

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



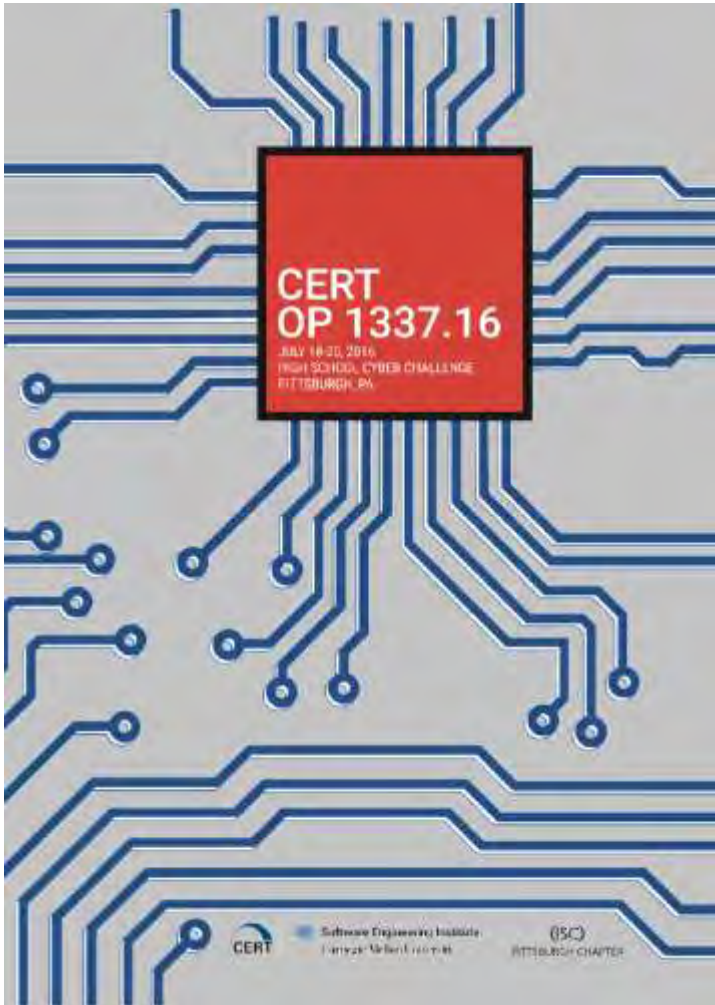
- Reporter held hostage by enemy forces
 - No-notice hasty operation
- Outmanned, outgunned
 - Must outsmart

