

Bryan L Singer CISM, CISSP, CAP

Key Assignments

- *Principal Consultant – Kenexis Consulting Corporation*
- *Vice President – Kenexis Security Corporation*
- *Co-Chairman ISA-99 Industrial Automation and Control Systems Security*

- Support US Department of Homeland Security in Critical Vulnerability Research, advisement on industry threats, and advisement and commercialization of advanced security techniques, methodologies, and training courses. This is all done under the umbrella of the US Department of Homeland Security's Cyber Security Applied techniques from ISA-99 and ISA-84 to a Steel Pipe plant that was upgrading their process control architecture and industrial network to receive a comprehensive MES system. This effort provided logical design and processor upgrades, I/O counts, and an overall systems strategy to meet the safety, reliability, and efficiency targets for production process and applications. Further, identified a significant potential network related issue that could have impacted process safety in the melting process. Estimated that the process used for this project represented a 75% reduction in deployment cost for the industrial network proposed by the MES provider.
- Conducted NERC CIP assessments for over 40 fossil and hydro generation facilities in western Canada. Results included systems design changes, upgrades, NERC CIP compliance issues, and penetration tests to test security and process controls. Identified a series of industrial network security related issues that were previously missed during network scans and utilizing IT security methodologies. Applying ISA-99 and other techniques – was able to expose and address these potentially serious issues. Also provided theoretical attack and defense models that would have impacted generation reliability from a financial systems and scheduling perspective resulting in significant work process changes.
- Conducted security assessment for an Automated Metering Infrastructure company including transponders connected to automated meter readers through the business systems to view and control meter data. This assessment focused heavily on development practices, secure coding practices, and system deployment considerations to improve overall system reliability. Executed via NERC CIP 005 and CIP 007 and ISA-99. Provided recommendations for additional coding and development practices, theoretical designs to improve security and validity of firmware downloads to meters and transponders, and additional network protocols and integrity verification mechanisms to prevent time of check/time of use security threats that could impact grip reliability. Identified and modeled several scenarios including criminal mischief to

Fields of Competence

- Industrial Cyber Security and Risk Analysis
- Industrial Networking and Wireless
- Cyber Incident Response and Management
- Physical Security
- Process Optimization
- Process Safety Management
- Software Development

Experience Summary

Mr. Singer has over 15 years experience in information technology security including 7 years specializing in industrial automation and control systems security, critical infrastructure protection, and counter-terrorism. Mr. Singer's background focuses on software development, network design, information security, and industrial security. Industry experience includes healthcare, telecommunications, water/wastewater, automotive, food and beverage, pharmaceuticals, fossil and hydro power generation, oil and gas, and several others. Mr. Singer has specialized in process intelligence and manufacturing disciplines such as historians, industrial networking, Power and Energy Management (PEMS), Manufacturing Enterprise Systems (MES), Laboratory Information Management Systems (LIMS), Enterprise Resource Planning (ERP), Condition Based Monitoring (CBM) and others.

He began his professional career with the US Army as an Intelligence Analyst. After the military, Mr. Singer worked in various critical infrastructure fields in software development and systems design, including security. Mr. Singer has worked for great companies such as EnteGreat, Rockwell Automation, FluidIQs, and Wurdtech before joining Kenexis Consulting and co-founding Kenexis Security in 2008. At Kenexis, Mr. Singer is responsible for development, deployment, and management of industrial network design and security services from both a safety and system architecture perspective. He is also the co-chairman of ISA-99 Security Standard, a former board member of the Department of Homeland Security's Process Control Systems

Forum, member of Idaho National Labs recommended practices commission, US technical expert to IEC, North American Electronics Reliability Corporation (NERC) Drafting Team Member for NERC CIP, and other industry roles.

Credentials

B.S. Computer Information Systems, Phoenix University
Certified Information Systems Security Professional (CISSP)
Certified Information Security Manager (CISM)
Certified Automation Professional (CAP)

Articles and Presentations

- Co-author on upcoming book by CRC press on Cyber Security for Critical Infrastructure
- 2008-2009 delegate as part of ISA's Automation Federation, an outreach program and lobbying effort on in Washington DC with key Senate, House, and Presidential Staff
- Various contributions to Automation World Articles 2002-2008
- Frequent blog author, commenter, and contributing author on SCADASEC, Digital Bond, and others
- Frequent presenter at ISA Expo, S4, ACS, AWWA, and others
- Test question drafter for ISA's Certified Automation Professional (CAP) Exam

Papers

- **A Security Assurance Level Methodology** – Kenexis Security 2009
- **Combinatorial Sequence Attack Methodology** – Kenexis Security 2009
- **Industrial Network Performance Management** – Kenexis Security 2009
- **Open Source Intelligence Collection for Critical Infrastructure Protection**, Kenexis Security 2009
- **A SIL Approach to Security** – Dr. Nate Kube and Bryan Singer – Wurdtech Security Technologies
- **Securing your Manufacturing Data** – BioPharm Magazine Dec 2005

tamper with meter data through potential cyber and physical terror attacks including motivational profiles, objectives, and threat vectors.

- Designed and deployed global process control security strategy for over 1500 cement facilities worldwide. This project included firewalls, business process changes, training, and policy and procedure deployments to improve the consistency of security deployments throughout the corporate environment. Additionally, worked with their Information Technology department to design cost effective and secure mechanisms to integrate OSI/PI enterprise historian data without exposing shop floor data.

Education and Training

- Bachelor of Science in Computer Information Systems, University of Phoenix
- 96B3P All Source Intelligence Analysis
- CISSP Official Training
- CISM Official Training
- HP-UX Advanced System Administration by Hewlett Packard

Professional Organizations and Memberships

- ISA
- ISA Certified Automation Professional
- ISACA
- (ISC)2
- AWWA
- Former Board Member of the former DHS Process Control Systems Forum (DHS)
- Member of the Idaho National Labs Recommended Practices Commission