



# Carnegie Mellon University Software Engineering Institute CERT® Division

*Trusted. Valued. Relevant.*

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# Carnegie Mellon University (CMU)



## Pioneering discoveries that enrich the lives of people on a global scale

- Turning disruptive ideas into success through leading-edge research
- 2022 *U.S. News and World Report* rankings:
  - #1 in computer engineering, AI, cybersecurity, software engineering, mobile/web applications, quantitative analysis, management information systems, and programming languages
  - Top 5 in 17 more programs

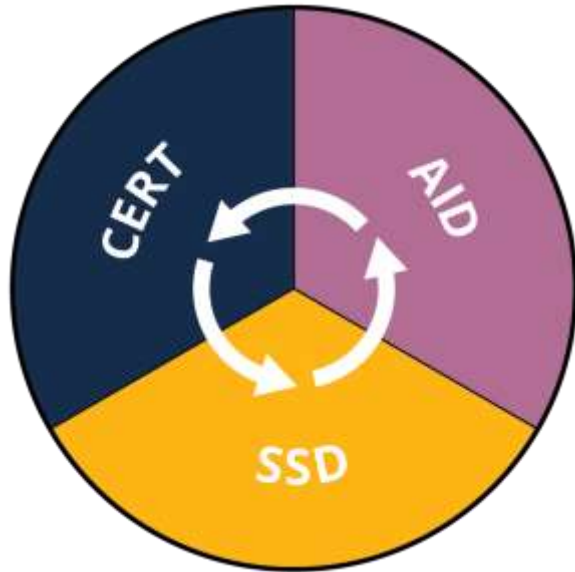
# CMU Software Engineering Institute (SEI)



## **Bringing innovation to the U.S. government**

- A Federally Funded Research and Development Center (FFRDC) chartered in 1984 and sponsored by the DoD
- Leader in researching complex software engineering, cyber security, and artificial intelligence (AI) engineering solutions
- Critical to the U.S. government's ability to acquire, develop, operate, and sustain software systems that are innovative, affordable, trustworthy, and enduring

# Three Collaborative Technical Divisions



**CERT Division: Strengthening the cybersecurity and resilience of systems and networks**

**AI Division: Addressing the need for leap-ahead AI capabilities that are reliable, responsible, safe, fair, and transparent**

**Software Solutions Division: Assuring that software functions predictably as intended and that capability is delivered quickly with a minimum of uncertainty and risk**

# CERT Division – Birthplace of Cybersecurity



## **Trusted**

Conducting research for the U.S. Government in a non-profit, public-private partnership

## **Valued**

Collaborating with military, industry, and academia globally to innovate solutions

## **Relevant**

Achieving technology and talent results for our mission partners

# CERT Division – Then and Now

**1988**

Computer Emergency Response Team formed in response to the Morris Worm

**2022**

Cybersecurity Engineering and Resilience Team conducting collaborative and innovative evidence-based research to fortify the cyber ecosystem and protect national security and prosperity

# CERT Strategic Goals

- **Advance Cybersecurity by Design:** Develop and transition evidenced-based solutions addressing foundational and enduring challenges
- **Enhance Cybersecurity Resilience:** Discover and prototype methods to build resilience into existing and future critical infrastructure
- **Influence the Cybersecurity Marketplace:** Promote more effective, efficient, and resilient methodologies and principles
- **Shape the Future:** Inform stakeholders of technical priorities and emerging research challenges in partnership with the community

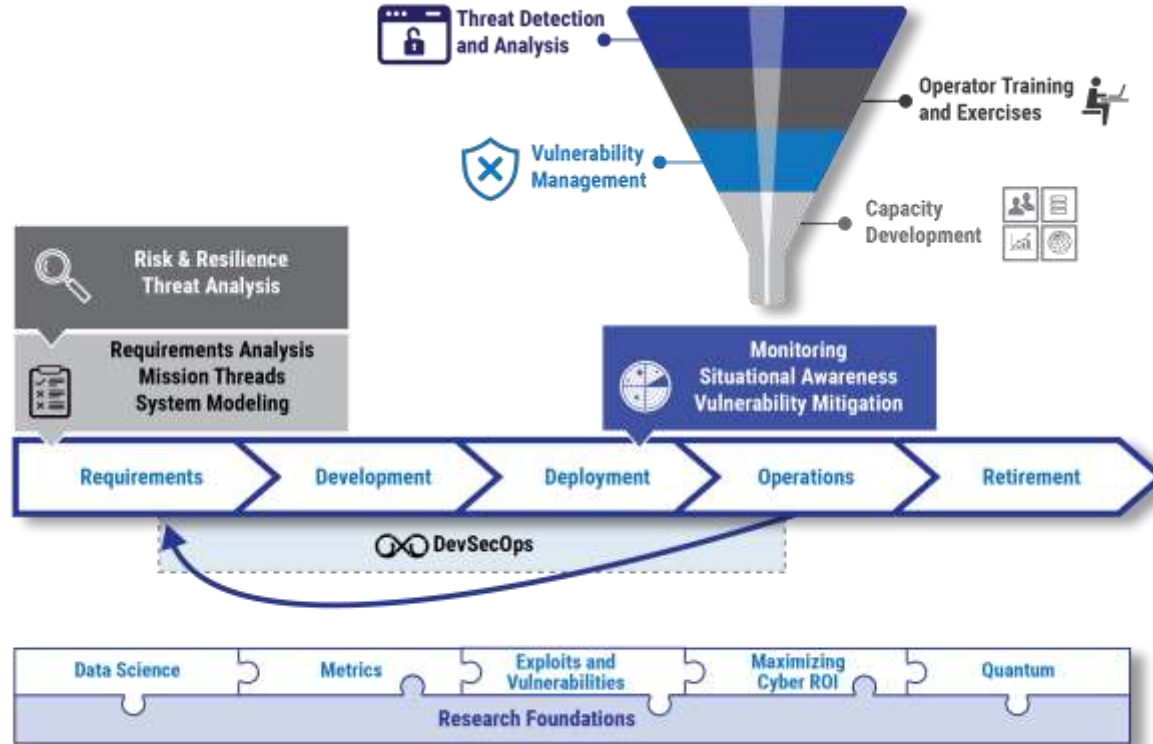
# The People of CERT

- **Researchers**  
Maturing the disciplines of engineering and secure software systems
- **Innovators**  
Creating and prototyping technologies that enable the cyber mission
- **Collaborators**  
Applying our expertise with academia, government, and private industry
- **Transitioners**  
Partnering with CMU to disseminate our solutions

# CERT Technical Areas

- **Engineering for Cyber Resilience**
- **Measuring Risk and Optimizing Cybersecurity Investment**
- **Identifying and Countering Threats**
- **Cultivating Essential Skills and Abilities**
- **Situational Awareness and Network Analysis**
- **Cyber Operations Development**

# Improving the Full Lifecycle



# Example Work Products



## Technical and Process-Driven Solutions



## Training and Exercises



## Analysis and Recommendations

# Space Research

- Cyber security exploratory with Aerospace for Roberta Ewart
- Cyber security and DevSecOps for Space Development Agency (SDA)
- CMU Robotics Institute – Robotic Exploration Lab (REX Lab)
  - Magnetorquer attitude manipulation
  - Optimal algorithms for maneuvers and electric propulsion
  - Cubesat control
- Robotic Exploration – Astrobotic Technology spinout

# Engage with Us



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# Contact Us

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