RESearch and innovation on future Telecommunications systems and networks, to make Italy more smART (RESTART)

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SAPERI INTERCONNESSI

RESTART

- **Telecommunications**: a fundamental Critical Infrastructure of our modern societies
  - is playing a basic role in interconnecting the human, the digital, and the physical worlds, and setting the premises for becoming in the future
- In Italy a newly program will strengthen this infrastructure: **RESTART**
  - A comprehensive program, targeting at aggregating, and integrating the efforts of the main stakeholders of the Italian Telecommunications sector
  - Funded by the EU Recovery Fund

National Recovery and Resilience Plan (NRRP), Mission 4 Component 2 Investment 1.3

Grant=116M€

RESTART program features

- The RESTART partnership includes several research projects, with concrete and measurable results, to be jointly carried out by universities, research centres, companies and public administrations
- The program includes the following activities
  - fundamental and applied research
  - technology transfer and exploitation of research results, including dissemination activities
  - support for the birth and development of start-ups and spin-offs from research, promoting the activities and services of incubation and venture capital funds
  - training led in synergy by universities and enterprises, with particular reference to SMEs, to reduce the mismatch between the skills required by enterprises and those offered by universities
  - PhDs program
- In line with the NRRP, RESTART can produce concrete and lasting results in many aspects.
- The focus of the project is the structural improvement of research and development, using **telecommunications** in a wide variety of sectors: agriculture, trade, energy, finance, industry, media, health, security, transportation…
  … all while strengthening the link between scientific excellence and business

RESTART program key points

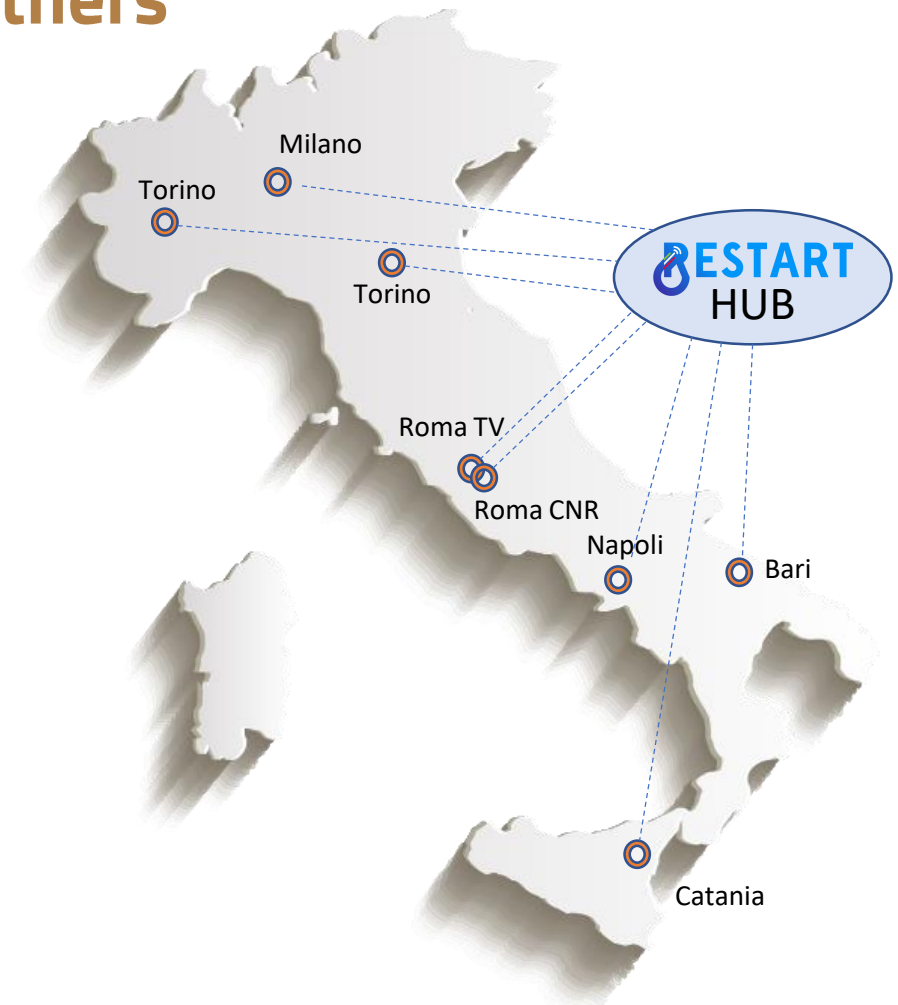
- There will be specific initiatives aimed at industrial districts and Southern Italy, including support for the design and creation of technology islands and ecosystems, such as private 5G/6G networks with related services and cloud edge
  - telecommunications resources enable even small or peripheral communities to work smart and access global opportunities and markets.
- Enable intelligences, experiences, professionalism and entrepreneurship differently located throughout the country to all contribute to the country's revitalization, avoiding emigration
- Evolution of the 5G slice concept from that of a virtual (cellular) network of guaranteed quality to that of a virtual (general) infrastructure/platform that automatically runs and manages distributed applications of verticals, such as video distribution systems, Smart Cities/IoT platforms and Edge Learning architectures
- We care about digital transformation of industries/administrations and business efficiency, with new business and cost-sharing models for a more equitable and broader contribution to telecom network investments
- Creation of new companies with the associated increase in average size.
- Increasing the number of **telecommunications students**, researchers and professionals; improving their skills and reducing the gender gap and the North-South divide in telecommunications.

