

# Asymmetric Resilient Cybersecurity Roadshow

**Friday, May 12th**

Battelle

1550 Crystal City Drive, Suite 601

Arlington, VA 22202



[cybersecurity.pnnl.gov/roadshow](https://cybersecurity.pnnl.gov/roadshow)

**8:00–8:30 a.m.** *Check in/Refreshments*

## Morning Session

- ▶ **8:30–9:00 a.m.** Welcome/Purpose/Description of Activities
- ▶ **9:00–10:30 a.m.** Product Demonstrations (*with breakout rooms*)
- ▶ **10:30 – 12:00 p.m.** Research Experiments and Discussion

**12:00-1:00 p.m.** *Break*

## Afternoon Session

- ▶ **1:00 – 1:30 p.m.** Welcome/Purpose/Description of Activities
- ▶ **1:30–3:00 p.m.** Product Demonstrations (*with breakout rooms*)
- ▶ **3:00 – 4:30 p.m.** Research Experiments and Discussion

## ARC Technologies and Concepts Impact a Variety of Missions:

- Real-time situational awareness
- Decision support
- Testing and evaluation
- Coordinated response
- Threat awareness
- Triage and recommenders for analysts

## System Resilience, Survivability

### Pre-Boom:

Make complex cyber systems more difficult to manipulate

### During/Post-Boom:

Sense loss of functionality and regrow, regenerate, reconstitute

# An Inward-focused Sensing and Acting Loop

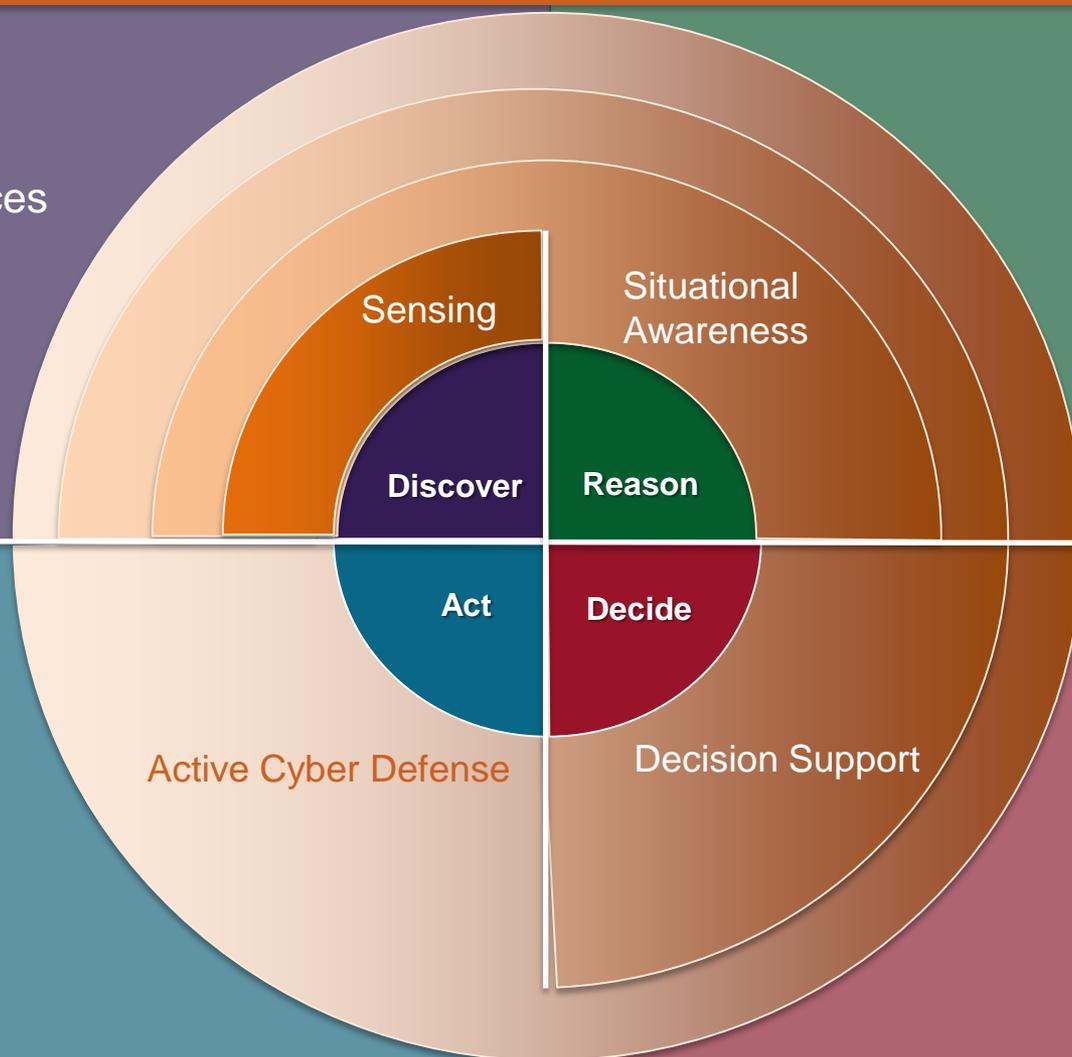
Some tools and techniques exist, but must be enhanced and integrated for resilient systems.

