Information Briefing

Industry Day

ATEC Test Technology Symposium

United States Army
OPERATIONAL TEST COMMAND
(USAOTC)

OTC's Mission

OTC plans and conducts independent operational testing and experiments in order to provide essential information for the decision making process.

Soldiers

Operations MTOE Units

Advanced Technology

Modeling

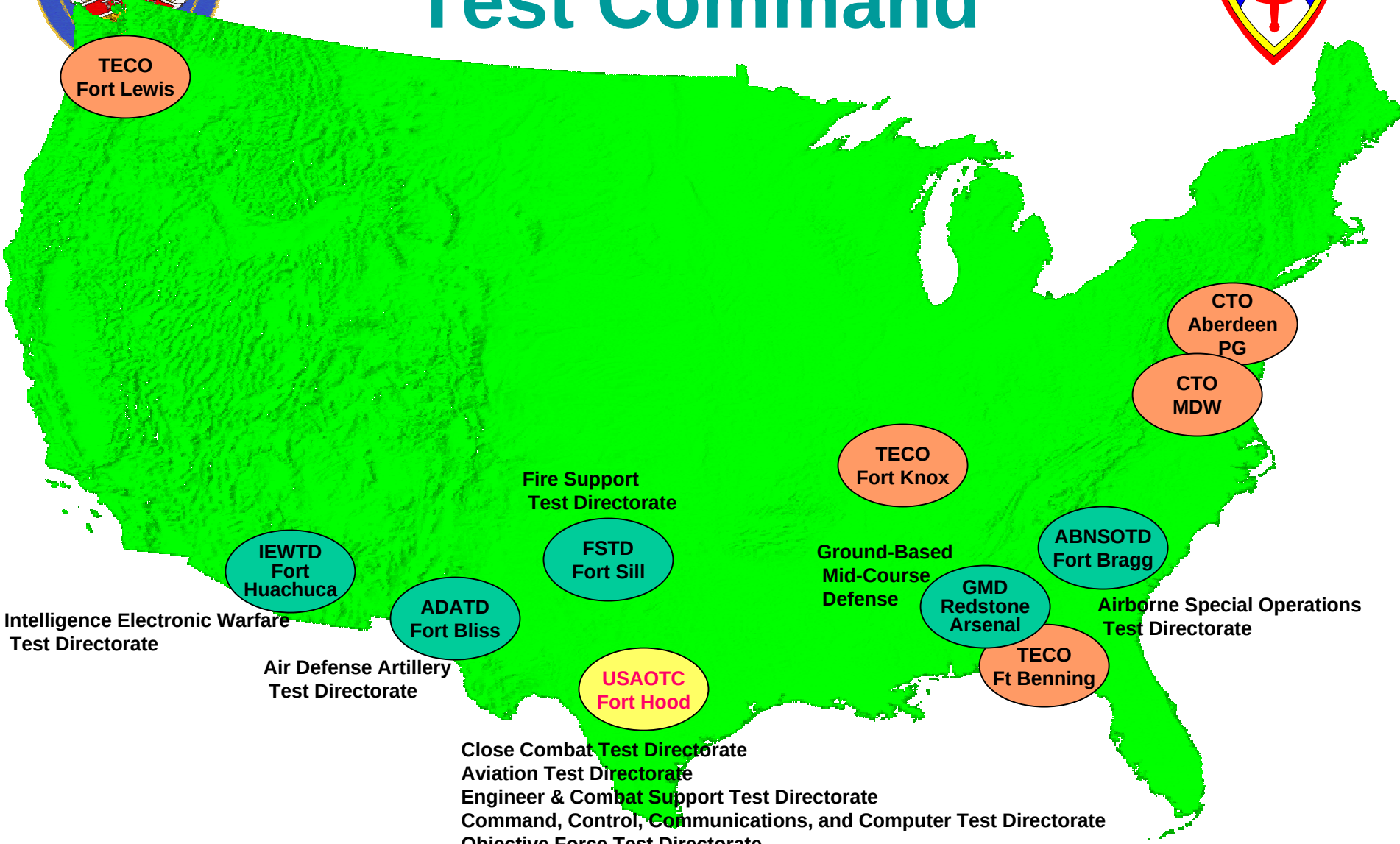
Wartime Tempo

Simulation/ Stimulation

OTC Vision

A USAOTC that contributes to the Army's success on future battlefields by conducting realistic, objective operational tests and experiments using state-of-the-art technology and driven to excellence by a professional workforce motivated by a commitment to the American soldier.

