TRUSTED SYSTEMS FOR ADVANCED ARCHITECTURES

Exceptional service in the national interest

Sandia National Laboratories

U.S. DEPARTMENT OF ENERGY
SAND2012-9035P

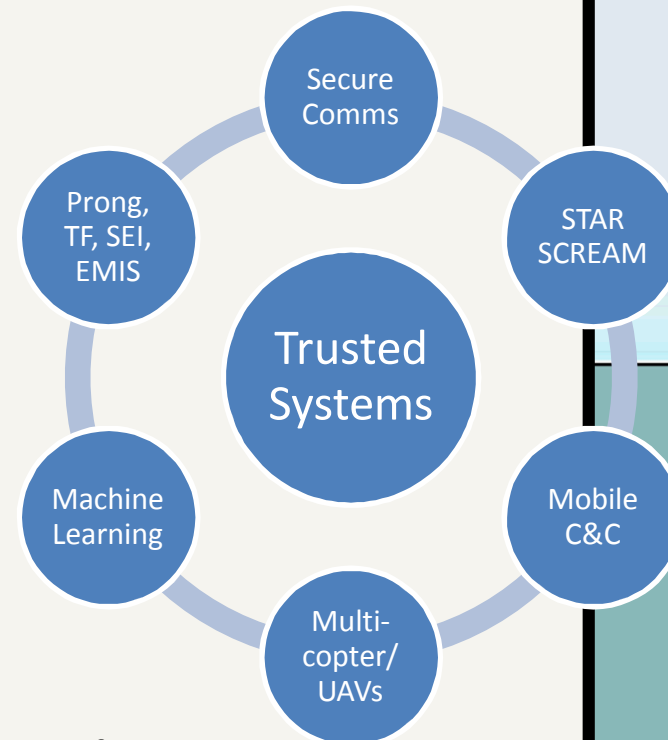NNSA National Nuclear Security Administration

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Sandia Develops and Fields Unique Solutions Encompassing the Convergence of RF & Cyber

Trusted Systems

- Signatures Detection
- Merging Radio Frequency (RF) / Cyber Capabilities
- Machine Learning of Signatures
- Mobile Command & Control
- Demonstration Hardware

Secure Comms
Prong, TF, SEI, EMIS
STAR SCREAM
Trusted Systems
Machine Learning
Mobile C&C
Multi-copter/ UAVs

Observe
Orient
Act
Decide

Goal 1 Goal 2 Goal 3
Power
Communications
Software
Electronics
Mission Data
Timing
Location
Resolution
Etc.

