ISA/IEC 62443 Compliance Strengthen ICS Cyber Defense

Daniel Ehrenreich,
SCCE - Secure Communications and Control Experts

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……. Presenter Introduction

- 1976 -1990 Tadiran Inc.
- 1991 - 2011 Motorola Ltd
- 2011 - 2013 Siemens Ltd
- 2014 - 2014 Waterfall Security Ltd
- 2014 - SCCE Consulting
- 2014 - SCCE Training
- 2018 - ISO 27001 Auditor

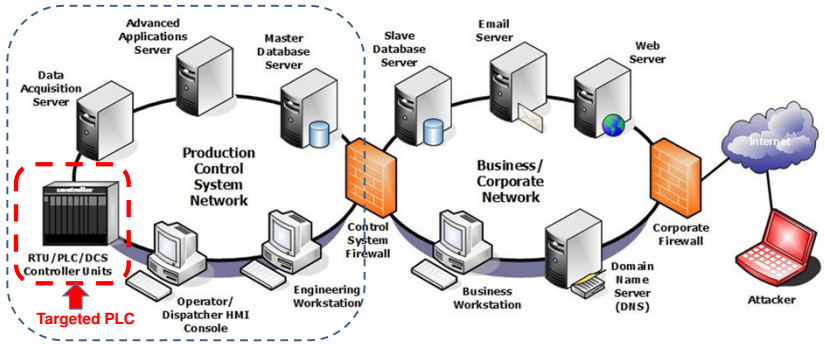
Over 44 years of Industrial Activity

Daniel Ehrenreich
SCCE
Secure Communication and Control Experts
Tel: +972-54-9151594
Daniel@Scce.co.il

Industrial Applications targeted for Cyber attacks

- Targeted Industrial sectors for cyber attacks
  - Chemicals, Oil and Gas
  - Food and Beverage
  - Buildings and Energy
  - Pharmaceuticals
  - Water and sewage
  - Manufacturing
  - Transportation
  - Industrial suppliers
  - Government
  - Public safety

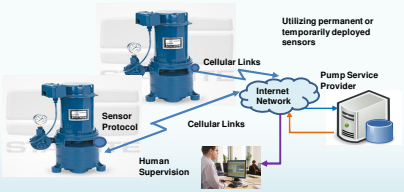
Organization architecture including IT & ICS

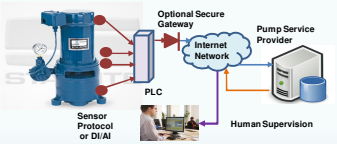


Not permitted for training purposes

Industrial IoT Sensors – Stand alone configuration

- **Ecosystem architecture**
  - Each sensor is acting as an IIoT Endpoint device
- **True cyber risks to industrial operations**
  - Each sensor increase the cyber attack surface
  - The risk are operation outage or damage to the mechanical equipment





The Cyber attack surface comprise of 3 main vectors

- **Internally Generated Cyber Attacks**
  - Start with breaching the physical perimeter
  - Attacker can be: employee, visitor or a hacker

Conducted by:
- Determined attacker
- Disgruntled employee
- Any person by intention
- Unintentional action

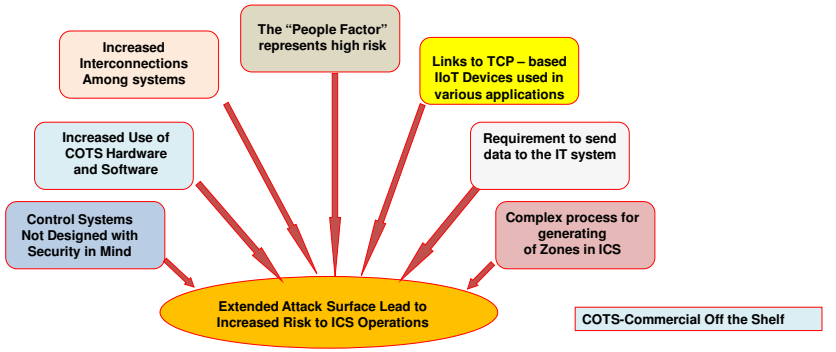
- **Externally Generated Cyber attack**
  - Starts through internet with Social Engineering
  - Gradual compromising of safety barriers
  - May operate 100-200 days prior it is detected

Conducted by:
- Determined attacker
- Disgruntled employee
- Hostile country Action
- Crime action

