CCDCOE

NATO COOPERATIVE
CYBER DEFENCE
CENTRE OF EXCELLENCE

What is a Centre of Excellence?

NATO
OTAN

NATO-ACCREDITED
CENTRES OF
EXCELLENCE

2022
CATALOGUE

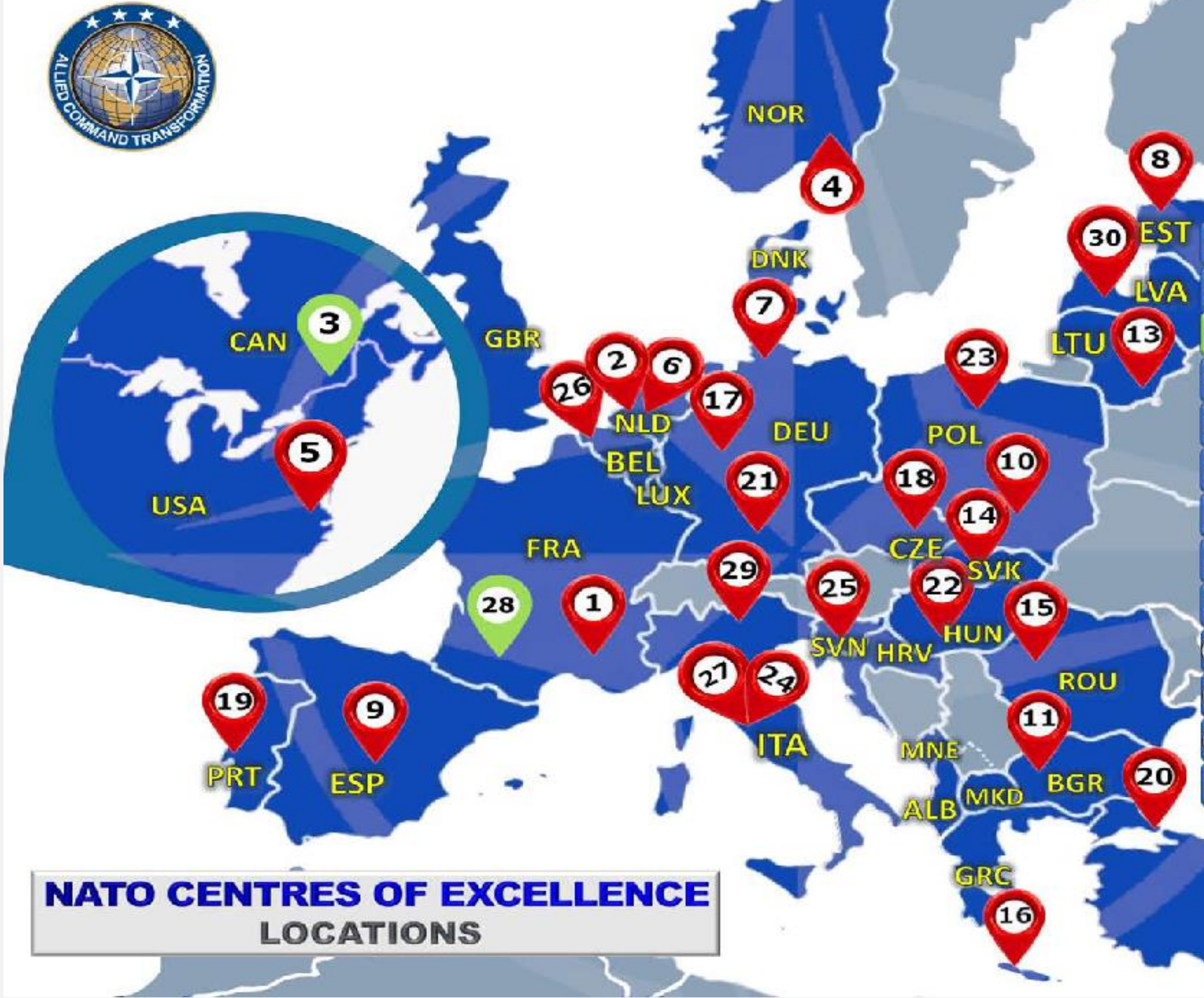
→ Allied Command Transformation (ACT) has overall responsibility for the currently **29 NATO accredited Centres of Excellence (COE)**.

→ COEs are nationally or multi-nationally funded. NATO does not directly fund COEs and COEs are **not part of the NATO Command Structure**.

→ The COEs cover a **wide variety of areas** such as civil-military operations, cyber defence, military medicine, energy security, naval mine warfare, defence against terrorism, cold weather operations, and counter-IED.

→ In addition the European Centre of Excellence for Countering Hybrid Threats (**Hybrid CoE**) in Helsinki focuses on responses to hybrid threats.

