

Program

Monday, September 27, 2021

Format: VIRTUAL

38th ICSSC Colloquium

09:00 - 17:00

Virtual Platform

Theme: Satellite Constellations and 5G

Organized by the Co-Chairs:



Rajeev Gopal, Hughes Network Systems, LLC, USA



Maria Guta, European Space Agency (ESA), The Netherlands

Synopsis

5G is a revolutionary force in telecommunications; defining new sets of services in support of diverse use cases for connecting humans and machines, and deploying a network of networks. Significant investments have also been made in launching High Throughput satellites (HTS) and NGSO constellations. Instead of satellites being the choice of last resort, the technological and regulatory environment is now ripe for a truly integrated system of systems where satellites can complement terrestrial networks to provide ubiquitous coverage and capacity. Besides offering important societal and economic benefits, this unification can also be leveraged for enhancing emergency/disaster management and national security.

Mega satellite constellations being designed today comprise hundreds or even thousands of LEO satellites. With limited deployment today, HAPS can also join this hybrid architecture framework that extends the 3GPP 5G baseline to include non-terrestrial network nodes. With global coverage across all oceans and continents being a primary differentiator, the LEO mega-constellations will eventually be indispensable for global connectivity.

The colloquium will look across a broad range of topics that address how space, high altitude, and terrestrial 5G systems will interoperate with key enabling technologies such as software defined networks, artificial intelligence, and cost effective electronically steered antennas. Besides leveraging the confluence of advanced technologies, an innovative regulatory approach will also be essential to address the burgeoning spectrum requirements and more dynamic allocation for space and terrestrial applications.

Panelists from the Satellite and Cellular industry, GEO and NGSO SAT-COM designers and operators, and governments will discuss their visions, strategies and plans to integrated 5G architectures and services in interactive sessions.

09:00 - 09:15

Virtual Platform

Colloquium Opening

The Co-Chairs: **Rajeev Gopal** (Hughes) and **Maria Guta** (ESA) will welcome attendees and open the Colloquium.

09:15 – 09:35

Virtual Platform

Keynote: 5G Challenges and Opportunities

Keynote Speaker will provide a review diverse use cases for connecting humans and machines with 5G enabled by terrestrial and space platforms and discuss unique challenges and opportunities including HTS and LEO satellite constellations that extend the 3GPP 5G baseline to include non-terrestrial network nodes. With global coverage across all oceans and continents being primary differentiator, the space segment will eventually be indispensable for global connectivity with quality service.

- **Channasandra Ravishankar**, Hughes, USA - Mega-Constellations and Cross Plane/Layer Architectures

09.35 - 10.45

Virtual Platform

Session 1: 5G Use Cases Augmentation with Space

Leaders representing MNOs, satellite service providers, and equipment manufacturers will discuss how satellites, instead being the choice of last resort, can now complement terrestrial networks to provide ubiquitous coverage, capacity, and broadcast efficiencies. Besides offering important societal and economic benefits, this unification will also benefit enhancing emergency/disaster management and national security.

- **Helmut Zaglauer**, Airbus, Germany
- **Nicolas Chuberre**, Thales Alenia Space, France
- **Rajeev Gopal**, Hughes, USA

10.45 - 11.00 - Break

11:00 – 12:15

Virtual Platform

Session 2: 5G Services, Business and Strategy (interactive Panel)

Session 2 will be an interactive panel among 5G cellular and satellite industry players including network providers and manufacturers. 5G requires new equipment, including Multi-access Edge Computing (MEC) and technology to accommodate the user requirements and multi use cases. Panelist will debate their technology road maps in delivering network and user equipment fulfilling the demanding 5G needs in terms of size, flexibility and Capex while covering larger areas. They will address various funding and deployment strategies and share insights with respect to their unique business case priorities.

- **Nav Bains**, Oneweb, USA
- **Stephane Anjuere**, Thales Alenia Space, France
- **Maria Guta**, ESA, The Netherlands

12:15 – 12:30

Morning Q&A

The morning will conclude with general Q&A open to all.

12:30 - 14:00 - Break

14.00 - 15.45

Virtual Platform

Session 3: Technical Insights with Cross Plane/Layer Designs and Future Advances

Session 3 will comprise a series of technical presentations from experts involved in 3GPP standardization, 6G advances, terrestrial equipment design, and satellite system development. This includes how space (GEO/LEO) and terrestrial 5G systems will interoperate with key enabling technologies such as smart and open RAN, MEC, mobility/roaming, security, software defined networks, artificial intelligence, cost effective electronically steered antennas, smart routing and traffic engineering, and dynamic spectrum allocation. For example, integration could include promising satellite use cases such as for eMBB and mMTC and 5G network rollout efficiencies for unserved and underserved areas.

- **Amane Miura**, NICT, Japan - 5G/6G Satellite Unification
- **Eric Spittle**, LinQuest, USA - Integration, Security and Resiliency
- **Helmut Zoglauer**, Airbus, Germany - 5G/6G Advances for Satellite Systems
- **Nader Alagha**, ESA, The Netherlands - Technical Status and Road Ahead

15:45 - 16:00 - Break

16:00 - 16:45

Virtual Platform

Session 4: Regulatory and Governance Challenges

Keynote speaker will address challenges and opportunities related to driving governance topics (such as standardization, C band reallocation, mmWave sharing, satellites as cellular base stations, etc.) with a distinguished panel having government and industry experience. Besides leveraging the confluence of advanced technologies, an innovative regulatory approach will be essential to address the burgeoning spectrum requirements and smart sharing.

- **Jennifer Manner**, EchoStar, USA

16:45 - 17:00

Virtual Platform

Concluding Remarks

The Colloquium will close with a summary of the key takeaways from the four sessions.

