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Day 1 (26/02/2025) – Morning		
09:00 – 09:20	**Opening Ceremony (Room Talaia)**	
09:20 –10:00	Keynote (Room Talaia) ***NTN from 5G to 6G: Standardization and Sustainability Aspects***	*Nicolas Chuberre* ThalesAlenia Space a Thales / Leonardo company
10:00 – 10:40	Keynote (Room Talaia) ***IRIS² – The New EU Programme Providing Secure Connectivity via Satellites***	*Jaime Ferragut* European Commission Joint Research Centre
10:40 – 11:10	***Coffee-Break (Room Formentera with Demo/Exhibition Space)***	
11:10 – 12:40	Panel Discussion (Room Talaia) ***Space for 6G*** *Moderator: Fabrizio De Paolis (European Space Agency)* *Gino Masini* – ERICSSON *Eduardo Yusta Padilla* – Telefónica *Antonio Arcidiacono* – EBU *Philipp Landgraf* – HOLOLIGHT	
12:40 – 14:00	***Lunch (Room Al Capone)***	

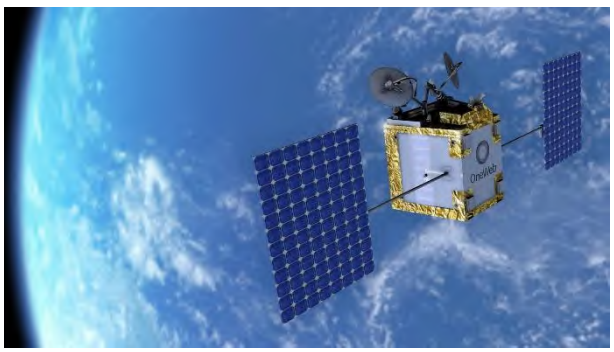
Day 1 (26/02/2025) – Afternoon

	Tutorial (Room Talaia)	Paper Session (Room Maricel)	Paper Session (Room Vento)
14:00 – 16:00	***From 5G NTN to 6G NTN – Standardization, Research, and Challenges*** *Christian Rohde* Fraunhofer IIS	***IoT Systems (IoT)*** *Chair: Nader Alagha (ESA)*	***Physical Layer-1 (PHY-1)*** *Chair: Selma Zamoum (ESA)*
16:00 – 16:30	***Coffee-Break (Room Formentera with Demo/Exhibition Space)***		
	Special Session (Room Talaia)	Paper Session (Room Maricel)	Tutorial (Room Vento)
16:30 – 18:30	***Space-Terrestrial Integrated Internet-of-Things*** *Juan A. Fraire* Inria *Marco Guadalupi* SATELIOT *Vincent Deslandes* kinéis *Sergio Sarasola* FOSSA	***Physical Layer-2 (PHY-2)*** *Chair: Alessandro Guidotti (CNIT)*	***Mobility for 5G NTN: Performance and Challenges of NTN over Mobile Channels*** *Nicolò Mazzali* *Riccardo Tuninato* esa
19:00 – 20:30	***Bus Transfer to Sitges Old Town (duration ca. 15 min)*** ***Walking Guided Tour through Sitges Old Town***		
From 20:30	***Cocktail-Reception (Restaurant Pic Nic)*** ***Bus Transfer back to the Conference Hotel at 22:00***		

Day 2 (27/02/2025) – Morning

09:00 – 09:40	Keynote (Room Talaia) ***Satellite Communication Systems: a Vision for beyond 2030***	*Alberto Ginesi* esa
09:40 – 10:20	Keynote (Room Talaia) ***5G-NTN: from Standardization to Deployment***	*Daniele Finocchiaro* EUTELSAT GROUP
10:20 – 10:50	***Coffee-Break (Room Formentera with Demo/Exhibition Space)***	
10:50 – 12:20	Panel (Room Talaia) ***Recent Developments in Direct-to-Device Satellite Communications*** *Moderator: Stefano Cioni (European Space Agency)* *Greg Pelton* – iridium *Lorenzo Casaccia* – Qualcomm *Munira Jaffar* – ECHOSTAR *Stefano Vaccaro* – Viasat	
12:20 – 13:00	Keynote (Room Talaia) ***From Earth to the Sky: How does Interworking between Terrestrial and Non-Terrestrial Networks Looks Like?***	*Barbara Pareglio* GSMA
13:00 – 14:30	***Lunch (Room Al Capone)***	

EUTELSAT GROUP is a global leader in satellite communications, delivering connectivity and broadcast services worldwide. The Group was formed through the combination of the Company and OneWeb in 2023, becoming the first fully integrated GEO-LEO satellite operator with a fleet of 35 Geostationary satellites and a Low Earth Orbit (LEO) constellation of more than 600 satellites.



Eutelsat addresses the needs of customers in four key verticals of Video, where it distributes more than 6,500 television channels, and the high-growth connectivity markets of Mobile Connectivity, Fixed Connectivity, and Government Services. Eutelsat Group's unique suite of in-orbit assets enables it to deliver integrated solutions to meet the needs of global customers. Eutelsat is dedicated to continuous innovation to enhance its services and deliver a superior long-term customer experience. Its ongoing initiatives include the standardization and development of 5G-NTN protocols, advancements in Internet of Things (IoT) applications, adoption of the DVB-NIP video distribution standard, and efforts to promote clean and eco-friendly space operations. Additionally, Eutelsat leverages Artificial Intelligence to mitigate signal interference. The company actively participates in numerous collaborative projects, such as 5G-Emerge, European Protected Waveform, and SunRise.

Day 2 (27/02/2025) – Afternoon

14:30 – 16:30

Special Session (Room Talaia)

5G/6G NTN Experimentations

Jens Haala

TESAT

Sandro Scalise

DLR

Daniele Finocchiaro

EUTELSAT GROUP

Reiner Stuhlfauth

ROHDE&SCHWARZ Make ideas real

Pol Henarejos

ttc

Paper Session (Room Maricel)

System Performance (SYS)

Chair: Alberto Mengali (ESA)

Short Tutorial (Room Vento)

ESTOL: a European Specification to Ensure Interoperable Optical Links

Daniel Arapoglou

esa

Short Tutorial (Room Vento) – **Start 15:15**

DVB Standard Support of NGSO Systems

Peter Nayler

EASii IC

Invited Presentation (Room Vento) – **Start 16:00**

5G Backhaul Integration of LEO JoeySat Satellite

Michael Fitch

UNIVERSITY OF SURREY

16:30 – 17:00 ***Coffee-Break (Room Formentera with Demo/Exhibition Space)***

17:00 – 19:00

Tutorial (Room Talaia)

ML/AI integration in 5G and Beyond-5G

Dejan Vukobratović

UNIVERSITAS STUDIORUM NEOPLANTENSIS – UNIVERSITY OF NOVI SAD

Paper Session (Room Maricel)

5G/6G-NTN Systems (NTN)

Chair: Tomaso De Cola (DLR)

Paper Session (Room Vento)

Networking (NET)

Chair: Maria Pimentel (ESA)

From 20:00 ***Social Dinner (Conference Hotel, Restaurant Acqua)***

Day 3 (28/02/2025) – Morning		
09:00 – 09:20	Short Keynote (Room Talaia) ***Shared Space Infrastructure***	*Girish Chandran* Viasat
09:20 – 09:40	Short Keynote (Room Talaia) ***Role of Geostationary Satellites in Future Communication Systems***	*Joel Grotz* SES
09:40 – 10:00	Short Keynote (Room Talaia) ***The Path towards 5G NTN***	*José Luis Alcolea Coronel* hispasat
10:00 – 10:45	Round Table with the Satellite Operators (Room Talaia) *Moderator: Sandro Scalise (DLR)*	**Eutelsat Group, Hispasat Iridium, SES, Viasat**
10:45 – 11:15	***Coffee-Break (Room Formentera with Demo/Exhibition Space)***	
11:15 – 11:35	Short Keynote (Room Talaia) ***Tyvak International: Small Satellites Big Solutions. The Crucial Role of the ARTES 5G Demonstrator***	*Margherita Cardi* TYVAK INTERNATIONAL A Terran Orbital Corporation
11:35 – 11:55	Short Keynote (Room Talaia) ***Multilayer Satcom Constellations – Challenges for the Satellite Industry***	*Stephan Roemer* OHB
11:55 – 12:15	Short Keynote (Room Talaia) ***Accelerating NTN Deployment to Beat the Goldrush***	*Richard Soden* KEYSIGHT
12:15 – 13:00	Round Table with Satellite and Equipment Manufacturers (Room Talaia) *Moderator: Alberto Ginesi (European Space Agency)*	**Keysight, OHB, Tesat, Tyvak International, Thales Alenia Space, Airbus Defense and Space**
13:00 – 14:15	***Lunch (Room Formentera with Demo/Exhibition Space)***	

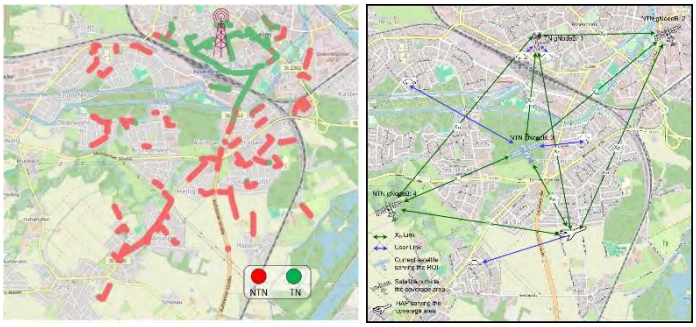
Day 3 (28/02/2025) – Afternoon

	Special Session (Room Talaia)	Short Paper Session (Room Maricel)	Tutorial (Room Vento)
14:15 – 16:15	***Overview of Ongoing NTN-Related EC/SNS Projects*** *Moderator: Bernard Barani (6G-IA)* *Alessandro Vanelli-Coralli (Univ. Bologna)* *Tomaso De Cola (DLR)* *Joan A. Ruiz de Azúa (i2CAT)* *Babak Mafakheri (SPI)* *Luis Blanco (CTTC)*	***Security (SEC)*** *Chair: Joan Bas (CTTC)* Special Session – **Start 15:15** (Room Maricel) **Research Advances in EU GovSatCom** *Andrea Julia Pérez-Carro Ríos* *Miguel Ángel Vazquez* *Almudena Sánchez* *Eduardo Agra Barros*	***An Overview of 6G Multi-Functional Satellite Systems for Communication, Sensing and Positioning*** *Jorge Querol, Prabhu Kaliyammal Thiruvasagam and Alejandro Gonzalez Garrido*
16:15 – 16:30	**Closing Ceremony and Best Paper Award Assignment (Room Talaia)**		

Demo/Exhibition Space (Room Formentera)

3D CAD Visualization in XR for Design & Engineering

HOLOLIGHT



3D Network System Level Simulator for Performance Analysis of Hybrid TN-NTN

Fraunhofer IIS

Realtime 5G-NTN End2End Demonstrator

Fraunhofer IIS

Lasting software

Exhibition Stands of the Industrial Patrons of the Conference:

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Exhibition Stand of the Following EC/SNS Projects:

5G stardust

6GNTN

ETHER

Keynote (Room Talaia)
Wednesday 26/02, 09:20 – 10:00

NTN from 5G to 6G: Standardization and Sustainability Aspects

Nicolas Chuberre
Solution Line Manager @ Thales Alenia Space

The keynote will provide views on the 5G NTN standard and the lessons learned and then will attempt to provide a perspective of NTN in the 6G context. Sustainability considerations will also be addressed.

