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IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing
Special Issue on "AI-driven Remote Sensing Image Compression for Human and Machine Intelligence"

The rapid expansion of Earth Observation (EO) systems has led to unprecedented growth in the volume, resolution, and diversity of remote sensing imagery, creating significant challenges for efficient storage, transmission, and processing. At the same time, remote sensing applications are increasingly shifting from traditional human-centered visual interpretation toward AI-driven analysis pipelines, where machine learning models automatically extract information for downstream tasks. These trends call for next-generation remote sensing image compression frameworks that can efficiently support both human interpretation and machine intelligence.

Recent advances in artificial intelligence, have enabled the development of learning-based image compression methods with substantially improved rate–distortion performance and representation capability compared with conventional codecs. However, remote sensing imagery presents unique challenges due to its extremely high spatial resolution, large data volume, multi-band spectral characteristics, and rich semantic content. Moreover, modern EO systems require compression methods that not only preserve perceptual quality for human analysts, but also maintain task-relevant information for downstream machine analysis. In this emerging paradigm, quality assessment becomes an essential component of compression design, guiding optimization objectives and evaluation criteria through perception-aware and task-aware metrics.

This Special Issue aims to provide a dedicated forum for recent advances in AI-driven remote sensing image compression, with particular emphasis on task-oriented and perception-aware compression frameworks designed for both human interpretation and machine intelligence. Original contributions from remote sensing, image compression, multimedia signal processing, computer vision, and machine learning communities are highly encouraged.

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

- Task-oriented compression for downstream machine vision tasks
- Perception-oriented remote sensing image compression
- Remote sensing image compression for human interpretation and machine analysis
- Compression-aware remote sensing interpretation and compressed-domain analysis
- Scalable and adaptive compression for large-scale Earth observation data
- Semantic-aware and region-of-interest remote sensing image compression
- Quality assessment for compressed remote sensing imagery
- Perception-aware and task-aware quality metrics
- Onboard, edge, and real-time compression for emerging EO systems
- Benchmark datasets and evaluation protocols for remote sensing compression

Schedule

01 December 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 "**AI-driven Remote Sensing Image Compression for Human and Machine Intelligence**" special issue manuscript type. Prospective authors should consult the site https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9082768 for guidelines and information on paper 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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