ISA99 - Industrial Automation and Controls Systems Security

Committee Summary and Activity Update
January 2015
Topics

• **Who** are we?
• **How** do we work?
• **What** are the basics?
• **What** are our work products?
• **Where** do things stand?
Who we are
ISA99 Committee

- The International Society of Automation (ISA) Committee on Security for Industrial Automation & Control Systems (ISA99)
  - 500+ members
  - Representing companies across all sectors, including:
    - Chemical Processing
    - Petroleum Refining
    - Food and Beverage
    - Energy
    - Pharmaceuticals
    - Water
    - Manufacturing

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• “... industrial automation and control systems whose compromise could result in any or all of the following situations:
  - endangerment of public or employee safety
  - environmental protection
  - loss of public confidence
  - violation of regulatory requirements
  - loss of proprietary or confidential information
  - economic loss
  - impact on entity, local, state, or national security”
How we Work
ISA99 and ISA/IEC 62443

- ISA/IEC 62443 is a Series of Standards
- Being Developed by 3 Groups
  - ISA99 → ANSI/ISA-62443
  - IEC TC65/WG10 → IEC 62443
  - ISO/IEC JTC1/SC27 → ISO/IEC 2700x
Other Partners for Related Topics

- Process Safety (ISA84)
- Wireless Communications (ISA100)
- Certification (ISCI)
- Information Sharing (ICSJWG)
- Security Framework (NIST)
- International Reach (IEC/ISO)
- etc.
The Basics

- General Concepts
- Fundamental Concepts
General Concepts

- Security Context
- Security Objectives
- Least Privilege
- Defense in Depth
- Threat-Risk Assessment
- Policies and Procedures

Source: ISA-62443-1-1, 2nd Edition (Under development)
Fundamental Concepts

- Security Life Cycle
- Zones and Conduits
- Security Levels
- Foundational Requirements
- Program Maturity
- Safety and Security

Source: ISA-62443-1-1, 2nd Edition (Under development)
Security Life Cycle

Source: ISA-62443-1-1, 2nd Edition (Under development)
Zones and Conduits

A network & system segmentation technique:

- Prevents the spread of an incident
- Provides a front-line set of defenses
- The basis for risk assessment in system design
System Segmentation

• A process to understand:
  - How different systems interact
  - Where information flows between systems
  - What form that information takes
  - What devices communicate
  - How fast/often those devices communicate
  - The security differences between system components

• Technology helps, but architecture is more important
Foundational Requirements

- FR 1 – Identification & authentication control
- FR 2 – Use control
- FR 3 – System integrity
- FR 4 – Data confidentiality
- FR 5 – Restricted data flow
- FR 6 – Timely response to events
- FR 7 – Resource availability
Program Maturity

- A means of assessing capability
- Similar in concept to Capability Maturity Models
  - e.g., SEI-CMM
- An evolving concept in the standards
  - Applicability to IACS-SMS
Safety and Security

- Safety is much of the “raison d’être” for security
  - Presenting consequences
- Much to be learned from the Security community
- Collaboration
  - ISA99-ISA84 joint efforts
  - ISA Safety and Security Division
Fundamental Concepts Status

- Security Life Cycle
- Zones and Conduits
- Security Levels
- Foundational Requirements
- Program Maturity
- Safety and Security
Work Products
The ISA-62443/IEC 62443 Series

General
- ISA-62443-1-1: Concepts and Models
- ISA-TR62443-1-2: Master Glossary of Terms and Abbreviations
- ISA-62443-1-3: System Security Conformance Metrics
- ISA-TR62443-1-4: IACS Security Life Cycle and Use Cases

Policies & Procedures
- ISA-62443-2-1: Requirements for an IACS Security Management System
- ISA-TR62443-2-3: Patch Management in the IACS Environment
- ISA-62443-2-4: Requirements for IACS Solution Suppliers

System
- ISA-TR62443-3-1: Security technologies for IACS
- ISA-62443-3-2: Security Risk Assessment and System Design
- ISA-62443-3-3: System Security Requirements and Security Levels

Component
- ISA-62443-4-1: Product Development Requirements
- ISA-62443-4-2: Technical Security Requirements for IACS Components

Status Key
- Published
- In development
- Planned
- Published (under review)
- Out for comment/vote
General Information

• ISA-62443-1-1
  - Concepts and Models
• ISA-TR62443-1-2
  - Master Glossary
• ISA-TR62443-1-3
  - Metrics
• ISA-TR62443-1-4
  - Lifecycle & Use Cases
Policies and Procedures

- ISA-62443-2-1
  - Security Management System
- ISA-TR62443-2-2
  - Implementation Guidance
- ISA-TR62443-2-3
  - Patch Management
- ISA-62443-2-4
  - Requirements for Suppliers
System Requirements

- ISA-62443-3-1
  - Security Technologies
- ISA-62443-3-2
  - Risk Assessment and Design
- ISA-62443-3-3
  - System Requirements
Component Requirements

- ISA-62443-4-1
  - Product Development
- ISA-62443-4-2
  - Technical Component
What is Happening
Recent Developments

- ISA-TR62443-1-3
  - Formally assigned to a new WG12 for development
- ISA-TR62443-2-3
  - Approved; publication pending
- IEC-62443-2-4
  - Essentially complete
  - Proposed adoption by ISA
Current Areas of Attention

• Alignment of Management System with ISO 27001:2013
• Affirming of Fundamental Concepts
  - Security Levels
  - Zones and Conduits
  - Maturity Levels
• Detailed Requirements
  - Component Technical
  - Product Development
Pending Developments

- ISA-62443-3-2
  - Soon available for comment
- ISA-62443-4-1 and ISA-62443-4-2
  - Revised drafts soon
Review

- **Who** are we?
- **How** do we work?
- **What** are the basics?
- **What** are our work products?
- **Where** do things stand?
Conclusion
Questions, Comments, Contributions…

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## Document Description

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