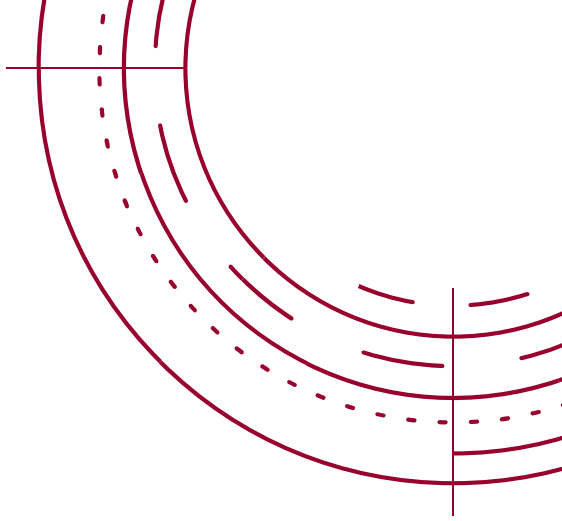# ROMARS

R&D AND PRODUCTS

**APPLICATIONS, RESEARCH AND SYSTEMS
FOR TOMORROW'S TELECOMMUNICATIONS**

ROMARS TEAM AND BACKGROUND

Our research activity

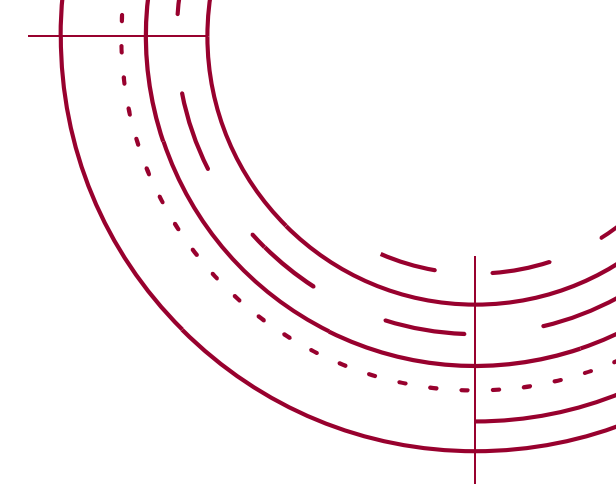ROMARS IS A UNIVERSITY SPIN-OFF SPECIALIZED IN R&D AND ADVANCED SOLUTIONS FOR TELECOMMUNICATION NETWORKS.

More than 20 years in research. More than 50 R&D projects.

SPECIFIC EXPERTISE ON SATELLITE TELECOM, 5G ARCHITECTURE / CORE NETWORK AND INTEGRATION.

MOST OF THE DEVELOPED ACTIVITIES FUNDED AND VALIDATED BY esa (EUROPEAN SPACE AGENCY).

ABOUT US

Status:

RomARS is a University spin-off and Innovative Start Up company.
Made of highly skilled personnel specialized in telecommunication and software development.

Mission:
Committed to design, develop and validate innovative network technologies.

Background and track record:
Expertise from >50 projects in >20 years of activities
3GPP and 5G mobile networks
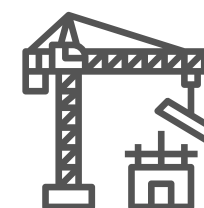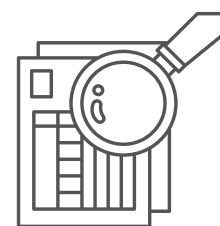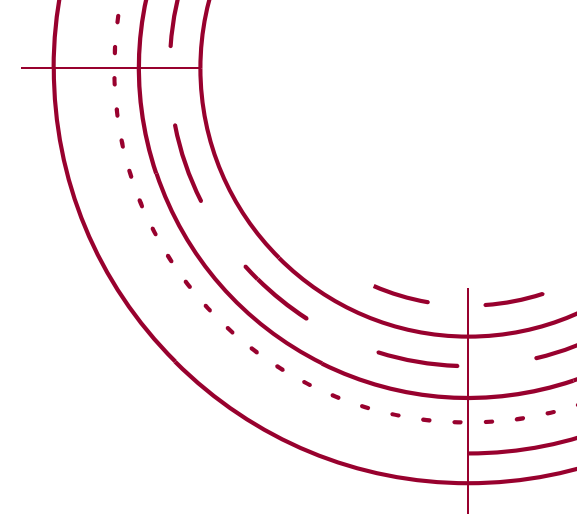Network protocols (IETF and other)
Virtualized network architectures
Satellite systems (GEO and LEO)
Software development (C, Go, Java, C++, Python, etc.)

