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KEY=INDUSTRIAL - DASHAWN MAHONEY

CYBERSECURITY FOR INDUSTRIAL CONTROL SYSTEMS

SCADA, DCS, PLC, HMI, AND SIS

CRC Press *As industrial control systems (ICS), including SCADA, DCS, and other process control networks, become Internet-facing, they expose crucial services to attack. Threats like Duqu, a sophisticated worm found in the wild that appeared to share portions of its code with the Stuxnet worm, emerge with increasing frequency. Explaining how to develop and implement an effective cybersecurity program for ICS, Cybersecurity for Industrial Control Systems: SCADA, DCS, PLC, HMI, and SIS provides you with the tools to ensure network security without sacrificing the efficiency and functionality of ICS. Highlighting the key issues that need to be addressed, the book begins with a thorough introduction to ICS. It discusses business, cost, competitive, and regulatory drivers and the conflicting priorities of convergence. Next, it explains why security requirements differ from IT to ICS. It differentiates when standard IT security solutions can be used and where SCADA-specific practices are required. The book examines the plethora of potential threats to ICS, including hi-jacking malware, botnets, spam engines, and porn dialers. It outlines the range of vulnerabilities inherent in the ICS quest for efficiency and functionality that necessitates risk behavior such as remote access and control of critical equipment. Reviewing risk*

assessment techniques and the evolving risk assessment process, the text concludes by examining what is on the horizon for ICS security, including IPv6, ICSv6 test lab designs, and IPv6 and ICS sensors.

CYBER SECURITY OF INDUSTRIAL CONTROL SYSTEMS IN THE FUTURE INTERNET ENVIRONMENT

IGI Global *In today's modernized market, many fields are utilizing internet technologies in their everyday methods of operation. The industrial sector is no different as these technological solutions have provided several benefits including reduction of costs, scalability, and efficiency improvements. Despite this, cyber security remains a crucial risk factor in industrial control systems. The same public and corporate solutions do not apply to this specific district because these security issues are more complex and intensive. Research is needed that explores new risk assessment methods and security mechanisms that professionals can apply to their modern technological procedures. Cyber Security of Industrial Control Systems in the Future Internet Environment is a pivotal reference source that provides vital research on current security risks in critical infrastructure schemes with the implementation of information and communication technologies. While highlighting topics such as intrusion detection systems, forensic challenges, and smart grids, this publication explores specific security solutions within industrial sectors that have begun applying internet technologies to their current methods of operation. This book is ideally designed for researchers, system engineers, managers, networkers, IT professionals, analysts, academicians, and students seeking a better understanding of the key issues within securing industrial control systems that utilize internet technologies.*

CYBER-SECURITY OF SCADA AND OTHER INDUSTRIAL CONTROL SYSTEMS

Springer *This book provides a comprehensive overview of the fundamental security of Industrial Control Systems (ICSs), including Supervisory Control and Data Acquisition (SCADA) systems and touching on cyber-physical systems in general. Careful attention is given to providing the reader with clear and comprehensive background and reference material for each topic pertinent to ICS security. This book offers answers to such questions as: Which specific operating and security issues may lead to a loss of efficiency and operation? What methods can be used to monitor and protect my system? How can I design my system to reduce threats?This book offers chapters on ICS cyber threats, attacks, metrics, risk, situational awareness, intrusion detection, and security testing, providing an advantageous reference set for current system owners who wish to securely configure and operate their ICSs. This book is appropriate for non-specialists as well. Tutorial information is provided in two initial chapters and in the beginnings of other chapters as needed. The book concludes with advanced topics on ICS governance, responses to attacks on ICS, and future security of the Internet of Things.*

SECURITY OF INDUSTRIAL CONTROL SYSTEMS AND CYBER PHYSICAL SYSTEMS

FIRST WORKSHOP, CYBERICS 2015 AND FIRST WORKSHOP, WOS-CPS 2015 VIENNA, AUSTRIA, SEPTEMBER 21–22, 2015 REVISED SELECTED PAPERS

Springer *This book constitutes the refereed proceedings of the First Conference on Cybersecurity of Industrial Control Systems, CyberICS 2015, and the First Workshop on the Security of Cyber Physical Systems, WOS-CPS 2015, held in Vienna, Austria, in September 2015 in conjunction with ESORICS 2015, the 20th annual European Symposium on Research in Computer Security. The 6 revised full papers and 2 short papers of CyberICS 2015 presented together with 3 revised full papers of WOS-CPS 2015 were carefully reviewed and selected from 28 initial submissions. CyberICS 2015 focuses on topics covering ICSs, including cyber protection and cyber defense of SCADA systems, plant control systems, engineering workstations, substation equipment, programmable logic controllers, PLCs, and other industrial control system. WOS-CPS 2015 deals with the Security of Cyber Physical Systems, that exist everywhere around us, and range in size, complexity and criticality, from embedded systems used in smart vehicles, to SCADA systems in smart grids to control systems in water distribution systems, to smart transportation systems etc.*

