



Network Effects Emulation System

NE2S Cyber Emulator

May 2019

Presented to: ITEC

Presented by: Mike Merritt, Deputy Technical Director



Cyber Effects Training for C2/Decision Making



Focus Area: Command Level



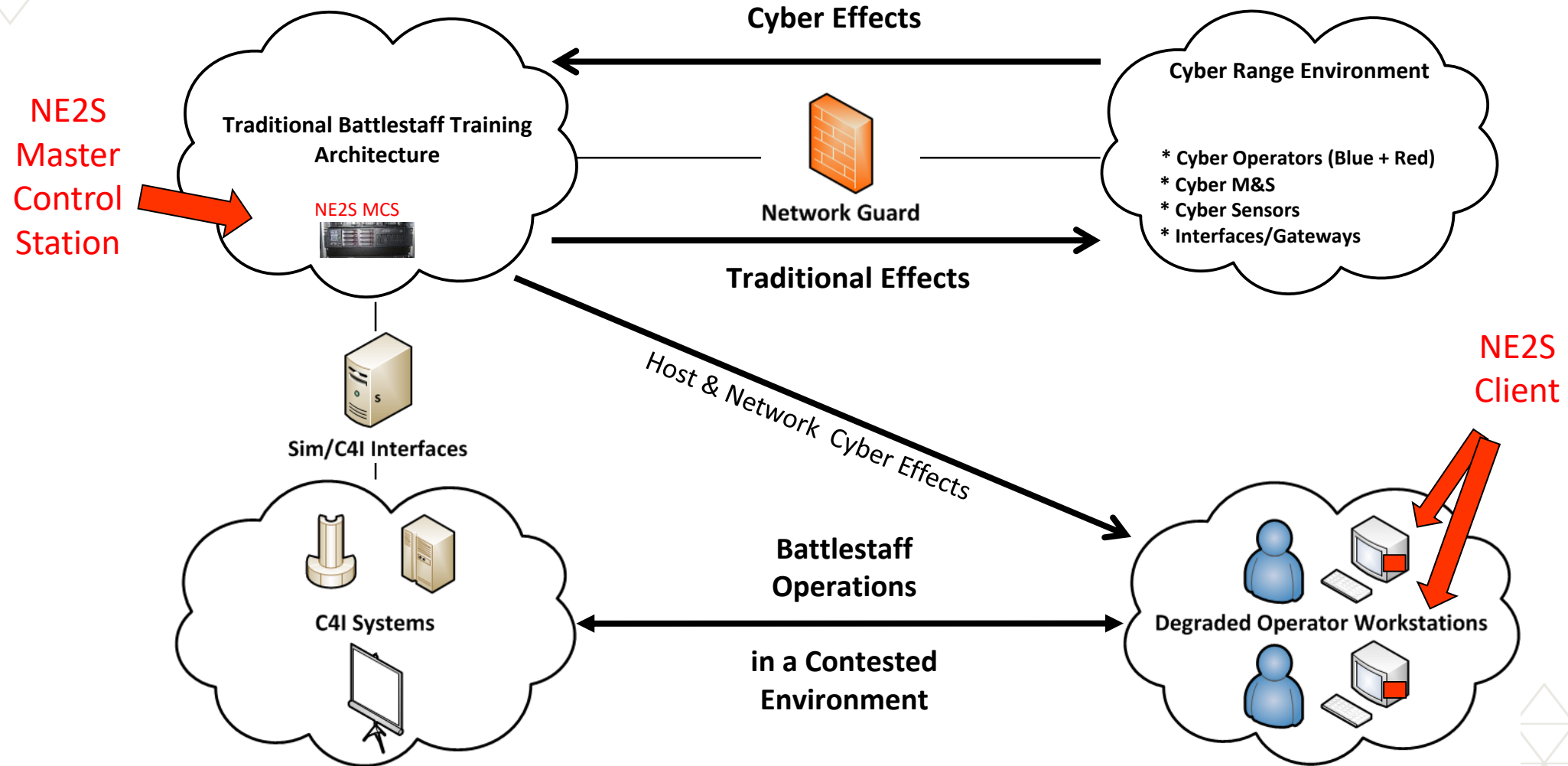
**Staff works through
decisions & policy issues**

BLUF

- Description: Software tool/application to help exercise designers, planners and OPFOR provide training in a degraded cyber environment
- NE2S delivers cyber effects to end user work station
- NE2S delivers COATS (Cyber Operational Architecture Training System) cyber effects to operator's work station
- COCOMs using NE2S for Cyber effects training



COATS Operational View



“Safely and securely synchronize and deliver realistic, integrated cyber effects to the entire battle staff.”

System Overview- NE2S Effects

Host-Based Effects Inputs

Blue Screen
Erratic Mouse
Keyboard Lock
Forced Reboot
Sound Damage
Disruption to Monitor

Network Effects Inputs

Delay
Jitter
Packet Loss
Packet Duplication
Packet Corruption
Packet Reordering
Bandwidth Limitations
Packet Filter

Operational Results

- Annoyance
- Work Stoppage
- Frustration
- Blue Screen of Death
- Forced Reboots
- Inoperable System
 - Keyboard lock
 - Sound
 - Erratic Text
- Denial of Service (DoS)
 - Portal Use
 - E-mail
 - Chat
 - UAV/other Video Feeds
 - Web/Cloud Services
 - NIPR/SIPR/I-net Access
- Partial to Total outages

Effects Tied to the Training Objective – Groups or Individual Workstations

Benefits to the Training Audience

- Provides Command Staffs an ability to operate in Cyber degraded environment
- Provides additive capability for OPFOR
- Realistic network cyber effects
 - Includes: Delay, Jitter, Packet Loss, Packet Duplication and more
- Forces training audience to fight through various effects
 - Degraded realities with no impact on real network
- Master Control Station (MCS) location is flexible
 - Can be located at the Joint Exercise Control Group or positioned at a distributed site
- Allows exercise designers to balance training requirements to train for Cyber without impacting real world operations or other training objectives

NE2S Lessons Learned

- Planning for cyber training is a challenge
- Augments OPFOR Teams—Does not replace them
- Information assurance certification is a challenge
 - Software application (web based application)
 - Creates network effects on client workstations without physically degrading the network
 - Includes a failsafe “effects off” feature
 - Normal operations restored in seconds, when effects are turned off
 - Information Assurance Certification in process (last step)
- Cost effective and not manpower intensive



Conclusion

- NE2S delivers cyber effects to end user work station
 - Effects are variable from subtle to drastic
 - Only clients loaded with application appear degraded
 - Effects can be terminated in seconds
- Allows exercise designers to balance training requirements to train for Cyber without impacting real world operations or other training objectives