

## Call for Papers

### Reliability Engineering & System Safety Special Issue on Resilience Engineering

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**Theme:** The concept of “resilience” has emerged in a variety of fields and the concept’s proliferation has resulted in many interpretations and perceptions. For example, the management literature refers to resilience of organizations, such as the ability of a firm to withstand difficult economic conditions. The psychology literature uses the term to refer to an individual’s ability to cope with adversity. The social sciences describe resilience as the ability of groups and communities to withstand challenges from nature such as Hurricane Katrina to tsunamis in the Sea of Japan and Indian Ocean, or to human-made disasters such as the Union Carbide gas tragedy in Bhopal and the Deepwater Horizon fire in the Gulf of Mexico.

Resilience has been described in the safety literature as “the intrinsic ability of a system to adjust its functioning prior to, during, or following changes and disturbances, so that it can sustain required operations under both expected and unexpected conditions.” Resilience Engineering develops theories, methods and tools to proactively manage the adaptive ability of organizations to function effectively and safely. Since its inception, the development of resilience engineering (RE) as a concept and a field of practice has made it clear that the scope must be expanded from being concerned with failure to include the acceptable everyday functioning of a system or an organization.

Nearly ten years have passed since the introduction of resilience engineering in safety science (see Woods, D "Creating Foresight: How Resilience Engineering Can Transform NASA’s Approach to Risky Decision Making", Testimony on *The Future of NASA* for Committee on Commerce, Science and Transportation, John McCain, Chair, October 29, 2003). While views on RE have been presented in symposia, international conferences e.g. Working on Safety and ESREL, five books and texts since then, there has been no deep discussion of the field in a peer-reviewed journal. This special issue will provide the scientific and industrial communities the opportunity to critically view RE’s progress and contributions to research and practice. It will also explore possible future paths in the development of Resilience Engineering.

**Scope:** The special issue highlights the Resilience Engineering agenda, its questions and specific work. It invites works from different disciplinary backgrounds that provides insights into complexity, safety and resilience. Many of these are areas where interaction among disciplines produces new kinds of work including systems engineering, cognitive ergonomics, system test and evaluation, and information processing concerns in systems, science of complex systems and organizations. This special issue aims to document specific kind of empirical and theoretical work that has been inspired by Resilience Engineering.

**Topics:** Submissions for the special issue are invited on all topics that are related to resilience engineering applications. These topics include, but are not limited to:

#### Theory

- Resilience Engineering capabilities and properties
- Models for complex socio-technical systems that take into account the operational context, interactions and interdependencies
- Adaptive systems and management of change

- Controls and feedback in adaptive systems
- System architectures and margins of maneuver

### **Methods**

- Making resilience concepts operational
- Approaches to visualize and foresee side effects of change
- Ways to model everyday operations of systems, trade-offs, and their implications that can be anticipated
- Ways to identify, monitor, and assess sources of brittleness, and resilience
- Approaches to reveal and to expand the adaptive capability of systems or organizations
- Ways to support analysis and implementation of resilience engineering concepts

### **Example Topics**

- Ecological models and other models that are relevant to systems and/or organizations
- Comparison/contrast between models and methods
- Complex adaptive systems
- Controls, feedback and feed forward
- Emergence, resilience, complexity, polycentric governance
- Design and operation of resilient systems
- Resilience Management

### **Applications in high stakes sectors**

- Nuclear power
- Transportation, including rail, highway, and maritime
- Defense
- National security
- Healthcare
- Aviation and Aerospace
- First responders
- Petrochemical

**Format:** Papers shall comply with Reliability Engineering & System Safety journal format requirements: <http://www.elsevier.com/journals/reliability-engineering-and-system-safety/0951-8320/guide-for-authors>

**Contact** For further information on the special issue, please contact Christopher Nemeth, PhD at [cnemeth@ara.com](mailto:cnemeth@ara.com).