Tuesday, September 28, 2021

Format: Hybrid

26th Ka and 38th ICSSC Joint Conference

8:15 - 8:30

Conference Hotel, Salon C

Opening

Artemis and Beyond: Communications and Navigation for Space Exploration

With the Artemis program, NASA and its International Partners will land the first woman and next man on the Moon by 2024 using innovative technologies to explore more of the lunar surface than ever before. With Commercial and International partners, sustainable exploration of the moon region will be established by the end of the decade to enable the next giant leap - sending astronauts to Mars.

- **Welcome and Introductory Remarks by**
Badri Younes, Joint Conference Executive Chair

08:30 - 09:15

Conference Hotel, Salon C

Keynote: NASA Artemis Mission/Vision Overview



Keynoter: **Astronaut Capt. Kenneth Bowersox**, Deputy Associate Administrator of the Human Exploration and Operations Mission Directorate (HEOM D), NASA, USA

09:15 -10:45

Conference Hotel, Salon C

Round Table: Public and Private Sector's Role in Returning to the Moon and Going Beyond

Space agencies and private companies will present and discuss their planned participation/role in missions such as Artemis with an inclusive round table discussion.



Chair: **Badri Younes**, Deputy Associate Administrator for Space Communications and Navigation (SCaN), NASA, USA

Panelists:

- David Parker, Director of Human & Robotic Exploration Program, ESA, The Netherlands
- Hiroshi Sasaki, Vice President for International Space Exploration, JAXA, Japan
- Marco Brancati, Chief Technology & Innovation Officer, Telespazio, Italy
- Sue Horne, Space Exploration Programme Manager, UKSA, UK
- Phil McAlister, Director of Commercial Spaceflight, NASA, USA

10:45 - 11:00 – Salon B - Coffee break

11:00-12:30

Conference Hotel, Salon C

Plenary 1: Communications and Navigation Requirements

An overview of the future Communications Architecture will be given, followed by a description of the communications and navigation requirements of major elements and opportunities offered for commercialization.



Co-Chair: **Greg Heckler**, Manager, Network Services Division, SCaN Program, NASA, USA



Co-Chair: **Wael El-Dali**, Communication System Engineer at Directorate of Telecom and Integrated Application, ESA, The Netherlands

Panelists:

- Andy Petro, Lunar Relay Lead, NASA, USA
- Kota Tanabe, Deputy Director, Space Exploration System Technology Unit, JAXA Space Exploration Center (JSEC), Japan

- William Carey, Future Robotics Engineer, ESA Human and Robotic Exploration Directorate, The Netherlands
- James Schier, SCA N Architect, NASA, USA
- Catherine C. Sham, Spectrum Manager for Human Spaceflight Lunar Programs, NASA, USA

12:30 -14:15 – Salon B - *Luncheon and*

- **Historical Remembrance, by Neil Helm**
- **Remembering Frank Gargione, Co-Founder of Ka and Broadband Communications Conference, by Tom Butash**

14:15 - 15:45

Conference Hotel, Salon C

Plenary 2: Communications and Navigation Technology Gaps

Technology plans and description of emerging technologies that enable this Integrated Earth/Lunar and Beyond Communications and Navigation Network will be given by leading experts



Co-Chair: **Jason Mitchell**, NASA, Advanced Communication and Navigation Technology Division Chief, USA



Co-Chair: **Richard Morgan-Owen**, ESA, Chief TT&C and PDT Section, The Netherlands

Panelists:

- Gopal, Hughes, Vice President, Advanced Systems, USA
- Dave Israel, NASA GSFC, Chief Architect, Exploration and Space Communications Projects Division, USA
- Naoto Kadowaki, NICT VP, Japan
- Marco Lanucara, ESA, The Netherlands
- David Gomez Otero, ESA Moonlight/LCNS Technical Lead, The Netherlands
- Pietro Giordano, ESA, Radionavigation Engineer, Directorate of Technology Engineering & Quality, The Netherlands

15:45 – 16:00 – Salon B - *Coffee Break*

16:00 - 17:30

Conference Hotel, Salon C

Plenary 3: Commercial Communications and Navigation Industry Role

Commercial industry will share with the audience their novel, new technologies and services that can support space communication and navigation including Near Earth Missions, Lunar Missions (Artemis), and Deep Space Missions.



Co-Chair: **Eli Naffah**, Comm. Services Program (CSP) Formulation Manager, NASA, USA



Co-Chair: **James Hinds**, CEO OneWeb Satellites, USA

Panelists:

- Matthew Cosby, Chief Technology Officer, Goonhilly Earth Stations Ltd, UK
- Ruben Nunez, Director of Business Development, KSAT, Norway
- Massimo Comparini, Deputy CEO of Observation, Exploration and Navigation at Thales Alenia Space, Italy
- Nelly Offord, Business Manager, Exploration, Surrey Satellite Technology, Ltd., UK
- Bernhard Hufenbach, Chief Commercialization and Innovation, ESA, The Netherlands

20:00 – 22:30 - **Conference Dinner** and

2020 American Institute of Aeronautics and Astronautics (AIAA) Aerospace Communications Award (ACA) presentation to Mr. Badri Younes

Wednesday, September 29, 2021

Format: Hybrid - Virtual

08:00 - 09:15

Location: **Conference Hotel, Salon C**

Special Session Ka 01 (in-person)

Chair: **Denise Ponchak**, Teltrium Solutions LLC

#140 - NASA's Wideband Multilingual Terminal Efforts as a Key Building Block for a Future Interoperable Communications Architecture