Operational Test Command



Operational Testing Focus

Whether we plan for it or not,
whether we admit it or not,
REALITY WILL impose itself on
any new system.

The goal is to inject reality as early in the process as possible.

Support The Materiel Developer

Customer Tests

Limited User Tests

Initial Operational Tests

Follow-On Tests

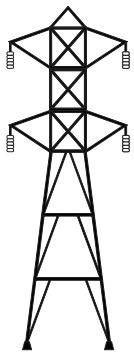
Support The Combat Developer

Ideas from Soldiers

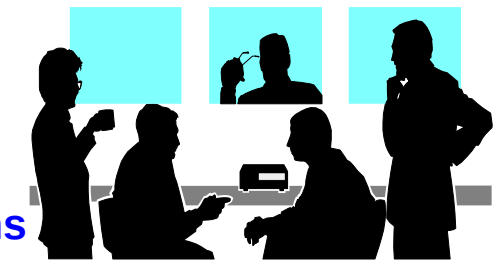
Great Ideas

Threat

Industry Development



Technology Advances



Army Warfighting Experiments
Concept Evaluation Program
Advanced Concept Technology Demonstrations
Force Development Test and Evaluations

What We Test

What We Test

STRYKER

SENTINEL Enhanced Target Range and Classification (ETRAC)

PROPHET Ground Block 1

MORTAR FIRE CONTROL SYSTEM (MFCS)

TACTICAL MESSAGE SYSTEM

C-130J

ABCS Systems

Joint Biological Point Detection System (JBPDS)

HIMARS

ASAS Light

ISYSCON

FBCB2 / JTRS

Modeling and Simulation

Simulation Domains

Constructive

OT and Training M&S Differences

- **Purpose**
  - **Individual and Collective Training**
  - **Determine readiness of systems for production or fielding (Effectiveness, Suitability, Survivability)**
- **Causality - After Action**
  - **Focused on improving the human decision-making process**
  - **Determine whether problem is hardware, software, TTP, training, test control, or other causes**
- **Entity (Fidelity) Definition**
  - **Focus on individual platforms**
  - **Platform, components, signatures, behaviors**

Color Code:
Training
Testing

Operational Testing
Other Aspects

- **Location**
  - **Fixed, instrumented ranges (Developmental test**
  - **Fully mobile instrumentation and M&S (**
- **Non-Interference with Tactic**
  - **Minimize power draw f**
  - **Cannot interfer**
  - **Cannot**
  - **ance data**
  - **ruth must be as realistic as possible**
  - **ast limit access to simulation configuration files**
  - **Behaviors in simulation must imitate live system capabilities**

Re-Use when possible, Build as a last resort.

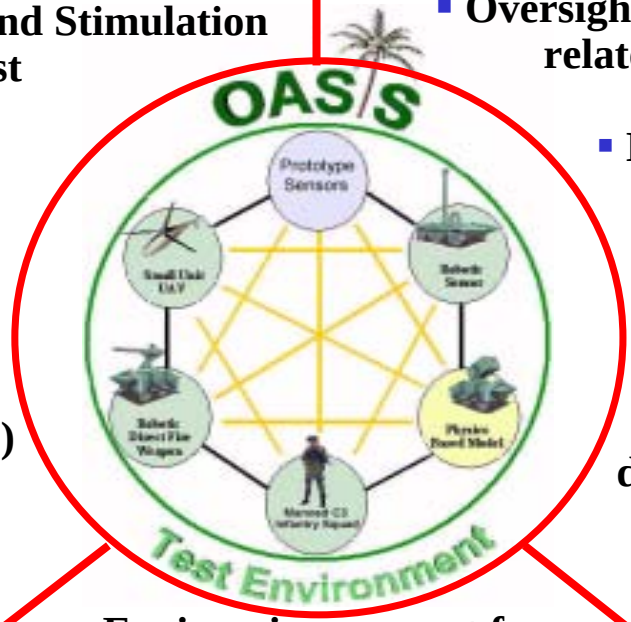
OTC Analytic Simulation and Instrumentation Suite

Test Environments & Integration

- **Instrumentation, Simulation and Stimulation (ISS) for realistic operational test environments.**
- **Synthetic Environment Lab (SEL) for integration of ISS into a collaborative and distributed environment.**
- **OT link to FCS System of Systems Integration Lab (SoSIL) and Advanced Collaborative Environment (ACE), Joint Virtual Battlespace (JVB), and others.**
- **Integrates OT facilities for system of systems testing.**