CYBERSECURITY OF INDUSTRIAL SYSTEMS

John Wiley & Sons *How to manage the cybersecurity of industrial systems is a crucial question. To implement relevant solutions, the industrial manager must have a clear understanding of IT systems, of communication networks and of control-command systems. They must also have some knowledge of the methods used by attackers, of the standards and regulations involved and of the available security solutions. Cybersecurity of Industrial Systems presents these different subjects in order to give an in-depth overview and to help the reader manage the cybersecurity of their installation. The book addresses these issues for both classic SCADA architecture systems and Industrial Internet of Things (IIoT) systems.*

INDUSTRIAL CYBERSECURITY

EFFICIENTLY SECURE CRITICAL INFRASTRUCTURE SYSTEMS

Packt Publishing Ltd *Your one-step guide to understanding industrial cyber security, its control systems, and its operations. About This Book Learn about endpoint protection such as anti-malware implementation, updating, monitoring, and sanitizing user workloads and mobile devices Filled with practical examples to help you secure critical infrastructure systems efficiently A step-by-step guide that*

will teach you the techniques and methodologies of building robust infrastructure systems Who This Book Is For If you are a security professional and want to ensure a robust environment for critical infrastructure systems, this book is for you. IT professionals interested in getting into the cyber security domain or who are looking at gaining industrial cyber security certifications will also find this book useful. What You Will Learn Understand industrial cybersecurity, its control systems and operations Design security-oriented architectures, network segmentation, and security support services Configure event monitoring systems, anti-malware applications, and endpoint security Gain knowledge of ICS risks, threat detection, and access management Learn about patch management and life cycle management Secure your industrial control systems from design through retirement In Detail With industries expanding, cyber attacks have increased significantly. Understanding your control system's vulnerabilities and learning techniques to defend critical infrastructure systems from cyber threats is increasingly important. With the help of real-world use cases, this book will teach you the methodologies and security measures necessary to protect critical infrastructure systems and will get you up to speed with identifying unique challenges.Industrial cybersecurity begins by introducing Industrial Control System (ICS) technology, including ICS architectures, communication media, and protocols. This is followed by a presentation on ICS (in) security. After presenting an ICS-related attack scenario, securing of the ICS is discussed, including topics such as network segmentation, defense-in-depth strategies, and protective solutions. Along with practical examples for protecting industrial control systems, this book details security assessments, risk management, and security program development. It also covers essential cybersecurity aspects, such as threat detection and access management. Topics related to endpoint hardening such as monitoring, updating, and anti-malware implementations are also discussed. Style and approach A step-by-step guide to implement Industrial Cyber Security effectively.

PROTECTING INDUSTRIAL CONTROL SYSTEMS FROM ELECTRONIC THREATS

Momentum Press *Aimed at both the novice and expert in IT security and industrial control systems (ICS), this book will help readers gain a better understanding of protecting ICSs from electronic threats. Cyber security is getting much more attention and SCADA security (Supervisory Control and Data Acquisition) is a particularly important part of this field, as are Distributed Control Systems (DCS), Programmable Logic Controllers (PLCs), Remote Terminal Units (RTUs), Intelligent Electronic Devices (IEDs)-and all the other, field controllers, sensors, and drives, emission controls, and that make up the intelligence of modern industrial buildings and facilities. This book will help the reader better understand what is industrial control system cyber security, why is it different than IT security, what has really happened to date, and what needs to be done. Loads of practical advice is offered on everything from clarity on current cyber-security systems and how they can be integrated into general IT systems, to how to conduct risk assessments and how to obtain certifications, to future trends in legislative and regulatory issues affecting industrial security.*

INDUSTRIAL CYBERSECURITY

EFFICIENTLY MONITOR THE CYBERSECURITY POSTURE OF YOUR ICS ENVIRONMENT

Packt Publishing Ltd *Get up and running with industrial cybersecurity monitoring with this hands-on book, and explore ICS cybersecurity monitoring tasks, activities, tools, and best practices Key FeaturesArchitect, design, and build ICS networks with security in mindPerform a variety of security assessments, checks, and verificationsEnsure that your security processes are effective, complete, and relevantBook Description With Industrial Control Systems (ICS) expanding into traditional IT space and even into the cloud, the attack surface of ICS environments has increased significantly, making it crucial to recognize your ICS vulnerabilities and implement advanced techniques for monitoring and defending against rapidly evolving cyber threats to critical infrastructure. This second edition covers the updated Industrial Demilitarized Zone (IDMZ) architecture and shows you how to implement, verify, and monitor a holistic security program for your ICS environment. You'll begin by learning how to design security-oriented architecture that allows you to implement the tools, techniques, and activities covered in this book effectively and easily. You'll get to grips with the monitoring, tracking, and trending (visualizing) and procedures of ICS cybersecurity risks as well as understand the overall security program and posture/hygiene of the ICS environment. The book then introduces you to threat hunting principles, tools, and techniques to help you identify malicious activity successfully. Finally, you'll work with incident response and incident recovery tools and techniques in an ICS environment. By the end of this book, you'll have gained a solid understanding of industrial cybersecurity monitoring, assessments, incident response activities, as well as threat hunting. What you will learnMonitor the ICS security posture actively as well as passivelyRespond to incidents in a controlled and standard wayUnderstand what incident response activities are required in your ICS environmentPerform threat-hunting exercises using the Elasticsearch, Logstash, and Kibana (ELK) stackAssess the overall effectiveness of your ICS cybersecurity programDiscover tools, techniques, methodologies, and activities to perform risk assessments for your ICS environmentWho this book is for If you are an ICS security professional or anyone curious about ICS cybersecurity for extending, improving, monitoring, and validating your ICS cybersecurity posture, then this book is for you. IT/OT professionals interested in entering the ICS cybersecurity monitoring domain or searching for additional learning material for different industry-leading cybersecurity certifications will also find this book useful.*