ROMARS TEAM AND BACKGROUND

The story

2003

Founders start to cooperate in PhD research at University TorVergata

2005

Founders join Nitel Consortium for expansion of their R&D activities

2015

Starts the development of Commercial Products and Applications for 3rd party Customers

2020

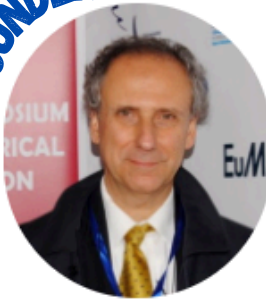Foundation of RomARS Innovative Start Up

2024

1M€ in research project managed per year Backlog of >2M€ of R&D project already granted. Expansion of business with a dedicated BU for product development and technology transfer.

ROMARS TEAM AND BACKGROUND

The company

FOUNDER

Michele Luglio

President

FOUNDER

Francesco Zampognaro

Vice President, CTO

FOUNDER

Cesare Roseti

Chief R&D Officer

Mattia Quadrini

Internet Engineer

Lorenzo Serranti

R&D Software engineer

Domenico Verde

R&D Software engineer

Luca Fiscariello

R&D Software engineer

Sara De Prai

Responsabile della comunicazione

Federica Malavasi

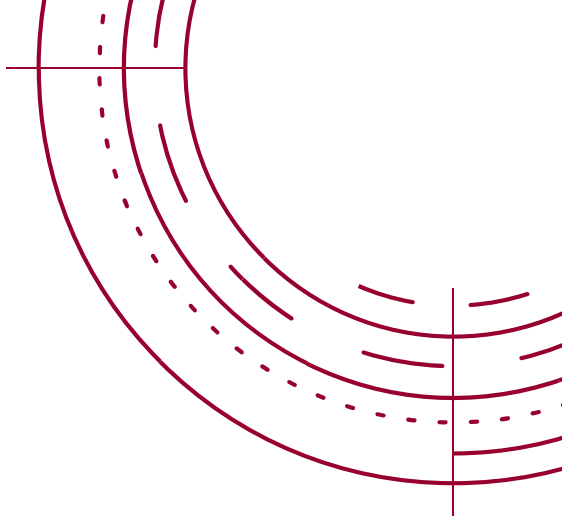**Administrative secretary**

Walter Munarini

Commercial director

R&D PROJECTS

INTEGRATION OF NON-3GPP SATELLITE NETWORKS WITH 5G CORE NETWORKS

INN3SCO goal is to extend the applicability of non-3GPP Access Gateways functions to significant satellite-based scenarios, spanning from SATCOM/5G integrated modems for improved redundancy and resilience to IoT satellite terminals, considering as well mobile broadband connectivity to Residential Gateways for IPTV and narrowband services. All the technology developed are validated into a realtime testbed with a 5GC and a SatCom component.

https://connectivity.esa.int/projects/inn3sco

SATELLITE-BASED NARROW BAND IOT (NB-IOT)

In this project we focused on the identification of suitable satellite-based architectures supporting compelling NB-IoT applications addressing both a satellite Uu interface and an on-board eNB design. For each and every scenario, we carried out a specific analysis which led to the consolidation of the connectivity requirements for the satellite integration starting from those indicated in the relevant 3GPP specifications and scientific literature.

https://artes.esa.int/projects/nbiot4space

R&D PROJECTS
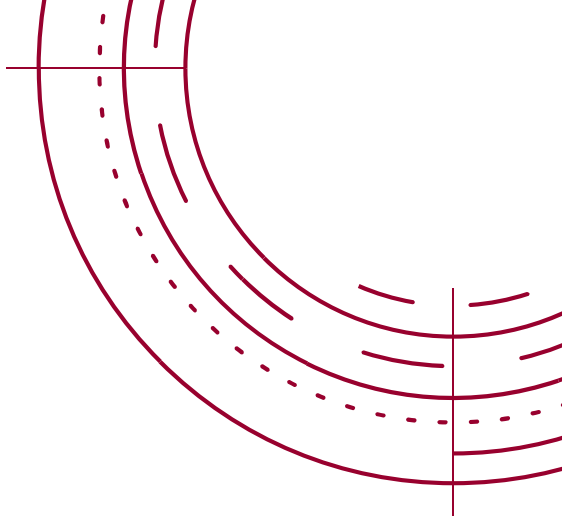
5G HOST-SAT

5G-HOSTS-SAT focuses on experimental validation of various vertical services in 5G environments enhanced with satellite technologies. The final aim is to identify business drivers, technical challenges and practical solutions to foster and facilitate the creation of new applications in sectors that particularly benefit from the integration of satellite in 5G networks. On of the two trials is based on the adaptation of Wi-Fi sensors for agriculture to be exposed towards a 5G Core Network interfaced via satellite.

