

# Leveraging Serious Games to Assist Motivation and Education

## Utilizing: CKEI - (Cyber-Kinetic Effects Integration)

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# Core Challenge Problem – I



- Limited DoD resources for continuing training
  - Experts drive innovation
  - How to create outliers?

# Core Challenge Problem - II



- Increasingly interconnected world
- Cyber-Physical systems
- Changing face of DoD operations
- Cyber-Supported operations





# Core Challenge Problem



- Cyber Operator Training
- Lacks Integration with Kinetic Domains
  - Cyber Effects → Kinetic Domains
  - Kinetic Effects → Cyber Domains
  - Awareness of Cyber-Kinetic dependencies
- Cyber operators not immersed in a ‘living’ environment
  - Importance of system C.I.A. not dictated by larger mission needs
  - Unrealistically locked down systems

# Bringing Back Reality

Two birds, one stone.





# Approach



Integrate realistic representation of kinetic operations into cyber training

- Realistic Kinetic Simulation
- Mature Cyber Platform (STEP Technology)

# Approach



- Drive engagement through gamified play experience
- Develop appreciation for realities of kinetic mission



# Scenario Overview



Participants placed in support role of cyber-kinetic operation.

- Training supports mission
- Real time mission execution
- Environment drives immersion

# Mission Overview



- Reporter held hostage by enemy forces
  - No-notice hasty operation
- Outmanned, outgunned
  - Must outsmart

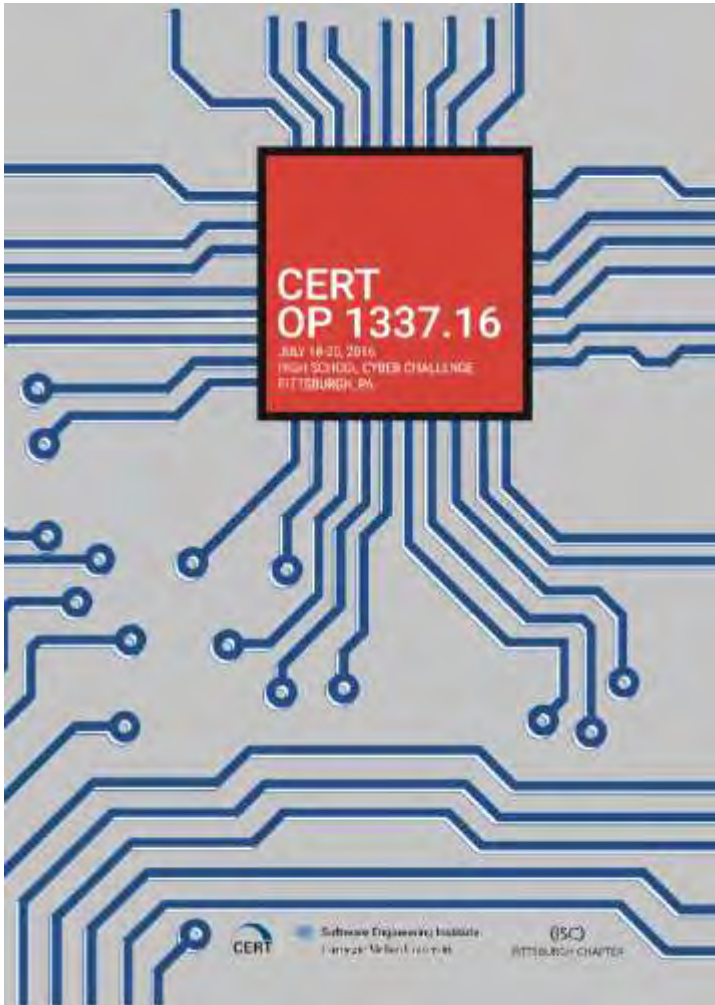
# Participants Attack and Defend



- Defend Cyber Infrastructure
  - Surveillance Drone
  - Communications Systems
- Attack Enemy Cyber-Physical Systems
  - Lighting
  - Security Cameras
  - Alarms
  - Power



