INL/CON-23-73197-Revision-0

Cyber-Informed Engineering Overview: Joint NERC/INL/E-ISAC Webinar

July 2023

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Changing the World's Energy Future

Idaho National Laboratory

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Cyber-Informed Engineering

Battelle Energy Alliance manages INL for the
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Idaho National Laboratory

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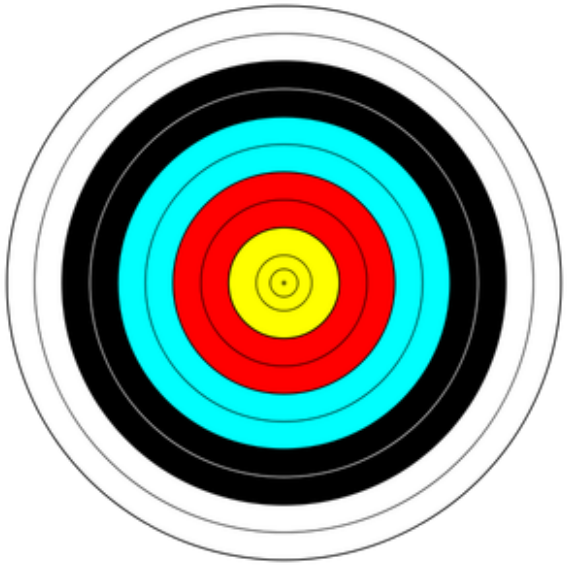
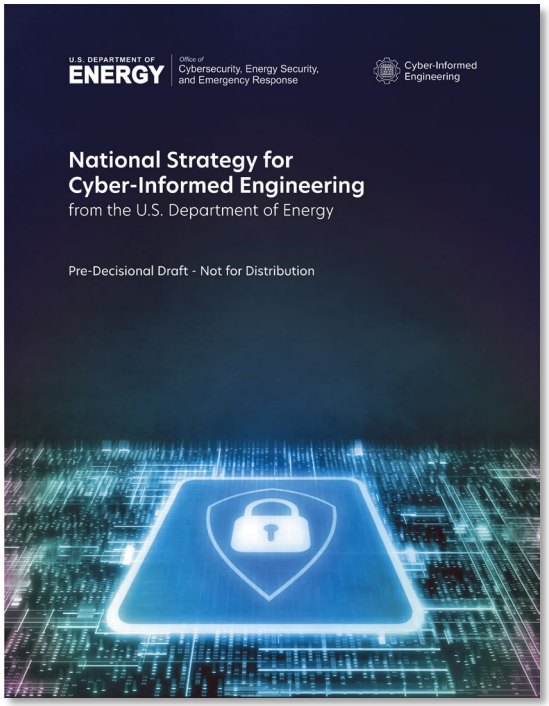
Start with Why, Remember Why

- Managing risks inherent from using digital technology in a world with adversaries is *the* **why**
- CIE is *the* **what**
  - Principles distilled from trends in years of work
- CCE is *a* **how**
  - Based on and developed by many of the same people as CIE
- CITPF is a *new* how for the specific discipline of transmission planning



Cyber-Informed Engineering (CIE)

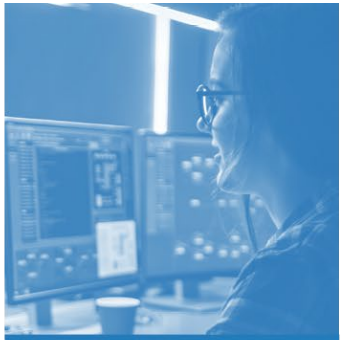
- CIE uses **design decisions and engineering controls** to eliminate or mitigate avenues for cyber-enabled attack.
- CIE offers the **opportunity to use engineering to eliminate specific harmful consequences** throughout the design and operation lifecycle, rather than add cybersecurity controls after the fact.
- Focused on **engineers and technicians**, CIE provides a framework for cyber education, awareness, and accountability.
- CIE aims to engender a **culture of security** aligned with the existing industry safety culture.