Model-based approaches for **discovering** resources and state lead to advanced sensing technologies

Combining discovery with novel **reasoning** algorithms provides new insight at attack relevant speeds

Connecting prioritized options to **actuators** makes complex cyber systems more active, continuing to support missions in the face of impediments

Including a proactive and reactive **decision** engine supports automated or human response

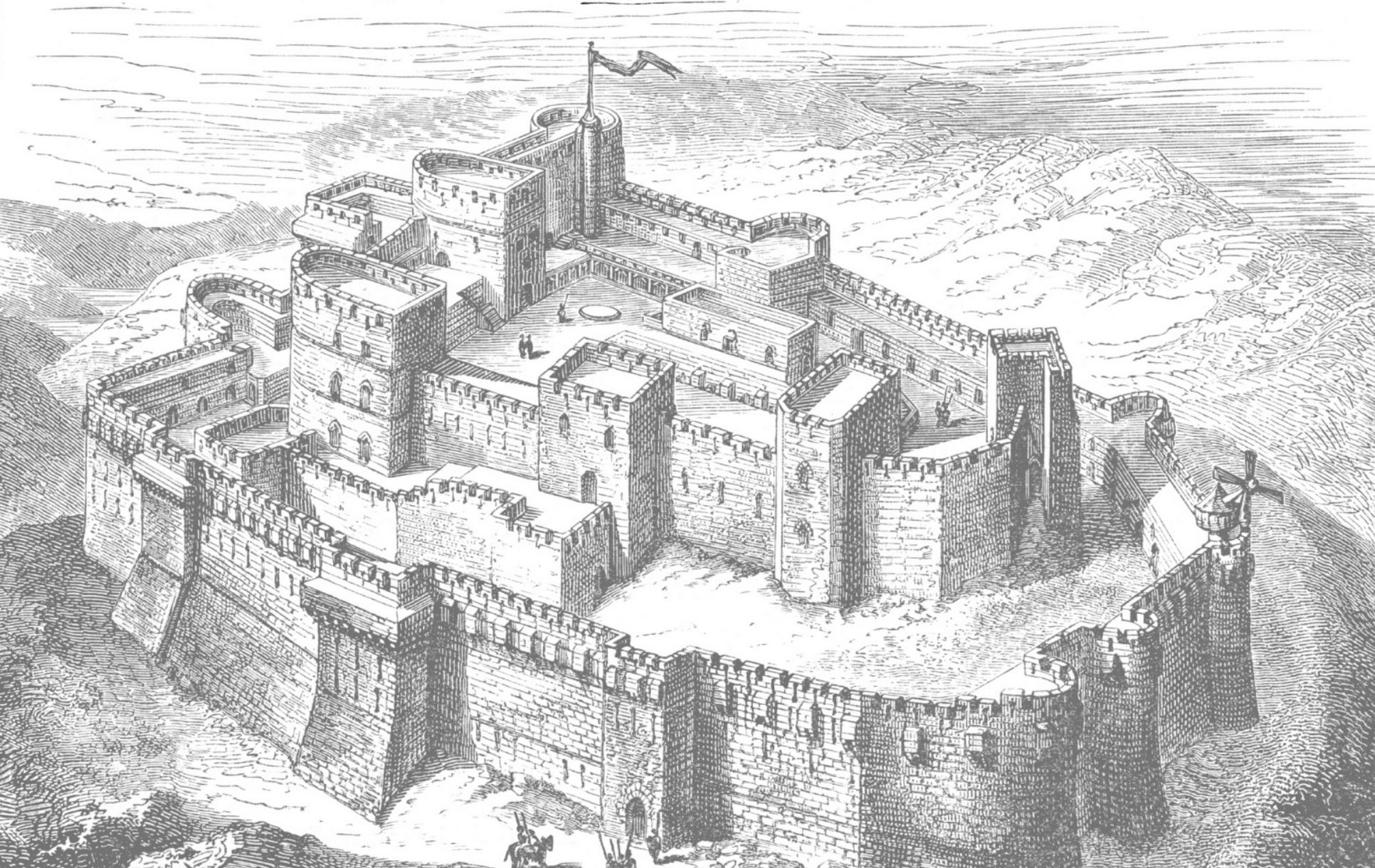