Nicolas Chuberre graduated in 1988 from "Ecole Supérieure d'Ingénieur en Electronique et Electrotechnique" in Paris. Previously with Nokia & Alcatel Mobile phones to design signal processing algorithms, Medium Access Control protocols and test tools for 2G cellular handsets & systems assembly, he joined Thales Alenia Space to manage the development of satellite payload equipment and the design of advanced Satellite Communication Systems. He has successfully initiated and led several European collaborative research projects in FP6, FP7, H2020, Horizon Europe as well as ESA ARTES context. He has been chairing the SatCom Working Group of Networld2020 technology platforms during 9 years and as such was member of the partnership board of the 5G Infrastructure Association. Nicolas has published several papers on innovative Satellite System concepts and co-authored a book " 5G Non-Terrestrial Networks: Technologies, Standards, and System Design". Currently he is defining and developing Satellite Solutions for 5G and 6G systems. In addition, he is the lead representative of Thales in 3GPP TSG RAN where he is the rapporteur of the standardisation on the integration of satellite in 5G since 2017. He also chairs since 2006 the Satellite Communication and Navigation working group at ETSI and technical manager of the Horizon Europe research project "6G-NTN". Last, he chairs the NTN forum.

Keynote (Room Talaia)
Wednesday 26/02, 10:00 – 10:40

IRIS² – The New EU Programme Providing Secure Connectivity via Satellites

Jaime Ferragut
Team Leader Wireless Communications and Radio Spectrum @ European Commission JRC

The IRIS² multi-orbit satellite constellation is the third pillar of the EU Space Programme, alongside Galileo (for positioning, navigation and timing) and Copernicus (for Earth observation). IRIS² will address long-term challenges of the EU's security, safety and resilience by offering enhanced connectivity services to governmental users as well as commercial services to citizens and business. This presentation will provide an overview of the IRIS² programme from the policy and technical points of view, including aspects related to its service portfolio and key mission requirements.

Jaime Ferragut is the Team Leader of the Wireless Communications and Radio Spectrum group at the European Commission Joint Research Centre – the in-house science and technology service of the European Commission. Prior to this role, Jaime held various research and development positions in the industry (Nokia, ARM), academia (CTTC) and the public sector (European Space Agency). Jaime holds an M.Sc. and a Ph.D. in Electrical Engineering from the Universitat Politècnica de Catalunya - BarcelonaTech.

Panel Discussion (Room Talaia)
Wednesday 26/02, 11:10 – 12:40

Space for 6G

Gino Masini	*Eduardo Yusta Padilla*	*Antonio Arcidiacono*	*Philipp Landgraf*
Principal Researcher – Standardization @ Ericsson	*Technology Expert – Wireless and Satellite Communications @ Telefonica*	*CTO & CIO @ European Broadcasting Union*	*Senior Director of XR Streaming @ Holo-Light*

Moderator: Fabrizio De Paolis
5G/6G Implementation Manager @ European Space Agency

In a context of significant advancement in 5G non-terrestrial network (NTN), many activities are already defining the next generation 6G wireless system where space plays a major role, ranging from novel waveforms to innovative payload architectures. Future integrated 6G-satcom networks has also implications on future sustainability, in terms of smart mobility and reduced environmental impact of the network. Despite these recent progresses on 6G, the detailed architecture and technologies of the system is still unclear.
This panel will discuss:

- What are the NTN features in 6G, which are already defined in the early standardization efforts of 3GPP?
- It is expected that regenerative payloads will play a major role in 6G. Is there a clear path?
- One of the promises of 6G is the fusion between digital/physical/virtual world. How can XR/VR support this promise in the context of NTN
- What about content delivery and broadcasting in 6G? What is the role of Mobile Network Operators?

Gino Masini is Principal Researcher with Ericsson in Sweden. He holds a master's degree in Electronics Engineering from Politecnico di Milano and an MBA from SDA Bocconi School of Management. He worked as researcher at Politecnico di Milano for ESA (European Space Agency) and ASI (Italian Space Agency) on millimeter wave propagation modeling, contributing to preliminary research for radio propagation experiments in space (including Alphasat). He joined Ericsson in 1999, working at first with microwave radio link antennas and network planning, and then designing microwave monolithic integrated circuits. Since 2009 he works with 4G and 5G radio access network architecture. He has worked in standards since 2001, representing Ericsson in 3GPP, ETSI, ITU, and CEPT. Active in 3GPP for more than 15 years, he was elected as 3GPP RAN WG3 Chairman for two terms, overseeing the standardization of 5G RAN architecture. He received the 3GPP Excellence Award in 2022. He is the author of more than 80 patents, 3 recent books on 5G and 5G NTN, and a number of scientific articles. He also holds a "Six Sigma" certification.

Eduardo Yusta Padilla earned his Telecommunications Engineering degree from the Universidad Politécnica de Madrid (UPM) in 2004, joining Telefónica I+D, the Research and Development unit within the group, now Telefónica Innovación Digital under the global Telefonica CTIO office. Since then, he has participated in multiple EU-funded research projects, internal projects and initiatives across all the Telefonica Operations and Business Units worldwide, and different standardization forums and industry groups, accumulating more than 20 years of experience in wireless technologies, satellite communication networks, and mobile network automation and orchestration architectures.

Antonio Arcidiacono is the Chief Technology and Innovation Officer at the European Broadcasting Union (EBU). He is also the Chair of the 5G-Media Action Group (5G-MAG) and Security4Media organizations, and the project sponsor and architect of the 5G-EMERGE consortium funded by the European Space Agency (ESA) and 33 other partner companies. He has extensive experience with bringing products to market in the satellite, media and telecommunications fields. Under his leadership, and by leveraging the combined weight of European public service media, the EBU successfully introduced and accelerated several key infrastructure technologies, delivering greater capabilities, robustness and market opportunities to the media sector. Antonio also initiated the EBU EuroVOX, 'A European Perspective' and tech-i mobile application services. Prior to joining the EBU in 2018, Antonio worked as Director of Innovation and a Member of the Management Committee at Eutelsat, and prior to that at ESA.

Philipp Landgraf is Senior Director XR Streaming at Hololight, the leading specialist in AR and VR solutions for the enterprise market. He's responsible for the development of Hololight Hub, a centralized streaming platform for managing and scaling XR applications and deployments. Philipp holds a Master Degree in Physics from the Technical University of Munich and is an expert in XR software and hardware development as well as cloud and edge computing in the enterprise market.

Tutorial (Room Talaia)
Wednesday 26/02, 14:00 – 16:00

From 5G NTN to 6G NTN – Standardization, Research, and Challenges

Christian Rohde
Chief Scientist @ Fraunhofer IIS

This tutorial is structured in three main parts. First, we provide an overview of 3GPP standardization activities w.r.t. non-terrestrial networks (NTN) - starting from two studies in Releases 15 and 16 until the first specification of satellites as Non-Terrestrial Networks (NTN) as part of the 5G-standard in Release 17. We also describe the gradual growth of covered features, capabilities, and supported scenarios until the most recent planning and topics for future releases of 6G. In the second part, we explain key techniques and enablers of NTN and motivate their relevance. Since many of them represent extensions or modifications of the terrestrial network procedures, we provide respective references and context. Furthermore, we explain how different supported scenarios lead to different side conditions, which need to be satisfied. Finally, we address topics of current and future developments as well as research topics for NTN. We also identify and discuss the challenges of future NTN features.

Christian Rohde received his PhD degree (Dr.-Ing.) from the Chair of Mobile Communications of the Friedrich-Alexander-University Erlangen-Nuremberg (FAU), Germany, in 2013. Since then, he is with the Communication Systems Division of the Fraunhofer Institute for Integrated Circuits IIS as a senior scientist and since 2017 as chief scientist. During his time at FAU, he gave the tutorial lecture on receiver synchronization. Since 2019, he gives lectures on Satellite Communications at FAU as well as at TECNUN, Universidad de Navarra, San Sebastian, Spain. His technical focus is on terrestrial and non-terrestrial system design and corresponding algorithms design for transmitters and receivers.

Paper Session (Room Maricel)
Wednesday 26/02, 14:00 – 16:00

IoT Systems (IoT)

Design and Development of VDE-SAT Compliant Payloads for Small Satellite Platforms	Leonardo Nanna (MBI s.r.l., Italy)
Satellite Intermittent Connectivity and its Impact on Age of Information for Finite Horizon Scheduling	Leonardo Badia (Università degli Studi di Padova, Italy); Andrea Munari (German Aerospace Center (DLR), Germany)
NB-IoT for Direct-to-Satellite Communications: Performance Modeling and Evaluation	Enrico Testi (University of Bologna, Italy); Riccardo Marini (CNIT, National Laboratory of Wireless Communications (WiLab), Italy); Gianni Pasolini and Enrico Paolini (University of Bologna, Italy)
FLoRaSat 2: Simulating Cross-Linked Direct-to-Satellite IoT LEO Constellations	Alexander Ylnner Choquenaira Florez (INRIA, France); Robin Ohs (Saarland University, Germany); Juan A. Fraire (Inria/INSA Lyon & CONICET, National University of Córdoba, Argentina); Herve Rivano (Inria & Université de Lyon, INRIA, INSA Lyon, CITI, France)
LoRaFRESH®: AoI Optimization in Duty Cycle-Constrained LoRa-Based IoT Networks	Mevlüt Metin (METU, Turkey); Sude Özcan, Ayşe Betül Yıldırım and Sajjad Baghaee (Middle East Technical University, Turkey); Elif Uysal (METU, Turkey)
5G Non-Terrestrial Networks: NB-IoT for Space - from Study to Deployment	Robert Van der Pool and Svend Holme Sørensen (Gatehouse SatCom, Denmark)

Paper Session (Room Vento)
Wednesday 26/02, 14:00 – 16:00

Physical Layer-1 (PHY-1)

Cross-Polarization Interference Compensation for Dual-Polarization Satellite Receivers	Svilen Dimitrov (DLR, Germany)
Physical Layer Simulative Comparison of DVB-S2X/RCS2 and 3GPP 5G NR-NTN Technologies over Geostationary Satellite Scenario	Baptiste Chamaillard, Albekaye Traoré and Nathan Borios (Thales Alenia Space, France); Stefano Cioni (European Space Agency & ESTEC, The Netherlands)
Optimization of Performance of BICM via Design of Mapping and Demapping for 32APSK and 64APSK over Linear and Nonlinear Channels Using Bitwise Mutual Information	Neal Becker (Hughes Network Systems, USA)
Cyclic Prefix Reduction for 5G Non-Terrestrial Networks	Nicolò Mazzali (European Space Research and Technology Centre (ESA-ESTEC), The Netherlands & Akkodis for ESA, The Netherlands); Stefano Cioni (European Space Agency & ESTEC, The Netherlands); Alberto Ginesi (ESA/ESTEC, The Netherlands)
Simulative Comparison of DVB-S2X/RCS2 and 3GPP 5G NR NTN Technologies in a Geostationary Satellite Scenario	Lauri Sormunen (Magister Solutions Ltd, Finland); Tuomas Huikko (Magister Solutions Ltd., Finland); Verneri Rönty (Magister Solutions, Finland); Erno Seppänen (Magister Solutions Ltd., Finland); Sami Rantanen (Magister Solutions Ltd, Finland); Frans Laakso and Vesa Hytönen (Magister Solutions Ltd., Finland); Mikko Majamaa (Magister Solutions Ltd, Finland); Jani Puttonen (Magister Solutions Ltd., Finland)
Doppler-Based Geolocation with a Single LEO Satellite: a Machine Learning Perspective	Florian Collard, Octave Dupuis, Geoffroy Brichler and Hugo Garny (Eutelsat, France); Soufiane Zekri (Commandement de l'espace, France); Leo Dubois-Dunilac (Ecole de l'air et de l'espace, France)

Special Session (Room Talaia)
Wednesday 26/02, 16:30 – 18:30

Space-Terrestrial Integrated Internet-of-Things

This session explores the convergence of satellite and terrestrial IoT networks, highlighting the emerging ability for unmodified LPWAN devices to connect directly to LEO satellites. While low-power, low-data-rate IoT services have long existed in the satellite domain, the rapid adoption of LPWAN technologies (e.g., LoRa/LoRaWAN and NB-IoT) is paving the way to new possibilities for seamless, worldwide IoT connectivity. This integration promises to revolutionize remote monitoring and data collection on a global scale by extending coverage beyond the reach of terrestrial gateways and base stations. The session begins with an academic overview of current research in space-terrestrial IoT integration, followed by presentations from three leading industry speakers covering LoRa/LoRaWAN, NB-IoT, and custom protocols. It concludes with a panel discussion on the key challenges and future opportunities shaping this fast-evolving field.