Beliefs, Intent

Modeling Control Systems in and with Cyber Environments

- Emulation, real-time simulation, federation, and hardware-in-the-loop
- Providing LVC (live/virtual/ constructive) modeling for a wide range of control system security questions:
  - Devices,
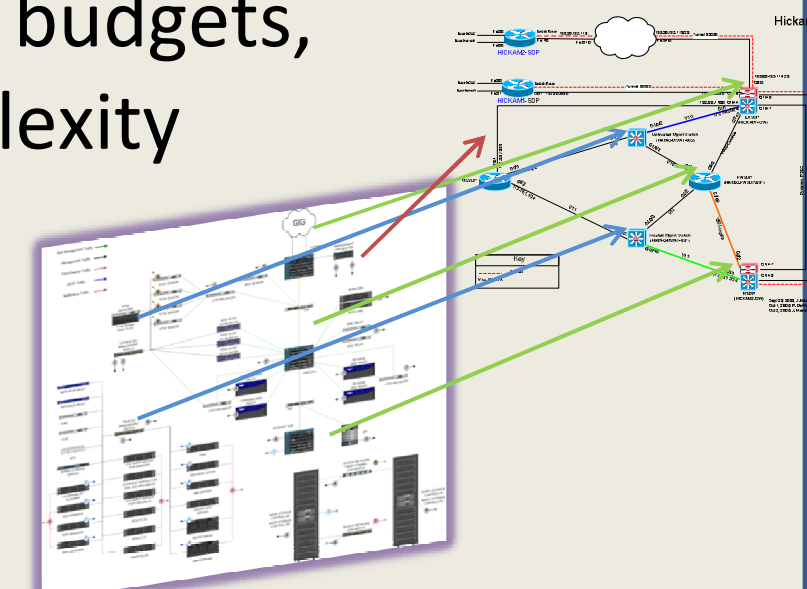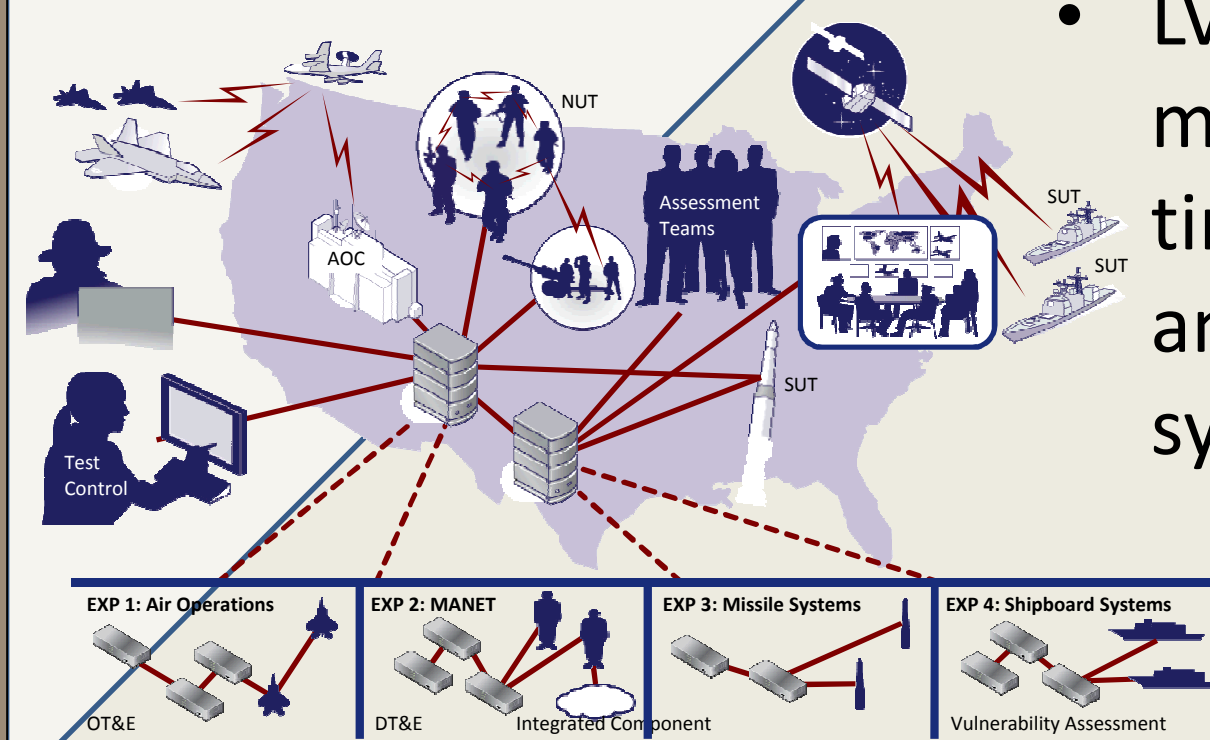 - Applications
  - Communications protocols
  - System interactions

Live / Virtual / Constructive Advanced Modeling and Simulation

- Live – real hardware, real software
- Virtual – real software, virtual hardware
- Constructive – full simulation
- LVC elements provide variable fidelity models of systems meeting demanding timelines, smaller budgets, and greater complexity systems

EXP 1: Air Operations — OT&E
EXP 2: MANET — DT&E
EXP 3: Missile Systems — Integrated Component Testing
EXP 4: Shipboard Systems — Vulnerability Assessment