Gregory Heckler, *NASA – United States*

Erica Weir, *Teltrium Solutions LLC - United States*

Badri Younes, *NASA - United States*

Jason Mitchel, *NASA - United States*

Nang Pham, *NASA - United States*

Avinash Sharma, *The Johns Hopkins University Applied Phy - United States*

Christopher Haskins, *The Johns Hopkins University Applied Phy - United States*

#102 - Higher Level Diversity for Laser Satellite Communication

Paul Christopher, *PFC Associates - United States*

#126 - Scintillation Measurements at Q and V Band

John Grey, *Calian Advanced Technologies - Canada*

Matt Gale, *Calian Advanced Technologies - Canada*

#129 - Optimal Philippines Small Remote Sensing Satellite Design

Pablito Yra, SSL Distinguished Engineer, retired, - *United States*

09:30 - 11:00

Conference Hotel, Salon C

Special Session ICSSC 02 (in-person)

Co-chairs: **Rajeev Gopal**, *Hughes, USA* and **George Haddad**, *NASA, USA*

#128 - Microwave Power Modules (MPMs) in Space

Allen Katz, *LTJ/LST/LP - United States*

Roger Dorval, *Linearizer Technology Inc. - United States*

Robert Gray, *Linearizer Technology Inc. - United States*

Christopher Tenev, *Linearizer Technology Inc. - United States*

#55 - History-based classification of encrypted traffic into QoS class with self-update

Chi-Jiun Su, *Hughes Network Systems. - United States*

Kaustubh Jain, *Hughes Network Systems, LLC - United States*

Sriram Vasudevan, *Hughes Network Systems, LLC - United States*

#53 - Application-Layer QoS Metrics to Aid Network Performance Monitoring and Diagnostics for Encrypted Traffic

Chi-Jiun Su, *Hughes Network Systems - United States*

Kaustubh Jain, *Hughes Network Systems - United States*

#83 - Intelligent Dynamic Network Traffic Management for Global Network Access Terminal

Genshe Chen, *Intelligent Fusion Technology, Inc. - United States*

Qi Zhao, *Intelligent Fusion Technology, Inc. - United States*

Xin Tian, *Intelligent Fusion Technology, Inc. - United States*

Yi Li, *Intelligent Fusion Technology, Inc. - United States*

Khanh Pham, *AFRL - United States*

James Lykye, *AFRL - United States*

#59 - Communication Waveform performance predication in Partial Band Partial Time Jamming RF environments

Yi Li, *Intelligent Fusion Technology, Inc - United States*

Xin Tian, *Intelligent Fusion Technology, Inc. - United States*

11:00 - 11:15 – Salon B - Coffee break

11:15 – 13:15

Virtual Platform

Plenary 4 - Disruption and the Changing Face of Space Industry

The satellite industry has emerged from a period of disruptive change with a changed focus. For four years our panels addressed the sources of disruption and speculated on their impact. A vibrant new, much broader, ecosystem has taken the place of the old GEO ecosystem. This year we will look at some of the exemplars of the new industry.



Chair: **Chris Hoerber**, CFH Engineering, USA (Consultant for the Communications Satellite Industry)

Panelists:

- Marco Brancati, Telespazio, Italy
- Rajeev Gopal, Hughes Network Systems, USA
- James Hinds, CEO OneWeb Satellites, USA
- Bernard Edwards, NASA GRC, USA
- Steve Joseph, Astranis, USA
- Rob Singh, SpaceLink, USA
- Alessandro Le Pera, Eutelsat, France

13:15 – 14:45 – Salon B - Lunch

Thursday, September 30, 2021

Format: Virtual

03:00 - 06:00

Virtual Platform

7th Assembly Aldo Paraboni Experimenters Group

The 7th Assembly Aldo Paraboni Experimenters Group is organized by the Co-Chairs:



Carlo Riva, Polytechnic of Milan, Italy



Antonio Martellucci, ESA, The Netherlands

AlphaSat Aldo Paraboni propagation Experimenters (ASAPE) Group is an open forum of researchers performing propagation campaigns with the **ASI Aldo Paraboni payload** and other satellite payloads at Ka band. From 2014 a European measurements campaign at Ka and Q band is possible thanks to the **Alphasat Aldo Paraboni payload**, developed by ASI. In 2019 ASI and ESA extended the operations of the Alphasat Aldo Paraboni payload until the end of 2022. In addition to the initial network, including the main ASI stations installed in Tito Scalo and Spino d'Adda, Italy, and the Joanneum Research ground station, installed in Graz, Austria, several research centres and space agencies (NASA and CNES) have joined the scientific campaign and now it includes **up to 24 ground stations**.

The Seventh General Assembly of ASAPE will have the objective to report and discuss the main results of the Working Groups activities and to plan ASAPE activities for the following period.

Preliminary agenda:

- Opening of the Meeting
- Report on the ASAPE Campaign
- Presentations of ASAPE Experimenters
- ASAPE Working Groups: scientific contributions, discussion and planning
- Planning for ASAPE activities in 2022
- Conclusions

Technical Sessions

Format: Virtual

08:30 - 10:00

Virtual Platform

Session: **Ka 01 - Ground Segment Technology**

Chair: **Avi Freedman**, SatixFy - Israel

#100 - Development of LDPC FEC Encoder Decoder for IP Network to Compensate for Rain Attenuation in 21-GHz-band Satellite Broadcasting

Yuki Koizumi, *NHK Science & Technology Research Laboratories - Japan*
Yoichi Suzuki, *NHK Science & Technology Research Laboratories - Japan*
Tomoya Kusunoki, *NHK Science & Technology Research Laboratories - Japan*
Kazunori Yokohata, *NHK Science & Technology Research Laboratories - Japan*
Hisashi Sujikai, *NHK Science & Technology Research Laboratories - Japan*