CYBER-SECURITY THREATS AND RESPONSE MODELS IN POWER PLANTS

Springer *This SpringerBrief presents a brief introduction to probabilistic risk assessment (PRA), followed by a discussion of abnormal event detection techniques in industrial control systems (ICS). It also provides an introduction to the use of game theory for the*

development of cyber-attack response models and a discussion on the experimental testbeds used for ICS cyber security research. The probabilistic risk assessment framework used by the nuclear industry provides a valid framework to understand the impacts of cyber-attacks in the physical world. An introduction to the PRA techniques such as fault trees, and event trees is provided along with a discussion on different levels of PRA and the application of PRA techniques in the context of cybersecurity. A discussion on machine learning based fault detection and diagnosis (FDD) methods and cyber-attack detection methods for industrial control systems are introduced in this book as well. A dynamic Bayesian networks based method that can be used to detect an abnormal event and classify it as either a component fault induced safety event or a cyber-attack is discussed. An introduction to the stochastic game formulation of the attacker-defender interaction in the context of cyber-attacks on industrial control systems to compute optimal response strategies is presented. Besides supporting cyber-attack response, the analysis based on the game model also supports the behavioral study of the defender and the attacker during a cyber-attack, and the results can then be used to analyze the risk to the system caused by a cyber-attack. A brief review of the current state of experimental testbeds used in ICS cybersecurity research and a comparison of the structures of various testbeds and the attack scenarios supported by those testbeds is included. A description of a testbed for nuclear power applications, followed by a discussion on the design of experiments that can be carried out on the testbed and the associated results is covered as well. This SpringerBrief is a useful resource tool for researchers working in the areas of cyber security for industrial control systems, energy systems and cyber physical systems. Advanced-level students that study these topics will also find this SpringerBrief useful as a study guide.

INDUSTRIAL CONTROL SYSTEMS (ICS): WHAT TO CONSIDER WHEN PROTECTING INDUSTRIAL ASSETS FROM CYBER THREATS? PART 1. SECURE ICS ARCHITECTURE DESIGN

Litres *Currently, the international cybersecurity environment is tense. While until recently, cyber threats were considered primarily in relation to the theft of confidential information and extortion, governments are now increasingly talking about cyber weapons and the possibility of physical damage to critical infrastructure. This can be achieved by attacking industrial control systems (ICS) that connect the world of information technology and real industrial processes. Traditionally, systems of this class were poorly protected from cyber threats, or not protected at all, which now puts entire industries at risk. This paper discusses practical issues of ICS protection and in particular, issues related to the design of secure ICS architectures.*

INDUSTRIAL NETWORK SECURITY

SECURING CRITICAL INFRASTRUCTURE NETWORKS FOR SMART GRID, SCADA, AND OTHER INDUSTRIAL CONTROL SYSTEMS

Elsevier *Industrial Network Security: Securing Critical Infrastructure Networks for Smart Grid, SCADA, and Other Industrial Control Systems describes an approach to ensure the security of industrial networks by taking into account the unique network, protocol, and application characteristics of an industrial control system, along with various compliance controls. It offers guidance on deployment and configuration, and it explains why, where, and how security controls should be implemented. Divided into 11 chapters, the book explains the basics of Ethernet and Transmission Control Protocol/Internet Protocol (TCP/IP) networking communications and the SCADA and field bus protocols. It also discusses industrial networks as they relate to “critical infrastructure and cyber security, potential risks and consequences of a cyber attack against an industrial control system, compliance controls in relation to network security practices, industrial network protocols, such as Modbus and DNP3, assessment of vulnerabilities and risk, how to secure enclaves, regulatory compliance standards applicable to industrial network security, and common pitfalls and mistakes, like complacency and deployment errors. This book is a valuable resource for plant operators and information security analysts, as well as compliance officers who want to pass an audit with minimal penalties and/or fines. Covers implementation guidelines for security measures of critical infrastructure Applies the security measures for system-specific compliance Discusses common pitfalls and mistakes and how to avoid them*

CYBER SECURITY OF INDUSTRIAL CONTROL SYSTEMS IN THE FUTURE INTERNET ENVIRONMENT

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utilize internet technologies.