https://connectivity.esa.int/projects/5ghostssat

SURPRISE

The main objective of the project is to design, develop, and test fully virtualized ground software components that can be deployed, configured and scaled dynamically over shared infrastructures exploiting edge or cloud resources. Orchestration and network automation mechanisms can combine, manage and control such components, exploiting their open programmability, to build and deliver end-toend services supported by both flexible high throughput satellites and terrestrial networks among multiple end-users and service providers.
IoT and 5G use-cases are currently being considered for their implementation in the project testbed

https://romars.tech/en/project/surprise/

5G EMERGE

The 5G-EMERGE project aims to develop an integrated satellite and terrestrial system based on open standards, toenable high-quality content distribution services. The project envisages an open multi-tenant ecosystem that seamlessly integrates Near Edges well connected to Satellite Teleport with distributed Far Edges through a virtualised satellite connection to 5G- base stations. This solution is a hybrid, native IP, infrastructure based on open standards to deploy edges in both 5G and non 5Gnetwork head-ends, home networks and networks in vehicles. The edge architecture can host applications and expose popular content transparently to end-users, with caching and satellite backhaul as core services.

https://www.5g-emerge.com/

QUICOS

The goal of the QUICoS project is to study, define, implement, and evaluate, in a satellite-based network testbed, possible enhancements in congestion control, flow control and retransmission mechanisms to be included within the UDP-based QUIC protocol, which is the basement of HTTP/3. These enhancements are driven by the most recent versions of TCP which have demonstrated good performance on satellite networks (TCP Cubic, TCP BBR, TCP Wave). In this way, an innovative and IETF compliant realization of the QUIC protocol can be defined, able to obtain good performance on both satellite, and terrestrial networks.

https://connectivity.esa.int/projects/quicos

R&D PROJECTS
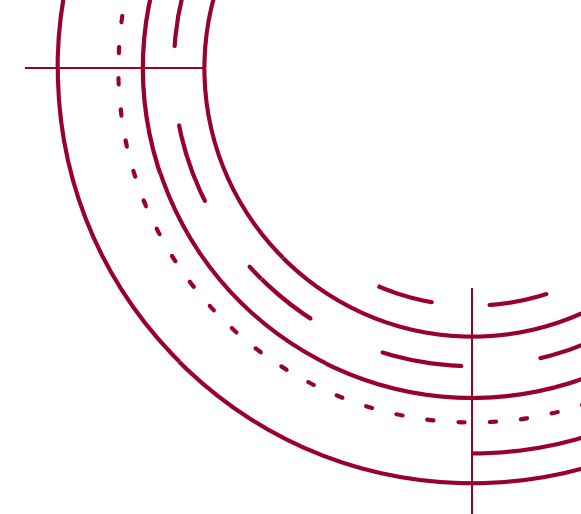
SATIABLE

 The objective of the SATIABLE project is to study the impact of the satellite (GEO, MEO, and LEO), and in general NTNs, in an IAB scenario, envisaging a new topology in which the satellite can be integrated as an IAB-node or an IAB-donor. The study considers the low-level protocols of the 3GPP-NR stack for the access (PHY, MAC, RLC) and for the backhaul (BAP), compliant with 3GPP Rel-17. Furthermore, aspects of the RF component are analysed, taking into account the current specification for the satellite transmissions (i.e., frequency, multiplexing scheme, etc). Accordingly, new IAB NTN scenarios are proposed, discussed, and finally validated by system-level simulations. An analytical approach is adopted to understand O-RAN required modifications to support satellite based IAB, supported by formal validation by e.g., UML, sequence diagrams and/or Open Interfaces definition (Swagger/YAML).

https://romars.tech/en/project/satiable/

OPENSATRANGE

OpenSatRange is an open cyber range for cyber security training of satellite system and network operators. The project aims to develop a cyber range offering an environment in which a customizable space system can be reproduced to support training courses in cyber security. The OpenSatRange (OSR) platform will be designed to integrate an emulated/simulated satellite component and support attacks relevant to space communication systems. It will be based on modern virtualization technologies to allow automated implementations of the considered scenarios and will be equipped with an integrated monitoring service capable of monitoring the behavior of learners, tracking their progress and skills, and evaluating their performance.