#106 - Beam Hopping - Deployment Scenario Analysis

Avi Freedman, *SatixFy - Israel*

#131 - A subarray-based antenna design for satellite communications ground terminals in Ka band

Federico Boulos, *German Aerospace Center (DLR) - Germany*
Andreas Winterstein, *German Aerospace Center (DLR) - Germany*
Stefano Caizzone, *German Aerospace Center (DLR) - Germany*

#132 - Simulation of Tracking Systems for Electronically Steered Antenna Arrays for GEO and LEO satellites

Bahadir Canpolat, *SatixFy UK Ltd - United Kingdom*

#169 - COEXISTENCE BETWEEN 5G NEW RADIO NR AND FIXED SATELLITE SERVICE UPLINK IN MILLIMETRE-WAVE BAND

Barry Evans, *University of Surrey - United Kingdom*
Humna Zafar, *University of Surrey – United Kingdom*
Abdelrahim Mohamed, *University of Surrey – United Kingdom*

08:30 - 10:00

Virtual Platform

Session: **IC 01 - Communication Systems for Space Exploration 1**

Co-Chairs: **George Haddad**, *NASA Glenn Research Center, USA* and **Daichi Hirahara**, *JAXA, Japan*

NASA Lunar Exploration -- Gateway's Power and Propulsion Element Communications Links (#87)

Roger Dendy, *HX5 LLC - United States*

Gateway – A Communications Platform for Lunar Exploration (#28)

Dale Mortensen, *NASA Glenn Research Center - United States*
Sandra Johnson, *NASA Glenn Research Center - United States*
Christopher Woodland, *NASA - United States*
Mark Chavez, *NASA Johnson Space Center - United States*

Framework for NASA Space Relay Satellite Services Over the Next Decade: Space Relay Partnership and Services Study (#155)

Eric Knoblock, *National Aeronautics and Space Administration - United States*

First Concept of Platform for High Data Rate Optical Station (PHAROS) to Support Deep-Space Missions and Small Satellites (#20)

Morio Toyoshima, *NICT - Japan*
Yoshihiko Saito, *NICT - Japan*
Tetsuharu Fuse, *NICT - Japan*
Naoko Yoshimura, *NICT - Japan*
Hiroyuki Tsuji, *NICT – Japan*

Evaluation of a Multi-Access Communication Architecture for future Mars Exploration (#165)

Massimiliano Marcozzi, *ThalesAleniaSpace Italia - Italy*
Martina Ottavi, *ThalesAleniaSpace Italia – Italy*

08:30-10:00

Virtual Platform

Session: **Ka 02 - Integrated Services & Interoperability**

Chair: **Marco Brancati**, *Telespazio - Italy*

A MULTI-SENSOR/MULTI-RAT SOLUTION FOR INTEGRATED EARTH & SPACE DISASTER MANAGEMENT SERVICES (#38)

Giuseppe Tomasicchio, *Telespazio - Italy*

Alessandra Ceccarelli, *Telespazio - Italia*

Alessia De Matteis, *Telespazio - Italia*

Luca Spazzacampagna, *Telespazio – Italia*

NASA's Wide band Multilingual Terminal Efforts as a Key Building Block for a Future Interoperable Communications Architecture (#140)

Greg Hecker, *NASA – United States*

Erica Weir, *Teltrium Solutions LLC - United States*

DATA LAYER CONVERGENCE SOLUTION FOR EARTH OBSERVATION AND SATELLITE-TERRESTRIAL TELECOM SYSTEMS (#141)

Marius Corici, *Fraunhofer FOKUS Institute - Germany*

ESA SAIRCC Project – Scenario Analysis For A Sat-To-Rail Communication System Targeting Support Of FRMCS Applications (#162)

Tommaso Catuogno, *Thales Alenia Space - Italy*

Alessia Miglietta, *Thales Alenia Space - Italy*

Stefano La Barbera, *Thales Alenia Space - Italy*

Alessandro Brizzi, *Thales Alenia Space - Italy*

Nikolaos Toptsidis, *European Space Agency - Netherlands*

Vincenzo Pellegrini, *EikonTech – Italy*

08:30-10:00

Virtual Platform

Session: **IC 02 - Satellite Networks Simulation and Traffic Management**

Co-Chairs: **Chris Hoerber**, CFH Engineering, USA and **Pablito Yra**, SSL Distinguished Engineer, (retired), USA

A SYSTEM SIMULATOR FOR BROADBAND GLOBAL AREA NETWORK (BGAN) (#45)

Jani Puttonen, *Magister Solutions Ltd - Finland*

Riku Järvinen, *Magister Solutions Ltd - Finland*

Juuso Alhava, *Magister Solutions Ltd - Finland*

Santeri Haka, *Magister Solutions Ltd - Finland*

Janne Kurjenniemi, *Magister Solutions Ltd - Finland*

Guray Acar, *European Space Agency/ESTEC - The Netherlands*

Intelligent Dynamic Network Traffic Management for Global Network Access Terminal (#83)

Genshe Chen, *Intelligent Fusion Technology, Inc. - United States*

Qi Zhao, *Intelligent Fusion Technology, Inc. - United States*

Xin Tian, *Intelligent Fusion Technology, Inc. - United States*

Yi Li, *Intelligent Fusion Technology, Inc. - United States*

Khanh Pham, *AFRL - United States*

James Lykye, *AFRL - United States*

Nichole Sullivan, *Intelligent Fusion Technology, Inc. - United States*

Automatic Identification of Home IoT Devices for Traffic Management in Satellite Networks (#159)

Satyajit Roy, *Hughes Network Systems - United States*

Akshay Ravichandran, *Hughes Network Systems - United States*

Inclined MEO constellation to provide cost effective global high speed trunking services (#18)

