Contents

Contributing Authors	1X
Preface	xvii
PART I THEMES AND ISSUES	
1 Emergent Risks in Critical Infrastructures Scott Dynes	3
2 Cyberspace Policy for Critical Infrastructures Dorsey Wilkin, Richard Raines, Paul Williams and Kenneth Hopkinson	17
PART II INFRASTRUCTURE SECURITY	
3 Security Assessment of a Turbo-Gas Power Plant Marcelo Masera, Igor Nai Fovino and Rafal Leszczyna	31
4 Detecting Cyber Attacks on Nuclear Power Plants Julian Rrushi and Roy Campbell	41
PART III CONTROL SYSTEMS SECURITY	
5 Applying Trusted Network Technology to Process Control Systems Hamed Okhravi and David Nicol	57
6 Towards a Taxonomy of Attacks Against Energy Control Systems Terry Fleury, Himanshu Khurana and Von Welch	71

7 Attribution of Cyber Attacks on Process Control Systems Jeffrey Hunker, Robert Hutchinson and Jonathan Margulies	87
8 Modeling and Detecting Anomalies in SCADA Systems Nils Svendsen and Stephen Wolthusen	101
9 Assessing the Integrity of Field Devices in Modbus Networks Ryan Shayto, Brian Porter, Rodrigo Chandia, Mauricio Papa and Sujeet Shenoi	115
10 Designing Security-Hardened Microkernels for Field Devices Jeffrey Hieb and James Graham	129
11 Combating Memory Corruption Attacks on SCADA Devices Carlo Bellettini and Julian Rrushi	141
12 Mitigating Accidents in Oil and Gas Production Facilities Stig Johnsen	157
PART IV SECURITY STRATEGIES	
13 Automated Assessment of Compliance with Security Best Practices Zahid Anwar and Roy Campbell	173
14 Collaborative Access Control for Critical Infrastructures Amine Baina, Anas Abou El Kalam, Yves Deswarte and Mohamed Kaaniche	189
PART V INFRASTRUCTURE INTERDEPENDENCIES	
15 Modeling Dependencies in Critical Infrastructures Albert Nieuwenhuijs, Eric Luiijf and Marieke Klaver	205
16 Metrics for Quantifying Interdependencies Emiliano Casalicchio and Emanuele Galli	215

Contents	V11
17 An Integrated Approach for Simulating Interdependencies Roberto Setola, Sandro Bologna, Emiliano Casalicchio and Vincenzo Masucci	229
PART VI INFRASTRUCTURE MODELING AND SIMULATION	
18 Simulation of Advanced Train Control Systems Paul Craven and Paul Oman	243
An Integrated Methodology for Critical Infrastructure Modeling and Simulation William Tolone, Seok-Won Lee, Wei-Ning Xiang, Joshua Blackwell, Cody Yeager, Andrew Schumpert and Wray Johnson	257
20	

269

Using 3D Models and Discrete Simulations in Infrastructure

Vicentino, Giorgio Scorzelli and Roberto Zollo

Pierluigi Assogna, Glauco Bertocchi, Alberto Paoluzzi, Michele

Security Applications