- **Supply Chain Cyber Attack**
  - Vendors of products and supply services
  - Expert service personnel (in country or abroad)

Conducted by:
- HR Service suppliers
- Vendors of HW and SW
- Servicemen unintentionally
- Intentional-planned attack

ICS-Related Cyber Security Risks and Concerns



Corporate Risk matrix as per ISA/IEC 62443

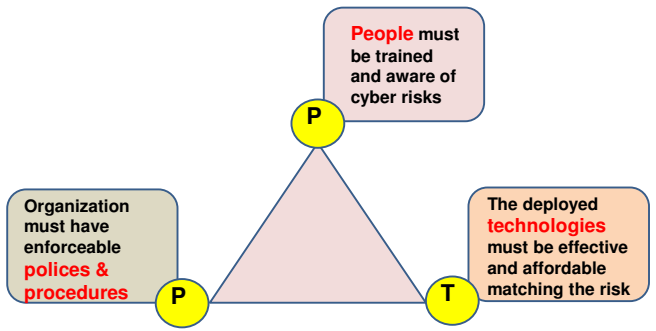
Risk=Likelihood * Impact

Risk = P * I

Impact \ Likelihood	1 Remote	2 Unlikely	3 Possible	4 Likely	5 Certain
1 Trival	1	2	3	4	5
2 Minor	2	4	6	8	10
3 Moderate	3	6	9	12	15
4 Major	4	8	12	16	20
5 Critical	5	10	16	20	25

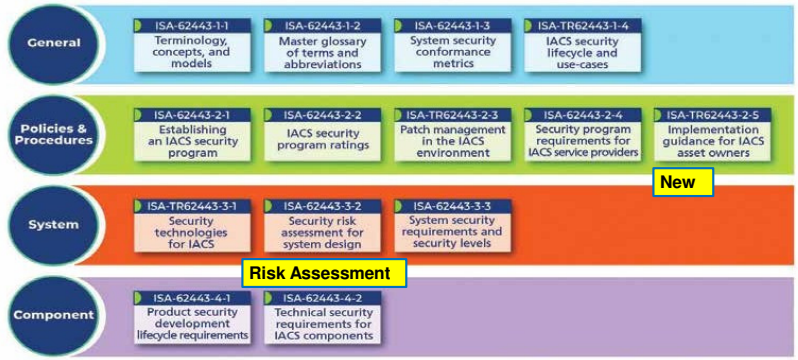
IEC 62443-3-2 Example table for mapping Cyber Risk Reduction Factor to Target Security Level

Cyber Defense through the PPT Triad



9

Risk assessment int he ISA/ICS 62443 Standard 1/2



10

The ISA99 committee created the ISA/IEC 62443 standard

- Constitutes the main international reference framework for cybersecurity related to ICS
  - The Safety, availability and integrity are the most important factors for the adoption of protective measures against cyber threats
- The ISA99 committee that developed the IEC 62443 is composed of owners, equipment and service providers
  - Manufacturers and integrators, governments, educational institutions and various research groups.
- Other international and regional standards and regulations
  - NA: NIST 800-82, 800-53, NIST Framework 1.1, NERC-CIP, etc.
  - Israel: 2 NCD docs and 1 doc of Ministry of Environment Protection

11

The ISA/IEC 62443 key principles

- A "collection of processes, personnel, hardware and software to assure the secure and reliable ICS operation
  - The cybersecurity as an ongoing process and not as goal
  - It requires utilizing "secure-by-design principles" for the ICS
- The key standards in the IEC 62443 series are:
  - IEC 62443-2-4, The policies and practices for system integration
  - IEC 62443-4-1, The secure development lifecycle requirements
  - IEC 62443-4-2, The ICS components security specifications
  - IEC 62443-3-2 Focus on the process of assessing the risk of an ICS
  - IEC 62443-3-3 Defines the security requirements and security levels

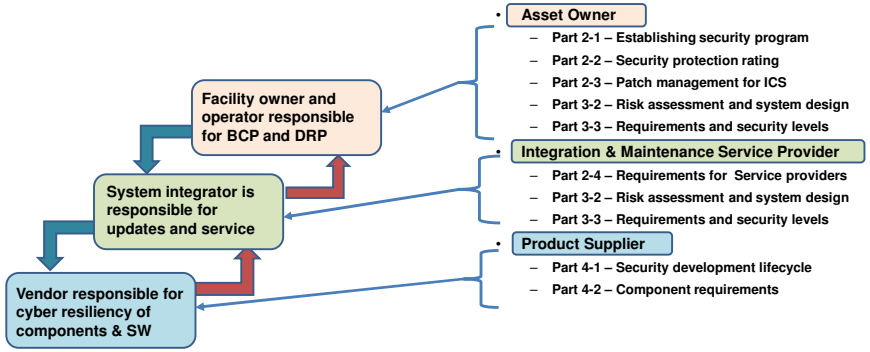
12

ISA/IEC 62443 Standard Security Level (SL)