Jean-Didier Gayraud, *Thales Alenia Space - France*

08:30 - 10:00

Virtual Platform

Session: **IC 03 - High Speed Optical Communications and Feeder Links**

Chair: **Nafiz Karabudak**, Lockheed Martin Corporation, USA

The Western Australian Optical Ground Station (#108)

Shane Walsh, *International Centre for Radio Astronomy Research, The University of Western Australia - Australia*

Gateway Selection Algorithm for Radio and Optical Hybrid Satellites Considering Weather Conditions (#103)

Yuma Abe, *National Institute of Information and Communications Technology - Japan*

Mitsugu Okawa, *NICT - Japan*

Amane Miura, *NICT - Japan*

Kazunori Okada, *NICT - Japan*

System Architecture of Adaptive Optical Satellite Network for Various Communication Services (#105)

Hideaki Kotake, *NICT - Japan*

Hideaki Kotake, *NICT/UEC - Japan*

Morio Toyoshima, *NICT - Japan*

Tetsuharu Fuse, *NICT/UEC - Japan*

Yuma Abe, *NICT - Japan*

10:00 - 10:15 - Break time

10:15 - 12:00

Virtual Platform

Session: **Ka 04 - Propagation**

Co-Chairs: **Carlo Riva**, *Polytechnic of Milan, Italy* and **Antonio Martellucci**, *ESA – The Netherlands*

FOUR-YEAR PROPAGATION RESULTS FROM THE ASI ALPHASAT GROUND STATIONS IN TITO SCALO AND SPINO D'ADDA (#10)

Carlo Riva, *Politecnico di Milano - Italy*

Lorenzo Luini, *Politecnico di Milano - Italy*

Michele D'Amico, *Politecnico di Milano - Italy*

Alberto Panzeri, *Politecnico di Milano - Italy*

Roberto Nebuloni, *IEIIT-CNR (Consiglio Nazionale delle Ricerche) - Italy*

Giuseppe Codispoti, *Agenzia Spaziale Italiana - Italy*

Giorgia Parca, *Agenzia Spaziale Italiana - Italy*

AI-SUPPORTED FADING PREDICTION ON Q-BAND SATELLITE CHANNEL (#99)

Árpád László Makara, *Budapest University of Technology - Hungary*

László Csurgai-Horváth, *Budapest University of Technology and Ec - Hungary*

Tamás Deli, *Budapest University of Technology and Ec - Hungary*

Experimental Evaluation of the Opportunistic use of Q/V-band Satellite Links for Rainfall Rate Estimation (#118)

Tommaso Rossi, *University of Rome Tor Vergata – Italy*

Real-time estimation of the tropospheric attenuation impinging the feeder uplink of VHTS systems operating at Q/V band (#142)

Liz Angelica Ramos Medina, *ONERA - France*

Laurent Castanet, *ONERA - France*

Michel Bousquet, *ONERA – France*

Scintillation Measurements at Q and V Band (#126)

John Grey, *Calian Advanced Technologies - Canada*

Matt Gale, *Calian Advanced Technologies - Canada*

10:15 - 12:00

Virtual Platform

Session: **Ka 05 - Payload Technology 1**

Chair: **Nafiz Karabudak**, *Lockheed Martin Corporation - USA*

EFFECTS OF OSCILLATORS PERFORMANCE ON THE SPREAD SPECTRUM COMMUNICATION (#25)

Pietro Giorgio, *Thales Alenia Space - Italy*
Alessandro Pisano, *Thales Alenia Space - Italy*
Rodolfo Mura, *Thales Alenia Space - Italy*
Vincenzo Marziale, *Thales Alenia Space - Italy*

Photonic integrated circuits for next generation satellite communication systems (#124)

Leili Shiramin, *Antwerp Space - Belgium*

Simulations of Chirp Spread Spectrum for LEO Satellite Communication (#33)

Gyeongrae Im, *ETRI - Korea, South*
Dong-hyun Jung, *ETRI - Korea, South*
Sooyeob Jung, *ETRI - Korea, South*
Pansoo Kim, *ETRI - Korea, South*
Joon-Gyu Ryu, *ETRI - Korea, South*

10:15 - 12:00

Virtual Platform

Session: **IC 05 - High Throughput and Multibeam Satellite Systems**

Co-Chairs: **Farbod Kayhan**, University of Surrey, UK and **Christian Rohde**, Fraunhofer, IIS, Germany

Capacities of HTS Systems (#95)

Liping Ai, *Goldfishgreen - United States*
Harry Shaw, *NASA - United States*

Efficient Multicast Delivery in a Spot Beam High Throughput and Very High Throughput Satellite Network (#156)

Satyajit Roy, *Hughes Network Systems - United States*

Enablers for Matching Demand in GEO Multi-Beam Satellites: Dynamic Beamforming, Precoding, or Both? (#125)

Haythem Chaker, *SigCom Research Group, SnT, Interdisciplinary Centre for Security, Reliability and Trust, University - Luxembourg*
Nicola Maturo, *SigCom Research Group, SnT, Interdiscipl - Luxembourg*
Symeon Chatzinotas, *SigCom Research Group, SnT, Interdiscipl - Luxembourg*
Joel Grotz, *SES S.A. - Luxembourg*
Houcine Chougrani, *SigCom Research Group, SnT, Interdiscipl - Luxembourg*
Wallace Alves Martins, *SigCom Research Group, SnT, Interdiscipl - Luxembourg*

Design Aspects of Non-Regular Multibeam Coverage for Ka-band Broadband Communication Satellites (#153)

Piero Angeletti, *European Space Agency - Netherlands*
Alfredo Catalani, *Airbus - Italy*
Marco Baldelli, *Airbus - Italy*
Enrica Calà, *Airbus - Italy*
Esteban Menargues, *Swisst012 - Switzerland*
Giovanni Toso, *European Space Agency - Netherlands*