Challenges and Opportunities in Space-Terrestrial Integrated IoT

The rise of a Space-Terrestrial Integrated IoT offers a transformative yet complex frontier in global connectivity, enabling seamless communication across terrestrial and low-Earth orbit networks. This talk addresses key challenges: effective spectrum management across diverse operators, robust distributed transmission policies, and scalable medium access control to manage large satellite footprints. IoT-specific constellation design must align carefully with terrestrial LPWAN architectures, especially in the fast-evolving landscape of direct-to-smartphone communications and Lunar networks like Moonlight and LunaNet. Despite these challenges, the opportunity for unmodified terrestrial IoT devices to connect directly with space assets promises new solutions in agriculture, logistics, asset tracking, and utilities. However, realizing this vision demands industry-wide protocol and interface cohesion to sustain a scalable, space-terrestrial ecosystem led by significant players such as Starlink. This talk outlines the technical and strategic steps to build a unified, accessible, scalable IoT infrastructure worldwide for remote and underserved regions.

Juan A. Fraire is a researcher at INRIA (France) and a also guest professor at CONICET-UNC (Argentina) and Saarland University (Germany). Core topics of his interest are near-Earth and deep-space networking and informatics, adding up to more than 100 published papers in international journals and leading conferences. Juan is the co-founder and chair of the Space-Terrestrial Internetworking Workshop (STINT) and participates in diverse joint projects with space agencies (e.g., NASA, ESA, CONAE) and companies in the space sector (e.g., D3TN, Skyloom).

Extending Massive Cost-Effective IoT Connectivity with 5G IoT NTN: Insights from Sateliot. First Commercial Mission

The rapid growth of the Internet of Things (IoT) represents a significant business opportunity driven by the demand to connect an ever-increasing number of devices globally. Sateliot launched four CubeSat satellites to address this need in August 2024, equipped with the world's first payload capable of extending Narrowband IoT (NB-IoT) coverage under the 5G Non-Terrestrial Networks (NTN) standard. This breakthrough enables seamless 5G NB-IoT NTN services for commercial customers, marking a pivotal milestone in the satellite communication industry. Market demand for this innovation is evident, with Sateliot securing over €250 million in binding contracts to serve Mobile Network Operators (MNOs) worldwide. This demonstrates the critical role of satellite connectivity in enabling ubiquitous IoT deployments. This presentation presents the mission status since the August 2024 launch, highlighting key lessons learned, technical milestones achieved, and customer integration progress. Additionally, it discusses service deployment and operational status, offering valuable insights into the transformative potential of Sateliot's 5G NTN-enabled IoT solutions.

Marco Guadalupi is a Telecommunications Engineer from the University of Bologna, Master in IoT ecosystem, Postgraduate in Computer Security, Technical Director and co-founder of SATELIOT, former Technical Director of the Eurona Telecom Group, and with more than 20 years of experience in the telecommunications sector of broadband via terrestrial radio (WiMAX and LTE) and satellite with Hispasat, Avanti and Eutelsat Skylogic. Member of the 3GPP for the development of Rel 17 and beyond of the 5G standard for massive connectivity of objects in non-terrestrial networks, focusing its efforts on LEO smallsat constellation for NB-IoT in Discontinuous Coverage and Store&Forward for delay and disruption-tolerant applications. Member of the board of NTN FÒRUM by European Space Agency and Sateliot delegate in the Experimentation Group. Sateliot is a GSMA 5G IoT Strategy Group delegate and GSMA NTN Community.

Integrated IoT: from Dream to Reality

Integration of Space & Terrestrial technologies, a dream pursued for many years, has become a concrete reality daily. The emergence of low-cost, energy-efficient multi-band/multi-mode user terminal chipsets—for both 5G NTN and LPWANs—has enabled users, operators, and manufacturers to build integrated satellite and terrestrial solutions more quickly and affordably than ever before, with seamless functionality compared to terrestrial-only options. This presentation will illustrate this fact by showing how Kinéis has embraced this revolution and made it one of the key factors in the success of its IoT business.

Vincent Deslandes is a satellite telecommunications system architect who earned a Ph.D. in 2012 from the University of Toulouse in collaboration with IRIT laboratory Toulouse and Airbus Defense and Space, whose topic was already about integrating 4G satellite & terrestrial communication systems. He has worked for 15 years at Airbus Defense & Space designing and optimizing advanced satellite networks, including LEO, GEO, mobile, and IoT systems. With a background in telecommunication & system engineering, Dr Deslandes has contributed to groundbreaking projects, particularly on satellite IoT with the design of a complete IoT protocol deployed on Astrocast network and with next-generation 5G NTN Nb-IoT networks. He is now in charge of R&D at Kinéis, a satcom IoT operator currently deploying an IoT service based on a constellation of 25 LEO satellites.

FOSSA Systems, Space & IoT Technologies for Remote Asset Management

FOSSA Systems is a pioneering company specializing in IoT connectivity, providing innovative solutions for remote asset monitoring through a fully integrated technological ecosystem. Since its inception, FOSSA has achieved significant milestones in just four years, establishing itself as a key player in the NewSpace industry. A defining aspect of the company is its complete vertical integration in engineering development, allowing full control over its solutions' design, manufacturing, and deployment, ensuring efficiency, scalability, and reliability. This presentation will explore the journey of FOSSA Systems, highlighting its evolution, key accomplishments, and business model. The company operates across three primary segments—space, ground, and user—each playing a critical role in enabling seamless and cost-effective IoT connectivity. The discussion will also provide a detailed breakdown of FOSSA's product offerings within these segments, demonstrating how they contribute to the ecosystem. Additionally, the session will introduce the FOSSA Network, the backbone of the company's connectivity infrastructure, which integrates satellite, terrestrial, and user-end components to deliver data transmission and monitoring capabilities. The presentation will conclude with an insight into the company's strategic vision, upcoming projects, and future

Sergio Sarasola is an Industrial Electronics and Automation Engineer with a Master's degree in Space Engineering from Universidad Carlos III de Madrid, where he received multiple awards at both European and university levels for excellence in satellite design competitions. Part of FOSSA Systems' founding team, he has served as Head of Engineering for most of the company's existence. From its inception, he has been dedicated to designing and coordinating all engineering developments at FOSSA, overseeing advancements across the space, ground, and user segments.

roadmap, outlining FOSSA's commitment to innovation and expansion in the IoT and satellite communication industry.

Paper Session (Room Maricel)
Wednesday 26/02, 16:30 – 18:30

Physical Layer-2 (PHY-2)

Resource Coloring Allocation for Managing Grating Lobes in Distributed Satellite Configuration	Giulio Orlando (Thales Alenia Space, France); Francesco Lisi (Heriot-Watt University, United Kingdom (Great Britain)); Margaux Pellet (Heriot-Watt University & Thales Alenia Space, France); Andreas Knopp (Bundeswehr University Munich, Germany); George Goussetis (Heriot-Watt University, United Kingdom (Great Britain)); Hervé Legay (Thalès Alenia Space, France)
Beam Update Rate Analysis for Low-Complexity Hybrid Beamforming in LEO Satellites	Mohammad Momani (University of the Bundeswehr Munich, Germany); Thomas Delamotte and Andreas Knopp (Bundeswehr University Munich, Germany)
A New User-Centric Opportunistic Handover for LEO Satellite Communication Systems	Daesik Hong, Sunwoo Min, Hanwoong Kim, Eunsuh Lee, SeungWoo Sung and Yunseo Lee (Yonsei University, Korea (South))
Handover Delay Minimization in Non-Terrestrial Networks: Impact of Open RAN Functional Splits	Siva Satya Sri Ganesh Seeram (KTH Royal Institute of Technology, Sweden); Luca Feltrin (Ericsson Research, Sweden); Mustafa Ozger (Aalborg University, Denmark & KTH Royal Institute of Technology, Sweden); Shuai Zhang and Cicek Cavdar (KTH Royal Institute of Technology, Sweden)
An Open Source Channel Emulator for Non-Terrestrial Networks	Tim Düe, Mohammad Amin Vakilifard, Carsten Bockelmann, Dirk Wübben and Armin Dekorsy (University of Bremen, Germany)
Privacy-Aware Doppler Compensation in Next-Generation LEO Networks	Hannaneh B. Pasandi (University of California, Berkeley, USA); Farideh Parastar (Ferdowsi University of Mashhad, Iran); Juan A. Fraire (Inria/INSA Lyon & CONICET, National University of Córdoba, Argentina); Herve Rivano (Inria & Université de Lyon, INRIA, INSA Lyon, CITI, France)

Tutorial (Room Talaia)
Wednesday 26/02, 16:30 – 18:30

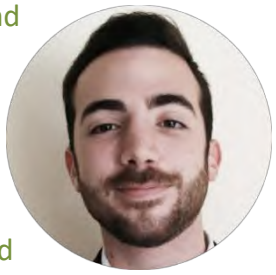
Mobility for 5G NTN: Performance and Challenges of Non-Terrestrial Networks over Mobile Channels in the 5G Era

Nicolò Mazzali and Riccardo Tuninato
Communication Systems and Technologies Engineers @ European Space Agency

Terrestrial infrastructure is the traditional backbone of mobile communication networks. However, the growing relevance of Low-Earth Orbit (LEO) satellite constellations is leading to the integration of satellites into the latest 5G specifications. In Release 17, the Third Generation Partnership Project (3GPP) introduced

Non-Terrestrial Networks (NTNs) in the 5G standard and improved such integration in Release 18. New solutions for 5G NTN shall consider the different challenges posed by the user-satellite link. In this tutorial, we investigate the performance of 5G NTN over satellite channels in mobile terminal scenarios. In fact, of great interest are the use cases related to vehicular systems, as for cars, high speed trains and aircraft. We will focus on the impact of the satellite channel on adaptive coding and modulation and retransmission techniques, in terms of latency, spectral efficiency, and block error rate.

Nicolò Mazzali received the master's degree (cum laude) in telecommunications engineering and the Ph.D. degree in information technologies from the University of Parma, Italy, in 2009 and 2013, respectively. He was a Visiting Postdoctoral Researcher with the Department of Signals and Systems, Chalmers University of Technology, Gothenburg, Sweden, and a Research Associate with the Interdisciplinary Centre for Security, Reliability and Trust, University of Luxembourg, Luxembourg. Since 2018, he has been a Communication Systems and Technologies Engineer with the Directorate of Technology, Engineering, and Quality, European Space Agency. His research interests include digital signal processing for satellite and free-space optical communications, 5G/6G, and ground segment engineering.



