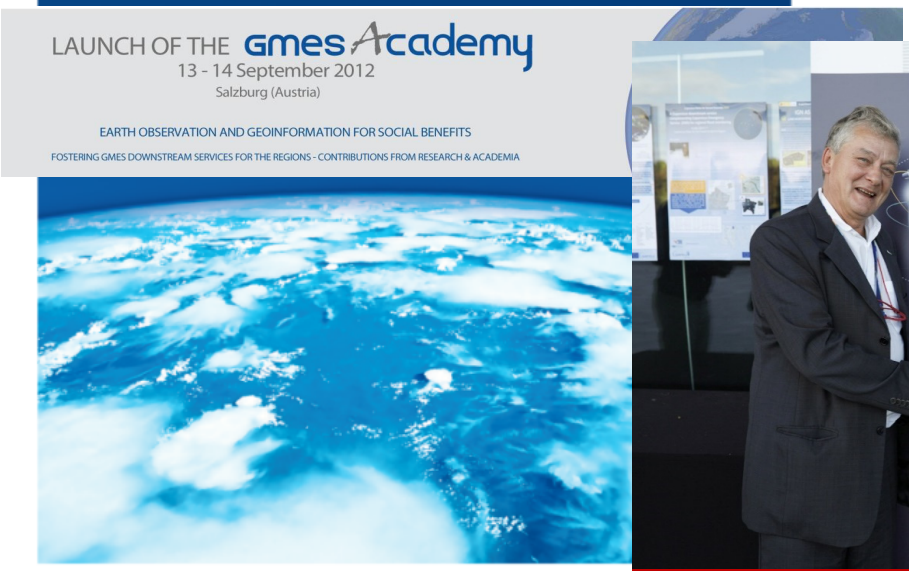
A fire alert map updated every 15 minutes presenting an active fire scenario. In the map, detected hot spots are reported by applying the RST-FIRES methodology to MSG/SEVIRI, NOAA/AVHRR and EOS/MODIS satellite data (Credits: University of Basilicata, CNR-IMAA, Geospazio Italia s.r.l.).

WINDOW ON GMES 21

Forest-fires rapid detection: a space-based services developed in Basilicata and offered to other Regions (Lombardy, Sicily, Calabria etc.)

TeRN in a nutshell

EDUCATION @ **Dealing with the education gaps in the Space Sector**



EDUCATION in SPACE TECHNOLOGIES: The EU Copenicus Academy Network

from a 2012 dream to a 2017 reality!

Prof. Valerio Tramutoli (University of Basilicata) and Prof. Peter Zeil (University of Salzburg) the Copernicus Academy «fathers»

6 June 2017 Bruxelles launch event of the Copernicus Academy Network

Today more than 150 international members !