ON THE IMPACT OF PHASED ARRAY BEAM FORMING ANTENNAS ON LEO SATELLITE DOWNLINK CAPACITY (#157)

Marco Krondorf, *HTWK Leipzig, Univ. for Applied Science - Germany*
Robert Wuensche, *HTWK Leipzig, Univ. for Applied Science - Germany*
Daniel Ehnert, *HTWK Leipzig, Univ. for Applied Science - Germany*

10:15 - 12:00

Virtual Platform

Session: **Ka 06 - Protocols**

Chair: **Naoto Kadowaki**, NICT, Japan

Usage of GPGPU computing in LEO satellite network simulations (#24)

Janne Kurjenniemi, *Magister Solutions – Finland*

SECURITY AND SPECTRALL EFFICIENCY TRADE-OFF FOR SINGLE CARRIER FASTER THAN NYQUIST IoT SYSTEMS OVER SATELLITE (#34)

Joan Bas, *CTTC - Spain*

Ana Pérez, *CTTC – Spain*

MULTI RESOLUTION CODING (MRC) SATELLITE RETURN WAVEFORM (#72)

Philippe Delbeke, *STEngineering IDirect - Belgium*

Dieter Duyck, *ST Engineering IDirect - Belgium*

Alain Rollé, *ST Engineering IDirect – Belgium*

SFO CORRECTION ALGORITHM FOR LORA SIGNALLING IN LEO SATELLITE IOT NETWORKS (#111)

Gyeongrae Im, *ETRI - Korea, South*

Pansoo Kim, *ETRI - Korea, South*

Joon-Gyu Ryu, *ETRI - Korea, South*

MRC Satellite Return Link Controller (#174)

Brecht Reynders, *ST Engineering IDirect - Belgium*

Philippe Delbeke, *STEngineering IDirect - Belgium*

Michiel Mertens, *ST Engineering IDirect – Belgium*

Daniel Delaruelle, *ST Engineering IDirect - Belgium*

10:15 - 12:00

Virtual Platform

Session: **IC 06 - Satellite and 5G Systems Integration and Harmonization**

Chair: **Jonathan Rodriguez**, *University of South Wales, UK*

System and Methods for providing integrated 5G and satellite Service in Backhaul and Edge Computing Applications (#161)

Satyajit Roy, *Hughes Network Systems - United States*

Performance Evaluation of Different 5G NB-IoT Satellite Systems (#122)

Romain Barbau, *Airbus Defence and Space - France*

Making Massive-MIMO Easy for Broadband Access Satellites: A Practical Guide (#121)

Piero Angeletti, *European Space Agency - Netherlands*

Riccardo De Gaudenzi, *European Space Agency – Netherlands*

12:00 -13:30 - Break time

13:30 - 15:00

Virtual Platform

Session: **IC 07 - Satellite System Protocols and Performance Analysis 1**

Co-Chairs: **George Choquette**, *Hughes, USA* and **Hiroyuki Tsuji**, *NICT, Japan*

Communication Waveform performance predication in Partial Band Partial Time Jamming RF environments (#59)

Xin Tian, *Intelligent Fusion Technology Inc. - United States*

PERFORMANCE OF MODERN WEB PROTOCOLS OVER GEOSTATIONARY SATELLITE LINKS (#47)

Jörg Deutschmann, *University of Erlangen-Nürnberg - Germany*

Reinhard German, *University of Erlangen-Nürnberg - Germany*

Kai-Steffen Hielscher, *University of Erlangen-Nürnberg - Germany*

Application-Layer QoS Metrics to Aid Network Performance Monitoring and Diagnostics for Encrypted Traffic (#53)

Kaustubh Jain, *Hughes Network Systems - United States*

Chi-Jiun Su, *Hughes Network Systems - United States*

History-based classification of encrypted traffic into QoS class with self-update (#55)

Chi-Jiun Su, *Hughes Network Systems. - United States*

Kaustubh Jain, *Hughes Network Systems, LLC - United States*

Sriram Vasudevan, *Hughes Network Systems, LLC - United States*

Analysis of the Effect of Beam Tracking Errors in sub-THz Inter-Satellite Communications (#66)

Chang Kyung Sung, *CSIRO - Australia*

Hajime Suzuki, *CSIRO - Australia*

Wei Ni, *CSIRO - Australia*

Jia Du, *CSIRO - Australia*

Ting Zhang, *CSIRO - Australia*

13:30-15:00

Virtual Platform

Session: **Ka 08 - Payload Technology 2**

Chair: **Roberto Winkler**, *Thales Alenia Space - Italy*

Development of Miniature Ka-Band LNA (#112)

Ryohko Hoshi, *NEC Space Technologies, Ltd. - Japan*

Compact light-weight TWT for active antenna on SDS satellites (#151)

Gael Derven, *Thales - France*

WIDEBAND MATCHED VOLTERRA MODELING OF HIGH-POWER AMPLIFIERS FOR SATELLITE ADVANCED AND RECONFIGURABLE NAVIGATION AND COMMUNICATION PAYLOADS DESIGN (#68)

David Pisanu, *Thales Alenia Space - Italy*

Ersilia Del Zoppo, *Thales Alenia Space - Italy*

Felice Rosato, *Thales Alenia Space - Italy*

Giulia De Lucia, *Thales Alenia Space - Italy*

Salvatore Corvo, *Thales Alenia Space - Italy*

Flavio Rossi, *Wiser S.r.l. - Italy*

Marco Della Maggiora, *Wiser S.r.l. - Italy*

Marco Luise, *Wiser S.r.l. - Italy*

Ottavio Picchi, *Wiser S.r.l. - Italy*

15:15 - 16:30

Virtual Platform

Session: **Ka 09 - HTS Systems and Technology**

Chair: **Peter Garland**, *MDA (retired), Canada*

FRACTIONATED SATELLITES: A NEW WAY TO FEED ULTRA HIGH THROUGHPUT SATELLITES (#17)