Riccardo Tuninato obtained his PhD in 2024 from the Department of Electronics and Telecommunications Engineering of Politecnico di Torino. During his PhD program, he spent a period as a visiting student at Cal State LA, Los Angeles. He started his current position at the European Space Agency as a Communication Systems and Technologies Engineer in 2024. His main research topic is the study and analysis of the physical layer of communication systems, mainly related to the 5G standard and satellite communications. In particular, he investigated the techniques for synchronization and initial access, and the beamforming techniques for massive MIMO systems.

Keynote (Room Talaia)
Thursday 27/02, 09:00 – 09:40

Satellite Communication Systems: a Vision for beyond 2030

Alberto Ginesi
Head of the Telecommunication Systems & Techniques Section @ European Space Agency

Recent years have been witnessed an unprecedent push of technology innovation within the commercial Satcom market. Global consumer broadband connectivity (fixed and mobile) has been finally becoming a reality thanks to the current and future deployment of massive LEO constellations. Direct-to-handheld systems are also being deployed and promising to deliver multi-Mbps ubiquitous broadband connectivity to our unmodified smartphones. A key catalyst for these innovative systems has been the 3GPP 5G NTN standard which, for the first time in 20+ years, has finally put SATCOM on the map of wireless terrestrial manufacturers and operators. More system and technology advances are expected to come in the near future. These systems will be also riding the wave of the upcoming 3GPP 6G standard, which promises to further emphasize the role of satellite within future telecom networks. In this talk, a review of state of the art of SATCOM systems will be provided, together with the identification of the possible system/technology improvement directions. A glance at a long-term vision of SATCOM networks will be presented covering several services and technology directions.

Alberto Ginesi received the Dr. Ing. (cum laude) and Ph.D degrees in electronic engineering from University of Pisa, Italy, in 1993 and 1998, respectively. In 1997, he joined Nortel Networks and in 2000 Catena Networks, both in Ottawa, Canada, where he worked on Digital Subscriber Loop (DSL) technologies and contributed to the definition of the second-generation ADSL standards. Since 2002 he joined ESA Research and Technology Centre (ESTEC), Noordwijk, The Netherlands, where he is currently covering the position of the Head of the Telecommunication Systems & Techniques Section of the Technical and Quality Management Directorate. His main research interests lie in the area of satellite systems architectures and technologies. He is the author of more than 70 technical publications, 15 international patents and co-author of a book. He is also an Adjunct Professor at University of Bologna (Italy).

Keynote (Room Talaia)
Thursday 27/02, 09:40 – 10:20

5G-NTN: from Standardization to Deployment

Daniele Finocchiaro
System Architect for Innovative Projects @ Eutelsat Group

5G-NTN has been standardized and must now be deployed, paving the way to stronger integration of satellite and terrestrial networks. At the horizon, 6G is expected to further pursue on this roadmap. We will present some opportunities and challenges on this path, from the point of view of a satellite operator with a fleet of GEO and LEO satellites.

Daniele Finocchiaro is responsible for R&D and Technology Roadmap within the Engineering Department in Eutelsat Group. He holds a Ph.D. in Computer Science from Scuola Normale Superiore in Pise, and he has a long experience in the development of new satellite architectures and services, including technical and business aspects. Since joining Eutelsat in 1999, he contributed to innovative technical projects in the satellite telecommunication scenario, ranging from early Internet access services to in-flight connectivity, video distribution over IP, direct-to-phone services, Internet of Things. He is author of conference and journal papers, and co-inventor in a dozen patents. His current activities include 5G-NTN architecture definition, next-generation LEO satellite constellations, and advanced waveforms.

Panel Discussion (Room Talaia)
Thursday 27/02, 10:50 – 12:20

Recent Developments in Direct-to-Device Satellite Communications

Greg Pelton	*Lorenzo Casaccia*	*Munira Jaffar*	*Stefano Vaccaro*
CTO @ Iridium	*Head of Technology Standards@ Qualcomm*	*Director of Spectrum and Standards @ Echostar Corporation*	*Managing Director Commercial Networks Europe@ Viasat*

Moderator: Stefano Cioni
Telecommunication Systems Engineer @ European Space Agency

For many years, the comfort zone for mobile satellite broadband communications has been the so-called frequency range 2 (FR2), adopting the 3GPP terminology, or equivalently the above 10 GHz spectrum. Certainly, FR2 spectrum will continue to be an important asset for broadband satellite services, however nowadays exploiting the same terrestrial cellular radio technology and the Non-Terrestrial Network (NTN) enhancements, it is becoming extremely relevant the direct to handheld services in sub-6GHz spectrum. Very different approaches and strategies have been announced either from satellite or terrestrial operators.
This panel will discuss:

- What are the main technical challenges for enabling Direct-to-Cell Satellite Communications?
- What are the relevant differences in deploying Direct-to-Cell in specific area of the world (e.g., Europe, US, Africa, etc.)?
- Given the benefits of 5G NTN for Direct-to-Device, what are the current risks for satellite network deployments?
- How is it fundamental to continue in the integration/unification of terrestrial and satellite networks in 5G and 6G standards?

Greg Pelton is CTO at Iridium Communications Inc. In this role, he drives innovation and oversees the technical aspects of Iridium's products and services, while managing the day-to-day activities of the company's systems teams. This includes technical roadmaps and strategy, system architecture and design, engineering design and process, performance and analysis, new service development programs and system integration, verification, and validation.

Lorenzo Casaccia, Head of Technology Standards at Qualcomm, leads a global team across 20 countries that includes radio standards, video and multimedia standards, standards in semiconductors, AI, automotive, computing and regional standards organizations. He holds degrees in Electrical Engineering from Turin Polytechnic, Telecommunications from the Eurecom Institute, and Philosophy from Rome University, and is the author or co-author of over 40 approved patents.

Munira Jaffar is Director of Spectrum and Standards at EchoStar. She drives satellite technology forward in the ever-changing world of 5G networks. Actively involved in key industry forums like 3GPP, ETSI, and other global platforms, Munira passionately advocates for the inclusion and advancement of satellite or non-terrestrial networks (NTN) in 5G Standards, while also looking ahead to their evolution into 6G. With a rich background encompassing both satellite and terrestrial systems, Munira previously served as a senior technical advisor for FirstNet, the US nationwide public safety LTE broadband network. She brings a wealth of experience from her roles with esteemed telecom and technology firms including Sprint Nextel, Lockheed Martin, and LCC International, where she successfully managed various wireless and spectrum projects and initiatives. Munira's dedication to industry leadership and collaboration is evident in her role as Chair of the Standards Working Group at the Global Satellite Operator

Association (GSOA). She holds an MBA from the George Washington University and a bachelor's degree in electrical engineering from MARA University of Technology in Malaysia.

Stefano Vaccaro is the Managing Director of Global Space Networks Europe at Viasat. Amongst his responsibilities, there is the Ground Segment and Terminals development including optical technology. Enabling business strategies with technology innovation has been at the core of Stefano's 25 years career in the satellite industry. This has been applied to various areas of expertise spanning from Satellite Terminals, RF Systems, Phased arrays, Optical Technology and Satellite Ground Infrastructure. Stefano Vaccaro holds a M.Sc. and a Ph. D. degree in electrical engineering from Ecole Polytechnique Fédérale de Lausanne.

Keynote (Room Talaia)
Thursday 27/02, 12:20 – 13:00

From Earth to the Sky: How Does Interworking between Terrestrial and Non-Terrestrial Networks Looks Like?

Barbara Pareglio
Senior Technical Director – Smart Mobility Lead @ GSMA

NTN is advancing and playing a role in transformative global connectivity. This session will explore the areas related to the interoperability of Terrestrial and Non-Terrestrial networks. We will look at the evolution of satellite technology, and the emerging opportunities for direct-to-device communication. The evolution of non-terrestrial networks (NTN) in the past few years has been a remarkable journey marked by significant advancements and innovations, in particular the shift to using mobile standards technologies. As technology continues to advance, NTNs are poised to play an even more pivotal role in bridging geographical coverage, capacity and increase resilience to global communication infrastructure. GSMA has the primary focus to provide recommendations and guidelines for globally interoperable networks and hence we will provide an overview of the work done so far and what more needs to happen from a technology point of view.

Barbara Pareglio has more than 20 years of experience in telecommunications. Since 2014, she has been the technical lead for several focus areas within the GSMA such as 5G, IoT, automotive, aviation and NTN. She also has an extensive background in several standardisations and represent GSMA in 3GPP. Barbara is leading several activities and communities with the GSMA members, the most recent is the Non-Terrestrial Community, looking at the integration and co-existence of TN and NTN networks driven by 3GPP standardisation. Active cooperation with ESA, GSOA and MSSA to facilitate the conversation, the evolution of NTN and the interworking with the Terrestrial Network. Barbara also leads the Smart Mobility Community, with the GSMA Drone Interest Group and the Aerial Connectivity Joint Activity, to investigate and help the mobile industry to create a trusted solution for commercial unmanned aircraft and beyond. Exploring features and capabilities of 4G and 5G needed for the aviation.

Special Session (Room Talaia)
Thursday 27/02, 14:30 – 16:30

5G / 6G NTN Experimentations

6G LINO – a 5G/6G Satellite in Orbit Realizing an NTN-Developer Laboratory

6G LINO is an in-orbit laboratory envisaged to execute various demonstrations. A consortium consisting of six members located in UK and Germany drives its development and operation. The goal is to have a flexible payload in orbit anddemonstrate various use-cases for future 5G/6G applications. Therefore, the project is not limited to space assets but is also including ground equipment to enable feeder and user equipment links. The project has started recently and is currently in the design phase of the platform and the payload. This paper presents the preliminary design of the 6G LINO system and the challenges that are faced.

Jens Haala studied Electrical Engineering at the University of Karlsruhe and also earned his doctorate in 2000 in the field of radio frequency technology. He worked for Marconi and Ericsson for 12 years on terrestrial communication networks. He has been working for TESAT-Spacecom since 2012. Since 2021, he has been leading the Digital Systems Development Team. He and his team are responsible for developing algorithms for satellite communications and in-space routing, including TESAT's TT&C, Modulator, and Router products. As a product manager, he is also responsible for TESAT's digital communication products. His current work focuses on non-terrestrial networks and corresponding communication payloads.

Demonstration of an Experimental 5G gNodeB in Space

The objective of the MIXELS project is to develop and demonstrate in orbit an experimental 5G g-NodeB (gNB). The demonstration using LEO satellites will focus on showing the main functionalities of a gNB for the non-terrestrial component of 5G according to 3GPP Rel 17 specifications.

Sandro Scalise holds a M.Sc in Electronic Engineering from University of Ferrara, Italy and a PhD from University of Vigo, Spain. Since 2001, he is within the Institute of Communications and Navigation, DLR (German Aerospace Centre), where, he is leading the Satellite Networks Department since 2008.. He is IEEE Senior Member and received the "Satellite Communications Distinguished Service Award" from IEEE ComSoc in 2013. Since 2016 he is also lecturing "Satellite Communications" at the Technical University of Munich. He is co-author of more than 70 international journal and conference papers, co-chairman of the biennial Advanced Satellite Multimedia Systems Conference since the 2006 edition and has been active in many standardisation groups within DVB and ETSI.

Experimentation of the Use of a 5G NR-NTN Waveform in Ku-Band with a Eutelsat OneWeb Laboratory Satellite

This paper presents the tests performed using a 5G NTN (Non-Terrestrial Network) waveform, in Ku-Band, with a laboratory satellite representative of a Eutelsat Oneweb satellite, called "Flatsat". The laboratory tests included a full two-way chain in "conducted" mode, with a 5G core, an NTN-enabled, a 5G-NTN modem, channel emulators and additional equipment described in this paper.