NUT
Assessment Teams
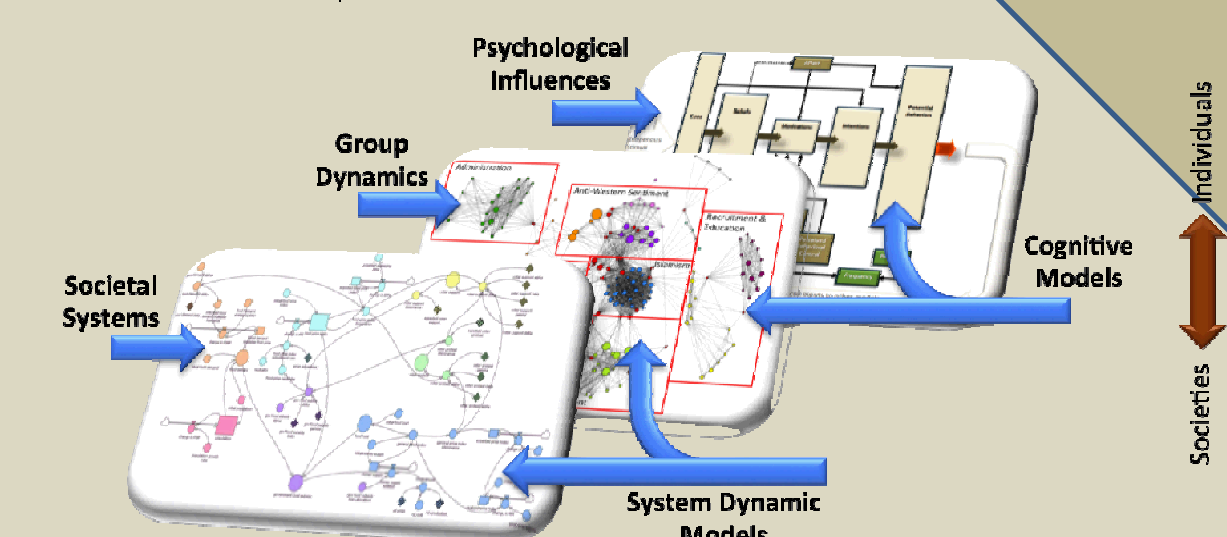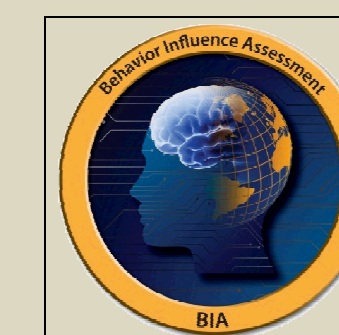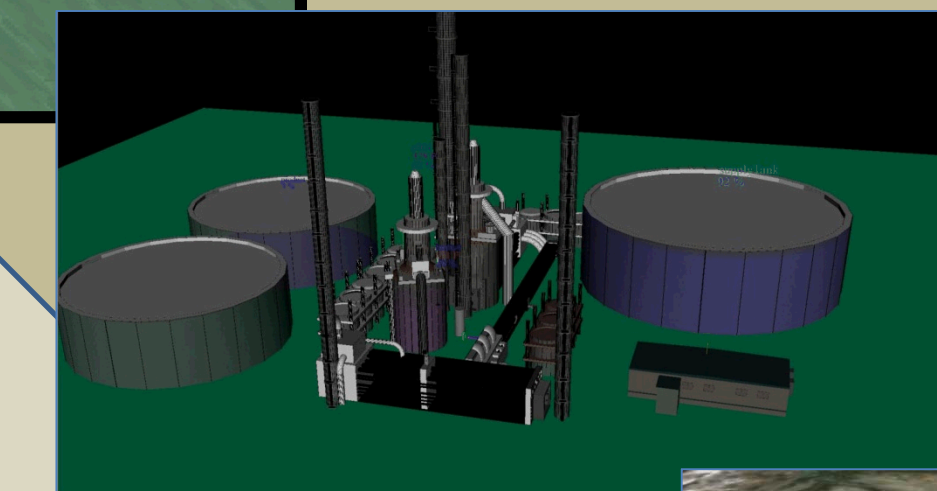AOC
SUT
Test Control

Organizational Cooperation in Cyber Defense

- Anticipates/influences adversary behaviors based on psychological, social, and economic factors
- Focuses on specific individual/group behaviors within countries
- Can Incorporate data from cyber defense programs as well as training exercises

Behavioral Influence Assessment
BIA
Psychological Influences
Group Dynamics
Societal Systems
Cognitive Models
System Dynamic Models
Individuals
Societies

Sandia supports guardians of peace and freedom on the battlefield and in the lab by applying engineering, science, and technology solutions to deter, detect, defeat, and defend threats to our national security.

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