Jean-Didier Gayraud, *Thales Alenia Space - France*

CURRENT DEVELOPMENT OF Ka-BAND DIGITAL BEAM FORMING TECHNOLOGY FOR THE HIGH THROUGHPUT SATELLITE COMMUNICATIONS SYSTEM (#175)

Eiichi Sakai, *Mitsubishi Electric Co. - Japan*

Research Activity on Flexible and Efficient HTS Communications System aiming Verification by Engineering Test Satellite 9 (#114)

Amane Miura, *NICT - Japan*

13:30 - 15:00

Virtual Platform

Session: **IC 09 - Advanced Communication Payloads and System Architectures**

Chair: **Marc Bjorkman**, *Lockheed Martin, USA*

Non-orthogonal transmission under flexible illumination patterns for advanced satellite payloads (#134)

Tomás Ramirez, *atlanTTic Research Center - Spain*
Carlos Mosquera, *atlanTTic Research Center - Spain*
Nader Alagha, *ESTEC European Space Agency Technical Res - The Netherlands*

An Error Tolerant Digital Payload Applying Stochastic Computing for Software Defined Satellite (#84)
Yasutaka Yamashita, *Mitsubishi Electric Corporation - Japan*

DEVELOPMENT OF ON-BOARD ENGINEERING MODEL FOR 920-MHz EARTH SENSING PLATFORM VIA LEO SATELLITE UTILIZING FEEDER-LINK MIMO TECHNOLOGY (#101)
Fumihito Yamashita, *NTT – Japan*

15:00 - 15:15 - Break time

15:15 - 16:30

Virtual Platform

Session: **Ka 10 - Special Topics**

Co-Chairs: **Arduino Patacchini**, ARPASAT – France and **Barry Evans**, University of Surrey - United Kingdom

A Study on Shadowing Effects of Vehicle Earth Station -Shadowing characteristics in urban areas due to difference of geostationary satellite orbit- (#136)
Byeongpyo Jeong, *National Institute of Information and Communications Technology - Japan*

COMPARISON AMONG ORBITAL CONSTELLATION FOR A GLOBAL LUNAR SATELLITE NAVIGATION SYSTEM (#166)
Jacopo Capoliccio, *Thales Alenia Space Italia – Italy*
Massimo Eleuteri, *Thales Alenia Space Italia – Italy*

CAPACITY LEVEL SIMULATOR FOR NGSO SATELLITE CONSTELLATIONS (#117)
Janne Kurjenniemi, *Magister Solutions - Finland*
Tuukka Varjus, *Magister Solutions - Finland*
Mikko Majamaa, *Magister Solutions - Finland*

MISSION ANALYSIS AND DESIGN ASPECTS FOR FUTURE LUNAR EXPLORATION SERVICES (#168)
Giuseppe Tomasicchio, *Telespazio - Italy*
Carlo Albanese, *Telespazio - Italy*
Luca Spazzacampagna, *Telespazio - Italy*
Michèle Lavagna, *Politecnico di Milano - Italy*
Giovanni Zanotti, *Politecnico di Milano - Italy*
Andrea Pasquale, *Politecnico di Milano - Italy*
Jacopo Prinetto, *Politecnico di Milano - Italy*
Michele Ceresoli, *Politecnico di Milano – Italy*

15:15 - 16:30

Virtual Platform

Session: **IC 10 - Satellite Systems Protocols and Performance Analysis 2**

Co-Chairs: **Carlos Mosquera**, University of Vigo, Spain and **Alessandro Le Pera**, Eutelsat, France

Performance Evaluation of Markov Modelled Land Mobile Satellite Channel with DVB-S2X Superframing (#50)

Burak UNAL, *University of South Wales - United Kingdom*
Abdulkareem Karasuwa, *University of South Wales - UK*
Nicholas Avlonitis, *University of South Wales - UK*
Pansoo Kim, *Electronics and Telecommunications Research - Korea*
Ifiok Otung, *University of South Wales - UK*

Variable-Coded Modulation and Error-Free Transmission Algorithms for an Exploratory In-Orbit Verification of an E-Band (71-76 GHz) Satellite Link (#150)

Laura Manoliu, *University of Stuttgart - Germany*
Shefali Kumari, *University of Stuttgart – Institute of R - Germany*
Ingmar Kallfass, *University of Stuttgart – Institute of R - Germany*

Joint Frequency Scheduling and Power Allocation for CubeSat Communication (#107)
Wenkai Zhang, *University of California, Irvine - United States*

MACHINE LEARNING BASED ENCRYPTED TRAFFIC CLASSIFICATION USING ESTIMATED APPLICATION LAYER STATISTICS (#85)

Sriram Vasudevan, *Hughes Network Systems - United States*
Kaustubh Jain, *Hughes Network Systems - United States*
Chi-Jiun Su, *Hughes Network Systems - United States*

A SPACE-BASED HEALTHCARE EMERGENCY MANAGEMENT SYSTEM FOR EPIDEMICS MONITORING AND RESPONSE (#82)

Giuseppe Tomasicchio, *Telespazio - Italy*
Antonio Ceccarelli, *Telespazio - Italy*
Alessandra Ceccarelli, *Telespazio - Italy*
Alessia De Matteis, *Telespazio – Italy*
Luca Spazzacampagna, *Telespazio - Italy*