Daniele Finocchiaro is responsible for R&D and Technology Roadmap within the Engineering Department in Eutelsat Group. He holds a Ph.D. in Computer Science and he has a long experience in the development of new satellite architectures and services, including technical and business aspects. His current activities include deploying 5G on satellite networks, and Internet-of-Things applications.

T&M Tackling the Challenges of NTN Evolving on the Path to 6G

This presentation will outline the technology evolution from the first NTN up to the anticipated technology evolutions on the path to 6G. The NTN technology starts with transparent payload architecture, incorporates regenerative payload and multi-connectivity mobility scenarios on a mid-term basis, and then looks towards long-term aspects 3D unified and resilient networks. Focus of the presentation are the challenges with respect to the architecture evolution, specific use cases like e.g. the UE accessing the network and we would like to present the evolution of Test and Measurement aspects and how T&M can ensure the successful operation and development of future NTN networks.

Reiner Stuhlfauth is a technology manager wireless from the Test & Measurement Division of Rohde & Schwarz in Munich. Before that he worked as trainer and has more than 20 years' experience in teaching and promoting mobile communication technologies in the background of cellular standards and non-cellular technologies. He is involved in several projects concerning 5G, 5G advanced and 6G research activities. Reiner has presented at a plethora of conferences and events, he has published several technical documents, webinars and he is one of the authors of the R&S technology book "5G New Radio – fundamentals, procedures, testing aspects". He holds the academic degree of engineer in telecommunications (Dipl.-Ing) issued by the Technical University of Kaiserslautern.

Technical Insights into Implementing 5G NTN User Equipment

This talk will examine the technical journey of implementing a user equipment (UE) to support 5G non-terrestrial networks (NTN). We will explore the key development stages, highlighting the modifications required to support NTN Release 17. The presentation will also cover the technical challenges encountered, the innovative solutions adopted, and the significant results achieved during testing. Additionally, we will discuss critical considerations for optimizing UE performance in the unique environment of NTN.

Pol Henarejos received the Ph.D. degree from UPC, with a distinction Cum Laude. He joined the CTTC in 2010 in Engineering area. He is an expert in terrestrial and satellite technologies, such as 5G-NR, LTE, DVB-S2X, BGAN or Li-Fi. He participated in several European and ESA projects and is the Principal Investigator of the TRANTOR project. Moreover, he is the head of satellite experimentation facilities at CTTC and the promoter of the CASTLE Platform, the cloudified architecture for hybrid satellite and terrestrial networks.

Paper Session (Room Maricel)
Thursday 27/02, 14:30 – 16:30

System Performance (SYS)

Advanced Analysis of FSO Communications Considering Direct and Relayed Paths to Improve Satellite-to-Earth Data and Control Links	Miguel Romero-Garcia and Juan Pablo García-Martin (Integrasys SA, Spain); Máximo Morales-Céspedes (Universidad Carlos III de Madrid, Spain)
Bundle in Bundle Encapsulation Overview	Scott C Burleigh (USA); Carlo Caini and Andrea Grano (University of Bologna, Italy)
Satellite Connectivity Prediction for Fast-Moving Platforms	Babak Mafakheri and Chao Yan (Safran Passenger Innovations GmbH, Germany)
Proof of Concept of AITRON Applied to LEO Satellite Systems	Lorena Albiol and Víctor Huertas-García (Indra Espacio, Spain)
On the Use of Mega Constellation Services in Space	Roberto Garello and Gabriel Maiolini Capez (Politecnico di Torino, Italy); Juan A. Fraire (Inria/INSA Lyon & CONICET, National University of Córdoba, Argentina)
Recent Advances in Optical Satellite Links at DLR	Christian Fuchs (German Aerospace Center (DLR), Germany)

Short Tutorial (Room Vento)
Thursday 27/02, 14:30 – 15:15

ESTOL: a European Specification to Ensure Interoperable Optical Links

Daniel Arapoglou
Telecommunications System Engineer @ European Space Agency

ESTOL, the ESA specification for Terabit/s Optical Links, is a specification document coordinated by ESA and prepared by industrial and research entities of ESA member countries in joint cooperation. ESTOL issue 2.2 (released in July 2024) covers the optical inter-satellite links definition in terms of the physical and datalink layers for a number of non-coherent and coherent air interfaces. Its ambition is to offer a vehicle that will ensure interoperable optical links between European suppliers. The next issue of ESTOL will also include optical space-ground links. The HydRON Demo System will be among the first systems to implement ESTOL.

Daniel Arapoglou received the Diploma degree and the Dr.Eng. degree in electrical and computer engineering from the National Technical University of Athens (NTUA). Since 2012, he has been a Telecommunications System Engineer with ESA/ESTEC in the Systems Division, where he is technically supporting the HydRON and IRIS2 programmes and carries out R&D in the areas of high rate optical and RF telecom and data relay systems.

Short Tutorial (Room Vento)
Thursday 27/02, 15:15 – 16:00

DVB Standard Support of NGSO Systems

Peter Nayler
Business Development Manager @ EASII IC

The DVB project has been active in maintaining and adapting its specifications to the requirements of modern satellite communications systems. The physical layer specifications, which include DVB-S2X for the forward link and DVB-RCS2 for the return link have been recently updated to support beam-hopping over the forward link and signalling within a VSAT system, including some support of Non-Geostationary Orbit (NGSO) satellites. In 2023, the DVB Commercial Module issued a new set of requirements for further support of NGSO by the DVB-RCS2 standard. The requirements call for support and analysis of operation within an NGSO system and extending the capabilities of the return link to support higher capacity and enable more symmetric traffic. The DVB Technical Module (satellite working group, TM-S) has produced an enhancement of the specifications and performed a set of analyses to answer the commercial requirements. In the presentation, the new features introduced above will be described, as well a brief summary on simulations comparing the waveform efficiencies between RCS2, DVB-S2X and 5G NTN standards.

Peter Nayler has over 40 years' relevant experience in the electronics communications industry with over 20 years in the satellite tele-communications domain. His technical early career included fibre optics, GSM, 3G, Bluetooth, WiFi and many other standards. Peter was responsible for the specification and promotion of a wide range of commercially available ASIC and SoC devices which achieved substantial market success many of them serving the satellite broadband and broadcast markets. In 2019 Peter decided to join EASII IC as business development manager in charge of satellite communications products. Peter is an active member in DVB-S subcommittees.

Invited Presentation (Room Vento)
Thursday 27/02, 16:00 – 16:30

5G Backhaul Integration of LEO JoeySat Satellite

Michael Fitch
Research Project Manager @ University of Surrey

JoeySat is a single proof of concept satellite that is operated by Eutelsat OneWeb, it is in in Low Earth Orbit and was launched 2023. There are two main novel features that JoeySat is proving, and these are a regenerative payload and beam-hopping on the user links. We have successfully integrated JoeySat into our 5G cellular network, where the satellite connects the 5G Core Network to the RAN, i.e. in the backhaul link. The talk gives details of the integration concept and design, and describes the tests and measurements that have taken place. These tests include network performance such as throughput and latency, and also the results of a small number of use-cases such as web browsing and video conferencing.

Michael Fitch started his career with Marconi on military satellite communications, then a period with Private Mobile Radio companies designing RF hardware. This was followed by a long period with BT at their research labs at Adastral Park leading their wireless research team through 4G and 5G mainly on radio performance optimisation. He is currently with the University of Surrey leading bids and managing 5G, 6G and NTN related projects. Michael holds a first degree in maths and physics, and a PhD in satellite communications.

Tutorial (Room Talaia)
Thursday 27/02, 17:00 – 19:00

AI/ML Integration in 5G and Beyond 5G

Dejan Vukobratovic
Full Professor @ University of Novi Sad

Machine Learning (ML) and Artificial Intelligence (AI) concepts are gradually being integrated in modern 3GPP standardized cellular networks. The process is initiated by introducing AI/ML functions in the 5G core network (5G CN) and from there, it is expanding towards AI-enabled 5G radio access network (RAN). AI/ML is currently at the early stage of design within 3GPP standardisation and many pathways for its impact are still open. In this talk, we present an overview of AI/ML integration in 5G and Beyond. Following the 3GPP perspective, we start from 5G CN and move towards 5G RAN, focusing on AI/ML impact on 5G and B5G physical layer design. We also cover complementary work done by Open RAN (O-RAN) Alliance. The final part of the talk will expand towards specific AI/ML tasks suitable for remote IoT environmental monitoring over 3D cellular networks exploiting efficient implementations build upon split learning concepts.

Dejan Vukobratovic received a PhD.degree in electrical engineering from University of Novi Sad, Serbia, in 2008, where he is currently a Full Professor. During 2009-2010, he was Marie Curie postdoctoral fellow at the University of Strathclyde, Glasgow, UK, after which he was supported by 3-year Marie Curie Reintegration Grant. He has published more than 50 journal papers and 100 conference papers in top-tier IEEE journals and conferences. He was General Chair for BalkanCom 2021 (Novi Sad) and IEEE CSCN 2024 (Belgrade). His research group was involved in a number of EU and national projects (H2020 C4IIoT, H2020 COLLABS, H2020 SENSIBLE, HE REMARKABLE), and he was the coordinator of the H2020 project INCOMING. His research interests include wireless communications, signal processing, machine learning and information theory applied in mobile cellular systems (5G and beyond 5G) and IoT communications.

Paper Session (Room Maricel)
Thursday 27/02, 17:00 – 19:00

5G/6G-NTN Systems (NTN)

Edgecasting and the M.A.R.S. Distribution Strategy	Antonio Arcidiacono (EBU, Switzerland)
Satellite-Terrestrial Integration: 5G Architectures for the Seamless Support of Mission Critical Services	Sara Nasirian and Giovanni Giambene (University of Siena, Italy); Sergio Barrachina (Centre Tecnològic de Telecomunicacions de Catalunya, Spain); Josep Mangues-Bafalluy (Centre Tecnològic de Telecomunicacions de Catalunya (CTTC), Spain); Makhlouf Hadji (AIrbus Defence and Space, France); Miguel Ángel Vazquez (CTTC, Spain); Lorenzo Santilli (TIM - Telecom Italia SPA, Italy); Fotis Foukalas (University of Thessaly, Greece); Hamzeh Khalili (Centre Tecnol`ogic de Telecomunicacions de Catalunya, Spain)
Functional Split on Regenerative Satellite Payload for 5G Non-Terrestrial Networks	Katja Vornberger (Fraunhofer Institute for Integrated Circuits IIS, Germany); Michael Nieland, Manuel Schrauth, Rainer Wansch and Christian Rohde (Fraunhofer IIS, Germany)
System Level Simulator for 3D Mobile Networks	Moustafa Roshdi (Fraunhofer IIS & Friedrich Alexander University (FAU), Germany); Samhita Roy and Maik Bauer (Fraunhofer IIS, Germany); Sahana Raghunandan (Fraunhofer-Gesellschaft, Germany)
3D Multi Layered 6G-NTN Architecture	Sandro Scalise (German Aerospace Center (DLR), Germany); Juraj Poliak (German Aerospace Center (DLR) & Institut für Kommunikation und Navigation, Germany); Madivanane Nadarassin (Thales Alenia Space France, France); Eduardo Medeiros (Ericsson, Sweden); Per-Erik Eriksson (Ericsson Research, Sweden); Sebastian Euler (Ericsson, Sweden); Ji Lianghai (Qualcomm Technologies, Inc., USA); Russell Hills (Thales Alenia Space, United Kingdom (Great Britain))
5G-STARDUST: Multi-Connectivity Exploitation in Future 5G-NTN Systems	Tomaso De Cola, Benjamin Barth and Roshith Sebastian (German Aerospace Center (DLR), Germany)