# Why it Matters: Today's Cyber Challenge



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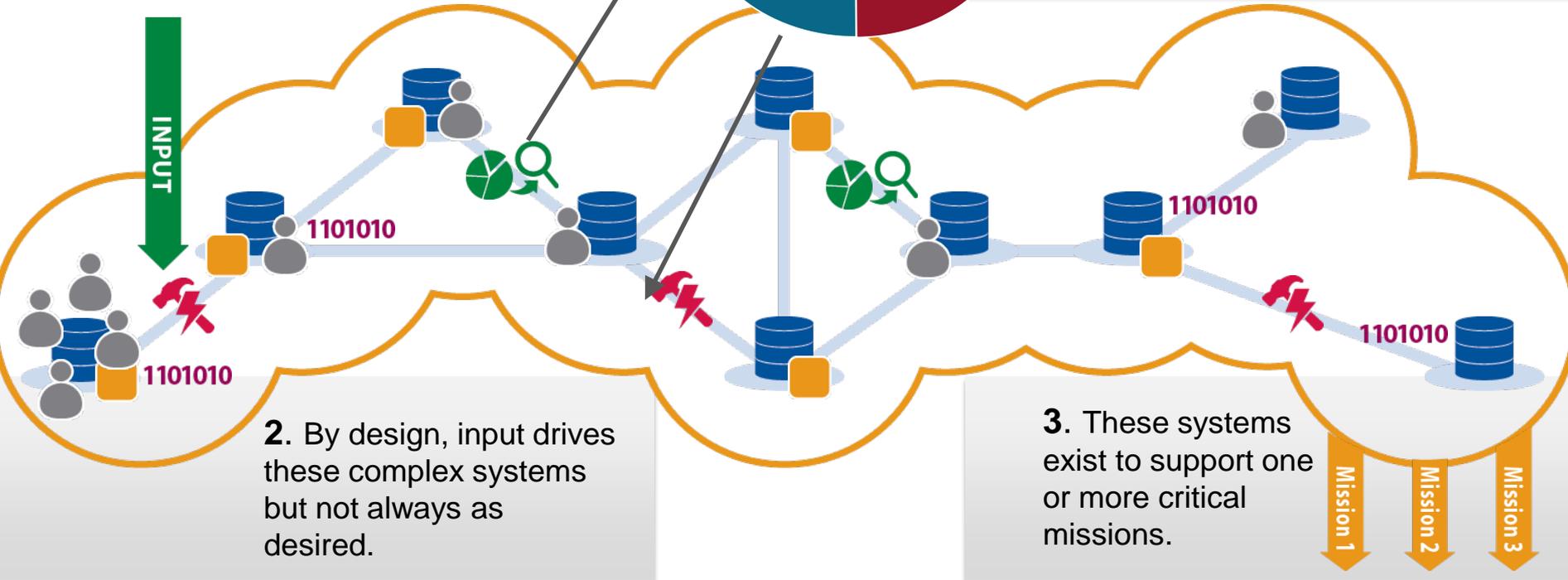
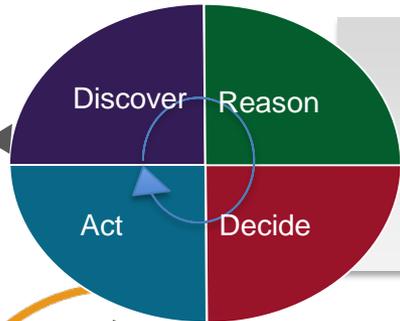
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# Vision: Resilient Cyber Systems

1. Complex cyber systems are composed of systems, users, data, and applications, connected by one or more networks.

4. Resilience can be realized using an inward-looking OODA loop that takes sensory input and affects the system through actuators.