NATO CENTRES OF EXCELLENCE
LOCATIONS

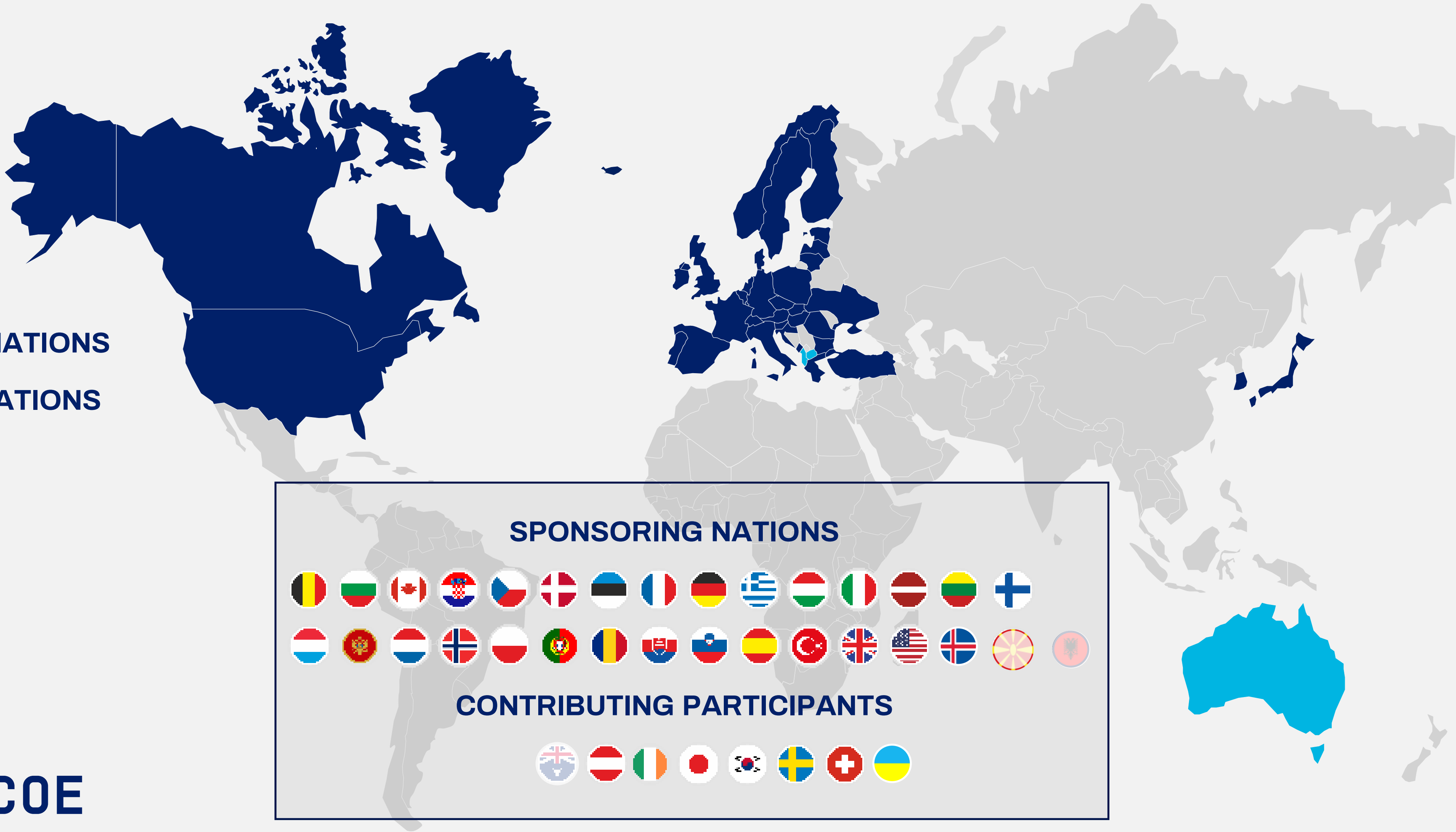


1	Analysis and Simulation Center for Air Operations (AO) , Lyon
2	Civil-Military Cooperation (CCOE) , The Hague
3	Climate Change and Security (CCAS), Montreal *Under Establishment Process
4	Cold Weather Operations(CWO) Elverum
5	Combined Joint Operations from the Sea (CJOS), Virginia
6	Command & Control (C2), Utrech
7	Operations in Confined and Shallow Waters (CSW), Kiel
8	Cooperative Cyber Defense (CCD), Tallinn
9	Counter-Improvised Explosive Devices (C-IED), Madrid
10	Counter Intelligence (CI), Krakow
11	Crisis Management & Disaster Response (CMDR), Sofia
12	Defence Against Terrorism (DAT), Ankara
13	Energy Security (ENSEC), Vilnius
14	Explosive Ordnance Disposal (EOD), Trencin
15	Human Intelligence (HUMINT), Oradea
16	Integrated Air & Missile Defence (IAMD), Chania
17	Joint Air Power Competence Centre (JAPCC), Kalkar
18	Joint Chemical Biological Radiological & Nuclear Defence (JCBRN-D), Vyskov
19	Maritime Geospatial, Meteorological & Oceanographic (MGEOMETOC), Lisbon
20	Maritime Security (MARSEC), Istanbul
21	Military Engineering (MILENG), Ingolstadt
22	Military Medicine (MILMED), Budapest
23	Military Police (MP), Bydgoszcz
24	Modelling & Simulation (M&S), Rome
25	Mountain Warfare (MW), Begunje na Gorenjskem
26	Naval Mine Warfare (NMW), Ostende
27	Security Force Assistance (SFA), Rome
28	Space , Toulouse *Under Establishment Process
29	Stability Policing (SP), Vicenza
30	Strategic Communications (STRATCOM), Riga