Paper Session (Room Vento)
Thursday 27/02, 17:00 – 19:00

Networking (NET)

A Distributed Task Allocation Methodology for Edge Computing in a LEO Satellite IoT Context	Swapnil Sadashiv Shinde (Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT), Italy); David Naseh (University of Bologna, Italy); Tomaso De Cola (German Aerospace Center (DLR), Germany); Daniele Tarchi (University of Florence, Italy)
Deep Reinforcement Learning for Adaptive Traffic Engineering in Satellite Constellation Networks	Manuel Markus Hubert Roth (German Aerospace Center, Germany); Thomas Jerkovits (German Aerospace Center (DLR), Germany); Anupama Hegde (German Aerospace Center, Germany); Thomas Delamotte and Andreas Knopp (Bundeswehr University Munich, Germany)
Careful Resume: Design and Analysis with Picoquic over Satellite Paths	Matthias Hofstätter and Jörg Deutschmann (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany); Raffaello Secchi and Gorry Fairhurst (University of Aberdeen, United Kingdom (Great Britain)); Reinhard German (University of Erlangen, Germany)
Orbit-Routing Simulator: Advanced Routing in Multi-Orbit Satellite Networks	Alberto Gotta (ISTI-CNR, Italy & CNIT, Italy); Abraham Gebrehiwot (CNR, Italy); Filippo Lauria (CNR - IIT, Italy)
Advanced Routing Strategies for LEO and VLEO Constellations: Ensuring Polar Coverge	Camilla Ottaviani and Alessandro Compagnoni (Politecnico di Torino, Italy); Juan A. Fraire (Inria/INSA Lyon & CONICET, National University of Córdoba, Argentina); Giacomo Verardo (KTH Royal Institute of Technology, Sweden); Gabriel Maiolini Capez (Politecnico di Torino, Italy); Daniel Gaetano Riviello (CNR-IEIIT, Italy); Gregory Stock (Saarland University, Germany); Carla Fabiana Chiasserini (Politecnico di Torino & CNIT, IEIIT-CNR, Italy); Roberto Garello (Politecnico di Torino, Italy)
On the Latency Trade-off Between Space and Terrestrial Clouds in Non-Terrestrial Networks	Camilo Jose Rojas and Fabio Patrone (University of Genoa, Italy); Juan A. Fraire (Inria/INSA Lyon & CONICET, National University of Córdoba, Argentina); Mario Marchese (University of Genoa, Italy)

Short Keynote (Room Talaia)
Friday 28/02, 09:00 – 09:20

Shared Space Infrastructure

Girish Chandran
CTO @ Viasat

The satellite industry largely has been built around closed architectures. Due to increasing interest and easier access to space, many countries and organizations are creating systems in space that continue the historical trend of stove-piped infrastructure. However, spectrum and orbital examples of resources that are finite and the risk of resource exhaustion has increased considerably over the last few years. To use these resources sustainably, we explore an alternate idea - that of an open, shared architecture in space.

Girish Chandran serves as Corporate Chief Technical Officer at Viasat, Inc. In this role he oversees the evolution of Viasat's global network, which is responsible for connecting millions of personal and mobile devices per year—on the ground, in the air, and at sea. He has extensive experience in building products and networks on multiple continents and leading change in engineering organizations. Girish and his team focus on how next-generation communications infrastructure, especially software-based technologies, will continue to be an integral part of the digital ecosystem connecting people, places and things. Girish has held a number of engineering roles at Viasat since joining the company in October 2007, from Principal Engineer and Chief Technology Officer — Commercial Networks to his current position, which he assumed in May 2017. Prior to joining Viasat, Girish held several senior level engineering roles at various companies including Vice President of Engineering at Newtec America Inc., a satellite communications equipment provider, and Vice President of Systems Engineering at Tiernan Communications Inc. (acquired by Radyne Comstream Inc.), a provider of video compression and transmission solutions. Girish earned a Ph.D. degree in Electrical Engineering from the University of California, San Diego, and a Master's of Science degree in Electrical Communication Engineering from the Indian Institute of Science.

Short Keynote (Room Talaia)
Friday 28/02, 09:20 – 09:40

Role of Geostationary Satellites in Future Communication Systems

Joel Grotz
Senior Manager, Technology Development, Systems Engineering @ SES

In the last decades, video broadcasting and video cable feeding have imposed themselves as the most successful and profitable satellite applications, using relatively simple bent pipe geostationary satellites. Massive LEO constellations launched in the recent times are clearly aiming at increasing further the satellite role to deliver vital connectivity services to more end users. As part of its comprehensive fleet, SES is also operating an NGSO constellation in Medium Earth Orbit (MEO) with a first generation in 2013 and a second generation in 2024. To meet the quality-of-service expectations of end users, it is essential to adopt a network-of-networks approach. This involves integrating Geostationary (GEO), Medium Earth Orbit (MEO), and Low Earth Orbit (LEO) satellites with terrestrial networks, ensuring optimal service delivery everywhere in the most efficient manner. The presentation will analyze the role of geostationary satellite in future systems, allowing to optimize the overall satellite and terrestrial network of network for a given mix applications and geographies (optimization of cost, quality of service and environmental footprint).

Joel Grotz is with the Systems Engineering department at SES working on multi-orbit satellite communication system design. He is Senior Manager, Technology development within the Systems Engineering department, working on satellite system engineering of future satellite constellations for SES and on 5G-NTN related topics. He was previously responsible for the resource allocation system concept of the O3b mPOWER MEO constellation and the SES-17 operational concept. He has worked on the conception and development of satellite communication systems as well as on satellite payload and ground segment implementations for satellite communication projects for GEO and MEO systems in different roles. He has also worked for the Technical Labs at STEi iDirect formerly Newtec Cy NV in Sint-Niklaas, Belgium on the development and implementation of satellite modem systems. Dr. Grotz holds an Electrical Engineering degree from the University of Karlsruhe and Grenoble Institute of Technology and a PhD from the Royal Institute of Technology (KTH) Stockholm. He is an IEEE Senior Member and has been a committee member of the Benelux Com/VT chapter.

Short Keynote (Room Talaia)
Friday 28/02, 09:40 – 10:00

The Path towards 5G NTN

José Luis Alcolea Coronel
5G Strategy Manager @ Hispsat

5G NTN represents a revolution for the Satellite sector, not only as a mere waveform change but also as a driver to open new markets and a paradigm shift for the traditional day-to-day operations of a Satellite operator. After almost a decade defining and fostering 5G NTN in 3GPP, it's time to take the first steps towards the implementation of new services based on this technology. In this talk I will show how Hispasat is preparing for this.

José Luis Alcolea Coronel serves as the 5G Strategy Manager, reporting directly to the Head of Innovation at Hispasat. In this role, he is building the development of the 5G connectivity strategy, leading initiatives that capitalize on new market opportunities driven by 5G NTN. José Luis is a Telecommunication engineer with nearly 20 years of experience in the Telco sector. He has navigated various segments of the industry, including roles at engineering companies, consulting firms, utilities, telco vendors, and mobile network operators (MNOs). His diverse responsibilities have spanned strategy, innovation, design, deployment, pre-sales and post-sales. In addition to his extensive technical expertise in 5G mobile communications, he maintains a broad perspective on commercial trends in both terrestrial and satellite telecommunications. Before transitioning into the Space communications arena, José Luis headed the DAS/Small Competence Center at Vantage Towers (Vodafone Group).

Round Table with Satellite Operators (Room Talaia)
Friday 28/02, 10:00 – 10:45

The Roadmap for 5G/6G Deployment and New Related Services

Greg Pelton	*Daniele Finocchiaro*	*Girish Chandran*	*Joel Grotz*	*José Luis Alcolea Coronel*
CTO @ Iridium	*System Architect Innovative Projects @ Eutelsat Group*	*CTO @ Viasat*	*Senior Manager Systems Engineering @ SES*	*5G Strategy Manager @ Hispsat*

Moderator: Sandro Scalise
Head of Satellite Networks Department @ DLR (German Aerospace Center)

Greg Pelton is CTO at Iridium Communications Inc. In this role, he drives innovation and oversees the technical aspects of Iridium's products and services, while managing the day-to-day activities of the company's systems teams. This includes technical roadmaps and strategy, system architecture and design, engineering design and process, performance and analysis, new service development programs and system integration, verification, and validation.

Daniele Finocchiaro is responsible for R&D and Technology Roadmap within the Engineering Department in Eutelsat Group. He holds a Ph.D. in Computer Science from Scuola Normale Superiore in Pise, and he has a long experience in the development of new satellite architectures and services, including technical and business aspects. Since joining Eutelsat in 1999, he contributed to innovative technical projects in the satellite telecommunication scenario, ranging from early Internet access services to in-flight connectivity, video distribution over IP, direct-to-phone services, Internet of Things. He is author of conference and journal papers, and co-inventor in a dozen patents. His current activities include 5G-NTN architecture definition, next-generation LEO satellite constellations, and advanced waveforms.

Girish Chandran serves as Corporate Chief Technical Officer at Viasat, Inc. In this role he oversees the evolution of Viasat's global network, which is responsible for connecting millions of personal and mobile devices per year—on the ground, in the air, and at sea. He has extensive experience in building products and networks on multiple continents and leading change in engineering organizations. Girish and his team focus on how next-generation communications infrastructure, especially software-based technologies, will continue to be an integral part of the digital ecosystem connecting people, places and things. Girish has held a number of engineering roles at Viasat since joining the company in October 2007, from Principal Engineer and Chief Technology Officer — Commercial Networks to his current position, which he assumed in May 2017. Prior to joining Viasat, Girish held several senior level engineering roles at various companies including Vice President of Engineering at Newtec America Inc., a satellite communications equipment provider, and Vice President of Systems Engineering at Tiernan Communications Inc. (acquired by Radyne Comstream Inc.), a provider of video compression and transmission solutions. Girish earned a Ph.D. degree in Electrical Engineering from the University of California, San Diego, and a Master's of Science degree in Electrical Communication Engineering from the Indian Institute of Science.

Joel Grotz is with the Systems Engineering department at SES working on multi-orbit satellite communication system design. He is Senior Manager, Technology development within the Systems Engineering department, working on satellite system engineering of future satellite constellations for SES and on 5G-NTN related topics. He was previously responsible for the resource allocation system concept of the O3b mPOWER MEO constellation and the SES-17 operational concept. He has worked on the conception and development of satellite communication systems as well as on satellite payload and ground segment implementations for satellite communication projects for GEO and MEO systems in different roles.

He has also worked for the Technical Labs at STEi iDirect formerly Newtec Cy NV in Sint-Niklaas, Belgium on the development and implementation of satellite modem systems. Dr. Grotz holds an Electrical Engineering degree from the University of Karlsruhe and Grenoble Institute of Technology and a PhD from the Royal Institute of Technology (KTH) Stockholm. He is an IEEE Senior Member and has been a committee member of the Benelux Com/VT chapter.