CYBERSECURITY FOR INDUSTRIAL CONTROL SYSTEMS

SCADA, DCS, PLC, HMI, AND SIS

CRC Press *As industrial control systems (ICS), including SCADA, DCS, and other process control networks, become Internet-facing, they expose crucial services to attack. Threats like Duqu, a sophisticated worm found in the wild that appeared to share portions of its code with the Stuxnet worm, emerge with increasing frequency. Explaining how to develop and im*

COUNTERING CYBER SABOTAGE

INTRODUCING CONSEQUENCE-DRIVEN, CYBER-INFORMED ENGINEERING (CCE)

CRC Press *Countering Cyber Sabotage: Introducing Consequence-Driven, Cyber-Informed Engineering (CCE) introduces a new methodology to help critical infrastructure owners, operators and their security practitioners make demonstrable improvements in securing their most important functions and processes. Current best practice approaches to cyber defense struggle to stop targeted attackers from creating potentially catastrophic results. From a national security perspective, it is not just the damage to the military, the economy, or essential critical infrastructure companies that is a concern. It is the cumulative, downstream effects from potential regional blackouts, military mission kills, transportation stoppages, water delivery or treatment issues, and so on. CCE is a validation that engineering first principles can be applied to the most important cybersecurity challenges and in so doing, protect organizations in ways current approaches do not. The most pressing threat is cyber-enabled sabotage, and CCE begins with the assumption that well-resourced, adaptive adversaries are already in and have been for some time, undetected and perhaps undetectable. Chapter 1 recaps the current and near-future states of digital technologies in critical infrastructure and the implications of our near-total dependence on them. Chapters 2 and 3 describe the origins of the methodology and set the stage for the more in-depth examination that follows. Chapter 4 describes how to prepare for an engagement, and chapters 5-8 address each of the four phases. The CCE phase chapters take the reader on a more granular walkthrough of the methodology with examples from the field, phase objectives, and the steps to take in each phase. Concluding chapter 9 covers training options and looks towards a future where these concepts are scaled more broadly.*

2018 INTERNATIONAL RUSSIAN AUTOMATION CONFERENCE (RUSAUTOCON).

PRACTICAL INDUSTRIAL CYBERSECURITY

ICS, INDUSTRY 4.0, AND IIOT

John Wiley & Sons *A practical roadmap to protecting against cyberattacks in industrial environments In Practical Industrial Cybersecurity: ICS, Industry 4.0, and IIoT, veteran electronics and computer security author Charles J. Brooks and electrical grid cybersecurity expert Philip Craig deliver an authoritative and robust discussion of how to meet modern industrial cybersecurity challenges. The book outlines the tools and techniques used by practitioners in the industry today, as well as the foundations of the professional cybersecurity skillset required to succeed on the SANS Global Industrial Cyber Security Professional (GICSP) exam. Full of hands-on explanations and practical guidance, this book also includes: Comprehensive coverage consistent with the National Institute of Standards and Technology guidelines for establishing secure industrial control systems (ICS) Rigorous explorations of ICS architecture, module and element hardening, security assessment, security governance, risk management, and more Practical Industrial Cybersecurity is an indispensable read for anyone preparing for the Global Industrial Cyber Security Professional (GICSP) exam offered by the Global Information Assurance Certification (GIAC). It also belongs on the bookshelves of cybersecurity personnel at industrial process control and utility companies. Practical Industrial Cybersecurity provides key insights to the Purdue ANSI/ISA 95 Industrial Network Security reference model and how it is implemented from the production floor level to the Internet connection of the corporate network. It is a valuable tool for professionals already working in the ICS/Utility network environment, IT cybersecurity personnel transitioning to the OT network environment, and those looking for a rewarding entry point into the cybersecurity field.*

HACKING EXPOSED INDUSTRIAL CONTROL SYSTEMS: ICS AND SCADA SECURITY SECRETS & SOLUTIONS

McGraw Hill Professional *Learn to defend crucial ICS/SCADA infrastructure from devastating attacks the tried-and-true Hacking Exposed way This practical guide reveals the powerful weapons and devious methods cyber-terrorists use to compromise the devices, applications, and systems vital to oil and gas pipelines, electrical grids, and nuclear refineries. Written in the battle-tested Hacking Exposed style, the book arms you with the skills and tools necessary to defend against attacks that are debilitating—and potentially deadly. Hacking Exposed Industrial Control Systems: ICS and SCADA Security Secrets & Solutions explains vulnerabilities and attack vectors specific to ICS/SCADA protocols, applications, hardware, servers, and workstations. You will learn how hackers and malware, such as the infamous Stuxnet worm, can exploit them and disrupt critical processes, compromise safety, and bring production to a*

halt. The authors fully explain defense strategies and offer ready-to-deploy countermeasures. Each chapter features a real-world case study as well as notes, tips, and cautions. Features examples, code samples, and screenshots of ICS/SCADA-specific attacks Offers step-by-step vulnerability assessment and penetration test instruction Written by a team of ICS/SCADA security experts and edited by Hacking Exposed veteran Joel Scambray