Pillars of the National CIE Strategy

Awareness

Promulgate a universal and shared understanding of CIE



Education

Embed CIE into formal education, training, and credentialing

Development

Build the body of knowledge by which CIE is applied to specific implementations

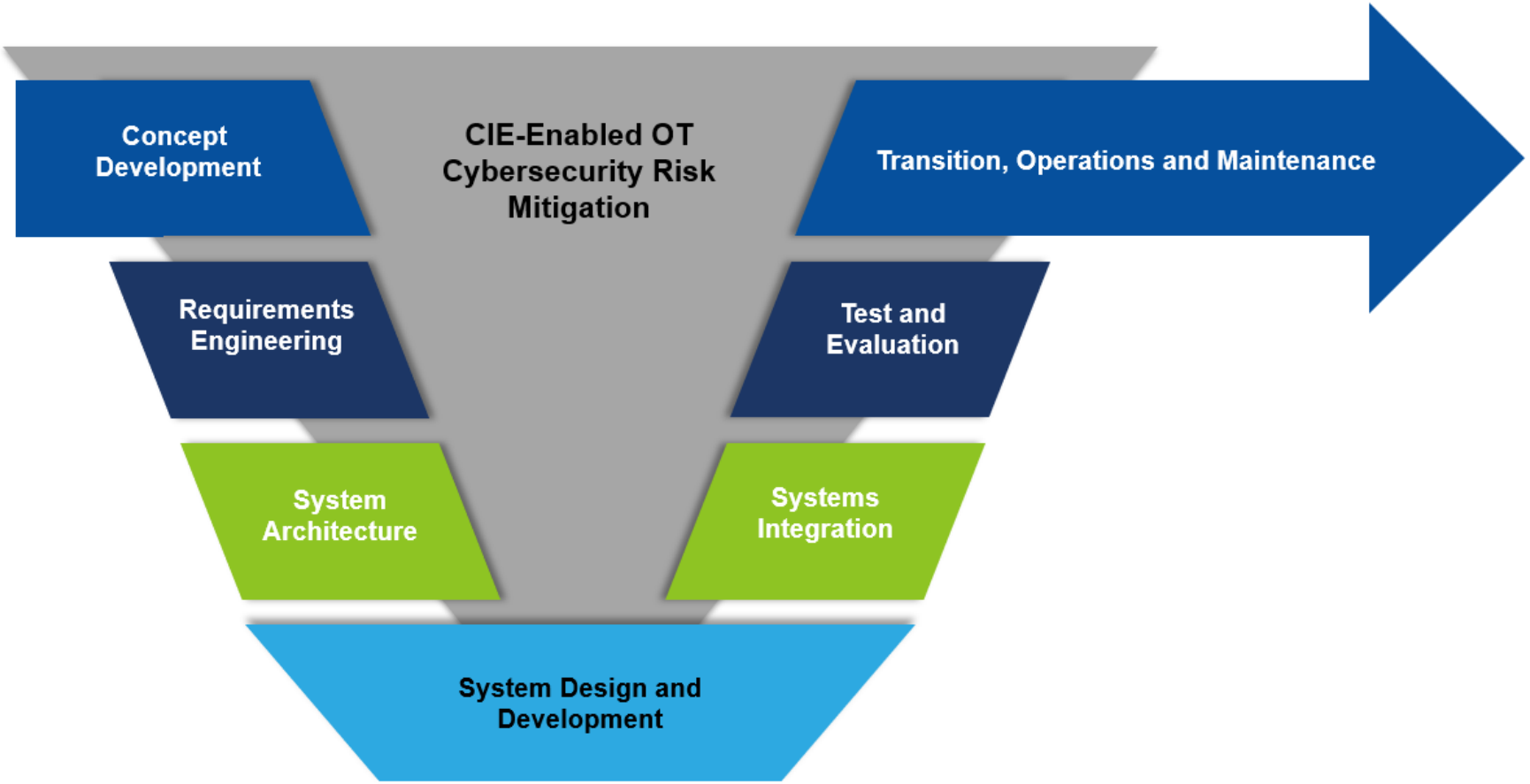
