

**Resilience of Complex Networks -  
Intelligent Simulation and Optimization to Stabilize Critical Infrastructures  
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**ABSTRACT**

Society depends decisively on the availability of critical infrastructures such as energy, telecommunication, transportation, banking and finance, health care and governmental and public administration. Even selective disruption of one of these infrastructures may result in disruptions of governmental, industrial or public functions. Vulnerability of infrastructures therefore offers spectacular leverage for natural disasters as well as criminal actions. Threats and risks are part of the technological, economical, and societal development. Increasing complexity of our critical infrastructures exacerbates consequences of natural and/or man-made disasters. Not only primary effects but also cascading effects as result of increasing dependencies and interdependencies of our technological and societal systems demand intelligent simulation and optimization techniques (AI) in the area of industrial informatics and a comprehensive safety and security management.

This talk gives an overview on the intelligent simulation and optimization of complex networks. New methods like predictive analytics, network analysis, system dynamics and artificial intelligence are presented to master such complex networks via modern command & control systems. It presents actual decision support approaches - in the area of modern transportation systems, energy networks and aviation management - via innovative sensor networks, network control and reachback architectures to support an adaptive information and smart management system. Actual heuristics and first computational results for special multilayered decision problems will be presented. We refer to the projects RIKOV, REHSTRAIN and MILAN.