INDUSTRIAL NETWORK SECURITY

ISA *Nowadays one only needs to read the newspaper headlines to appreciate the importance of Industrial Network Security. Almost daily an article comes out describing the threat to our critical infrastructure, from spies in our electrical grid to the looming threat of cyberwar. Whether we talk about process control systems that run chemical plants and refineries, supervisory control and data acquisition (SCADA) systems for utilities, or factory automation systems for discrete manufacturing, the backbone of our nationA's critical infrastructure consists of these industrial networks and is dependent on their continued operation. This easy-to-read book introduces managers, engineers, technicians, and operators on how to keep our industrial networks secure amid rising threats from hackers, disgruntled employees, and even cyberterrorists.*

SECURING YOUR SCADA AND INDUSTRIAL CONTROL SYSTEMS

Government Printing Office *Version 1.0. This guidebook provides information for enhancing the security of Supervisory Control and Data Acquisition Systems (SCADA) and Industrial Control Systems (ICS). The information is a comprehensive overview of industrial control system security, including administrative controls, architecture design, and security technology. This is a guide for enhancing security, not a how-to manual for building an ICS, and its purpose is to teach ICS managers, administrators, operators, engineers, and other ICS staff what security concerns they should be taking into account. Other related products: National Response Framework, 2008 is available here: https://bookstore.gpo.gov/products/sku/064-000-00044-6 National Strategy for Homeland Security (October 2007) is available here: https://bookstore.gpo.gov/products/sku/041-001-00657-5 New Era of Responsibility: Renewing America's Promise can be found here: https://bookstore.gpo.gov/products/sku/041-001-00660-5*

SYSTEM SAFETY ENGINEERING AND RISK ASSESSMENT

A PRACTICAL APPROACH, SECOND EDITION

CRC Press *We all know that safety should be an integral part of the systems that we build and operate. The public demands that they*

are protected from accidents, yet industry and government do not always know how to reach this common goal. This book gives engineers and managers working in companies and governments around the world a pragmatic and reasonable approach to system safety and risk assessment techniques. It explains in easy-to-understand language how to design workable safety management systems and implement tested solutions immediately. The book is intended for working engineers who know that they need to build safe systems, but aren't sure where to start. To make it easy to get started quickly, it includes numerous real-life engineering examples. The book's many practical tips and best practices explain not only how to prevent accidents, but also how to build safety into systems at a sensible price. The book also includes numerous case studies from real disasters that describe what went wrong and the lessons learned. See What's New in the Second Edition: New chapter on developing government safety oversight programs and regulations, including designing and setting up a new safety regulatory body, developing safety regulatory oversight functions and governance, developing safety regulations, and how to avoid common mistakes in government oversight Significantly expanded chapter on safety management systems, with many practical applications from around the world and information about designing and building robust safety management systems, auditing them, gaining internal support, and creating a safety culture New and expanded case studies and "Notes from Nick's Files" (examples of practical applications from the author's extensive experience) Increased international focus on world-leading practices from multiple industries with practical examples, common mistakes to avoid, and new thinking about how to build sustainable safety management systems New material on safety culture, developing leading safety performance indicators, safety maturity model, auditing safety management systems, and setting up a safety knowledge management system

NUCLEAR POWER PLANT INSTRUMENTATION AND CONTROL SYSTEMS FOR SAFETY AND SECURITY

IGI Global *Accidents and natural disasters involving nuclear power plants such as Chernobyl, Three Mile Island, and the recent meltdown at Fukushima are rare, but their effects are devastating enough to warrant increased vigilance in addressing safety concerns. Nuclear Power Plant Instrumentation and Control Systems for Safety and Security evaluates the risks inherent to nuclear power and methods of preventing accidents through computer control systems and other such emerging technologies. Students and scholars as well as operators and designers will find useful insight into the latest security technologies with the potential to make the future of nuclear energy clean, safe, and reliable.*

DEPARTMENT OF HOMELAND SECURITY APPROPRIATIONS FOR 2010, PART 1B, 111-1 HEARINGS, *

DEPARTMENT OF HOMELAND SECURITY APPROPRIATIONS FOR 2007

HEARINGS BEFORE A SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS, HOUSE OF REPRESENTATIVES, ONE HUNDRED NINTH CONGRESS, SECOND SESSION