RESTART: a complex structure

- Proponent (Roma Tor Vergata)
- Hub (legal entity, created ex novo="Fondazione RESTART")
- **Grant=116M€**
- Duration: 1/1/23->31/12/25
- **President**: Nicola Blefari Melazzi (Università di Roma, Tor Vergata)
- **Vice-President**: Antonio Capone (Politecnico di Milano)
- **Board of Directors**:
  - Marco Giuseppe Francesco Bigatti (Open Fiber)
  - Carla Fabiana Chiasserini (Politecnico di Torino)
  - Paolo Giuseppe Natale Ravazzani (Consiglio Nazionale delle Ricerche)
  - Daniele Riccio (Università di Napoli Federico II)
  - Ilenia Tinnirello (Consorzio Nazionale Interuniver. per le TLC)
  - Alessandro Vanelli Coralli (Università di Bologna)

Spokes and partners

- 8 Spokes (admin and coordination centers)
- 25 Partners (=affiliates)



Università di Roma, Tor Vergata
Consiglio Nazionale delle Ricerche
Politecnico di Bari
Politecnico di Milano
Politecnico di Torino
Scuola Superiore Sant'Anna di Pisa
Università di Bologna
Università di Catania
Università di Firenze
Università di Napoli Federico II
Università di Padova
Università di Reggio Calabria
Università di Roma Sapienza
Consorzio Nazionale Interuniver. per le TLC
Fondazione Ugo Bordoni
Open Fiber
TIM
Vodafone
Wind Tre
Ericsson
Prysmian
ITALTEL
LEONARDO
Athonet
TIESSE