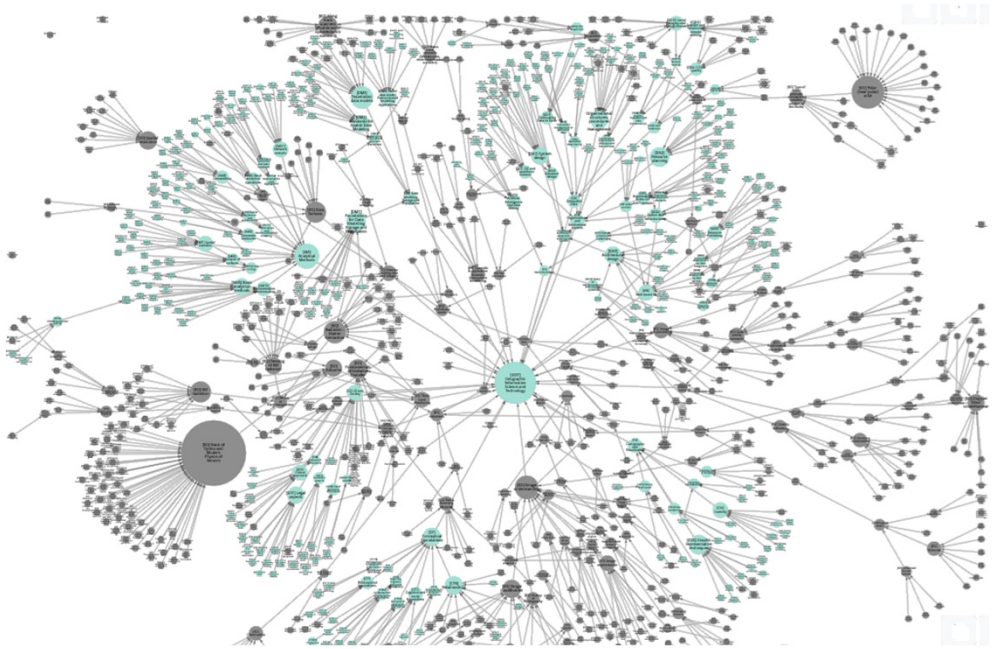
TeRN in a nutshell

EDUCATION @ **Drawing the new European curricula in the EO/GI sector**

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

From the EO/GI Body of Knowledge…

A formal description of a professional domain



To new curricula for LPAs professionals and for the schools

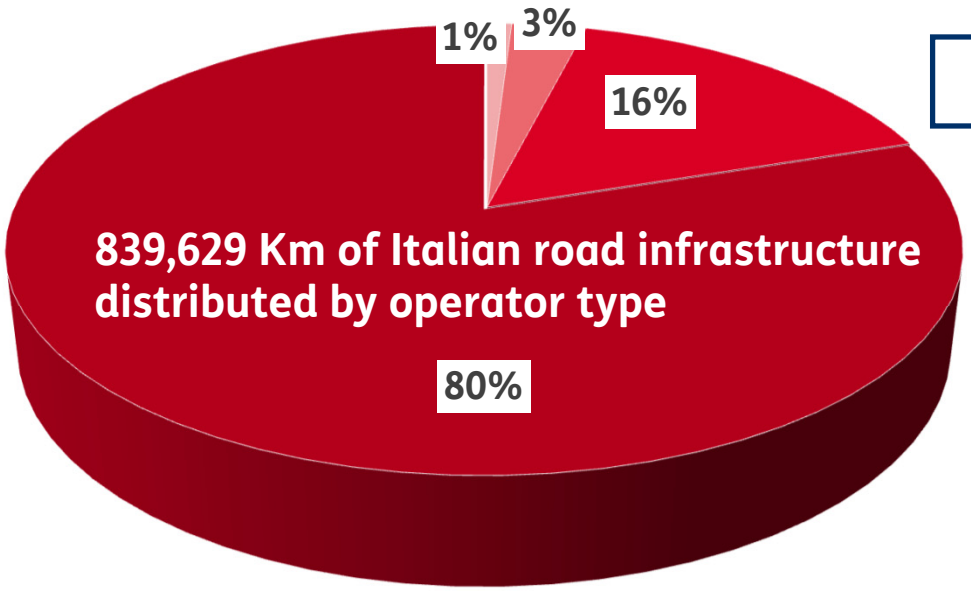
Copernicus for High School students during the Alternanza Scuola – Lavoro Stage (1 week -40 hours)

MILLE INFRASTRUTTURE
Rete d'Imprese

The Enterprises Network «MILLE INFRASTRUTTURE» Static and dynamic monitoring of infrastructures

Critical infrastructures and road & rail networks

The Italian transport network includes a **regional, provincial, and municipal road network** of **794,364 km**, a **national** & **highway network** of **35,265 km**, a **railway network** of **24,299 km**, **156 ports**, and **98 airports**.
The **Italian road and rail networks** are included in the **critical infrastructure** according to the Directive 2008/114/EC of December 8, 2008, adopted in 2011 by the Italian law regarding the **identification and designation of European critical infrastructures.**



- 1% - Highway Concessionaries
- 3% - National Roads (ANAS)
- 16% - Regions, Provinces and Metropolitan Cities
- 80% - Municipalities

- No. **27,392** Bridges, Viaducts and Overpasses
- No. **2,179** Tunnels

Source: ANSFISA - Annual safety Report of railway and road and highway infrastructures - 2021


