



Connecting Worlds:

IEEE's Role in Engaging Academia and Industry and
Developing Non-Terrestrial Networks



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2023 IEEE president & CEO, Joseph Loring professor
at Virginia Tech.

Space-Enabled Sustainability on Earth

Keeping space sustainable while connecting
every corner of the planet



NTN has crossed from standards work into commercial scale



The executive question is no longer “if.” It is how to make integration repeatable.

The opportunity is not satellite alone—it is one hybrid service fabric



A single customer promise requires cross-layer mobility, identity, security, spectrum and operations



Four executive value pillars justify coordinated investment now

Reach

Extend service beyond economical
terrestrial coverage

Resilience

Maintain critical communication
when ground networks fail



Continuity

Create one service experience across
terrestrial and satellite domains

Asset Intelligence

Connect remote equipment with
standards-based IoT

Value materializes only when standards, test evidence, devices, spectrum and operating models move together.

Six cross-domain gaps still block repeatable deployment

Engineering Gaps

Mobility

Fast topology changes, delay and compensation must work together

Spectrum

D2D growth raises interference, which needs regulatory coordination

Hardware

Link budgets, antennas, RedCap and battery life constrain experience

Operating Gaps

Interoperability

Proprietary paths must provide converge toward repeatable multi-vendor behavior

Security & Resilience

Identity, routing, on-board processing and recovery span domains.

Economics & Operation

Service assurance, roaming, SLAs and liability remain fragmented.

These gaps cross corporate and disciplinary boundaries—exactly where neutral coordination creates leverage.

The missing capability is a neutral translation layer across research, standards and products



Answering those questions determines readiness, and it can only be ascertained through a direct dialog between industry and academia

Attract student talent to achieve a connected earth and sustainable space

CST wants them to



We want students to participate and believe that they are part of the solution

Research competitions are one important means to bridge
the two sides

Is the idea:



Answering those questions determines readiness, and it can only be ascertained through a direct dialog

CST- IEEE research competition is a great platform



CST-IEEE

Global research competition
on Non-Terrestrial Networks

The competition is a platform for idea exposure and academia-industry dialog

The competition connects academics, professionals, and policymakers

The global research competition on
Non-Terrestrial Networks (NTN)

2022

2nd Edition (NTN'22)

28

Submitted papers

Third Winner
5,000 USD

2024

2nd Edition (NTN'24)

60

Submitted papers

First Winner
15,000 USD

2026

3rd Edition (NTN'26)