Missions

2
Laboratories, Proofs of Concept and Demonstrators

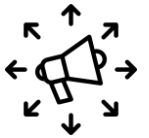
3
Innovation and Technology Transfer

4
Support to Start-ups and Spin-offs

1
Research

5
Education and Training Activities

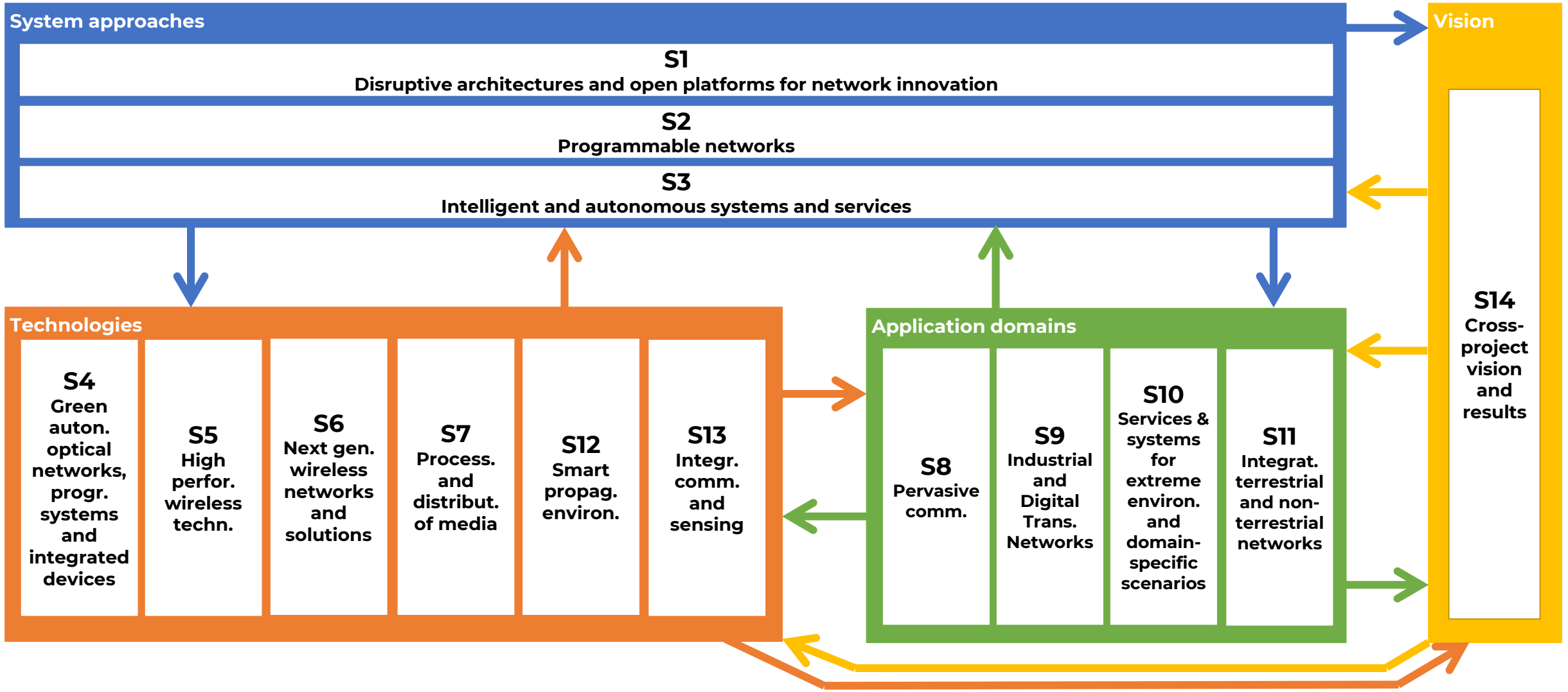
6
PhD Programs



7
Communication, Standardization and Open Source Solutions

14 structural projects: define the research program and give a structure to the overall work

18 focused projects: complete the structural projects towards more specific directions


System approaches
S1
Disruptive architectures and open platforms for network innovation
S2
Programmable networks
S3
Intelligent and autonomous systems and services
Vision
S14
Cross-project vision and results
Technologies
S4
Green auton. optical networks, progr. systems and integrated devices
S5
High perfor. wireless techn.
S6
Next gen. wireless networks and solutions
S7
Process. and distribut. of media
S12
Smart propag. environ.
S13
Integr. comm. and sensing
Application domains
S8
Pervasive comm.
S9
Industrial and Digital Trans. Networks
S10
Services & systems for extreme environ. and domain-specific scenarios
S11
Integrat. terrestrial and non-terrestrial networks

System approaches

F3
ADAPTO - Predictive and adaptive network dimensioning of Cloud Native Network Functions based on usage data collection and analysis

F18
LIASON LIfecycle Assessment and security assurance In SOftware-defined NEtworks

Technologies

F2
LEGGERO decentraLizEd & inteGrated edGE Routing platfOrm

F4
R4R Renewables for Resilience

F5
GrapHICS Graphene/ a-Si:H photonic Integrated Circuits

F6
ELENE Lithium niobate on insulator (LNOI) nonlinear photonics for communica-tions

F7
HePIC A Heterogeneous Photonic Integration platform for future telecomm. devices

F8
T-NEXT Terahertz frequency devices for next generation of optical wireless communica-tion

F9
MOSS Macroscopic modeling of scattering from static and reconfigurabl e smart skins

F10
INCHNET INnovative CHannel coding for modern and green NETworks

F11
SENSING NET Introducing SENSING capabilities in deployed TLC fiber NETworks

F17
ARCADIA grAphene-based THz wiReless Communications: chAnnel characterization and components moDeling and sImulAtion

Application domains

F1
WatchEDGE Wide-area Agile and flying neTwork arCHitectur e for AI-surveillance processing at the EDGE

F12
TeleSmEg Telecom as a service in the next SMart Energy Grid

F13
WITS Watering IoTs

F14
6G SALUS E2E Intelligent Network Platform for E-Health

F15
MoVeOver Wireless communic ations for seamless mobility in connected vehicles for the day-3 and over

F16
AQUASMARTT dAta acQuisition with Underwater and Above-water Sustainable wireless nodes for Monitoring how climAtic changes affects natuRal disasTers and biodiversity

Concluding remarks

RESTART Project

- Overcome the current fragmentation of research and development through actions of coordination and synergy between project initiatives
- Foster cooperation between universities, research centres, companies and public administrations
- Provide a long-term vision, transversal and supporting actions and adequate tools and enablers

Grazie! → guido.maier@polimi.it

https://www.fondazione-restart.it/