14 August 2018
Collapse of the *Morandi Bridge* in Genoa
43 dead and 600 displaced.

14 August 2020 | The Regional Technological District of **BASILICATA** | **TeRN** and **LIGURIA** | **SIIT** presented to the **Italian Government** the first project sheet about the innovative monitoring systems of infrastructures to request funds from the Next Generation EU Program

16 July 2021 | ESTABLISHMENT OF THE "**MILLE INFRASTRUTTURE" ENTERPRISES NETWORK**

MILLE INFRASTRUTTURE
Rete d'Imprese

the purpose ?

the enterprises network was born
to innovate the methods of static and dynamic infrastructure monitoring

In the period **2021-2032**, the **Next Generation EU Program** and **PNRR Italian Complementary Funds** have allocated **more than 2,000 M€** for monitoring systems of infrastructures

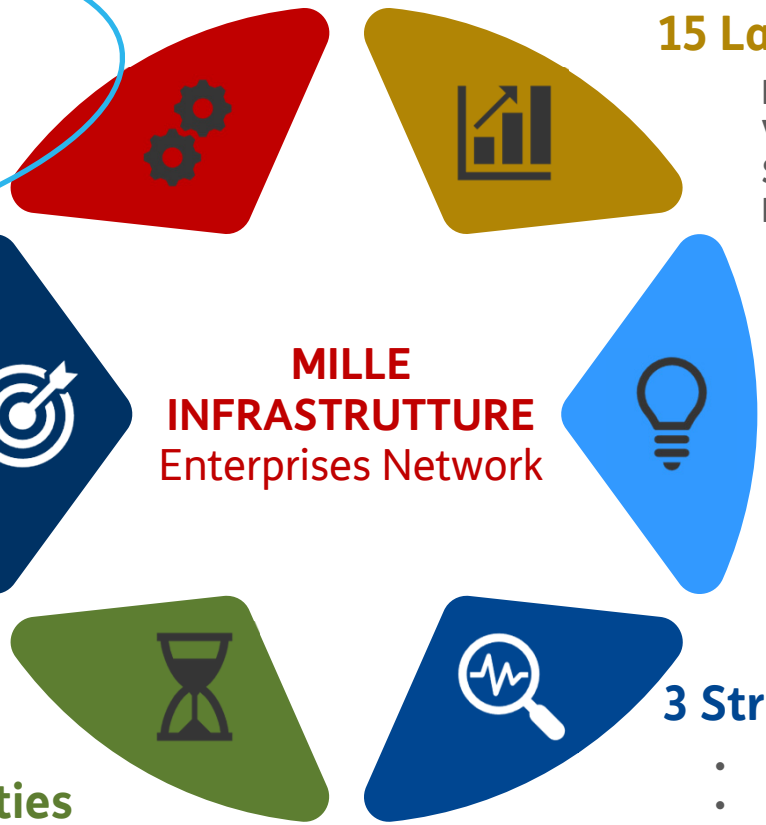
Enterprises Network | MILLE INFRASTRUTTURE

MILLE INFRASTRUTTURE
Rete d'Imprese

Promoters !!!

4 Regional Technological Districts

- **TeRN** | **BASILICATA** Region
- **SSIIT** | **LIGURIA Region**
- **TORINO WIRELESS** | **PIEMONTE** Region
- **DAC** | **CAMPANIA** Region



15 Large Enterprises

LEONARDO, TELESPAZIO, TAS-I, VITROCISET, e-GEOS, ENGINEERING, SANTER REPLY, TESMEC, SCAI group, ETT, MARINI IMPIANTI, etc...

56 SME Enterprises/Start-up

GEOCART, CREATEC, TECNOIN, PAGANO, PUBLISYS,TECNO PIEMONTE, FOS, GENEGIS-GI, HARPACEAS, TECNOSISTEM, AITEK, INNOVA, DIGIMAT, FAMAS SYSTEM, STRESS VALUE, etc...

