

Risks of Smart Water Applications

Rigorous Risk Assessment of the Adoption of Smart Water Applications

Andreas Hauser^{1*}, Thomas Stoertkuhl², Klaus Estenfeld², E. Earl Eiland³

¹ TÜV SÜD Asia Pacific Pte Ltd, 3 Science Park Drive, Singapore 118223

(*correspondence: andreas.hauser@tuv-sud.sg; Tel: +65 9749 0269)

²TÜV SÜD AG, Westendstrasse 199, München, 80686, Germany

³TÜV SÜD America Inc., 5945 Cabot Parkway, Alpharetta, Georgia, 30005, United States

Note: Presenting authors are underlined.

FORMAT

30 minute presentation

KEYWORDS

Smart Water Applications, Risk Assessment, Industrial IT Security, Automation Systems, Water Distribution

ABSTRACT

Integration of technical processes into ICT (Information and Communication Technology) systems is continuing at full speed and is now impacting the water domain, a renowned long-term cycle industry.

In many regions around the globe, water scarcity is already affecting the development of economies. This large-scale challenge combined with the availability of technology and strong cost reduction pressure for operating and maintaining water related processes and assets, result in a strong driver for adopting new technologies for improving overall system efficiency and sustainability.

Investors, owners and operators of cost intensive water systems are challenged by high energy and maintenance costs, and not chargeable Non-Revenue Water. Data driven or Smart Water applications, such as pressure optimization, leak detection, optimized operation or pro-active asset management, are becoming increasingly interesting and economically relevant. However, new technologies with their potential benefits often lack a rigorous risk assessment, therefore resulting in a low market acceptance.

In order to foster the adoption of latest software and communication related technologies, the paper will present a general risk assessment framework of the deployment of Smart Water technologies with a special focus on Interoperability, Process Efficiency and Availability, Security and Standardization.

The paper will cover assessing financial, economic and technical risks. This will be followed by a more technical consideration of whole system smart water solutions and key individual components. The points considered will be illustrated in the operation of water distribution networks.

About the Authors:



Dr. Andreas Hauser: During his more than 13 years of experience in academic and industry research and technology development, he has been working in various fields, ranging from plasma simulation for switchgear development, development of robust thermal, membrane and bio-electrochemical water treatment technologies, and sensor systems. The main focus has been the development, investigation and assessment of data driven water solutions. He has published

papers and articles, and given presentations at various conferences and congresses related to these and other innovative technologies. Dr. Andreas Hauser is now heading the global water business in TÜV SÜD.



Dr. Thomas Stoertkuhl: After his graduation in Physics and PhD in Computer Science, Dr. Thomas Stoertkuhl has been working 12 years in the area of Embedded Systems, Business Continuity, Risk Management, KPI and Identity Management. His special field relates to all aspects of industrial IT security with a specific focus on automation systems. He has published numerous papers and articles, and given presentations at various conferences and congresses. Dr. Thomas Stoertkuhl is responsible for IT Security in the global Embedded Systems Program of TÜV SÜD.



Dr. Klaus Estenfeld: After his studies (incl. PhD) in Computer Science, Dr. Klaus Estenfeld joined Siemens AG and worked in several positions in the ICT area (including Corporate Technology, In-house Consulting, Mobile Phones Group, Communications Group, Start-up Financing) and was co-founder of the European Computer Industry Research Centre. Before he joined TÜV SÜD as Senior Innovation Manager for ICT he was at Nokia Siemens Networks responsible for Innovation Management and for Business Development for Cloud Computing Services for Telco Operators worldwide. Within more than 30 years in the academic environment, in the large scale industry as well as in/with Start-up companies he covered a lot of ICT related aspects. He has published numerous papers and articles, and given presentations at various international conferences and congresses. Dr. Klaus Estenfeld is now heading the global ICT business in TÜV SÜD.



Mr. E. Earl Eiland: Mr. Eiland is currently a Sr. Project Engineer in Cyber Security for the Smart Grid and Smart Meters with TÜV SÜD America. Prior to working for TÜV SÜD, he was a Sr. Cyber Security and Communications Engineer at General Electric's Global Research Center (GE-GRC). During his five years at GE-GRC, he participated in developing innovative Cyber Security algorithms and Cyber-physical microgrid and Smart Meter controllers. He is lead inventor on three patents and numerous invention disclosures. Mr. Eiland is nearing completion of his doctorate in Computer Science at New Mexico Institute of Mining and Technology.