Current Infrastructure

Apply CIE principles to existing systemically important critical infrastructure

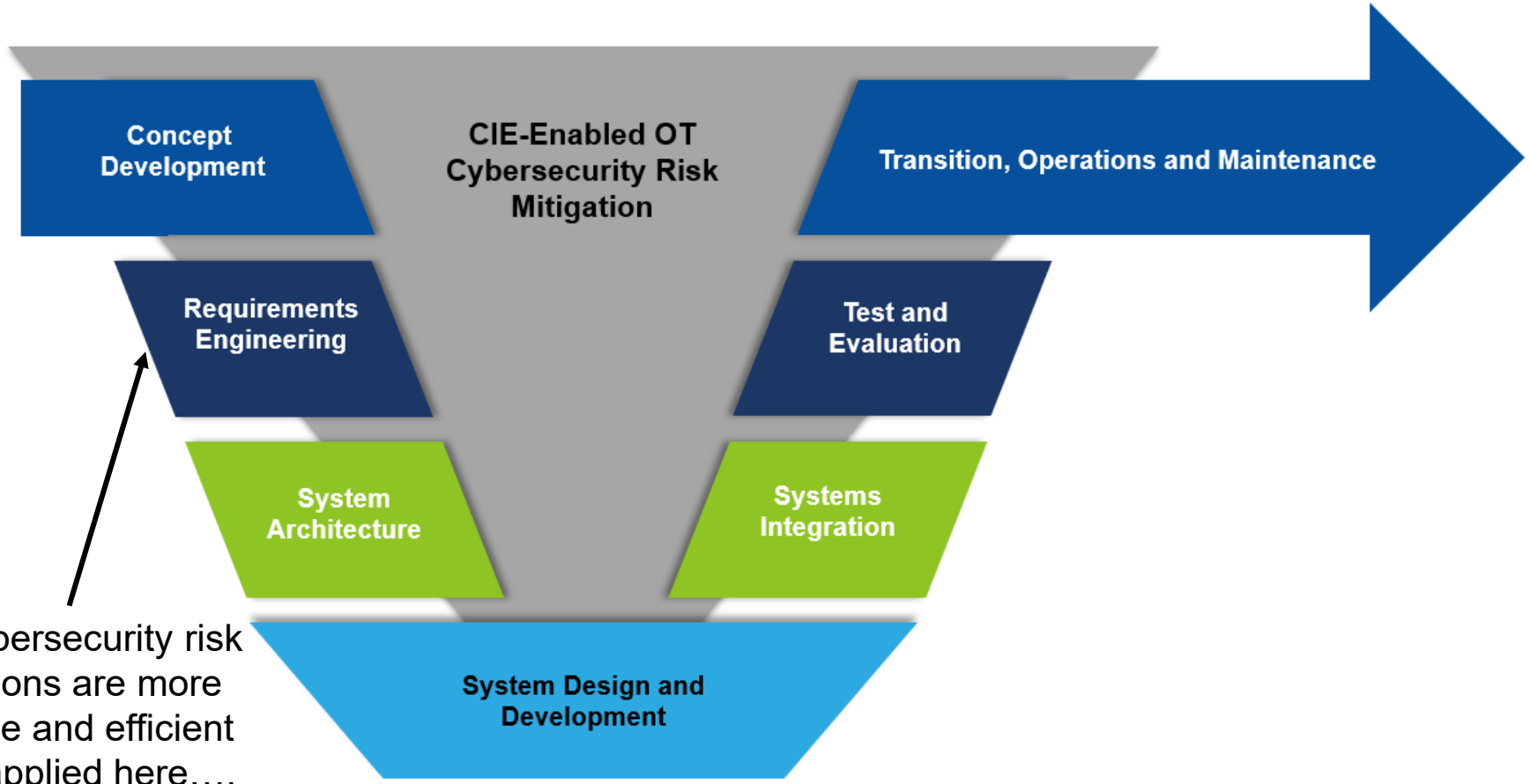
Future Infrastructure

Conduct R&D and develop an industrial base to build CIE into new infrastructure systems and emerging technology