Members

● MEMBER NATIONS

● JOINING NATIONS

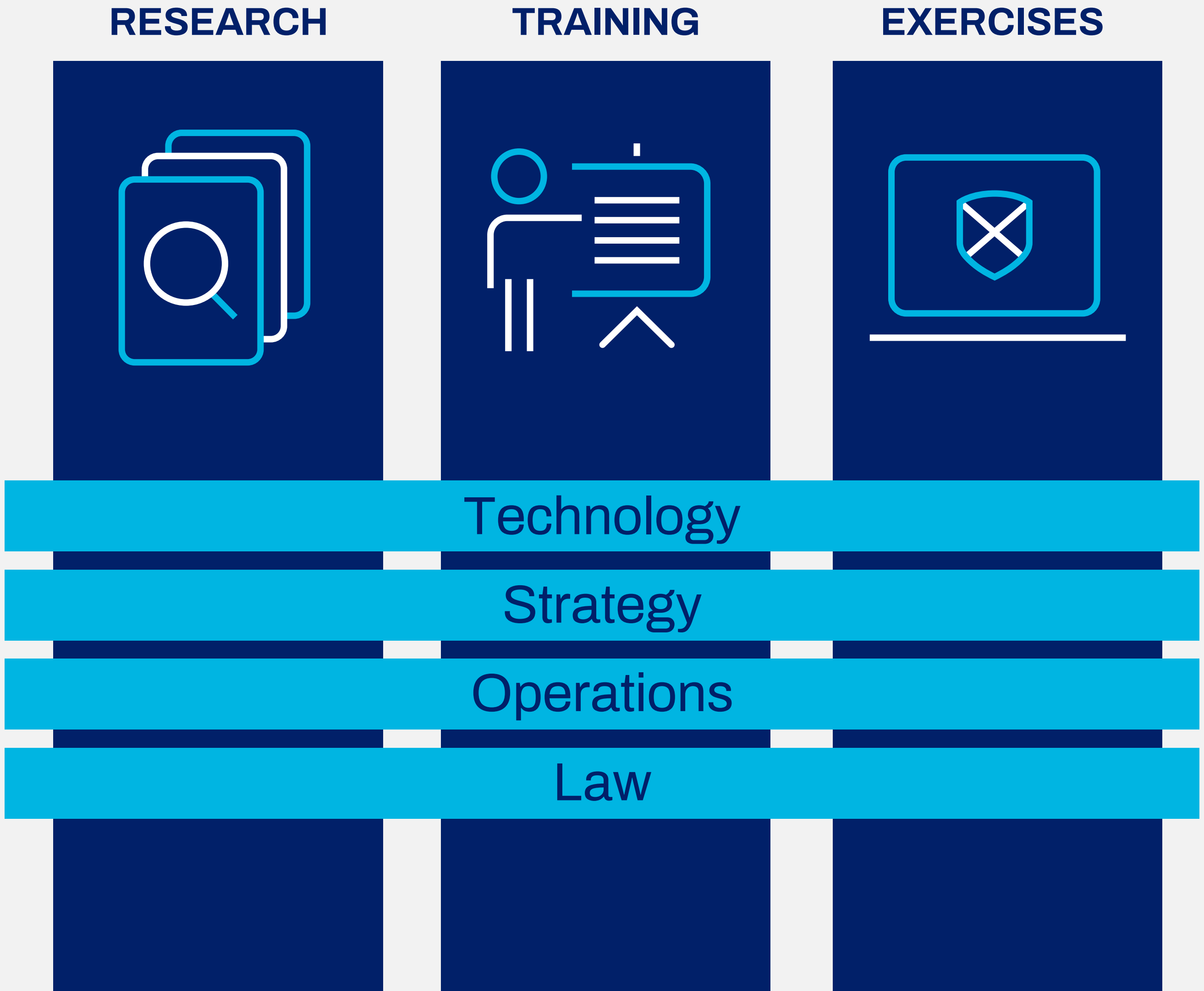


SPONSORING NATIONS

CONTRIBUTING PARTICIPANTS

CCDCOE

Focus areas



RESEARCH

TRAINING

EXERCISES

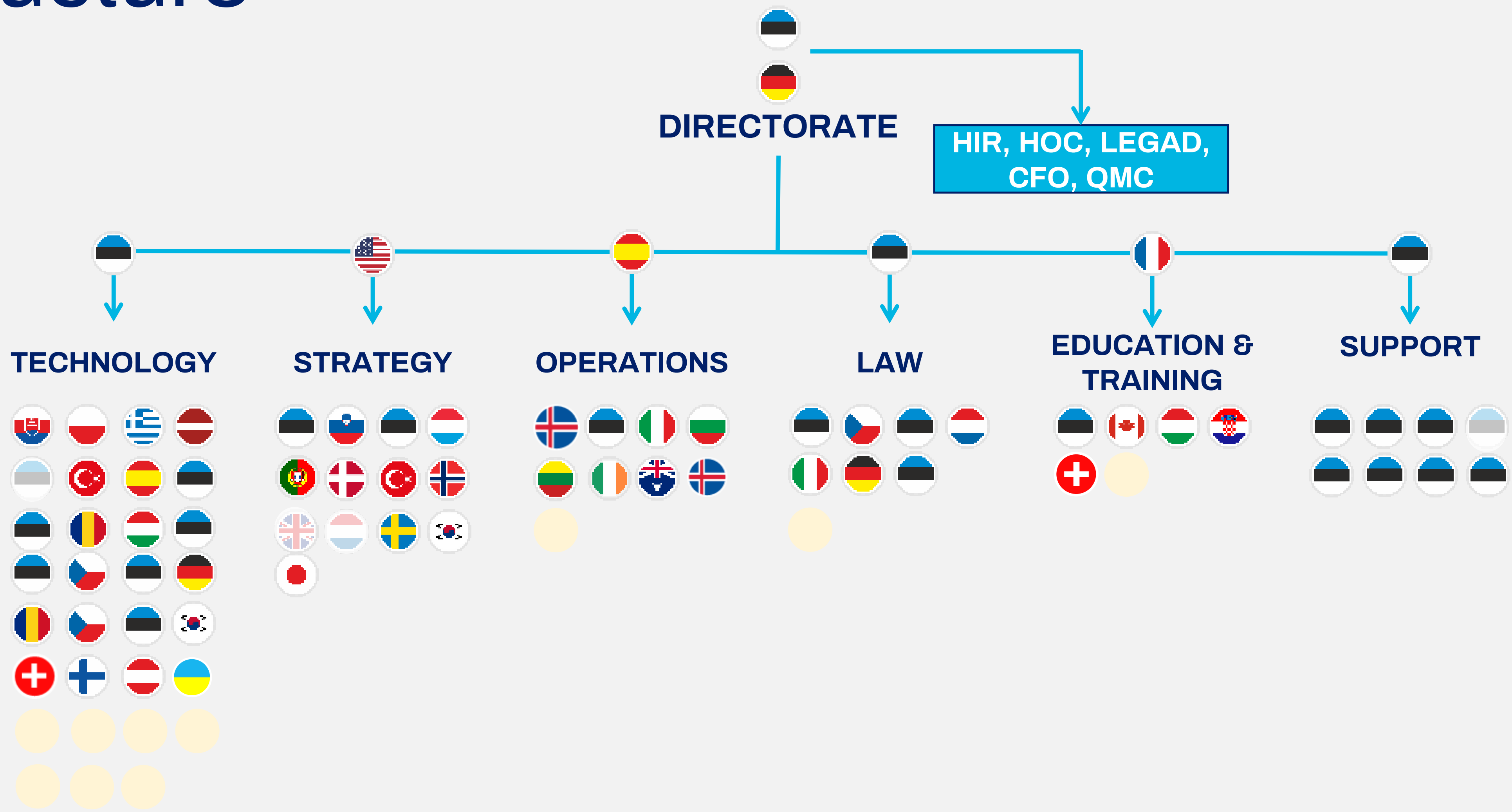
Technology

Strategy

Operations

Law

Structure



DIRECTORATE

HIR, HOC, LEGAD, CFO, QMC

TECHNOLOGY

STRATEGY

OPERATIONS

LAW

EDUCATION & TRAINING

SUPPORT

CCDCOE

Flagship Projects

LOCKED SHIELDS

CROSSED SWORDS

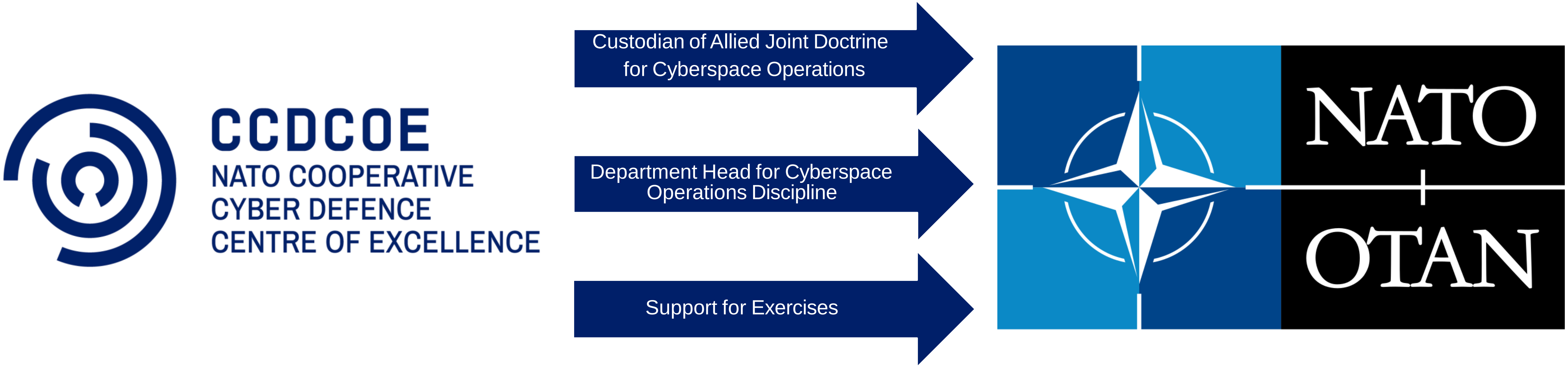
CYCON

INTERNATIONAL CONFERENCE ON CYBER CONFLICT

TALLINN MANUAL

INTERNATIONAL LAW APPLICABLE TO CYBER OPERATIONS

NATO CCDCOE key roles for NATO



Custodian of Allied Joint Doctrine for Cyberspace Operations

Department Head for Cyberspace Operations Discipline

Support for Exercises

CCDCOE coordinates cyber training within NATO

- → Identify training needs
- → Coordinate education and training solutions across the Alliance
- → Work closely with NATO Allied Command Transformation (ACT)
- → Unconditional quality assurance accreditation from ACT

Training

CCDCOE promotes continuous learning in cyber security

Our training courses are based on our latest research and cyber defence exercises