13:30 - 15:00

Virtual Platform

Session: **Ka 11 - Q&V Band Systems & Technology**
Chair: **Tommaso Rossi**, *University of Rome Tor Vergata - Italy*

EXPERIMENTATION OF Q/V-BAND GROUND SEGMENT TECHNOLOGIES IN THE FRAMEWORK OF THE H2020 PROJECT Q/V-LIFT (#49)

Giorgia Parca, *Italian Space Agency – Italy*

V/Q-band Double Conversion Receiver (#116)

Toshiyuki Murakami, *NEC Space Technologies, Ltd. - Japan*

HIGH POWER TRANSMITTERS FOR Q/V-BAND COMMUNICATIONS- ADVANCES BEYOND ALPHASAT TDP5 (#127)

Naresh Deo, *Visionary Solutions - United States*

Global Survey of Q/V Band Technology for Space Applications (#154)

Bruce Elbert, *Application Technology Strategy, LLC - United States*

15:15 - 16:30

Virtual Platform

Session: **IC 11 - Interference Mitigation and RF Propagation Issues**
Co-Chairs: **Nader Alagha**, *ESA, The Netherlands* and **Giuseppe Codispoti**, *Italian Space Agency, Italy*

On-board Detection, Localization, and Mitigation of Radio Frequency Interference (#167)

Hugues Vasseur, *Antwerp Space - Belgium*

Experimental Study of External Interference Mitigation for LEO Based Sensing (AIS) (#48)

Daichi Hirahara, *Japan Aerospace Exploration Agency - Japan*

Measurements of Tree Attenuation by Seasonal Change of Vegetation Using Two Different Elevation Angle Satellite for Ka-band Mobile Satellite Communication (#133)

Tomoshige Kan, *National Institute of Information and Communications Technology - Japan*

Gateway Site Diversity Statistics for EHF Band Satellite Systems (#171)

Barry Evans, *University of Surrey - United Kingdom*
Adegbeng Awoseyila, *University of Surrey - United Kingdom*
K'ufre-Mfon Ekerete, *University of Surrey - United Kingdom*

15:15 - 16:30

Virtual Platform

Session: **Ka 12 - Earth Observation**

Chair: **Pietro Milillo**, University of California Irvine - USA

Next-Generation High Data Rate Downlink Subsystems based on a Variable Coding and Modulation for Earth Observation Satellites (#113)

Mitsuhiro Nakadai, Japan Aerospace Exploration Agency - Japan

Chihaya Kato, Japan Aerospace Exploration Agency - Japan

Masanobu Yajima, Japan Aerospace Exploration Agency - Japan

Jin Miyazawa, Mitsubishi Electric Corporation - Japan

Tsuyoshi Sasaki, Mitsubishi Electric Corporation - Japan

Michiya Hayama, Mitsubishi Electric Corporation - Japan

EARTH OBSERVATION MISSIONS: LINK MODELLING METHOD FOR DUAL POLARIZATION TRANSMISSION SYSTEMS (#104)

Silvio Fenu, Thales Alenia Space Italia - Italy

Flaviano Bagolini, Thales Alenia Space Italia - Italy

Rita Roscigno, Thales Alenia Space Italia - Italy

Alessandro Bicchieri, Thales Alenia Space Italia - Italy

Edoardo Rondoni, Thales Alenia Space Italia - Italy

Sebastiano D'Amico, Thales Alenia Space Italia - Italy

EVOLUTION OF ESA K BAND CAPABILITIES ON POLAR REGIONS FOR THE SUPPORT OF EARTH OBSERVATION MISSIONS (#37)

Salvador Marti, ESA - Germany

Guillermo Lorenzo, ESA - Germany

Filippo Concaro, ESA - Germany

Felix Flentge, ESA - Germany

Luca Milani, ESA - Germany

Optimal Philippines Small Remote Sensing Satellite Design (#129)

Pablito Yra, SSL Distinguished Engineer - United States

Higher Level Diversity for Laser Satellite Communication (#102)

Paul Christopher, PFC Associates - United States

15:15 - 16:30

Virtual Platform

Session: **IC 12 - New Satellite System Components**

Co-Chairs: **Rajeev Gopal**, Hughes, USA and **Daniel Gratton**, Canadian Space Agency, Canada

Development and Demonstration of a Wideband RF User Terminal for Roaming between Ka-band Relay Satellite Networks (#160)

Marie Piasecki, NASA Glenn Research Center - United States

Microwave Power Modules (MPMs) in Space (#128)

Allen Katz, LTI/LST/LP - United States

Roger Dorval, Linearizer Technology Inc. - United States

Robert Gray, Linearizer Technology Inc. - United States

Christopher Tenev, Linearizer Technology Inc. - United States

A localized spaceborne camera for nano- and micro-satellite platforms (#158)

Paul Leonard Atchong Hilario, National Institute of Physics - Philippines

Daryll Jessica Occeña, National Institute of Physics - Philippines

Rogie Bernabe, National Institute of Physics - Philippines

Jholeeh Charls Madalipay, National Institute of Physics - Philippines

Micah Jibril Alampay, National Institute of Physics - Philippines

Anjon Hernandez, National Institute of Physics - Philippines

Maricor Soriano, *National Institute of Physics - Philippines*

Development of an Airborne Hyperspectral Scanning Camera System For Agricultural Missions (#138)

Mara Alain Maestro, *University of the Philippines Diliman - Philippines*

16:30 – 16:45 - *Break time*

16:45 – 17:30

Virtual Platform

Closing Session:

- **Best Paper Awards**, by **Ifiok Otung**, ICSSC Conference Technical Chair
- **Closing & Adjournment**, by **Franco Marconicchio**, Ka Conference Co-Chair