- **SL 1**
  - Prevent the unauthorized disclosure of information via casual exposure.
- **SL 2**
  - An entity using simple means with low resources, generic skills and low motivation.
- **SL 3**
  - An entity using sophisticated means with moderate resources, specific skills and moderate motivation.
- **SL 4**
  - An entity using sophisticated means with extended resources, specific skills and high motivation.

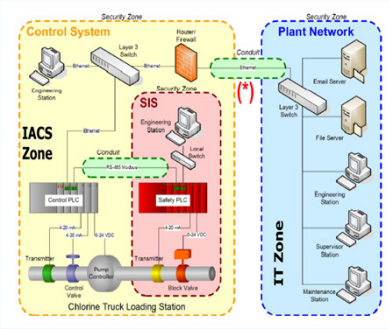
Who Might Attack us?

The cyber defense is achieved by 3 Stakeholders



Addressing ICS Zones and Conduits per ISA/IEC 62443

- **Main principle of Segregation**
  - How different systems interact within the ICS zone
  - Where information flows between systems
  - What form that information takes
  - What data-type devices communicate each to other
  - How fast/often those devices communicate
  - The security differences between system components



ISA/IEC 62443 Series for Asset Owners

- **Asset Owner activities:**
  - Establish a Security Program that includes specific requirements
  - Define the partition of Zones and Conduits
  - Request to conduct Risk Assessments
  - Document ICS requirements in the Cybersecurity Specification
  - Procure the service for a qualified integrator
- **ISA/IEC 62443 standards:**
  - ISA/IEC 62443-2-1, Establishing an ICS security program
  - ISA/IEC 62443-2-2, Security Program ratings
  - ISA/IEC 62443-3-2, Security risk assessment for system design
  - ISA/IEC 62443-3-3, Security risk requirements as per security levels
- **Just to know….**
  - ISA/IEC 62443-2-3, Patch management

ISA/IEC 62443 Series for Integration Providers

- **Service providers activities:**
  - Establish a Security Program for ICS
  - Implement a process that meet the Cybersecurity Requirements Specification (CRS)
  - Apply security patches during the integration phase of the ICS lifecycle
  - Purchase the products and software from qualified vendors
- **ISA/IEC 62443 standards:**
  - ISA/IEC 62443-2-4, Requirements for ICS service providers
  - ISA/IEC 62443-3-2, Security risk assessment for system design
  - ISA/IEC 62443-3-3, System security requirements and security levels
- **Just to know….**
  - ISA/IEC 62443-4-1, Product security development lifecycle requirements
  - ISA/IEC 62443-4-2, Technical security requirements for ICS Components

17

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ISA/IEC 62443 for Maintenance Service providers

- **Maintenance service activities:**
  - Establish and sustain a Security Program for maintenance services
  - Provide services and capabilities that meet the ICS security policies
- **ISA/IEC 62443 standards:**
  - ISA/IEC 62443-2-4, Requirements for ICS service providers
- **Just to know….**
  - ISA/IEC 62443-3-3, System security requirements and security levels
  - ISA/IEC 62443-3-2, Security risk assessment for system design

19

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ISA/IEC 62443 Series for Product Suppliers

- **Product Suppliers activities:**
  - Establish and sustain a Security Development Lifecycle
  - Provide ICS related software that meet defined SL capabilities
  - Provide Component products that meet the defined SL capabilities
  - Provide ongoing lifecycle support for their ICS related products
- **ISA/IEC 62443 standards:**
  - ISA/IEC 62443-4-1, Product security development lifecycle requirements
  - ISA/IEC 62443-4-2, Technical security requirements for ICS Components
- **Just to know….**
  - ISA/IEC 62443-3-3, System security requirements and security levels

18

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Takeaways from this Session

Put Security Goals into your specifications

Deal with Vendors who Take Security Seriously

Do Not Compromise on Security Requirements

Always Be Ready for Tomorrow's Challenges

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