Call for Papers

Special Issue on Task-oriented and AI-native Semantic Communication

IEEE VEHICULAR TECHNOLOGY Magazine
Connecting the Mobile World

Important Dates

Manuscript Submission by:	**29 August 2026**
First Round Reviews by:	**30 November 2026**
Second Round Submissions by:	**15 January 2027**
Second Round Reviews / Editorial Decision:	**15 February 2027**

Publication: June 2027

Future communication systems are evolving from bit-pipe connectivity toward intelligent, goal-driven infrastructures that support autonomous agents, Physical AI, connected mobility, digital twins, and distributed decision-making. In such systems, the objective is no longer simply to reproduce source data accurately, but to effectively enable downstream tasks such as perception, inference, control, planning, and human-AI interaction. Semantic communication has emerged as a promising paradigm for transmitting meaning, intent, and task-relevant information. However, many existing studies still treat semantic communication as an extension of conventional communication systems, focusing on semantic compression, reconstruction quality, or isolated AI-enabled transceiver designs. A more fundamental transformation is needed in which future networks become task-oriented and AI-native through the joint design of communication, computation, sensing, learning, and control around end-to-end task effectiveness, adaptability, trustworthiness, and resource efficiency. This Special Issue seeks tutorial, survey, visionary, and high-quality technical articles advancing the foundations, architectures, and practical deployment of task-oriented and AI-native semantic communication for future wireless and mobile networks. The issue welcomes contributions beyond vehicular systems and encourages perspectives relevant to mobile radio, intelligent transportation, connected autonomy, Physical AI, and edge intelligence.

The research topics suitable for this special issue include, but are not limited to:

- Foundations of task-oriented semantic communication for future wireless and mobile networks
- AI-native semantic communication architectures across device, edge, cloud, and radio access layers
- Token-level and context-level communication for LLMs, multimodal foundation models, and AI agents
- Semantic compression, synchronization, and transfer of task context, memory, knowledge, and KV cache
- Semantic metrics for inference, control, planning, coordination, and decision-making tasks
- Joint communication, computation, sensing, learning, and control for semantic systems
- Task-oriented semantic communication for Physical AI, embodied agents, UAVs, and autonomous vehicles
- Communication of intent, perception, plans, world models, task memory, and control context for Physical AI systems
- Semantic communication for autonomous agents, connected robotics, intelligent mobility, and cooperative autonomy
- Semantic-native protocol design, cross-layer optimization, and network orchestration
- Foundation models, LLMs, and world models for semantic communication
- Multi-agent semantic communication, collaborative intelligence, intent sharing, and goal negotiation
- Goal-aware and context-aware resource allocation for semantic and task-oriented networks
- AI-native edge intelligence, cooperative learning, and split inference over semantic links
- Semantic communication for connected vehicles, V2X, UAVs, low-altitude networks, and mobile autonomy
- Semantic communication for digital twins, XR, industrial automation, and smart-city mobility services
- Robustness, generalization, uncertainty, and distribution shift in semantic communication systems
- Trustworthy, explainable, private, and secure task-oriented semantic communication
- Semantic interoperability, knowledge representation, and shared context across heterogeneous agents
- Benchmarking, datasets, testbeds, prototypes, and reproducible evaluation methodologies
- Standardization, deployment challenges, and migration paths toward semantic-native future networks
- Energy-efficient and sustainable semantic communication for resource-constrained systems

Submission Guidelines

All manuscripts should present state-of-the-art materials in a tutorial or survey style, adhering to the IEEE Vehicular Technology Magazine (VTM) guidelines. All manuscripts to be considered for publication must be submitted by the deadline through the magazine's IEEE Author Portal submission site.

Guest Editors

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