2. By design, input drives these complex systems but not always as desired.

3. These systems exist to support one or more critical missions.

System	Network	ViSR	Application	User	Data	Actuation	Sensing

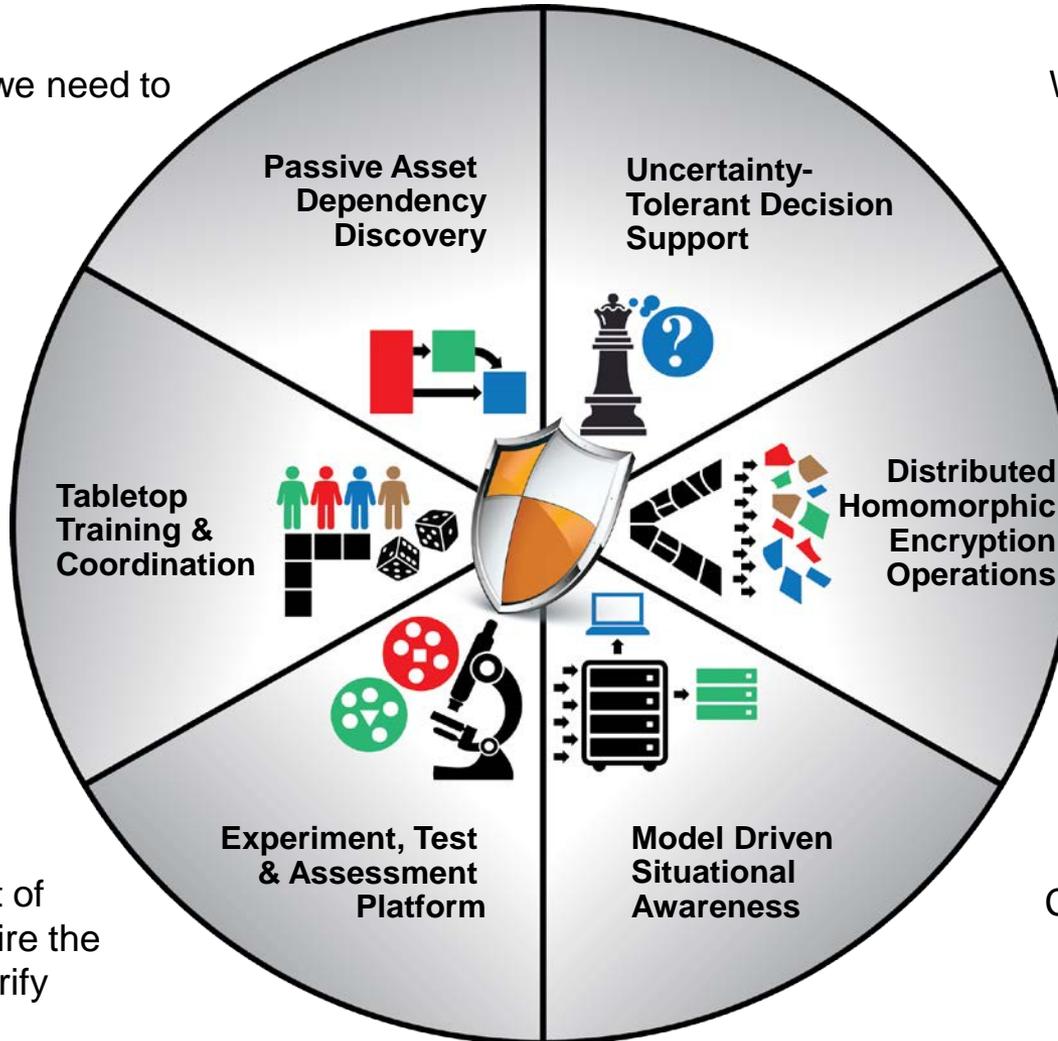
# Addressing Key Gaps with ARC Capability Areas

## Addressing specific technology gaps with novel R&D:

In dynamic systems, we need to track assets and their dependencies.

Resilience technologies will need to be usable by defenders.

Understanding impact of technologies will require the ability to rigorously verify performance.



We will need to make good decisions with imperfect knowledge.

Data at rest must be protected while enabling the range of operations that are necessary to make it useful.

Current sensors need to be supplemented with new information.



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Asymmetric Resilient  
Cybersecurity Initiative

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