81

Submitted papers

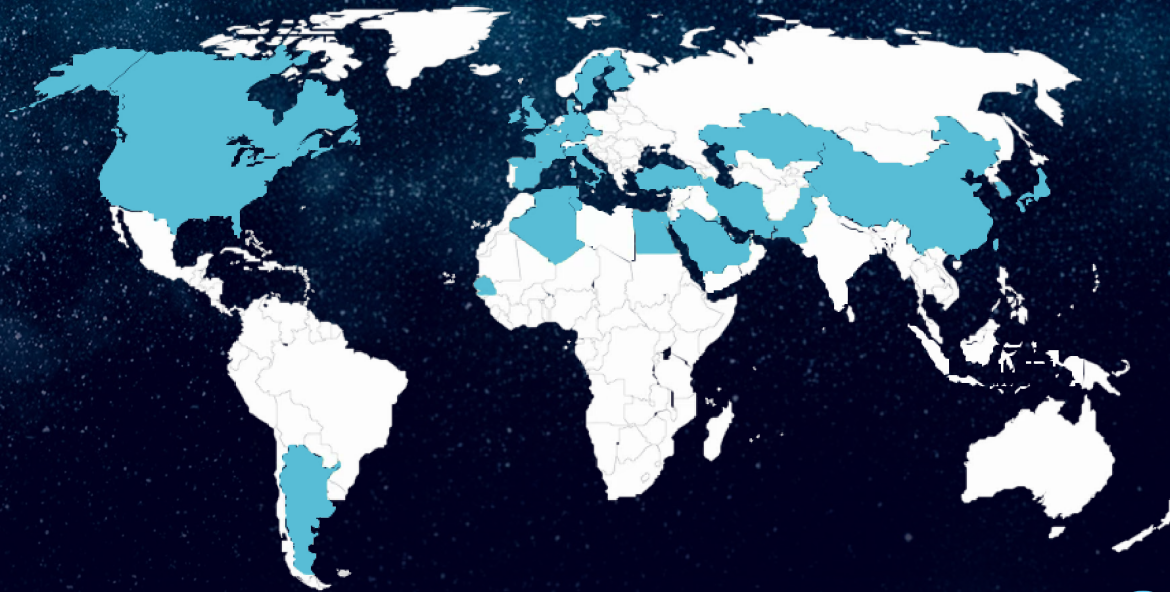
Second Winner
10,000 USD

Contributions from around the globe

More than 280 competition participants in NTN'26



Imperial College
London



Competition Top 10 Finalists

Commercial Aircraft as Sustainable
Relays for Satellite Direct-to-Device
Access

Alessandro Traspadini; Marco Giordani;
Tommaso Melodia; Michele Zorzi



When Every Cell Must Speak:
Signaling-Aware Beam Hopping in
LEO Satellite Networks

Siva Satya Sri Ganesh Seeram; Mustafa Ozger;
Cicek Cavdar



Affordable Connectivity from the
Skies: A Subsidy-Aware Pricing
Framework for Satellite Services
Under Public Budget Constraints

Manobendu Sarker; Gunes Karabulut Kurt;
Wael Jaafar



Transmit Less, Deliver More: Frugal
on-Device Intelligence for Energy-
and Spectrum-Sustainable Direct-to-
Satellite IoT

Alexander Y. Choquenaira-Florez; Herve
Rivano; Juan A. Fraire



Quantum-Safe Satellite Backhaul for
the Unconnected: Post-Quantum
IPsec over a GEO Link in a Private 5G
Network

Mudhar Bin Rabieah; Adnan Alghammas;
Nouf Alsedairy; Mufeb Abdulrahman
Alsaqhan; Ahmed Alsubaihy; Hazim Alsallumi;
Hatim Alhazmi; Abdullah Aljuffri; Yasser M
Seddiq; Saleh A. Almarshed



Mostly Asleep: How Much of an
Orbital Data Centre Needs to Be
Awake?

Camilo Jose Rojas; Juan A. Fraire; Fabio
Patrone; Nour Badini; Mario Marchese



Sustainable Urban HAP
Communications Through
Geometry-Aware Fluid Antennas

Daniel Dinis; Islam Mohammad Tanash; Risto
Wichman



AI-Enabled Multi-Layer NTN for
Rapid Target Acquisition in Desert
Search and Rescue

Abdullah Abu Zaid; Baha Eddine Youcef
Belmekki; Mohamed-Slim Alouini



EQROC: Hierarchical Reinforcement
Learning for Energy- and QoE-Aware
Satellite Resource Orchestration

Dhiraj Bhattacharjee; Pablo Madoery; Halim
Yanikomeroglu



Are HAPS Suitable for Next
Generation URLLC Services?

Hadj Ahmed Chikh Dahmane; Mukhtiar
Ahmad; Mohamed-Slim Alouini



Technical committee of the competition

Competition Chairs

CST هيئة الاتصالات والفضاء والتقنية
Communications, Space & Technology Commission

Dr. Muhammad Alrabeiah
Advisor, CST

POLYTECHNIQUE MONTREAL

Dr. Gunes Karabulut-Kurt
Professor, Polytechnique Montréal and
Chair of IEEE ComSoc SSC

UNIVERSITÀ DI SIENA
1240

Dr. Giovanni Giambene
Assoc. prof., University of Siena and Vice-
Chair of IEEE ComSoc SSC

Technical committee members

40
Committee
members

KAIST

Dr. Jihwan P. Choi

ORTA DOĞU TEKNİK ÜNİVERSİTESİ
MIDDLE EAST TECHNICAL UNIVERSITY

Dr. Melda Yuksel

Maynooth University
National University of Ireland Maynooth

Dr. Mustafa Kishk

The University of Texas at Austin
Chandra Department of Electrical
and Computer Engineering
Cockrell School of Engineering

Dr. Jeffery Andrews

ETS

Dr. Wael Jaafar

جامعة الملك سعود
King Saud University

Dr. Paresh Saxena

جامعة الملك سعود
King Saud University

Dr. Saleh A. Alshebeili

SOUTHEAST UNIVERSITY

Dr. Li You

JRC
EUROPEAN COMMISSION

Dr. Manlio Bacco

**To Name
some...**



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