# Performance Assessment of Multiple Cyber Security Teams in a Cyber Exercise Event

**S&T Campaign: Human Sciences**
***Integration of Humans and Systems***
***Humans in Multi-Agent Systems***

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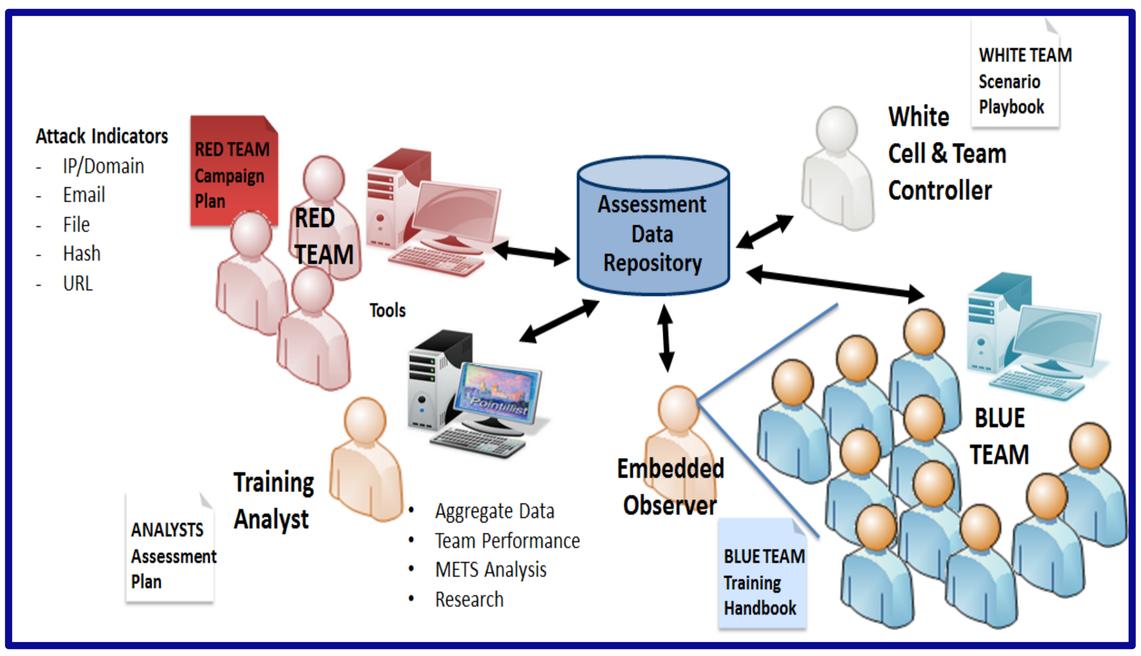
## Research Objective

- **Define and standardize critical measures of military cyber-security team performance**
- **Evaluate the technical instruments available for recording these measures**
- **Define gaps in metric collection and evaluation; explore methods to address them**



