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IEEE Internet of Things Journal

Special Issue on In-Orbit Internet of Things for Autonomous Satellite Systems and Applications

Emerging satellite missions, including Earth and space observation, autonomous on-orbit operations, and swarm operations, increasingly require multiple spacecraft to coordinate sensing, processing, and decision-making. Meeting these requirements calls for interconnected onboard subsystems and spacecraft that can exchange information and coordinate their capabilities and resources toward shared mission objectives. The In-Orbit Internet of Things (In-Orbit IoT) provides a framework for organizing these interactions within and across spacecraft, integrating sensing, computing, communication, energy, and control to support collaborative and autonomous mission execution directly in orbit. However, In-Orbit IoT faces distinctive challenges, including dynamic topologies, intermittent connectivity, time-varying energy availability, and constrained onboard processing and downlink capacity. These constraints make adaptive coordination among sensing, computing, networking, and energy essential for timely and reliable mission execution. Despite progress in satellite communications, satellite-enabled IoT, and in-orbit computing, the joint design and operation of interconnected orbital things for distributed mission execution remain insufficiently explored. This Special Issue invites contributions on In-Orbit IoT architectures, enabling technologies, intelligent operation, and experimental systems. Relevant topics include, but are not limited to:

- Architectures, system models, and hierarchical networking for In-Orbit IoT
- In-Orbit IoT for Earth and space observation and autonomous on-orbit operations
- Mission-aware sensing and adaptive payload operation
- Onboard intelligence, in-orbit computing, and foundation models for satellite missions
- Distributed computing, collaborative inference, and autonomous decision-making across orbital things
- High-capacity inter-satellite links, routing, and topology management for In-Orbit IoT
- Task-oriented and semantic communications among orbital things
- Information freshness and value-aware data management in In-Orbit IoT
- Joint sensing, computing, networking, and energy orchestration for In-Orbit IoT
- Security, trust, privacy, and resilient operation of interconnected orbital things
- Prototypes, testbeds, and in-orbit mission demonstrations

Important Dates

- Submission Deadline: June 15th, 2027
- First Review Due: August 15th, 2027
- Revision Due: October 15th, 2027
- Second Reviews Due/Notification: November 15th, 2027
- Final Manuscript Due: December 15th, 2027
- Publication Date: February 2028

Submission

All original manuscripts or revisions to the IEEE IoT Journal must be submitted electronically through IEEE Manuscript Central, http://mc.manuscriptcentral.com/iot. When the authors reach the Article Type step in the submission process, they should select SI: In-Orbit Internet of Things for Autonomous Satellite Systems and Applications. Submitted original manuscripts must not be currently under consideration for publication in other venues. Author guidelines and submission information can be found at http://ieee-iotj.org/guidelines-for-authors/.

The original manuscripts to be submitted need to follow the guidelines at: https://ieee-iotj.org/wp-content/uploads/2025/02/IEEE-IoTJ-Author-Guidelines.pdf, which should not be concurrently submitted for publication in other venues. Authors should submit their manuscripts through the IEEE Author Portal at: https://ieee.atyponrex.com/journal/iot. The authors must select as "Special Issue on In-Orbit Internet of Things for Autonomous Satellite Systems and Applications" when they reach the "Article Type" step in the submission process.

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