Strategic, Operational and Legal Training

→ **Senior Leadership Training**

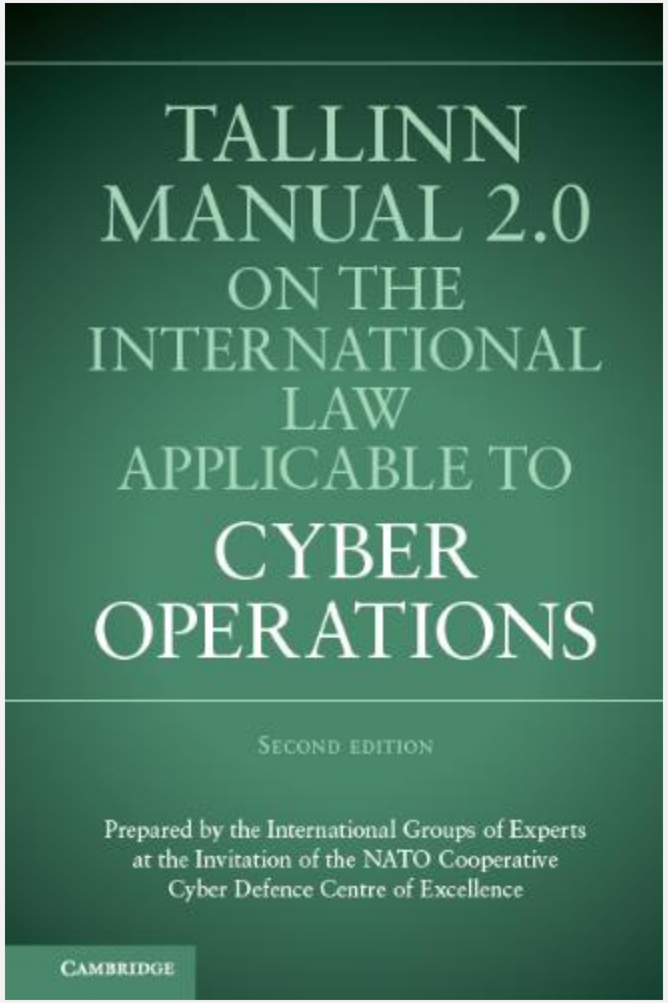
- Executive Cyber Seminar

→ **Operational Level Training**

- Integration of Cyber Considerations into Operational Planning Course
- Operational Cyber Threat Intelligence Course
- Critical Information Infrastructure Protection Course

→ **Legal Training**

- International Law of Cyber Operations Course



TALLINN MANUAL 2.0 ON THE INTERNATIONAL LAW APPLICABLE TO CYBER OPERATIONS

SECOND EDITION

Prepared by the International Groups of Experts
at the Invitation of the NATO Cooperative
Cyber Defence Centre of Excellence

CAMBRIDGE

e-Learning Materials

→ The Centre's e-Learning materials are published on the NATO e-Learning website (JADL)

→ **General awareness course:** ADL 076 Cyber Defence Awareness (from 2013)

→ **Specific Admin Awareness course:** ADL 335 Cyber Awareness course for System Administrators (under update)

→ Cyber Awareness Course **Tallinn Manual Module**

→ e-Learning materials to support the technical courses

CCDCOE

Exercises

CCDCOE organizes and contributes to exercises targeting technical experts and decision-makers in member nations and within NATO