CRITICAL INFRASTRUCTURE RISK ASSESSMENT

THE DEFINITIVE THREAT IDENTIFICATION AND THREAT REDUCTION HANDBOOK

Rothstein Publishing *As a manager or engineer have you ever been assigned a task to perform a risk assessment of one of your facilities or plant systems? What if you are an insurance inspector or corporate auditor? Do you know how to prepare yourself for the inspection, decided what to look for, and how to write your report? This is a handbook for junior and senior personnel alike on what constitutes critical infrastructure and risk and offers guides to the risk assessor on preparation, performance, and documentation of a risk assessment of a complex facility. This is a definite “must read” for consultants, plant managers, corporate risk managers, junior and senior engineers, and university students before they jump into their first technical assignment.*

CYBER-PHYSICAL SYSTEMS: INDUSTRY 4.0 CHALLENGES

Springer Nature *This book presents new findings in industrial cyber-physical system design and control for various domains, as well as their social and economic impacts on society. Industry 4.0 requires new approaches in the context of secure connections, control, and maintenance of cyber-physical systems as well as enhancing their interaction with humans. The book focuses on open issues of cyber-physical system control and its usage, discussing implemented breakthrough systems, models, programs, and methods that could be used in industrial processes for the control, condition assessment, diagnostics, prognostication, and proactive maintenance of cyber-physical systems. Further, it addresses the topic of ensuring the cybersecurity of industrial cyber-physical systems and proposes new, reliable solutions. The authors also examine the impact of university courses on the performance of industrial complexes, and the organization of education for the development of cyber-physical systems. The book is intended for practitioners, enterprise representatives, scientists, students, and Ph.D. and master’s students conducting research in the area of cyber-physical system development and implementation in various domains.*

RISK ASSESSMENT

THEORY, METHODS, AND APPLICATIONS

John Wiley & Sons *Introduces risk assessment with key theories, proven methods, and state-of-the-art applications Risk Assessment: Theory, Methods, and Applications remains one of the few textbooks to address current risk analysis and risk assessment with an emphasis on the possibility of sudden, major accidents across various areas of practice—from machinery and manufacturing processes to nuclear power plants and transportation systems. Updated to align with ISO 31000 and other amended standards, this all-new 2nd Edition discusses the main ideas and techniques for assessing risk today. The book begins with an introduction of risk analysis, assessment, and management, and includes a new section on the history of risk analysis. It covers hazards and threats, how to measure and evaluate risk, and risk management. It also adds new sections on risk governance and risk-informed decision making; combining accident theories and criteria for evaluating data sources; and subjective probabilities. The risk assessment process is covered, as are how to establish context; planning and preparing; and identification, analysis, and evaluation of risk. Risk Assessment also offers new coverage of safe job analysis and semi-quantitative methods, and it discusses barrier management and HRA methods for offshore application. Finally, it looks at dynamic risk analysis, security and life-cycle use of risk. Serves as a practical and modern guide to the current applications of risk analysis and assessment, supports key standards, and supplements legislation related to risk analysis Updated and revised to align with ISO 31000 Risk Management and other new standards and includes new chapters on security, dynamic risk analysis, as well as life-cycle use of risk analysis Provides in-depth coverage on hazard identification, methodologically outlining the steps for use of checklists, conducting preliminary hazard analysis, and job safety analysis Presents new coverage on the history of risk analysis, criteria for evaluating data sources, risk-informed decision making, subjective probabilities, semi-quantitative methods, and barrier management Contains more applications and examples, new and revised problems throughout, and detailed appendices that outline key terms and acronyms Supplemented with a book companion website containing Solutions to problems, presentation material and an Instructor Manual Risk Assessment: Theory, Methods, and Applications, Second Edition is ideal for courses on risk analysis/risk assessment and systems engineering at the upper-undergraduate and graduate levels. It is also an excellent reference and resource for engineers, researchers, consultants, and practitioners who carry out risk assessment techniques in their everyday work.*

RECENT DEVELOPMENTS ON INDUSTRIAL CONTROL SYSTEMS RESILIENCE

Springer Nature *This book provides profound insights into industrial control system resilience, exploring fundamental and advanced*

topics and including practical examples and scenarios to support the theoretical approaches. It examines issues related to the safe operation of control systems, risk analysis and assessment, use of attack graphs to evaluate the resiliency of control systems, preventive maintenance, and malware detection and analysis. The book also discusses sensor networks and Internet of Things devices. Moreover, it covers timely responses to malicious attacks and hazardous situations, helping readers select the best approaches to handle such unwanted situations. The book is essential reading for engineers, researchers, and specialists addressing security and safety issues related to the implementation of modern industrial control systems. It is also a valuable resource for students interested in this area.