# Study Design – Attention

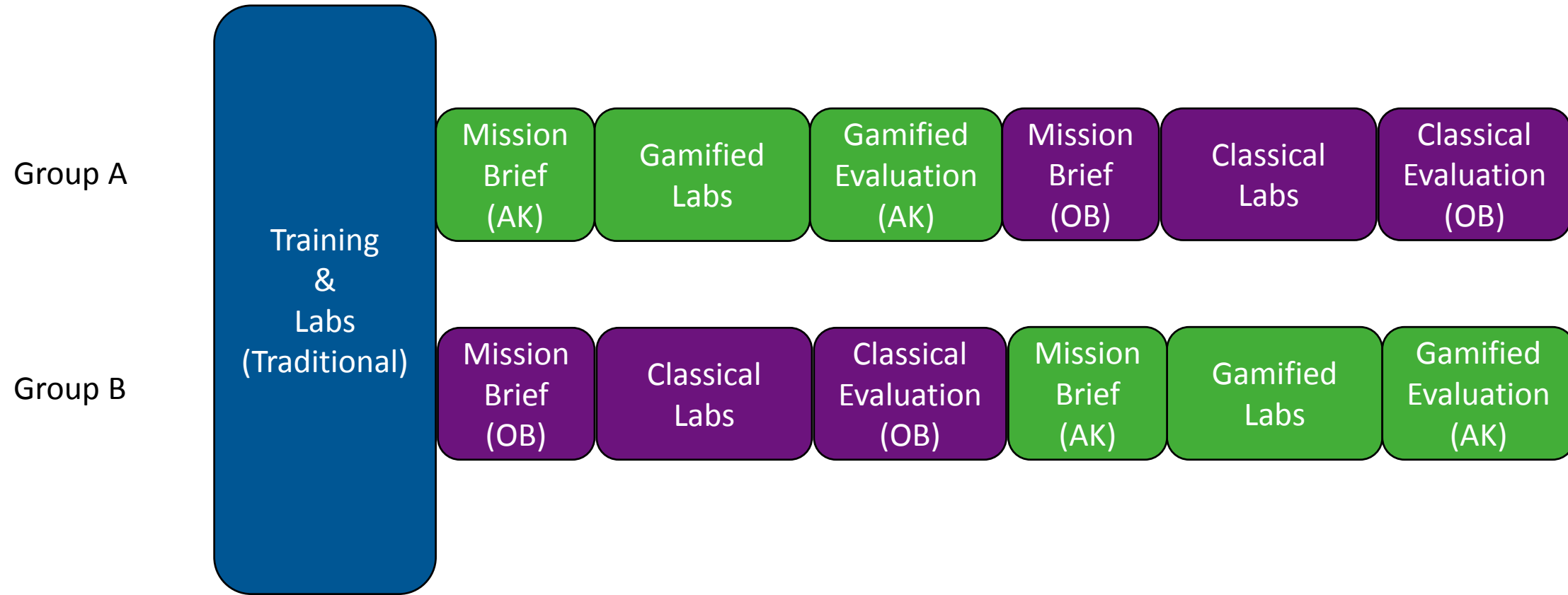


## Cooperative Event

- High-school Summer Cyber Challenge
- In Cooperation with ISC<sup>2</sup>
- Within Subjects Design
  - Alternating:
    - Operation Opulent Bluegrass
      - Defeat Botnet
    - Operation Aluminum Kangaroo
      - Rescue Hostage



# Study Design – Self Motivation



# Opulent Bluegrass – Feedback Mechanism

Regional Cyber Center East

CYBER OPERATOR	1	2	3	4	5	6	7
NON@EUACCUMSAN.CA	Green	Green	Red	Green	Green	Green	Red
NUNC.UILLAMCORPER@METUSVIVAMUSEUISMCD.COM	Red	Red	Red	Red	Green	Red	Red
ODIO.A@ORCISEMEGET.CA	Red	Green	Green	Green	Red	Green	Red
ORNARE.FUSCE@INTEGER.CA	Green	Green	Red	Red	Green	Red	Green
ORNARE.IN.FAUCIBUS@SEDPHARETRA.ORG	Red	Green	Green	Green	Red	Green	Red
PARTURIENT.MONTES@LIBEROPROIN.CA	Green	Green	Green	Green	Green	Red	Red
PARTURIENT@VELSAPIENIMPERDIET.CO.UK	Red	Red	Green	Green	Green	Green	Green
PEDE.CUM.SOCIIS@IPSUMNONARCU.EDU	Green	Red	Red	Green	Red	Red	Green
PEDE.NEC@ALIQUAM.ORG	Green	Green	Red	Red	Green	Green	Green
PHARETRA.NAM@VELTURPISALIQUAM.CA	Green	Green	Green	Red	Red	Red	Red
PORTA.ELIT@DIAMDUISMI.CA	Red	Red	Green	Green	Red	Red	Red
POSUERE.AT@MUSDONEC.EDU	Green	Green	Red	Red	Green	Red	Green
QUAM@FAUCIBUS.CO.UK	Green	Red	Green	Red	Green	Red	Red
RISUS.DONEC.EGESTAS@DICTUMPROIN.NET	Green	Red	Green	Red	Red	Green	Red