Exercises and exercise support

→ CCDCOE develops and organizes Cyber exercises **Locked Shields** and **Crossed Swords**

→ Support to NATO Cyber Defense Exercise **Cyber Coalition**

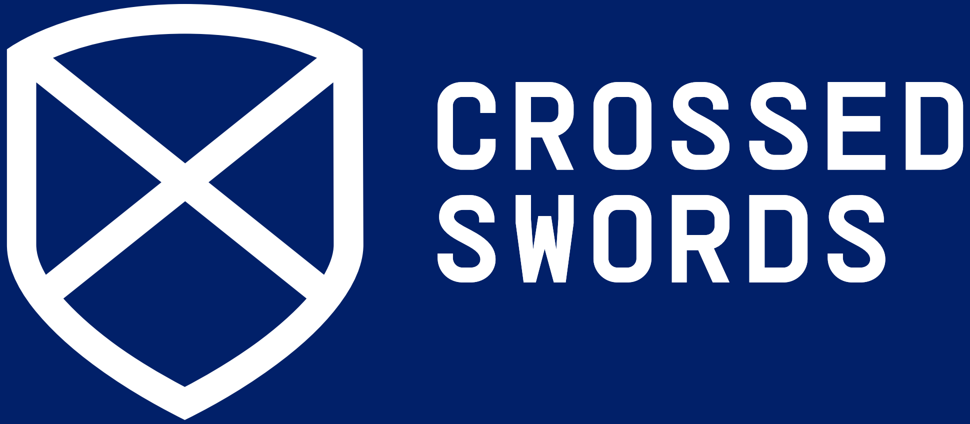
→ Support to NATO military exercises for evaluation and certification (e.g. **TRIDENT Juncture**)

→ Cyber related scenarios and injects

→ Cyber operations **inject database**

LOCKED SHIELDS

CROSSED SWORDS


CROSSED
SWORDS

Exercise Crossed Swords (XS)

- Developed and conducted since 2014
- Exercises essential aspects of cyber operation
- Complex scenario integrating cyber and conventional elements
  - Integrates innovative technologies, tactics, techniques and procedures
- Exercises Command & Control (C2) to include intelligence in conflict situation

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Crossed Swords 2021

Offensive Cyber Operations, Digital Forensics, Cyber Command HQ, kinetic operations with battlefield forensics

CROSSED SWORDS

- **400** Virtual Machines
- **108** participants from more than 21 countries
- **200** Offensive Cyber Operations target systems
- **150** Offensive Cyber Operations machines attack infrastructure and testing
- Windows, Linux, wyos, Siemens Spectrum and many more

XS21 promotional video clip: here

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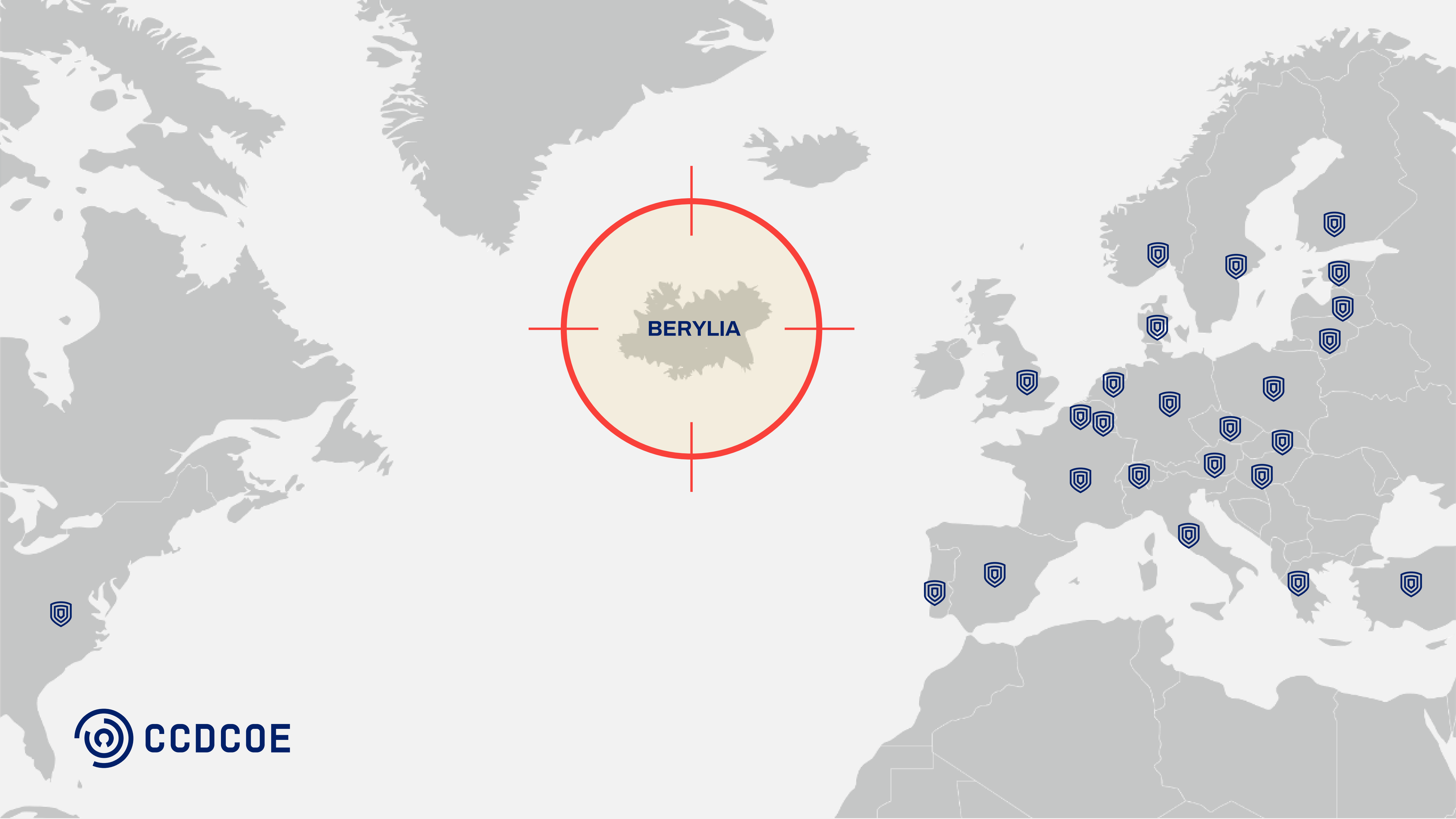
LOCKED SHIELDS

s.cs
sts.cs
rdingTests.cs
sproj

Locked Shields is unique

- → International
- → Technical & Strategic
- → Live Fire
- → Red ↔ Blue
- → Game Based