RESILIENCE OF CYBER-PHYSICAL SYSTEMS

FROM RISK MODELLING TO THREAT COUNTERACTION

Springer *This book addresses the latest approaches to holistic Cyber-Physical System (CPS) resilience in real-world industrial applications. Ensuring the resilience of CPSs requires cross-discipline analysis and involves many challenges and open issues, including how to address evolving cyber-security threats. The book describes emerging paradigms and techniques from two main viewpoints: CPSs' exposure to new threats, and CPSs' potential to counteract them. Further, the chapters address topics ranging from risk modeling to threat management and mitigation. The book offers a clearly structured, highly accessible resource for a diverse readership, including graduate students, researchers and industry practitioners who are interested in evaluating and ensuring the resilience of CPSs in both the development and assessment stages.*

PROCEEDINGS ON 18TH INTERNATIONAL CONFERENCE ON INDUSTRIAL SYSTEMS – IS'20

INDUSTRIAL INNOVATION IN DIGITAL AGE

Springer Nature

RISKS AND SECURITY OF INTERNET AND SYSTEMS

14TH INTERNATIONAL CONFERENCE, CRISIS 2019, HAMMAMET, TUNISIA, OCTOBER 29–31, 2019, PROCEEDINGS

Springer Nature *This book constitutes the revised selected papers from the 14th International Conference on Risks and Security of*

Internet and Systems, CRiSIS 2019, held in Hammamet, Tunisia, in October 2019. The 20 full papers and 4 short papers presented in this volume were carefully reviewed and selected from 64 submissions. They cover diverse research themes that range from classic topics, such as risk analysis and management; access control and permission; secure embedded systems; network and cloud security; information security policy; data protection and machine learning for security; distributed detection system and blockchain.

DETECTION OF INTRUSIONS AND MALWARE, AND VULNERABILITY ASSESSMENT

14TH INTERNATIONAL CONFERENCE, DIMVA 2017, BONN, GERMANY, JULY 6-7, 2017, PROCEEDINGS

Springer *This book constitutes the refereed proceedings of the 14th International Conference on Detection of Intrusions and Malware, and Vulnerability Assessment, DIMVA 2017, held in Bonn, Germany, in July 2017. The 18 revised full papers included in this book were carefully reviewed and selected from 67 submissions. They present topics such as enclaves and isolation; malware analysis; cyber-physical systems; detection and protection; code analysis; and web security.*

CONTROL PERFORMANCE ASSESSMENT: THEORETICAL ANALYSES AND INDUSTRIAL PRACTICE

Springer Nature *This book presents a comprehensive review of currently available Control Performance Assessment methods. It covers a broad range of classical and modern methods, with a main focus on assessment practice, and is intended to help practitioners learn and properly perform control assessment in the industrial reality. Further, it offers an educational guide for control engineers, who are currently in high demand in the industry. The book consists of three main parts. Firstly, a comprehensive review of available approaches is presented and discussed. The classical canon methods are extended with a discussion of nonlinear and complex alternative measures using non-Gaussian statistics, persistence and fractional calculations. Secondly, the methods' applicability aspects are visualized with the aid of computer simulations, covering the most popular control philosophies used in the process industry. Lastly, a critical review of the methods discussed, on the basis of real-world industrial examples, rounds out the coverage.*

THE COMPLETE GUIDE TO CYBERSECURITY RISKS AND CONTROLS

CRC Press *The Complete Guide to Cybersecurity Risks and Controls presents the fundamental concepts of information and communication technology (ICT) governance and control. In this book, you will learn how to create a working, practical control structure that will ensure the ongoing, day-to-day trustworthiness of ICT systems and data. The book explains how to establish*

systematic control functions and timely reporting procedures within a standard organizational framework and how to build auditable trust into the routine assurance of ICT operations. The book is based on the belief that ICT operation is a strategic governance issue rather than a technical concern. With the exponential growth of security breaches and the increasing dependency on external business partners to achieve organizational success, the effective use of ICT governance and enterprise-wide frameworks to guide the implementation of integrated security controls are critical in order to mitigate data theft. Surprisingly, many organizations do not have formal processes or policies to protect their assets from internal or external threats. The ICT governance and control process establishes a complete and correct set of managerial and technical control behaviors that ensures reliable monitoring and control of ICT operations. The body of knowledge for doing that is explained in this text. This body of knowledge process applies to all operational aspects of ICT responsibilities ranging from upper management policy making and planning, all the way down to basic technology operation.

ADVANCED TECHNOLOGIES IN ROBOTICS AND INTELLIGENT SYSTEMS

PROCEEDINGS OF ITR 2019

Springer Nature *This volume gathers the latest advances, innovations, and applications in the field of intelligent systems such as robots, cyber-physical and embedded systems, as presented by leading international researchers and engineers at the International Conference on Intelligent Technologies in Robotics (ITR), held in Moscow, Russia on October 21-23, 2019. It covers highly diverse topics, including robotics, design and machining, control and dynamics, bio-inspired systems, Internet of Thing, Big Data, RFID technology, blockchain, trusted software, cyber-physical systems (CFS) security, development of CFS in manufacturing, protection of information in CFS, cybersecurity of CFS. The contributions, which were selected by means of a rigorous international peer-review process, highlight numerous exciting ideas that will spur novel research directions and foster multidisciplinary collaboration among different specialists, demonstrating that intelligent systems will drive the technological and societal change in the coming decades.*