Participants Attack and Defend



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

Study Design – Attention

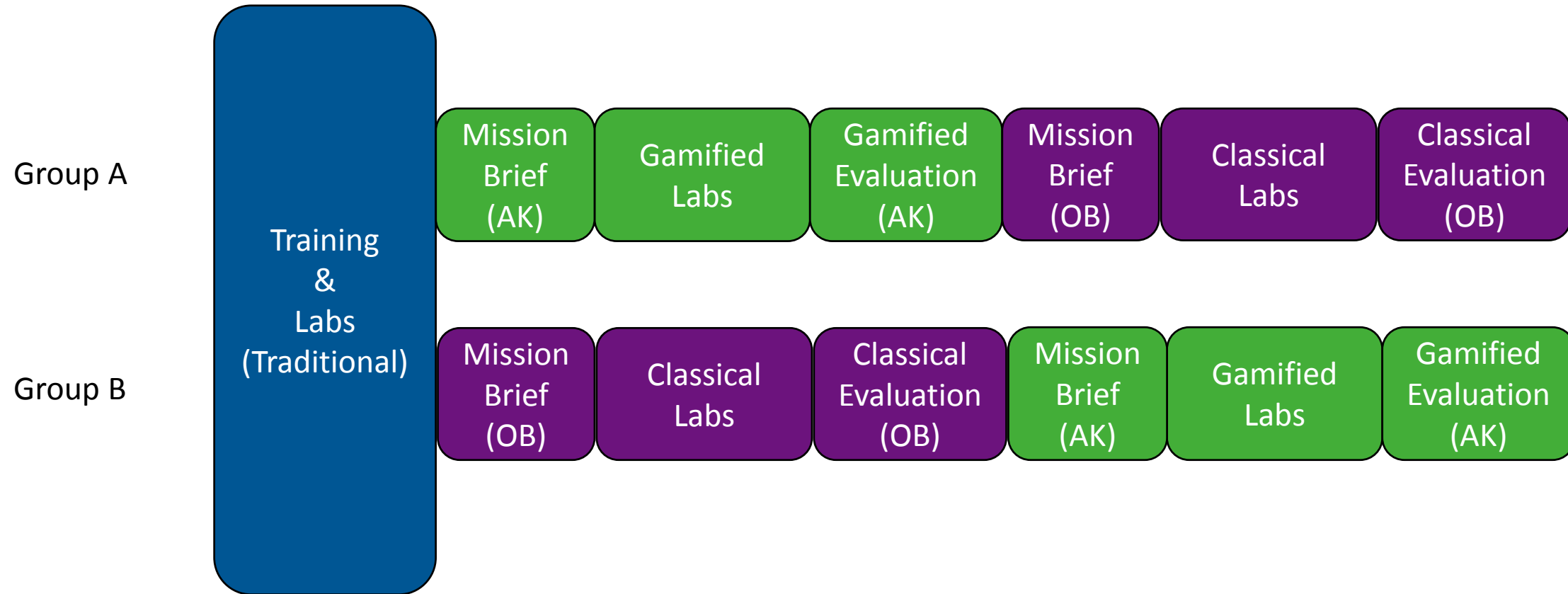


Cooperative Event

- High-school Summer Cyber Challenge
- In Cooperation with ISC²
- Within Subjects Design
 - Alternating:
 - Operation Opulent Bluegrass
 - Defeat Botnet
 - Operation Aluminum Kangaroo
 - Rescue Hostage



Study Design – Self Motivation



Opulent Bluegrass – Feedback Mechanism



Scrolling Task Board

- Projected at front of room
- Populated dynamically

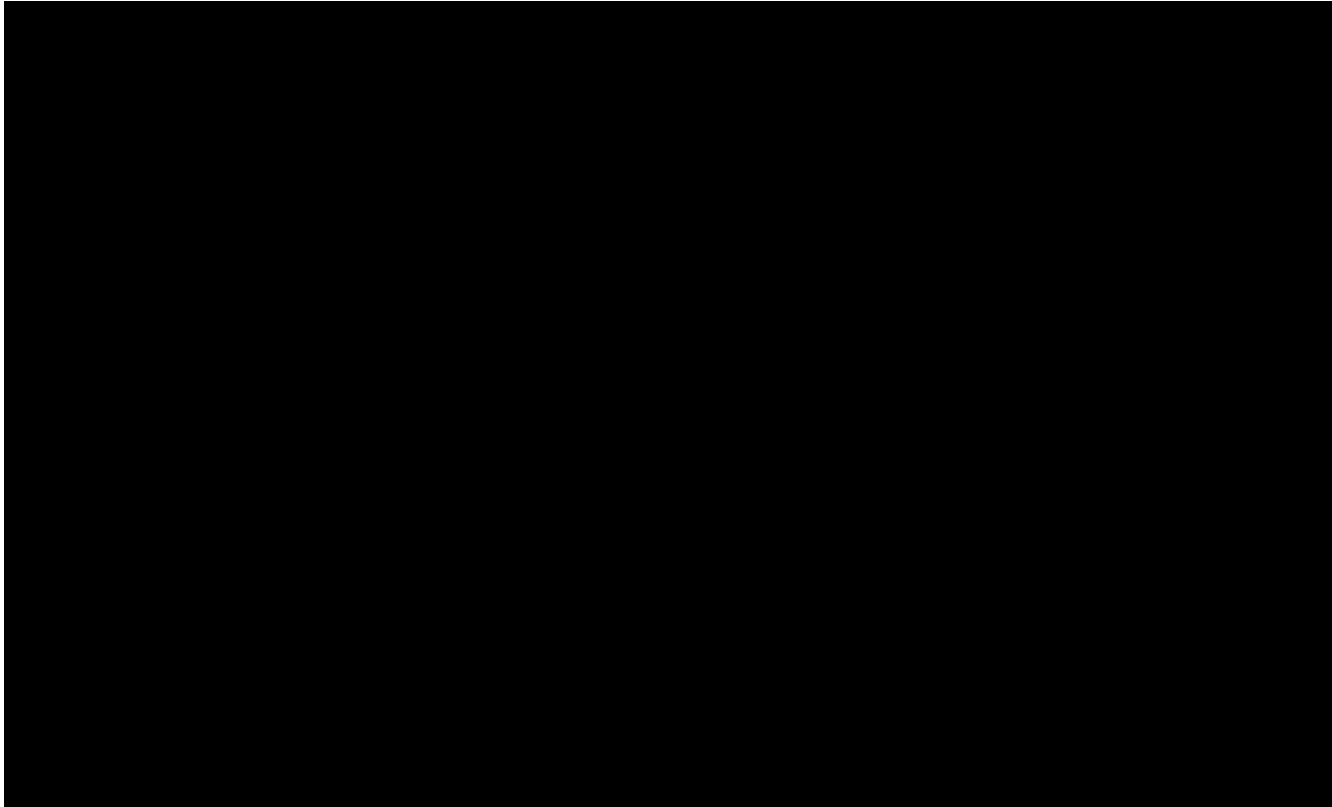
Opulent Bluegrass – Immersive Experience



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...