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Short Keynote (Room Talaia)
Friday 28/02, 11:15 – 11:35

Tyvak International: Small Satellites Big Solutions. The Crucial Role of the ARTES 5G Demonstrator

Margherita Cardi
VP Programs and Business Development @ Tyvak International

In the frame of the telecom roadmap implementation, the ARTES 5G demonstration mission plays a key role in Europe. Technical solutions for this venture are being developed by Tyvak International, European Small Satellite leader, PICOSATS, specializing in nano-satellite telecommunications, Radio Analog Micro Electronics (RAME), an expert in microelectronics, and TIM, a telecommunications services leader. The program leverages recent NR 3GPP standards to define Non-terrestrial Networks (NTN), facilitating data links between ground devices and space-based assets. The 12U spacecraft, based on Tyvak International's Renegade standard Platform, integrates transparent bent-pipe transponders from PICOSATS and K/Ka Band patch array antennae. In-orbit experiments aim to establish bidirectional K/Ka band links, evaluating key performance indicators (KPIs) such as C/N, latency, and throughput with data rates of at least 1 Mbps in uplink and 10 Mbps in downlink. Ground terminals incorporate Software Radio Stack solutions compatible with the latest NTN scenario (Release 17). This mission, a pivotal step in the European 5G/6G telecommunication roadmap, aims to surpass the previous 5G demonstration mission throughputs, setting the stage for future platforms capable of achieving transmission speeds in the range of hundreds of Mbps.

Margherita Cardi is an experienced professional with a background in space engineering. She has held various roles at Tyvak International SRL. In her current role of VP Programs and Business Development, she manages the Program Management area, the Business Development Unit and the System Engineering team, ensuring the overall company strategy is aligned in these three crucial areas. She is also responsible for coordinating and executing Tyvak International programs, managing program budgets and schedules, assessing risks, and acting as the point of contact with commercial and institutional customers. As Program Manager, she led the Hera Milani project and was responsible for coordinating project managers, executing objectives, and liaising with customers. As a System Engineer, she was involved in feasibility studies, requirements definition, systems budgets, design phases, and procurement processes. She has also worked as a Project Manager at Vitrociset S.p.A and holds a Master's Degree in Space Engineering and a Bachelor's Degree in Aerospace Engineering from the University of Rome, Sapienza.

Short Keynote (Room Talaia)
Friday 28/02, 11:35 – 11:55

Multilayer Satcom Constellations – Challenges for the Satellite Industry

Stephan Roemer
Business Development Manager SatCom/Navigation @ OHB

Currently the trend of the space-based communication world shows an evolution from former GEO based business towards (LEO dominated) multi-layer. There we see the typical use of GEO primary for secure classical institutional satcom, MEO as backbone for LEO or (primary) institutional communication and LEO for mass market satcom (e.g. D2D). But this trend creates massive new challenges for the space industry.
The first one is the (missing) standardization of the integration of NTN and TN. Of course, there are tries to create a standard (e.g. 3GPP and 5GAA), but US and Chinese players (Starlink, Kuiper, Geely, Thousand Sails….) are pushing to the market with proprietary solutions. Will this problem be solved by the market or do we need government action here? Second - new technologies especially in the digitalization and on-board processing (incl. AI) makes it more and more difficult to compete with the big digital/AI players (e.g. Google, Apple...) from non-space world. It's simply a question of economics of scale. Additional here comes the trend of European governments to go for PPP or other only 50% funding for technology developments for technologies, especially on payload. While the satellite operators can cover their investments later via the high-profit services, the satellite & satellite equipment manufacturers are facing a low-cost pressure by the operators, which makes it impossible to earn Return-of-Invest for significant technology investment. Third - especially for the LEO constellations, is of course the high numbers needed for full world coverage which is a big challenge for the supply chain and unfortunately have created the trend of fully vertical integrated Satellite-based-Service companies, which is a big issue for an agile and diverse supply chain. And this led us to the major question for the Satellite Industry (besides who of the current players will be still on the market in 5 to 10 years): What does the satellite operator industry want and requires from the space industry? Or do we will then live in a world of Companies purely vertical organized without significant supply chain? The presentation will discuss the points above from the view of a satellite integrator and should be a stimulation for further discussion between satellite industry, satellite operators and agencies/institutions in the technology and space domain.

Stephan Roemer has begun his aerospace career in 1999. Starting in university-based teaching and research environment he then worked in different space technology fields, e.g. as space system engineer and head of AIV department, and joined the Business Development domain in 2009. Since 2018 he is working in the OHB Group and finally joined 2023 the OHB Group HQ in Bremen as BD Manager for Satellite Communication & Navigation. In this position he contributes to the OHB group strategies in this fields, which also includes future secure satcom, QKD, 5G/6G and mobility connectivity applications. He has authored numerous publications in Space Segment, Space Technology, PNT and 5G/D2D/Mobility Connectivity domain and contributes to different organizations in this domain, such as IAA, EDA/EDF, EIC or DGLR.

Short Keynote (Room Talaia)
Friday 28/02, 11:55 – 12:15

Accelerating NTN Deployment to Beat the Goldrush

Richard Soden
Director Space and Satellite Solutions @ Keysight

The evolution of the space industry over the past 10-15 years has unlocked numerous new applications and business opportunities. However, the technical challenges associated with deploying space technologies remain significant. This presentation will explore the industry's challenges, not only from the harsh conditions of space but also from the need to adopt industrial processes for mass production of satellite systems to meet the demands of 5G and 6G non-terrestrial networks. Additionally, we will discuss the "shift-left" approach to accelerate mission deployment by extensively utilizing modeling, testing, and verification throughout the development workflow.

Richard Soden is the Space Solutions Program Manager for Keysight Technologies. In this role, Richard is responsible for enabling mission success for customers developing Space and Satellite systems. Guiding the development of customer-centric solutions that leverage the know-how and entire Keysight product portfolio of software, hardware and services specifically for the Industry. Richard joined Keysight Technologies in 2004. Before specializing in the requirements of the emerging space market, he has worked on the use of Keysight modular products for the characterization of wideband RF and microwave components. Richard earned a Ph.D. in instrumentation from the University of Manchester (UK), and Bachelors in Optoelectronics and Laser Systems Engineering from the University of Hull (UK).

Round Table with Satellite and Equipment Manufacturers (Room Talaia)
Friday 28/02, 12:15 – 13:00

The Competitiveness of the European Manufacturers in the Global Market

Jens Haala	*Stephan Roemer*	*Richard Soden*	*Nicolas Chuberre*	*Jérôme Tronc*	*Margherita Cardi*
Team Leader Digital Systems Development @ Tesat Spacecom	*Business Development Manager @ OHB*	*Director Space and Satellite Solutions @ Keysight*	*Solution Line Manager @ Thales Alenia Space*	*Senior Expert E2E Telecom System @ Airbus Defense and Space*	*VP Programs and Business Development @ Tyvak International*

Moderator: Alberto Ginesi
Head of the Telecommunication Systems & Techniques Section @ European Space Agency

Jens Haala studied Electrical Engineering at the University of Karlsruhe and also earned his doctorate in 2000 in the field of radio frequency technology. He worked for Marconi and Ericsson for 12 years on terrestrial communication networks. He has been working for TESAT-Spacecom since 2012. Since 2021, he has been leading the Digital Systems Development Team. He and his team are responsible for developing algorithms for satellite communications and in-space routing, including TESAT's TT&C, Modulator, and Router products. As a product manager, he is also responsible for TESAT's digital communication products. His current work focuses on non-terrestrial networks and corresponding communication payloads.

Stephan Roemer has begun his aerospace career in 1999. Starting in university-based teaching and research environment he then worked in different space technology fields, e.g. as space system engineer and head of AIV department, and joined the Business Development domain in 2009. Since 2018 he is working in the OHB Group and finally joined 2023 the OHB Group HQ in Bremen as BD Manager for Satellite Communication & Navigation. In this position he contributes to the OHB group strategies in this fields, which also includes future secure satcom, QKD, 5G/6G and mobility connectivity applications. He has authored numerous publications in Space Segment, Space Technology, PNT and 5G/D2D/Mobility Connectivity domain and contributes to different organizations in this domain, such as IAA, EDA/EDF, EIC or DGLR.

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Nicolas Chuberre graduated in 1988 from “Ecole Supérieure d’Ingénieur en Electronique et Electrotechnique” in Paris. Previously with Nokia & Alcatel Mobile phones to design signal processing algorithms, Medium Access Control protocols and test tools for 2G cellular handsets & systems assembly, he joined Thales Alenia Space to manage the development of satellite payload equipment and the design of advanced Satellite Communication Systems. He has successfully initiated and led several European collaborative research projects in FP6, FP7, H2020, Horizon Europe as well as ESA ARTES context. He has been chairing the SatCom Working Group of Networld2020 technology platforms during 9 years and as such was member of the partnership board of the 5G Infrastructure Association. Nicolas has published several papers on innovative Satellite System concepts and co-authored a book ” 5G Non-Terrestrial Networks: Technologies, Standards, and System Design”. Currently he is defining and developing Satellite Solutions for 5G and 6G systems. In addition, he is the lead representative of Thales in 3GPP TSG RAN where he is the rapporteur of the standardisation on the integration of satellite in 5G since 2017. He also chairs since 2006 the Satellite Communication and Navigation working group at ETSI and technical manager of the Horizon Europe research project “6G-NTN”. Last, he chairs the NTN forum.

Jérôme Tronc works as E2E System Senior Expert within Airbus Defence and Space in Toulouse, France. He has joined Airbus Defence and Space in 2000 working within the System Telecom Department on various activities such as support to satellite operators and R&D activities for the development of new mobile, broadband and data relay systems; follow up of regulatory and standardization activities within ETSI, CEPT and ITU; system support for various satellite bids and leading the architecture/design and performances group. From 2015 to 2018 he has joined the European Space Agency at ECSAT as ICE program manager. Inmarsat Communication Evolution (ICE) was a PPP program initiated by Inmarsat to shape its Next Generation of Mobile Satellite Services and to enable innovation introduction at all levels: space segment, ground segment, user terminal, service and applications. He joined back Airbus Defence and Space in 2018 where I have worked on several Mobile Satellites & Constellations initiatives. In 2019-2020, he took the role of satellite proposal manager on the Thuraya NGS satellite which was launched at the beginning of this year. In 2021, he took the role of Chief engineer of the European Secure Space Connectivity System project that served as preparation for the European constellation programme IRIS². More recently, he has been working in a role of senior expert on various R&D activities to support 5G NTN developments as well as bid activities in preparation of future LEO constellations (IRIS² and OneWeb).

Margherita Cardi is an experienced professional with a background in space engineering. She has held various roles at Tyvak International SRL, including VP Programs, Program Manager, and System Engineer. In her current of VP Programs and Business Development, she manages the Program Management area, the Business Development Unit and the System Engineering team, ensuring the overall company strategy is aligned in these three crucial areas. As VP Programs, Margherita is responsible for coordinating and executing Tyvak International programs, managing program budgets and schedules, assessing risks, and acting as the point of contact with commercial and institutional customers. As Program Manager, she led the Hera Milani project and was responsible for coordinating project managers, executing objectives, and liaising with customers. As a System Engineer, she was involved in feasibility studies, requirements definition, systems budgets, design phases, and procurement processes. She has also worked as a Project Manager at Vitrociset S.p.A and holds a Master's Degree in Space Engineering and a Bachelor's Degree in Aerospace Engineering from the University of Rome, Sapienza. Margherita is currently holding the position of VP Programs within Tyvak International.