ADVANCES IN AUTOMATION III

PROCEEDINGS OF THE INTERNATIONAL RUSSIAN AUTOMATION CONFERENCE, RUSAUTOCON2021, SEPTEMBER 5-11, 2021, SOCHI, RUSSIA

Springer Nature *This book reports on innovative research and developments in automation. Spanning a wide range of disciplines, including communication engineering, power engineering, control engineering, instrumentation, signal processing and cybersecurity,*

it focuses on methods and findings aimed at improving the control and monitoring of industrial and manufacturing processes as well as safety. Based on the International Russian Automation Conference, held on September 5-11, 2021, in Sochi, Russia, the book provides academics and professionals with a timely overview of and extensive information on the state of the art in the field of automation and control systems, and fosters new ideas and collaborations between groups in different countries. .

HANDBOOK OF SCADA/CONTROL SYSTEMS SECURITY

CRC Press *The availability and security of many services we rely upon—including water treatment, electricity, healthcare, transportation, and financial transactions—are routinely put at risk by cyber threats. The Handbook of SCADA/Control Systems Security is a fundamental outline of security concepts, methodologies, and relevant information pertaining to the supervisory control and data acquisition (SCADA) systems and technology that quietly operate in the background of critical utility and industrial facilities worldwide. Divided into five sections, the book examines topics comprising functions within and throughout industrial control systems (ICS) environments. Topics include: Emerging trends and threat factors that plague the ICS security community Risk methodologies and principles that can be applied to safeguard and secure an automated operation Methods for determining events leading to a cyber incident, and methods for restoring and mitigating issues—including the importance of critical communications The necessity and reasoning behind implementing a governance or compliance program A strategic roadmap for the development of a secured SCADA/control systems environment, with examples Relevant issues concerning the maintenance, patching, and physical localities of ICS equipment How to conduct training exercises for SCADA/control systems The final chapters outline the data relied upon for accurate processing, discusses emerging issues with data overload, and provides insight into the possible future direction of ISC security. The book supplies crucial information for securing industrial automation/process control systems as part of a critical infrastructure protection program. The content has global applications for securing essential governmental and economic systems that have evolved into present-day security nightmares. The authors present a "best practices" approach to securing business management environments at the strategic, tactical, and operational levels.*

SCADA SYSTEMS AND THE TERRORIST THREAT

PROTECTING THE NATION'S CRITICAL CONTROL SYSTEMS : JOINT HEARING BEFORE THE SUBCOMMITTEE ON ECONOMIC SECURITY, INFRASTRUCTURE PROTECTION, AND CYBERSECURITY WITH THE SUBCOMMITTEE ON

EMERGENCY PREPAREDNESS, SCIENCE, AND TECHNOLOGY OF THE COMMITTEE ON HOMELAND SECURITY, HOUSE OF REPRESENTATIVES, ONE HUNDRED NINTH CONGRESS, FIRST SESSION, OCTOBER 18, 2005

DETECTION OF INTRUSIONS AND MALWARE, AND VULNERABILITY ASSESSMENT

17TH INTERNATIONAL CONFERENCE, DIMVA 2020, LISBON, PORTUGAL, JUNE 24–26, 2020, PROCEEDINGS

Springer Nature *This book constitutes the proceedings of the 17th International Conference on Detection of Intrusions and Malware, and Vulnerability Assessment, DIMVA 2020, held in Lisbon, Portugal, in June 2020.* The 13 full papers presented in this volume were carefully reviewed and selected from 45 submissions. The contributions were organized in topical sections named: vulnerability discovery and analysis; attacks; web security; and detection and containment. *The conference was held virtually due to the COVID-19 pandemic.*

GUIDE TO VULNERABILITY ANALYSIS FOR COMPUTER NETWORKS AND SYSTEMS

AN ARTIFICIAL INTELLIGENCE APPROACH

Springer *This professional guide and reference examines the challenges of assessing security vulnerabilities in computing infrastructure. Various aspects of vulnerability assessment are covered in detail, including recent advancements in reducing the requirement for expert knowledge through novel applications of artificial intelligence. The work also offers a series of case studies on how to develop and perform vulnerability assessment techniques using start-of-the-art intelligent mechanisms. Topics and features: provides tutorial activities and thought-provoking questions in each chapter, together with numerous case studies; introduces the fundamentals of vulnerability assessment, and reviews the state of the art of research in this area; discusses vulnerability assessment frameworks, including frameworks for industrial control and cloud systems; examines a range of applications that make use of artificial intelligence to enhance the vulnerability assessment processes; presents visualisation techniques that can be used to assist the vulnerability assessment process. In addition to serving the needs of security practitioners and researchers, this accessible volume is also ideal for students and instructors seeking a primer on artificial intelligence for vulnerability assessment, or a supplementary text for courses on computer security, networking, and artificial intelligence.*

MAPPING THE CYBERBIOSECURITY ENTERPRISE

Frontiers Media SA