

Advanced Sciences and Technologies for Security Applications

Cindy Vestergaard *Editor*

# Blockchain for International Security

The Potential of Distributed Ledger  
Technology for Nonproliferation and  
Export Controls

 Springer

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Editor

# Blockchain for International Security

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Controls

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This volume is a collection of chapters by experts who represent a small but growing group of researchers who are studying distributed ledger technology (DLT) and its potential to create greater efficiencies and effectiveness in data management and information sharing related to international security. Their work is laying new trails by investigating and testing the tech in ways that allow for independent analysis which is made public and available to the international non-proliferation community. I am indebted to them for these efforts as they have advanced our knowledge on the potential for DLT and non-proliferation. I am also grateful to them for their collaboration on this book, particularly for their flexibility and patience as the COVID-19 global pandemic messed with deadlines and response times. A shout out to all authors and to Gabrielle Green's ruthless review of draft texts. Special dedication also goes to Sarah Frazar and Andrea Viski for stepping in when I needed help the most. I am also grateful to the Carnegie Corporation of New York (CCNY) for their generous support in funding a portion of this research and to Springer for their support in publishing the book.

Cindy Vestergaard

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# Abbreviations

A/CPPNM	Amended Convention for the Physical Protection of Nuclear Material
ANSTO	Australian Nuclear Science and Technology Organisation
AP	Additional Protocol
API	Application Programming Interface
ASNO	Australian Safeguards and Nonproliferation Office
ATT	Arms Trade Treaty
BFT	Byzantine Fault Tolerance
BIS	Bureau of Industry and Security
CAS	Chemical Abstracts Service
CPPNM	Convention on the Physical Protection of Nuclear Material
CSA	Comprehensive Safeguards Agreement
CWC	Chemical Weapons Convention
DAG	Directed Acyclic Graph
DAO	Decentralized autonomous organization
DGR	Deep Geological Repository
DLT	Distributed Ledger Technology
EDI	Electronic Data Interchange
EDIS	Electronic Declaration Information System
EDNA	Electronic Declaration tool for National Authorities
ERP	Enterprise Resource Planning
EU	European Union
EUC	End-User Certificate
EURATOM	European Atomic Energy Community
GDPR	General Data Protection Regulation
GTGA	Government to government assurances
GUI	Graphical User Interface
GUI	Graphical User Interface
IACC	International Anti-Counterfeiting Coalition Inc
IAEA	International Atomic Energy Agency
ICR	Inventory Change Report
ICT	Information and Communication Technology
INFCIRC	Information Circular

IoT	Internet of Things
IP	Intellectual Property
IPFS	InterPlanetary File System
IPPAS	International Physical Protection Advisory Service
ITT	Intangible Transfers of Technology
KMP	Key Measurement Point
KSI	Keyless Signature Infrastructure
LLNL	Lawrence Livermore National Laboratory
MBA	Material Balance Area
MBR	Material Balance Report
NCA	Nuclear Cooperation Agreement
NGO	Non-governmental Organization
NM	Nuclear Material
NNWS	Non-Nuclear Weapons State
NPT	Treaty on the Proliferation of Nuclear Weapons
NSG	Nuclear Suppliers Group
NUMBAT	Nuclear Material Balances and Tracking
NW	Nuclear Weapons
NWS	Nuclear Weapons State
OPCW	Organisation for the Prohibition of Chemical Weapons
PIL	Physical Inventory Listing
PIV	Physical Inventory Verification
PKI	Public Key Infrastructure
PNNL	Pacific Northwest National Laboratory
SAFKA	Finland's national safeguards database
SCM	Supply Chain Management
SIX	Secure Information Exchange
SLAFKA	Shared Ledger SAFKA
SLUMBAT	Shared Ledger NUMBAT
STUK	Finnish Radiation and Nuclear Safety Authority
TPS	Transactions Per Second
UNSC	United Nations Security Council
UNSCR	United Nations Security Council Resolution
UNSW	University of New South Wales
URL	Uniform Resource Locator
WEF	World Economic Forum
WMD	Weapons of Mass Destruction
WTO	World Trade Organization

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