

# Contents

*Preface, xiii*

## **1 BACKGROUND AND HISTORY, 3**

Information as a Tool of War, 3

The Role of Communications in Modern Warfare, 6

Early Attempts at Encryption, 9

Direct Observation Techniques, 10

The Creation of Cyberspace, 13

The Cyber Attacks Begin, 19

Cyber Enabling in the Nuclear Middle East, 26

Preparations for Infrastructure Cyber Attacks, 32

Russian Hacktivists and National Pride, 34

The Chinese Approach to Irregular Warfare, 38

The Current State of Cyber War, 45

References, 46

## **2 PROBLEMS, CONTROVERSIES, AND SOLUTIONS, 51**

Is a Cyber War Possible?, 51

Cyber as a Military Domain, 55

Cyber Strategy, 62

Instruments of National Power, 71

Cyber Crime, Cyber Espionage, Cyberterrorism, 79

The Problem of Attribution, 92

People and Paranoia, 98

Cyber Ethics, 101

References, 104

### **3 PERSPECTIVES, 109**

Escalation in Cyberspace: Martin Libicki, 110

Training Tomorrow's Cyber Warriors: Nicholas  
Michael Sambaluk, 116

Cyber Warfare in the Professional Military Education  
System: S. Michael Pavelec, 120

Waging e-Jihad: Heidi L. Dexter, 125

The Relationship between Space and Cyber Assets:  
Brian Tannehill, 131

References, 137

### **4 PROFILES, 143**

Alexander, Keith B., 143

Alperovitch, Dmitri, 145

Anonymous, 146

Carpenter, Shawn, 148

Carr, Jeffrey, 150

Clarke, Richard Alan, 151

Defense Advanced Research Projects Agency (DARPA),	153
Defense Information Systems Agency (U.S.),	155
FireEye, Inc.,	157
Google, Inc.,	158
Hayden, Michael,	161
Kaspersky, Yevgeniy “Eugene” Valentinovich,	163
Libicki, Martin,	165
Mandiant,	167
McAfee, Inc.,	168
Microsoft Corporation,	170
Mitnick, Kevin,	172
National Security Agency,	175
NATO Cooperative Cyber Defence Centre of Excellence,	178
People’s Liberation Army Unit 61398 (China),	179
Qiao Liang and Wang Xiangsui,	181
RAND Corporation,	184
Rogers, Michael S.,	185
Russian Business Network (RBN),	187
Snowden, Edward,	188
Symantec Corporation,	192
Syrian Electronic Army,	194
Tenenbaum, Ehud “Udi,”	196
U.S. Cyber Command,	197



WikiLeaks, 199

References, 202

## **5 DOCUMENTS, 211**

Excerpts from the North Atlantic Treaty (1949), 211

Remarks of President Barack Obama on Securing the Nation's Cyber Infrastructure, Washington, D.C., May 29, 2009, 213

Excerpts of Secretary of State Hillary Clinton on Internet Freedom, Washington, D.C., January 21, 2010, 218

Excerpts from the *Tallinn Manual on the International Law Applicable to Cyber Warfare, Draft*, NATO Cooperative Cyber Defence Centre of Excellence, 2010, 223

Excerpts of "International Strategy for Cyberspace," May 2011, 226

Excerpts of Secretary of Defense Leon Panetta on Cybersecurity, October 11, 2012, 236

Excerpts from U.S. Department of Defense, Defense Science Board, Task Force Report: "Resilient Military Systems and the Advanced Cyber Threat," January 2013, 242

Statement of General Keith B. Alexander, Commander, United States Cyber Command, before the Senate Committee on Armed Services, March 12, 2013, 248

## **6 RESOURCES, 253**

Print Resources, 253

Nonprint Resources, 287

7 **CHRONOLOGY, 295**

*Glossary, 313*

*Index, 323*

*About the Author, 341*