- → Complex, including ICS/SCADA
- → Innovative
- → Cyber Range Environment
- → Defense Oriented
- → Cooperation & information sharing



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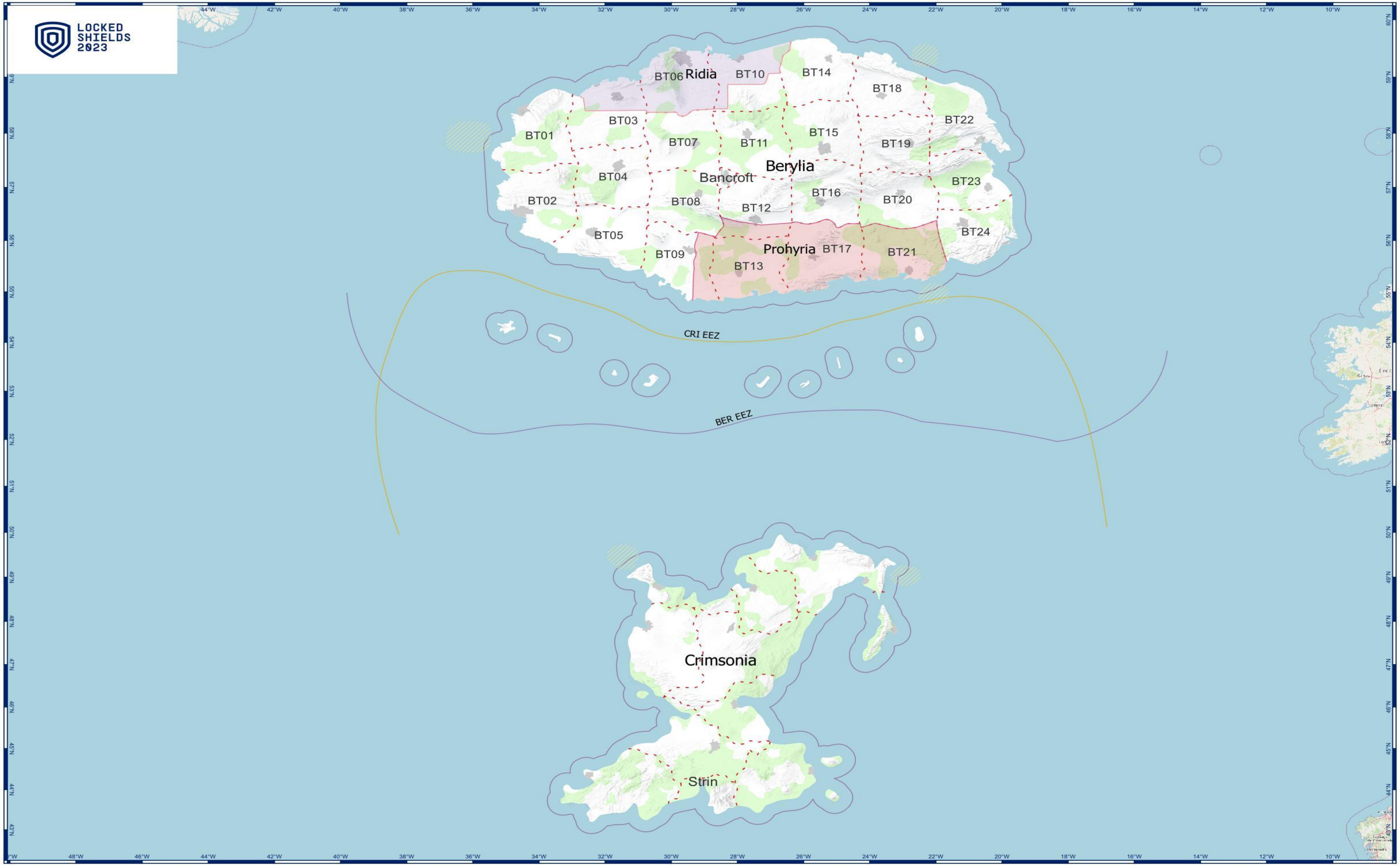
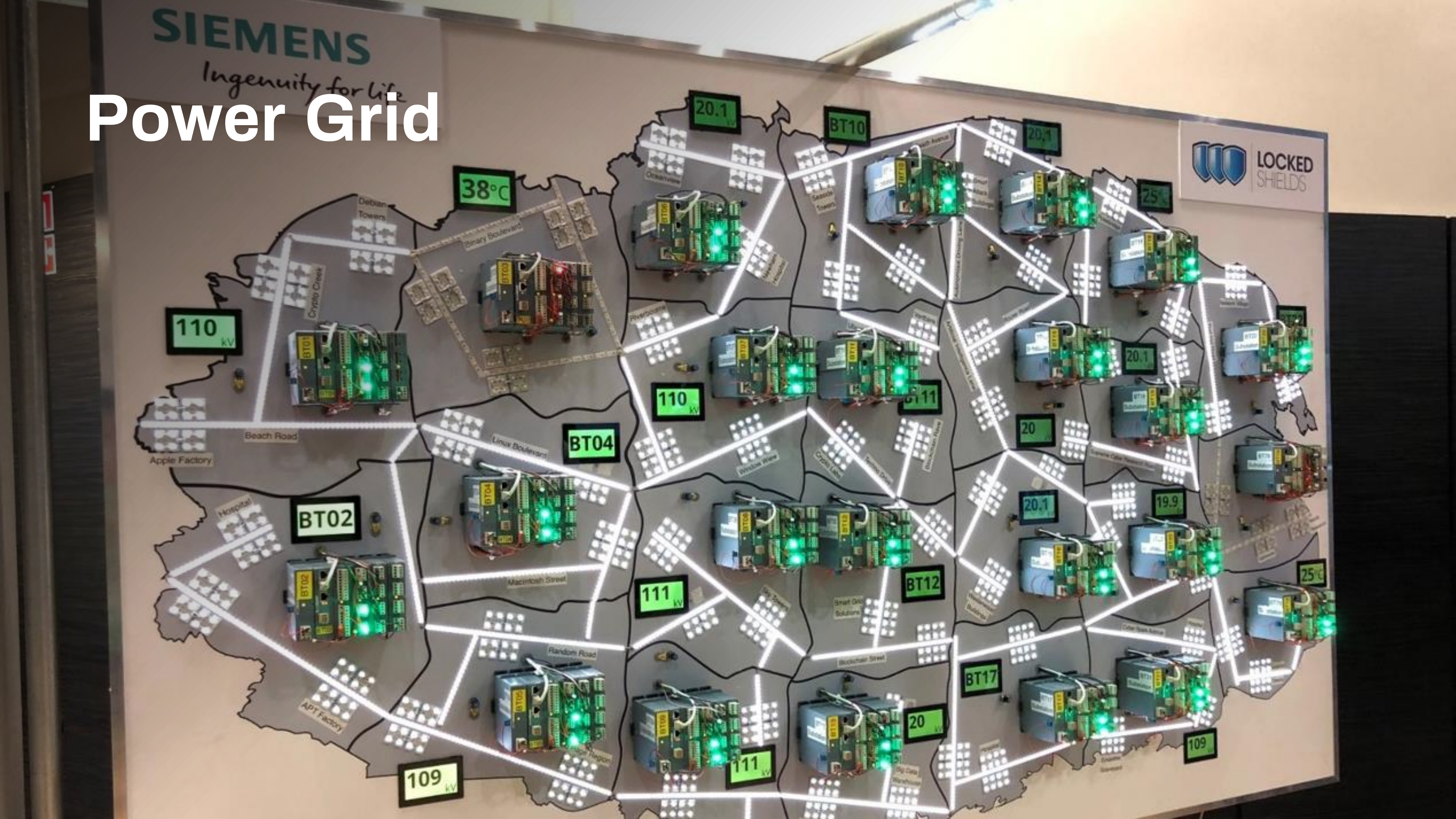
LOCKED
SHIELDS
2023



