

The *ITU Journal on Future and Evolving Technologies (ITU J-FET)* is an international journal providing complete coverage of all communications and networking paradigms, free of charge for both readers and authors. The ITU Journal considers yet-to-be-published papers addressing fundamental and applied research. It shares new techniques and concepts, analyses and tutorials, as well as learning from experiments and physical and simulated testbeds. It also discusses the implications of the latest research results for policy and regulation, legal frameworks, the economy and society. This publication builds bridges between disciplines, connects theory with application, and stimulates international dialogue. Its interdisciplinary approach reflects ITU's comprehensive field of interest and explores the convergence of ICT with other disciplines. The ITU Journal welcomes submissions at any time, and on any topic within its scope.



Special issue on

## Satellite constellations and connectivity from space

### Call for papers

The development of 6G technology is undergoing an important paradigm shift with the introduction of ubiquitous connectivity from space and the integration of terrestrial networks with non-geostationary satellite constellations. There is a growing industry interest in Low Earth Orbit (LEO) satellite communications systems as these future satellite networks are expected to consist of multiple network layers with varying degrees of heterogeneity. The layers will range from highly-mobile LEO communications satellites to those located at the geostationary orbit.

The high mobility in the space segment of these envisaged space-terrestrial integrated networks results in rapidly varying network topology. This special issue invites contributions on the development of new adaptive and robust communications strategies (from physical to the application layer) to fully realize the potential offered by satellite constellations.

#### Keywords

Satellite constellations, high-throughput satellites, terrestrial-space integrated networks, orbital edge computing, Internet of Things over satellites

#### Suggested topics (but not limited to):

##### New physical layer for satellite constellation networks

- Radio resource allocation
- Beam management
- Interference coordination
- Modulation and waveform design
- Channel characteristics and measurements
- Massive MIMO from space
- Inter-satellite communications
- Capacity and coverage

<b>Medium Access Control (MAC) layer and routing</b>	<ul style="list-style-type: none"> <li>• Random access for satellite constellations</li> <li>• Spectrum sharing</li> <li>• End-to-end data routing over satellite networks</li> <li>• Satellite association rules</li> </ul>
<b>Transport layer and congestion control</b>	<ul style="list-style-type: none"> <li>• Effect of satellite mobility on legacy congestion control algorithms</li> <li>• Traffic engineering and load balancing</li> <li>• New Transmission Control Protocol (TCP) for satellite constellations</li> </ul>
<b>Internet of Things (IoT), orbital edge computing and Artificial Intelligence (AI) in space</b>	<ul style="list-style-type: none"> <li>• Remote IoT over satellites</li> <li>• Edge computing on satellites</li> <li>• Applications of AI for satellite constellation design and management</li> </ul>
<b>New analytical and simulation models for performance analysis</b>	<ul style="list-style-type: none"> <li>• Stochastic-geometry models for satellite constellations</li> <li>• Game theory and utility optimization for satellite networks</li> <li>• Simulation models and platforms for satellite constellations</li> </ul>
<b>Standards and space-terrestrial integrated networks</b>	<ul style="list-style-type: none"> <li>• New standards for spectrum sharing</li> <li>• Integration with terrestrial 5G networks and other existing satellite systems</li> <li>• Integration of low-altitude flying network infrastructure with Low Earth Orbit (LEO)/ Medium Earth Orbit (MEO)/ Geostationary Equatorial Orbit (GEO) satellites</li> <li>• Unmanned Aerial Vehicle (UAV)-assisted satellite networking</li> <li>• Virtualization and software-defined networking</li> </ul>

### Deadlines extended

Paper submission: **31 October 2023**

Paper acceptance notification: 19 January 2024

Camera-ready paper submission: 4 March 2024

### Paper submission

This special issue calls for original scientific papers. Submitted papers should not be under consideration for publication elsewhere.

Submissions must be made electronically using EDAS: Editor's Assistant at:

<https://edas.info/N31163>. Templates and

guidelines can be found at:

<https://www.itu.int/en/journal/j-fet/Pages/submission-guidelines.aspx>

### Publication

Papers will be published in the ITU digital library.

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