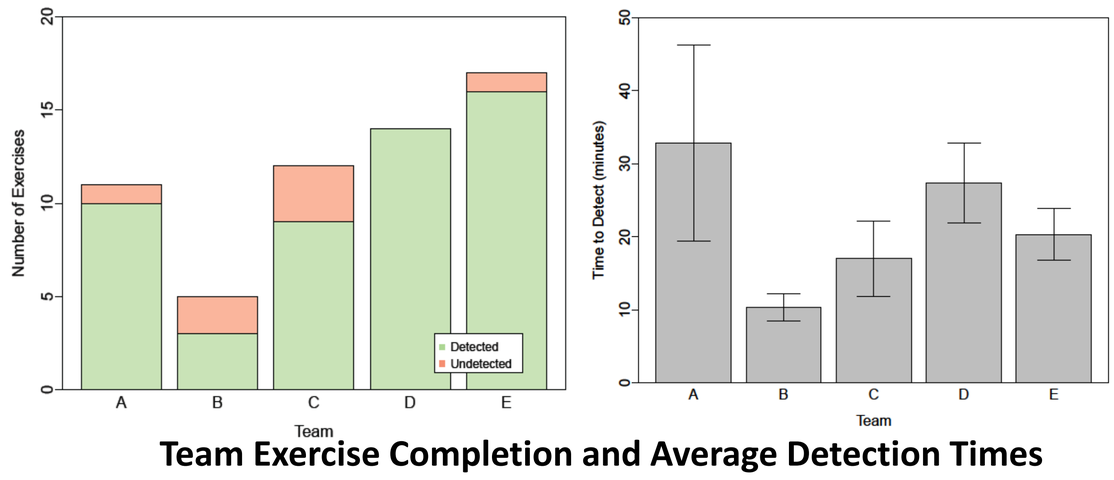

Performance and Assessment Elements of Cyber Defense Exercise

## Challenges

- **Tool- and process-based gaps exist in data collection and scoring efforts.**
- **The complexity and adversarial nature of real-world cyber security does not easily lend itself to controlled laboratory studies.**
- **Collection and analysis of individual and team performance in cyber defense exercises is essential and valuable, but requires significant overhead in addition to exercise organization.**

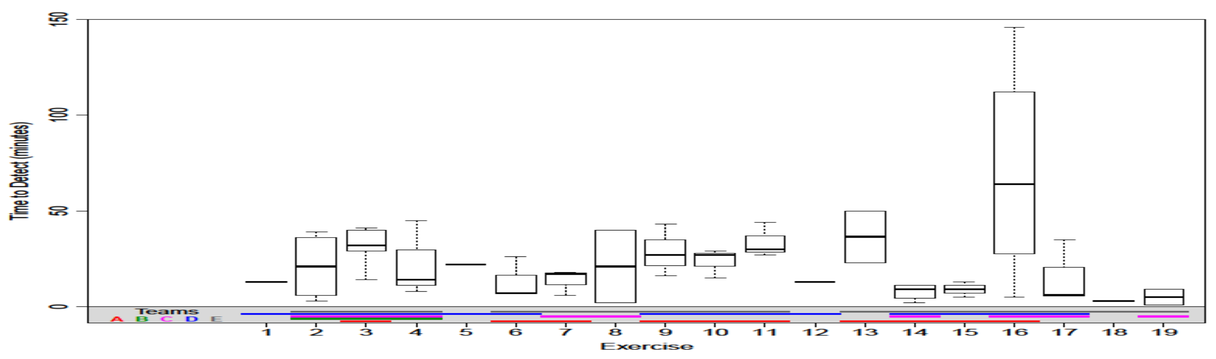
## Results

- **Cyber Protection Team (CPT) performance was highly variable (novice to expert teams) given by the number and probability of detecting ongoing cyber attacks.**




Team Exercise Completion and Average Detection Times

- **The teams exhibiting the fastest detection times were also the ones that detected the fewest events; thus, detection times need to be understood in terms of relative difficulty and context of the cyber attacks.**




- **Some events were challenging to detect. The outlier Event #16 is an ongoing Industrial Control System (ICS)/Supervisory Control and Data Acquisition (SCADA) attack. This highlights a critical cybersecurity challenge to a known vulnerability.**

## ARL Facilities and Capabilities Available to Support Collaborative Research

- **Cognitive Assessment, Simulation, and Engineering Laboratory (CASEL) at APG, MD**
- **CHIMERA (Cyber-Human Integrated Modeling and Experimentation Range-Army) Laboratory facilities enable network simulation and testing for tool prototypes**
- **Intelligence analysts are available for insights into cyber protection team processes and tasks.**
- **Ongoing collaborations through the ARL Cyber Security Collaborative Research Agreement (CRA)**
  - **Continued interaction and integration with the National Guard at annual Cyber Shield training event**

## Complementary Expertise/ Facilities/ Capabilities Sought in Collaboration

- **Tools to support automated collection – reduce resource / personnel needs**
- **Standards for data collection and automation processes across multiple training environments and/or events**
- **Expertise and knowledge of ICS and SCADA environments to integrate with cyber security knowledge and practice**
- **Greater access to CPT teams and cyber security exercises / events would provide more avenues to test and validate tools and metric collection**