Power Grid


SIEMENS
Ingenuity for life
LOCKED SHIELDS
38°C
20.1 kV
BT10
20.1
25°C
110 kV
110 kV
BT04
BT11
20.1
20
BT02
111 kV
BT12
20.1
19.9
25°C
BT17
20 kV
111 kV
109 kV
109
Debian Towers
Binary Boulevard
Crypto Creek
Beach Road
Apple Factory
Oceanview
Seaside Towers
Riverbourne
Linux Boulevard
Hospital
Macintosh Street
Window Wave
Crypto Labs
Random Road
APT Factory
Blockchain Street
Smart Grid Solutions
Big Data Warehouse
Cyber State Avenue
BT01
BT02
BT03
BT04
BT05
BT06
BT07
BT08
BT09
BT11
BT12
BT13

Critical Infrastructure Protection

BT06
BT07
BT08
BT09
BT10
BT11
BT12
BT13
BT14
BT15
BT19
BT20
LOCKED SHIELDS
CCDCOE
NATO Cooperative Cyber Defence Centre of Excellence Tallinn, Estonia

Locked Shields 2023 in numbers

Organisers

- 38 nations
- 20+ partners
- 375 planners & developers

Environment

- 5500 VM
- 8000 RT Attacks

Training Audience

- 38 nations
- 24 teams
- ~3400 participants

CCDCOE

Cyber exercises for strategic level

> We must continue emphasising the need for training on strategic decision-making level. The Locked Shields also offers national senior-level decision-makers the chance to test their readiness to manage a crisis.

Kaja Kallas, Prime Minister of Estonia,
at Locked Shields 2021

Strategic decision making - goals

- → Translate technical incidents into strategic decisions as outlined by National Cyber strategies
- → Reporting and information sharing, command and control functionality
- → Understand the coordination and decision making process during a cyber event - both domestically and internationally