https://romars.tech/en/project/opensatrange/

ROMARS MAIN COMPETENCES
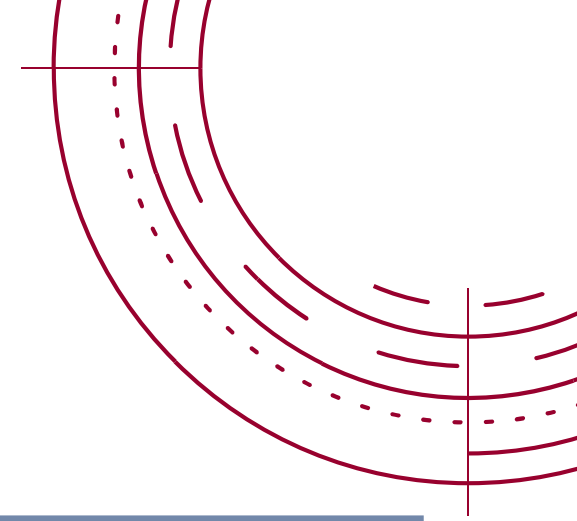
LAB TOOLS

- Network Emulation, Simulation and Test bed for Satellite and terrestrial networks
- Satellite Performance Optimizer (PEP), TCP protocol optimization
- Multipath solution with different applications: Satellite (GEO, MEO , LEO) and Terrestrial (Wireless, landline)
- CyberRange
- Networks for Research and Lab Testing : 5G toolkit, Alternative Access to 5G Core , Satellite Network Emulators

5G TECHNOLOGIES

- N3IWF (Non-3GPP Inter Working Function) to access to 5G Core via Wi-Fi
- NWDAF (5G Network Data Analytics Function) for 5G Data Analytics Support
- ATSSS (Access Traffic Switching Steering Splitting) for simultaneous usage of 5G and Wi-Fi
- Complete solution for 5G Network for Private Network and Vertical Applications
- Hybrid Networks 5G, Satellite, Wi-Fi

IT/TLC SOLUTIONS

- Orchestration Platforms and Virtualization of Network Functions
- Customized TCP/IP stacks and advanced Algorithms
- Software development in Go, Java, C/C++
- QUIC and MULTIPATH QUIC Application proxy solutions
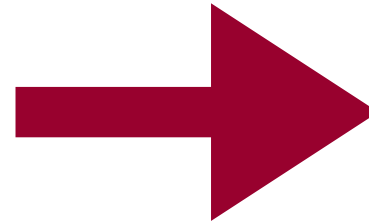- TCP and MULTIPATH TCP Application proxy solutions

FROM R&D TO PRODUCTS AND SERVICES
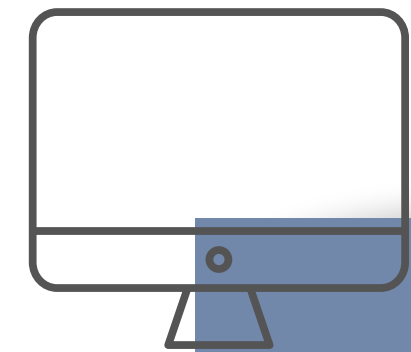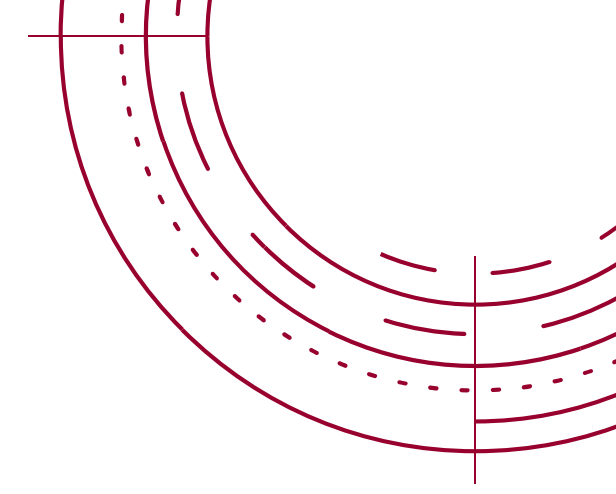
R&D

TECHNOLOGY TRANSFER

PRODUCTS AND SERVICES

FROM THE CORE COMPETENCE DEVELOPED WITHIN THE R&D ACTIVITY, TO THE TRANSFER OF TECHNOLOGY AND TRANSFER OF BENEFIT TO THE PRODUCTS AND CUSTOMERS

CONTACT US

Phone: +39 0645475521
Website: www.romars.tech
Email: info@romars.tech