EXORD TASKS

- 1 - CONFIGURE FIREWALL
- 2 - REMOVE UNNECESSARY SERVICES
- 3 - DELETE UNUSED GROUPS
- 4 - INSTALL ANTIVIRUS
- 5 - CONFIGURE ALERTS
- 6 - INSTALL SNOOT
- 7 - HARDEN WEBAPP

## Scrolling Task Board

- Projected at front of room
- Populated dynamically



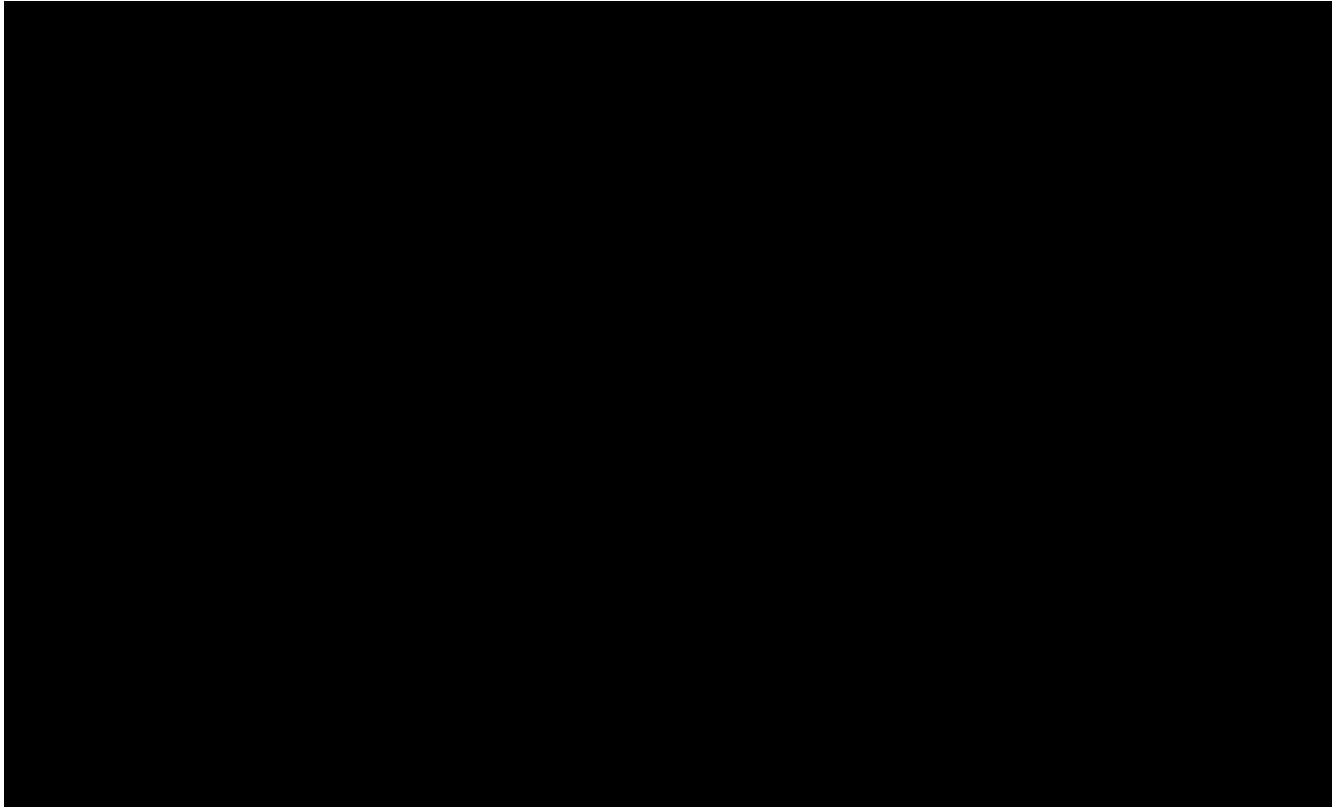
# Opulent Bluegrass – Immersive Experience



## Regional Cyber Center East

- Background Audio
- Projected Scoreboard

# Aluminum Kangaroo – Feedback Mechanism



## Cyber Shooting Range

- Projected for each workgroup
- Events triggered by completing lab tasks
- Provides engaging stimulus

# Aluminum Kangaroo – Immersive Experience



## Forward Operating Base Kyle

- Camo Netting
- Background Audio
- Projected Mission Planning Documents



# Aluminum Kangaroo – Mission Support



## Kinetic Operator Needs Help

- Staff Run
- Student Supported
- Anecdotal: High Engagement

# Aluminum Kangaroo – Mission Support



## Cyber-Kinetic Operator Teamwork

- Participant Run

# Live Demo

Nothing ever goes wrong with these...