7 Research/Competence Centers

- **IIT Istituto Italiano di Tecnologia**
- **SSSA Scuola Superiore Sant'Anna**
- CNR National Research Council
- ENEA
- Fondazione Links
- Artes 4.0
- CGIAM

3 Strucutral Engineering Consortia

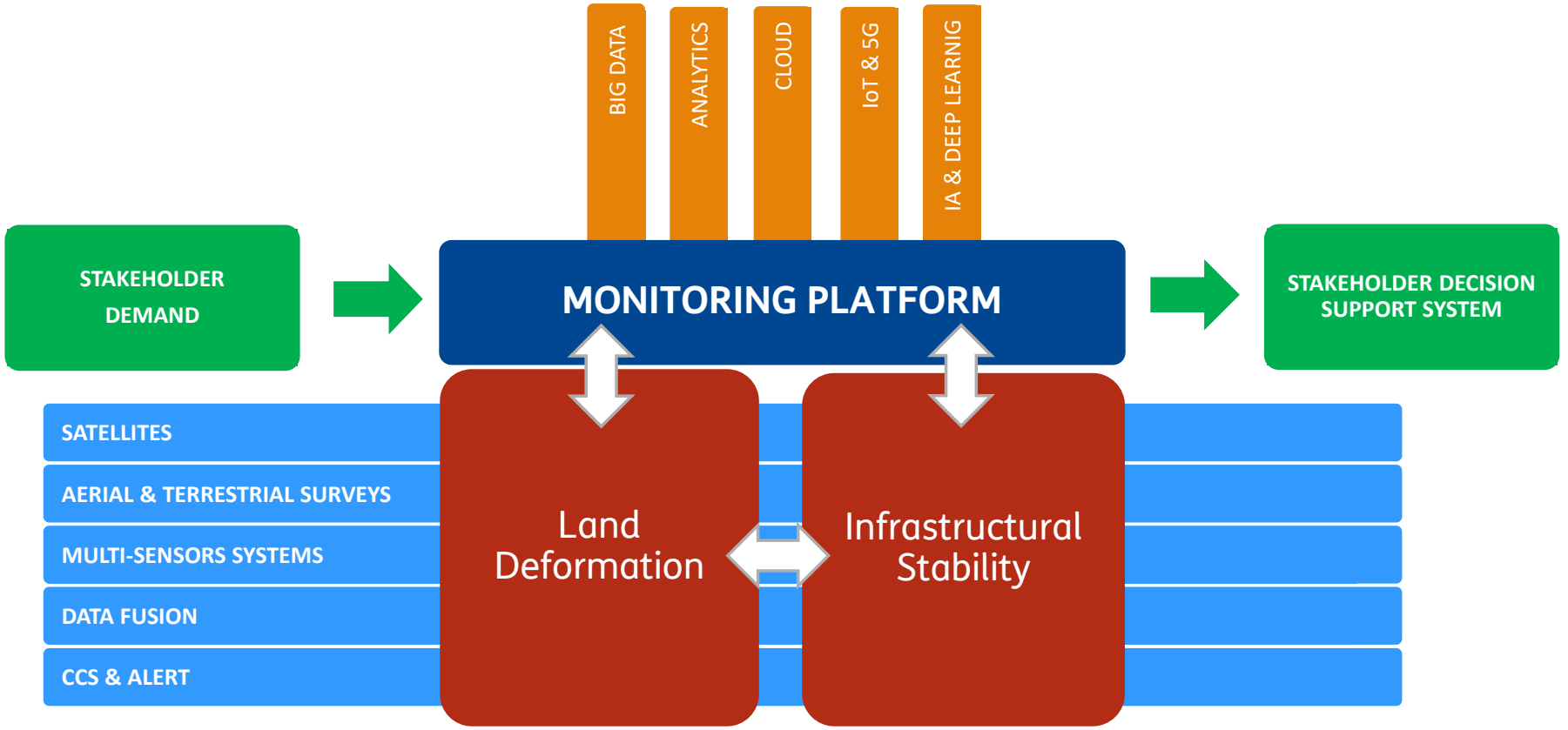
- **FABRE**
- **EUCENTRE**
- **STREES**

46 Universities

Monitoring Platform

Innovation in static and dynamic infrastructure monitoring sector

MILLE INFRASTRUTTURE
Rete d'Imprese



Contact information

Chairmaship of TeRN

www.tern.it
presidenza@tern.it
+39 0971 56671