Special Session (Room Talaia)
Friday 28/02, 14:15 – 16:15

Overview of Ongoing NTN-Related EC/SNS Projects

Alessandro Vanelli-Coralli	*Tomaso De Cola*	*Joan A. Ruiz de Azúa*	*Babak Mafakheri*	*Luis Blanco*
(University of Bologna)	*(DLR)*	*(i2CAT)*	*(Safran Passenger Innovation)*	*(CTTC)*

Moderator: Bernard Barani
Senior Consultant @ 6G Smart Networks and Services Industry Association

Alessandro Vanelli-Coralli received the Dr. Ing. degree in Electronics Engineering and the Ph.D. degree in Electronics and Computer Science from the University of Bologna, Italy, in 1991 and 1996, respectively, where he is currently a full professor. Since 2022, he has also been a Senior Scientist at ETH Zurich. In 2003 and 2005, he was a Visiting Scientist with Qualcomm Inc. in San Diego, CA, USA. He participates in national and international research projects on wireless and satellite communication systems, and he has been the Project Coordinator and scientific responsible for several European Space Agency and European Commission-funded projects. He is currently the Coordinator of the HE SNS JU 6G-NTN project and the lead for the Vision and Research Strategy task force of the NetworldEurope SatCom Working Group and Steering Board Member of the European Space Agency NTN Forum. Dr. Vanelli-Coralli is the University delegate to ETSI, 3GPP, and 6G-IA and has served on the organizing committees of scientific conferences. He has received several Best Paper Awards and he is the recipient of the 2019 IEEE Satellite Communications Technical Recognition Award.

Tomaso De Cola received the "Laurea" degree (with honors) in telecommunication engineering, in 2001, the Qualification degree as Professional Engineer in 2002 and the Ph. D. degree in Electronic and Computer Engineering, Robotics and Telecommunications in 2010 from the University of Genoa, Italy. Since 2008, he has been with the German Aerospace Centre (DLR), where he has been involved in different European Projects focusing on different aspects of 5G/6G-NTN integration, DVB standards, CCSDS protocols and testbed design. He is co-author of more than 100 papers, including international conferences and journals. He was the chair of the Satellite and Space Communications (SSC) technical committee within ComSoc and currently serves as area director of the Space-Internetworking Services (SIS) within the CCSDS standardization body as well as chair of the SatCom working group within the ETP NetworldEurope platform.

Joan A. Ruiz-de-Azua received the degree in aerospaceengineering from Supaero, Toulouse (France), and the degree in telecommunications engineeringfrom the Universitat Politècnica de Catalunya (UPC), Barcelona (Spain), in 2015. Additionally, hereceived the Ph.D. degree of telecommunications engineering with the UPC, Barcelona (Spain), in2020. His dissertation contributed to the Internet of Satellites paradigm in which satellites fromdifferent stakeholders establish temporal, opportunistic, and collaborative Inter-Satellite Networks.For this contribution, he was awarded with the Cum Laude mention. Furthermore, he has participated in six CubeSat missions highlighting the 6G-StarLab (on-going). This mission envisions to provide an in-orbit laboratory to support the developments and the standardization ofNTN. Currently, he is the director of the Space Communication Research Group in i2CATFoundation.

Babak Mafakheri is a Senior Research Engineer at Safran, specializing in Inflight Connectivity Systems since 2021. He has served as the Project and Technical Coordinator for German co-funded projects, including CANARIA and INTACT, and currently coordinates the Horizon Europe NexaSphere project. He received both his Master's and Ph.D. degrees in Telecommunications from the University of Bologna, where he also worked as a Postdoctoral Researcher before joining Safran.

Luis Blanco is Senior Researcher at CTTC with expertise in AI-driven optimization for beyond 5G and 6G integrated TN-NTN networks. He holds a PhD and MSc in Telecommunications Engineering from the Polytechnic University of Catalonia (UPC), along with an MSc in Research on ICT (MERIT) and an MBA. Additionally, he has completed two postgraduate degrees in Data Science and Quantitative Finance. With experience in 25+ research projects, including EC, ESA, national, and industrial collaborations, Dr. Blanco has been the manager of the EC funded project SEMANTIC and, currently, is the Scientific Coordinator of the SNS-JU UNITY-6G project. He has also led multiple defense projects with European industry. His research interests focus on AI and optimization and wireless communications, with special emphasis in the RAN, shaping the future of next-generation networks.

Paper Session (Room Maricel)
Friday 28/02, 14:15 – 15:15

Security (SEC)

Adaptive Detection of on-Orbit Jamming for Securing GEO Satellite Links	Anouar Boumeftah, Olfa Ben Yahia and Jean-François Frigon (Polytechnique Montréal, Canada); Gregory Falco (Cornell University, USA); Gunes Karabulut Kurt (Ecole Polytechnique de Montreal, Canada)
Collision Risk Analysis for LEO Satellites with Confidential Orbital Data	Svenja Lage and Felicitas Hörmann (German Aerospace Center (DLR), Germany); Felix Hanke (DLR, Germany); Michael Karl (German Aerospace Center (DLR), Germany)
Proto²Testbed: Towards an Integrated Testbed for Evaluating End-to-End Security Protocols in Satellite Constellations	Martin Ottens, Jörg Deutschmann, Kai-Steffen J. Hielscher and Reinhard German (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany)

Special Session (Room Maricel)
Friday 28/02, 15:15 – 16:15

Research Advances in EU GovSatCom

Horizon Europe activities for GovSatCom

This introductory talk will explain how R&I projects are funded at EU (Horizon Europe), "who does what" in EU, where GovSatCom activities can be found and will finally include a brief presentation of the projects funded so far.

Andrea Pérez-Carro Ríos holds a Telecommunications Engineer and Master´s Degree in Advanced Telecommunications Systems from the University of Vigo. She currently works for CDTI (Ministry of Science, Innovation and Universities of Spain) where she acts as Representative and National Contact Point for the space area of Horizon Europe Cluster. Previously she has been the Spanish representative on the EU Govasatcom Expert Group as well as other EU Space

Programme Committees and she has also been Delegate to the European Space Agency (ESA) for different Committees such as: Telecommunications, Navigation and Industrial Policy. Formerly, she worked for six years for the European Space Agency (ESA) in the Netherlands carrying out Advanced Mobile Satellite Telecommunications projects helping in the standardization of Satellite UMTS and organizing the first ASMS Conference.

5G-GOVSATCOM: NTN over the X-band

5G non-terrestrial networks (5G-NTN) satellite networks will soon be able to handle all types of applications and provide service to a massive number of users. In this complex and dynamic network ecosystem, and end-to-end adaptation of 5G-NTN towards the EU-GOVSATCOM services, requirements and use cases is of capital importance to efficiently deploy European governmental satellite services. To enable such a vision, 5G-GOVSATCOM targets the development and evaluation in a natural user environment of different key enabling technologies that aim to provide full integration of 5G-NTN in the EU-GOVSATCOM framework. In the radio technologies domain, 5GGOVSATCOM targets the development of necessary adaptions and enhancements of radio access procedures to attend to geostationary mobile terminals in the exclusive governmental X-band. Furthermore, the integration of 5GNTN user equipment with an antenna operationally focused on on-the-move and on-the-pause scenarios are planned. In parallel, in the inter-networking segments, 5G-GOVSATCOM aims to provide a seamless handover between terrestrial networks and NTN via a smart gateway while enhancing core-network functionalities. Finally, all project developments are planned to be first validated in a controlled lab with satellite connectivity and, posteriorly, experimentally tested in close collaboration with final users.

Miguel Ángel Vázquez is the head of space and resilient communications and systems at CTTC. Through his professional career he has been working and leading multiple European Space Agency and industry technology transfer contracts. He has more than 40 conference and journal scientific publication in the domain of satellite communications. His contributions are in the field of the use of antenna arrays and the application of AI in satellite telecommunications. He is the project coordinator of 5G-GOVSATCOM.

GOVSATCOM Extreme Crisis Management Service: Demonstration of Space Saving Lives

The GEXTECS project aims at demonstrating an end-to-end GOVSATCOM service supporting Extreme Events Crisis Management. The project has successfully performed its Mid-term review. GMV is proud to coordinate GEXTRECS which counts with partners covering the full SATCOM added value chain. Protecting citizens and freedoms is one of the four European Union priorities in its 2019-2024 strategic

Almudena Sánchez is MSc. Software Engineer from the Polytechnic University of Madrid. She completed postgraduate courses in Embedded Distributed and Fault-Tolerant Real-Time Systems from the same university, and has a postgraduate degree in Spatial Systems from the Delft University of Technology. She also holds an Executive MBA from the Instituto de Empresa. Her professional career has

agenda, with a priority to increase the EU's resilience against both natural and man-made disasters. However, crisis practitioners experience operational gaps for effective communication when deployed on the field. GEXTRECS demonstrates an End-to-End GOVSATCOM Service supporting Crisis Management. The GEXTRECS innovations will be demonstrated in two use cases (land and maritime) on real End-User environments, while exploiting synergies with other EU Space Programme components such as Copernicus Emergency service, and Galileo OSNMA and PRS services. Lessons learned from the first annual demonstration will be shared with the audience.

spanned several entities in the sector in Europe including European Space Agency. She joined the GMV project 30 years ago, where she has developed different functions within the company, and where she is currently responsible for R&D&I programs and strategic roadmaps, reporting directly to General Direction.

SIGMA: Satellite-Enabled Interoperable System Ensuring GOVSATCOM Services' Reliability, Optimal Traffic Management, Security and Long-Term Availability for EU and National Public Authorities

The increasing reliance on terrestrial networks for telecommunications and connectivity unveils significant challenges, particularly during natural disasters or humanitarian emergencies. The SIGMA project addresses these issues by combining satellite communication (SatCom) with 5G networks to provide resilient, secure, and dependable communication services to EU and national public authorities. SIGMA utilizes a multi-band SatCom system (X-band, military Ka-band, and civilian Ka-band), 5G user equipment, and advanced traffic management tools to ensure a seamless transition between satellite and terrestrial networks. Important communication services become possible by this method even in situations where terrestrial networks become congested or unavailable. The technical architecture of SIGMA is described in the paper. It consists of high-performance Satcom-On-the-Move (SOTM) terminals, real-time encryption solutions, and a traffic management system based on SD-WAN. Field demonstrations in three EU countries, focusing on natural disaster response, large event security, and search-and-rescue operations, will validate the platform's effectiveness.

Eduardo Agra Barros is responsible for SATCOM Systems Project Engineering at INSTER-Grupo Oesia. He graduated in Telecommunications Engineering in 2003, and later obtained a Master in R&D Project Management in 2010. He is currently studying a Master in Applied Systems Engineering. He has completed training in: Telecommunications Management, at MTNL CETTM Mumbai India; LinkStar™ Viasat Germantown MD USA; Skystar™360E Gilat Tel Aviv Israel, and others. He currently participates in the SiGMA project in the Technical Management of the Project and contributes on behalf of INSTER in the installation and commissioning of SATCOM On-The-Move SGOSAt terminals in X-band, military Ka and commercial Ka, installed on vehicle, to provide a stable and reliable connection in mobility.

Tutorial (Room Vento)
Friday 28/02, 14:15 – 16:15

An Overview of 6G Multi-Functional Satellite Systems for Communication, Sensing and Positioning

Jorge Querol, Prabhu Kaliyammal Thiruvasagam and Alejandro Gonzalez Garrido
Research Scientists @ SnT

This tutorial offers an in-depth exploration of Multi-Functional Satellite Systems (MFSS), which integrate communication, navigation, and sensing into a single platform. As demand for efficient satellite services grows, understanding MFSS's design and potential is crucial. The session covers technological innovations, architecture, and real-world applications, emphasizing their relevance in the evolving satellite landscape and the transition to 6G networks. Unlike previous tutorials that focused on specific functions, this tutorial provides a broader perspective by unifying multiple capabilities within one system, offering participants a comprehensive understanding of MFSS and their future impact.

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