CIE and the Systems Engineering Lifecycle

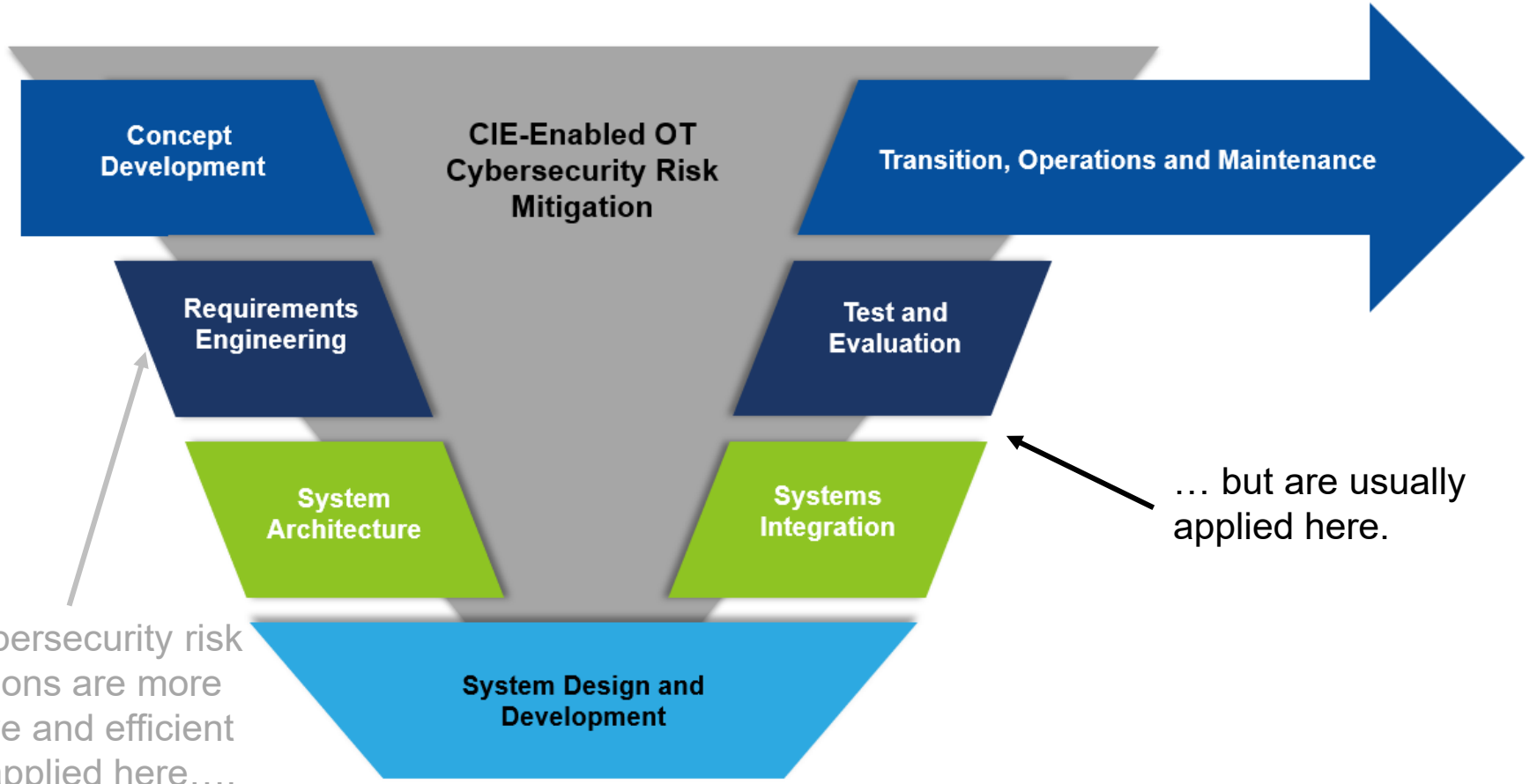


CIE and the Systems Engineering Lifecycle



OT Cybersecurity risk mitigations are more effective and efficient when applied here….

