



CALL FOR PAPERS

IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing

Special Issue on

“Generalist–Specialist Model Synergy for Remote Sensing: Theories, Methods, and Applications”

The emergence of Foundation Models (FMs)—including Vision Foundation Models (VFM), Vision-Language Models (VLMs), Large Language Models (LLMs), and Multimodal Large Language Models (MLLMs)—has fundamentally reshaped the landscape of Artificial Intelligence in remote sensing. These generalist models exhibit remarkable zero-shot transfer capabilities and generalization across diverse Earth Observation (EO) tasks, from land cover classification to disaster monitoring. However, their deployment in remote sensing systems faces persistent challenges: prohibitive computational costs, limited fine-grained spatial reasoning ability in geospatial contexts, poor adaptation to domain-specific modalities (e.g., hyperspectral, SAR, LiDAR), and lack of interpretability in high-stakes decision-making scenarios. Concurrently, lightweight specialist models—trained for specific tasks, sensors, or geographic regions—offer high efficiency and precision but lack the versatility to handle diverse or unseen scenarios. Rather than treating these two paradigms as competing, this Special Issue advances a novel paradigm: Generalist–Specialist Synergy (GSS) for next-generation remote sensing intelligence.

This special issue solicits contributions that design, analyze, or benchmark generalist–specialist collaborative systems for EO tasks. We particularly encourage works that tackle multimodal data fusion (optical, SAR, hyperspectral, LiDAR), cross-sensor and cross-region generalization, and real-world operational constraints such as limited labels or dynamic environments, with applications spanning precision agriculture, disaster response, urban planning, climate monitoring, etc.

The broad topics include (but are not limited to):

- Generalist–specialist model synergistic architectures for multimodal remote sensing tasks
- Knowledge distillation and lightweight extraction from foundation models to task-specific models
- Mixture-of-experts (MoE) and modality-aware pruning for efficient deployment in resource-constrained scenarios
- Edge–cloud collaborative intelligence with on-device specialists and cloud-based generalists in remote sensing
- Few-shot and zero-shot adaptation of generalist foundation models to specialist tasks in geospatial analysis
- Multi-agent systems and role-specialized AI collaboration for complex geospatial problems
- Domain generalization and cross-sensor transfer via specialist ensemble routing
- Benchmarking frameworks and evaluations for generalist–specialist synergy in remote sensing
- Real-world case studies of generalist–specialist model collaboration in precision agriculture, disaster response, urban monitoring, and climate applications

Schedule

30 Aug 2026 Submission system opening

31 May 2027 Submission system closing

Format

All submissions will be peer reviewed according to the IEEE Geoscience and Remote Sensing Society guidelines. Submitted articles should not have been published or be under review elsewhere. Submit your manuscript on <http://mc.manuscriptcentral.com/jstars>, using the Manuscript Central interface and select the “Generalist–Specialist Model Synergy for Remote Sensing: Theories, Methods, and Applications” manuscript type. Prospective authors should consult the site <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9082768> for guidelines and information on submission. All submissions must be formatted using the IEEE standard format (double column, single spaced). Please visit http://www.ieee.org/publications_standards/publications/authors/author_templates.html to download a template for transactions. Please note that since Jan. 1, 2025, IEEE J-STARS, as a fully open-access journal, is charging a flat publication fee \$1,800 per paper.

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