### **Important dates:**

2013

- Nov-Dec      Announce and invite submissions

2014

- Jan-Mar      Receive submissions
- Apr            Complete reviews
- May            Make acceptance decisions
- June-July     Receive revisions
- August        Prepare issue for press

## Guest editors:

**Chief editor: Christopher Nemeth, PhD, CHFP**, is a Principal Scientist and Group Leader for Cognitive Systems Engineering at Cognitive Solutions Division of Applied Research Associates. Recent research interests include technical work in complex high stakes settings, research methods in individual and distributed cognition, and understanding how information technology erodes or enhances system resilience. He has served as a committee member of the National Academy of Sciences, is widely published in technical journals, and his books include *Human Factors Methods for Design* (Taylor and Francis/CRC Press), as well as Ashgate Publishing texts *Improving Healthcare Team Communication*, and *Resilience Engineering Perspectives Series Volume One-Remaining Sensitive to the Possibility of Failure* and *Volume Two-Preparation and Restoration*. Dr. Nemeth earned his PhD in human factors and ergonomics from the Union Institute and University in 2003, and an MS in product design from the Institute of Design at Illinois Institute of Technology in 1984. His design and human factors consulting practice and his corporate career have encompassed a variety of application areas, including health care, transportation and manufacturing. As a consultant, he has performed human factors analysis and product development, and served as an expert witness in litigation related to human performance. His 26-year academic career has included adjunct positions with Northwestern University's McCormick College of Engineering and Applied Sciences (Associate Professor), and Illinois Institute of Technology. He is a Fellow of the Design Research Society, a Senior Member of the Institute of Electrical and Electronic Engineers and Vice-President, Human-Machine Systems of the IEEE Systems, Man and Cybernetics Society. He retired from the Navy in 2001 at the rank of Captain after a 30-year active duty and reserve career.

**Dr. Ivonne A. Herrera** is a Senior Research Scientist at SINTEF Information and Communications Technology, Department of Software Engineering Safety and Security (Trondheim, Norway). She has degrees in electrical engineering (Colombia), Masters in Aeronautical maintenance and Production (France) and PhD in Resilience Engineering and Safety Management (Norway). Her recent research addresses the areas of performance monitoring and assessing design from a safety perspective. She has 20 years' experience in the industry regarding avionics engineering, maintenance, air traffic management and safety analyses for the oil and gas industry. Ivonne was invited by the Norwegian Accident Investigation Board as a core member for the evaluation of concurrent changes in the Norwegian aviation industry and its impact on airlines and helicopter operators. In the period 2008-2010, Ivonne participated in the Helicopter Safety Study III. For the oil and gas industry, Ivonne has been involved in risk analysis and HSE analyses, in some specific cases she travelled offshore to analyze work in context. Since 2004, she has been invited as an independent expert acting as an evaluator or reviewer of research activities for FP6 and FP7 by the European Commission. She is currently involved in the review of a large research project ACTUATION2015 contributing towards more electrical aircraft. In 2010, Ivonne has been invited as member of the expert panel for the 1st Interim Evaluation of Clean Sky Joint Undertaking (CSJU, a Public Private Partnership between the European Commission and the Aeronautical Industry). The CSJU focus on demonstrating innovative, environmentally-friendly technologies in all segments of civil air transport. Ivonne is currently working in the 2nd Interim Evaluation of Clean Sky. She is involved in Single European Sky ATM Research (SESAR) projects and acts as project coordinator for SESAR project such as Dynamic Risk Modeling and a long term innovative research project dealing with resilience potential for Air Traffic Management in case of system degradation (SCALES). She contributes to the FP7 initiative Avionics Systems Hosted on a distributed modular electronics Large scale demonstrator for multiple type of aircraft (ASHLEY). Ivonne is a member of the executive committee of Resilience Engineering Association. She has been invited as a reviewer for different journal such as Reliability Engineering and System Safety, International Journal of Applied Aviation Studies, Information and Software Technology and Theoretical Issues in Ergonomics Science.