CIE and the Systems Engineering Lifecycle



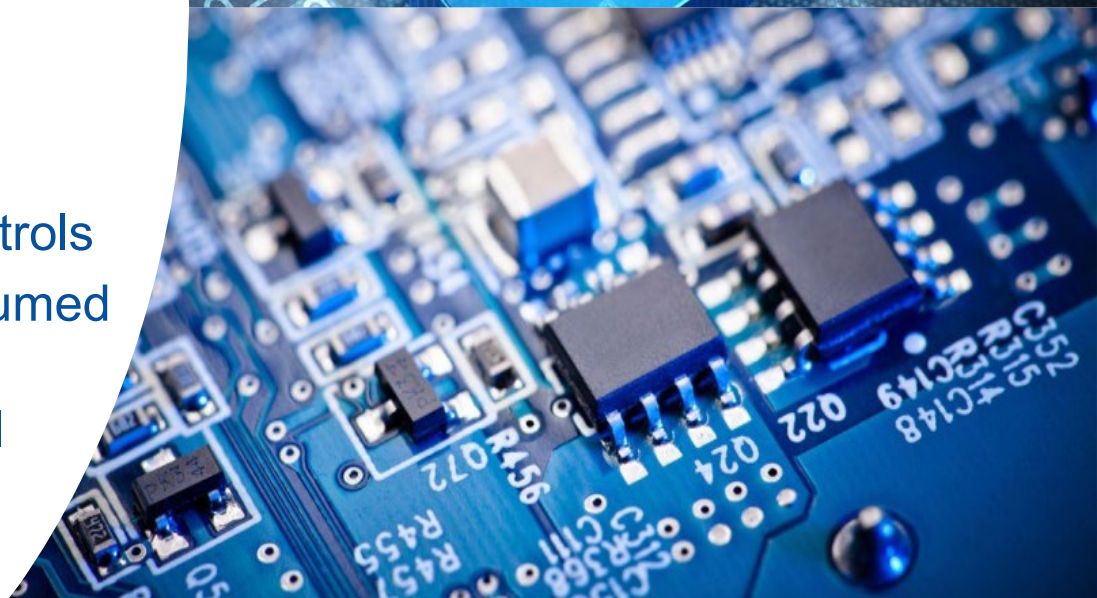
Principles of CIE

Design and Operations

- Consequence-focused design
- Engineered Controls
- Secure information architecture
- Design Simplification
- Resilient layered defenses
- Active defense

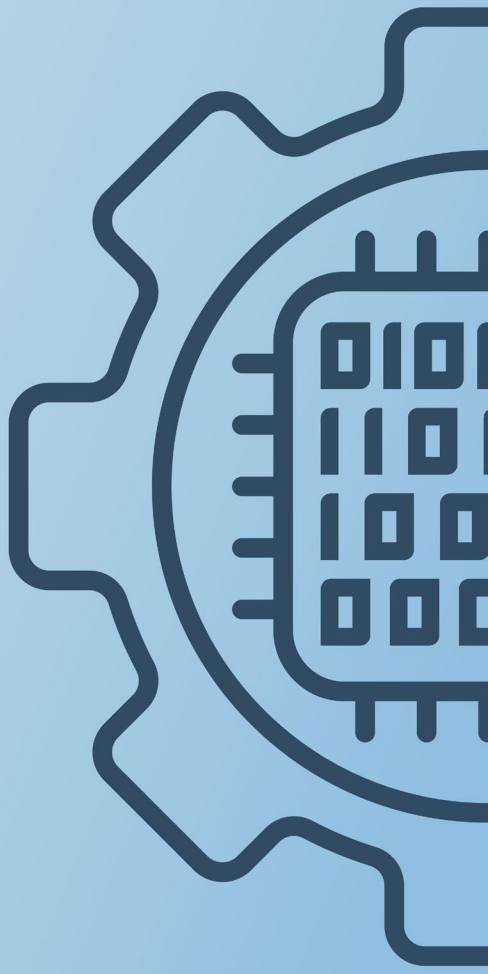
Organizational

- Interdependency evaluation
- Digital asset awareness
- Cyber-secure supply chain controls
- Planned resilience with no assumed security
- Engineering information control
- Security culture



Save the date

Cyber-Informed Engineering Practitioner's Workshop



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Sept. 6, 2023
11am - 5pm
Eastern

Learn More

- National CIE Strategy: https://www.energy.gov/sites/default/files/2022-06/FINAL%20DOE%20National%20CIE%20Strategy%20-%20June%202022_0.pdf
- 2-Part Industrial Cyber article on CIE and CCE: Meaning strides possible with CIE and CCE methodologies across industrial cybersecurity landscape - Industrial Cyber
- Harvard Business Review: https://hbr.org/2023/04/engineering-cybersecurity-into-u-s-critical-infrastructure?ab=hero-subleft-2
- Society of American Military Engineers / The Military Engineer : https://www.same.org/tmearticle/engineering-in-cybersecurity/
- Forbes article (published by external collaborator): https://www.forbes.com/sites/forbestechcouncil/2022/11/09/how-cyber-informed-engineering-can-be-the-way-forward-for-critical-infrastructure/?sh=133d54256614
- Hack the Plant Podcast (INL's Zach Tudor discusses the application of CIE for Small Modular Reactors): https://www.listennotes.com/podcasts/hack-the-plant/idaho-national-labs-and-the-vKyWbkUSNV5/

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