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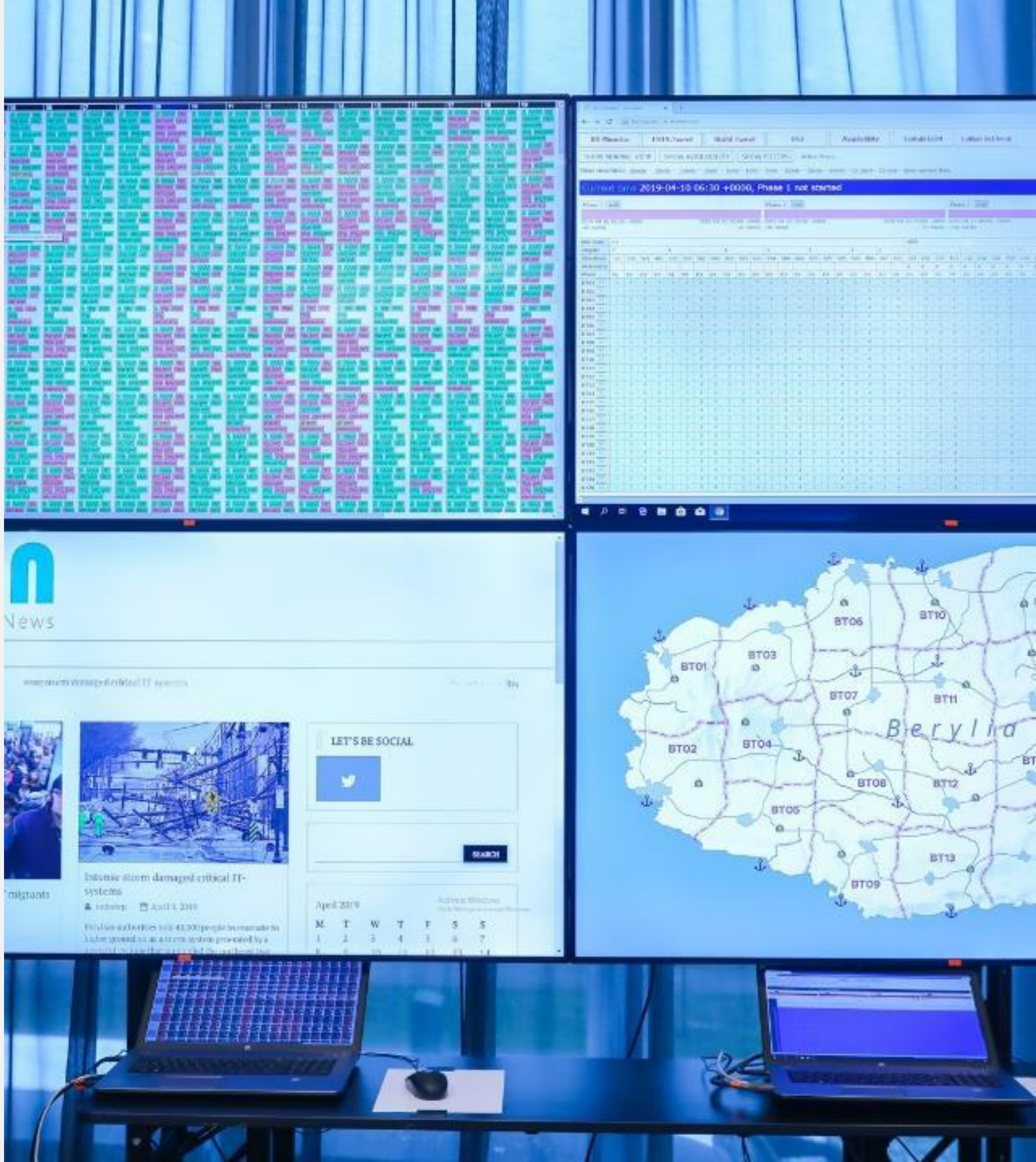
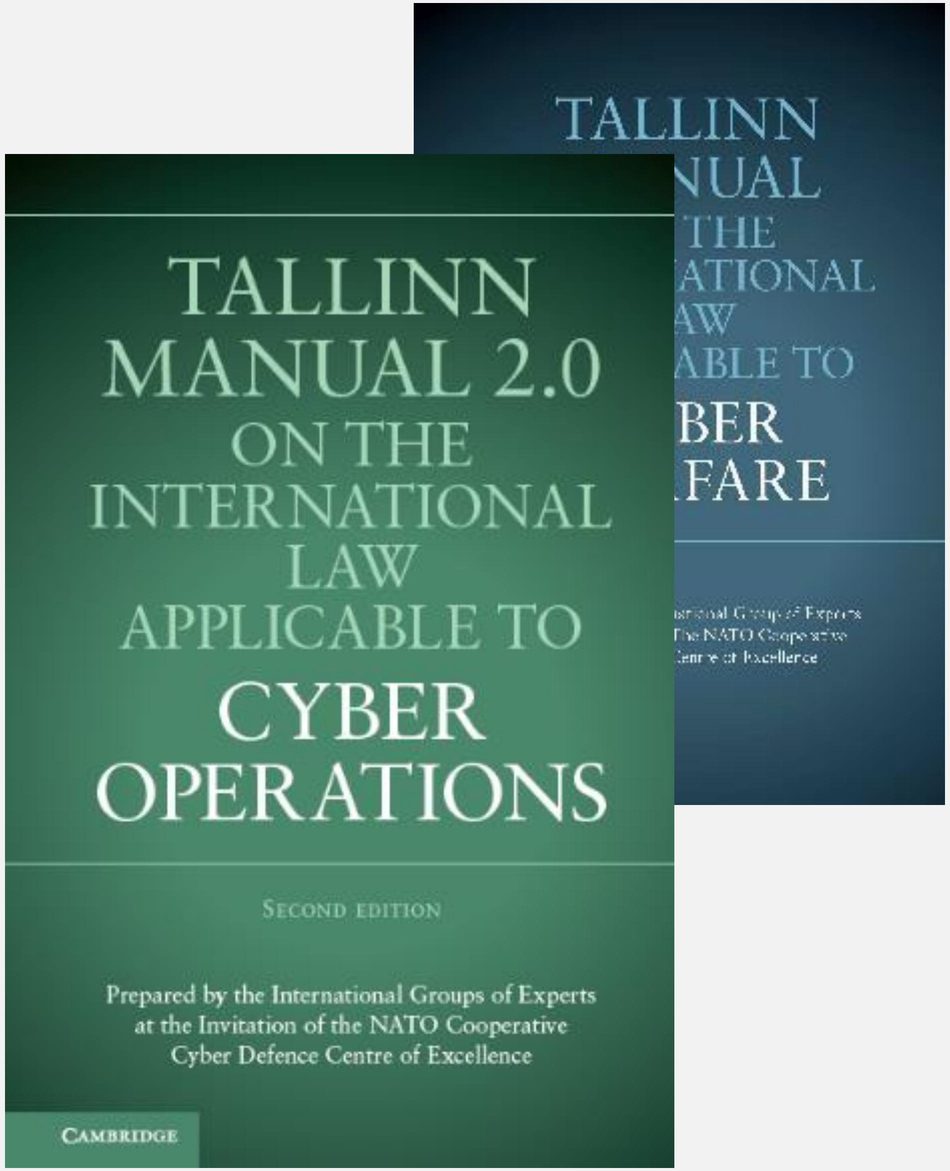


The Tallinn Manual

- Hosted by CCDCOE in 2009-2013; 2013-2017; 2021+
- International Group of Experts of scholars and practitioners from around the globe
- State consultations
- Interpretation of existing international law (*lex lata*) in the cyber context
- Rules and commentary



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CAMBRIDGE

CyCon 2024: Over the Horizon!
May 28-31, 2024

Partners

ACADEMIA

SU

FI CODE ForschungsInstitut Cyber Defence Universität der Bundeswehr München

U.S. NAVAL WAR COLLEGE
Est. 1884
NEWPORT, RHODE ISLAND

NATIONAL

NÚKIB

RKK ICDS

Ministry of Foreign Affairs of the Netherlands

INDUSTRY

SIEMENS

Value Your Content
thinklogical
Trust Our Proven Ingenuity

CYBEXER

ERICSSON

THREOD

CYBERNETICA

EclecticIQ

INTERNATIONAL

ICRC

CCDCOE

Thank you!

SLOVAKIA
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