

CALL FOR PAPERS: IEEE Journal on Selected Topics in Signal Processing Special Issue on Signal and Information Processing for Critical Infrastructures

Aims and Scope

Critical infrastructures such as the smart electric power grid, gas and water utility networks, transportation networks, and communication networks are crucially supporting the quality of life and economic growth. Future critical infrastructures are envisioned to integrate sensory data acquisition, communication and computation technologies, and signal processing to offer improved services to their end-users. Such an integration promises to have profound effects in improving societal welfare by enabling more efficient, open, consumer-centric, environmentally-friendly and resilient modern critical infrastructures. Thus, the design mantra for the evolution of critical infrastructures can be described, in part, as *knowledge is power*. Hence, at the heart of many technological challenges underlying the vision of evolved critical infrastructures is the need for signal and information processing. For instance, new problems in smart power grids require the use of distributed signal processing and big data analytics to process continuous streams of information from a variety of sources including phasor measurement units, smart meters, smart building sensors, and electric vehicle systems. Moreover, the increased penetration of renewable sources, distributed storage, controllable loads such as plug-in electric vehicles, calls for novel optimal resource management methods that provide security and privacy while yielding system-wide benefits. The relationship of smart grid systems to related critical infrastructures such as transportation and water must be addressed from both cyber and physical perspectives. Classical signal and information processing problems are thus adapting to support dynamic system requirements and complex infrastructure dependencies with evolving characteristics.

This special issue of IEEE J-STSP will showcase the research from the signal and information processing community that is providing leadership in advancing the design, analysis, optimization, and operation of critical infrastructures. Particularly of interest to this special issue will be novel multidisciplinary signal processing approaches at the nexus of big data analytics, control, game theory, and machine learning.

Topics of interest in the special issue include (but are not limited to):

- Optimal network flow problems and extensions
- Information processing for security and resilience
- Online optimization for resource management in critical infrastructures
- Robust and stochastic optimization methods for uncertain supply and demand
- Stochastic optimal control for dynamic pricing
- Topology identification
- Component placement & optimal infrastructure expansion planning
- Information processing for optimizing coupled infrastructures
- Demand forecasting and demand response
- State estimation in critical infrastructures
- Unit commitment and generator scheduling
- Infrastructure system dynamics and transient analysis
- Cyber-security of sensors and smart meters, including Phasor Measurement Units
- Energy theft detection and mitigation
- Energy management for efficient and carbon-neutral data centers
- Measurement-based infrastructure system analysis

Important Dates:

Manuscript submission due: October 1, 2017
First review completed: December 15, 2017
Revised manuscript due: February 1, 2018
Second review completed: April 15, 2018
Final manuscript due: June 1, 2018
Publication: August 2018

Prospective authors should visit <http://www.signalprocessingsociety.org/publications/periodicals/jstsp/> for submission information. Manuscripts should be submitted using ScholarOne (Manuscript Central) at <http://mc.manuscriptcentral.com/jstsp-ieee>.

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