Requirements Management

- **Oversight of OT CAPSTONE effort for all related ISS developments.**
- **Management process to identify Objective Force and Future Combat System test technology requirements.**
- **Program management partnership with materiel developer (PEO-STRI, PM ITTS).**
- **Develops entity state resolution for OT environments.**



Engineering & Sustainment

- **Engineering support for requirements analysis, technical evaluations, analysis of alternatives, and market surveys.**
- **Life cycle management of OT technologies.**

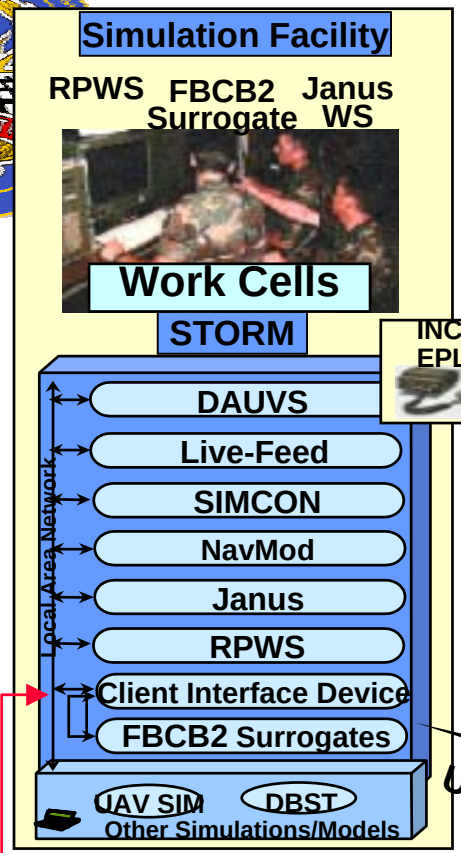
OASIS Mission

1) Integrate the suite of test instrumentation and simulation/stimulation (ISS) systems to support system of systems operational testing

2) Interoperate with other testing, training, and joint ISS systems

3) Embed testing functionality into existing and emerging training systems

STORM
Program Description



- **Entity-based** combat simulation.
- Simulates FBCB2 & ABCS with realistic **JVMF SA** and **C2** messages, using FBCB2 rules, via standard lower **Tactical Internet radios**.
- Receives and displays **live unit SA**.
- Provides real-time, **two-way** interactive, **soldier-in-the-loop**, live and sim seamless digital battlefield environment.
- **Complete battlefield** picture.

Background

Cost effective C4I testing Concept - generated from requirement to test FBCB2 without incurring the cost of a large combat force in field.

Oct 1996 - OTC commissioned EPG to do engineering study on emerging simulation technologies.

May 1997 - EPG published engineering study; OTC designated EPG lead for systems integration.

Jan 1998 - Alpha 1 Proof of Principle Test.

Aug 1998 - Displayed live entities FBCB2 LUT1

STORM Successes

Dec 99/Feb 00 - FBCB2 FT2 Ph I & II, Fort Huachuca/Hood.

Mar-Apr 2000 - FBCB2 FDTE/CT, Fort Hood.

Training support with NSC's DBST: JCF Advanced Warfighting Experiment; FBCB2 Division Capstone Exercise; Fort Hood unit training prep for NTC rotation; SBCT training at Fort Lewis.

Jan 2001 - FBCB2 FT3, Fort Huachuca.

Sep 2001 - FBCB2 FT4, Fort Huachuca.

Dec 2001 - FBCB2 LUT 2a, Fort Hood.

Sep 2002 - FBCB2 FT5, Fort Huachuca.

IMASE

SIMULATION AND SCORING SUB-SYSTEM (ISSS)

- *TACSIM-OT* **Replacement**
- **Funded by REP, UFR POM, OTPs**
- **A *high fidelity, object level resolution*, threat focused, computer based simulation with the following capabilities:**
  - ***Scenario Generation***
  - ***Product Development***
  - ***Product Delivery***
  - ***System Under Test Performance Scoring***
- **Object-Oriented Designed System**
  - ***Windows-Based Architecture***
  - ***Programming Environment (Visual C++/SQLServer)***

IMASE SCENARIO GENERATION TOOL

The scenario generation tool used to develop and drive threat scenario. Provides theater to entity level definition of the battlefield to support intelligence product development. Provides product development and simulation control in the COMSIM RF environment. (The tool used to develop products, both live and virtual transmissions, and deliver signals which represent the ISGT scenario).

Entity Level Definition

350Km x 350Km Battlespace

150,000 Entities 80/20 Mix OPFOR/BLUEFOR

Force Structure

Communication Networks

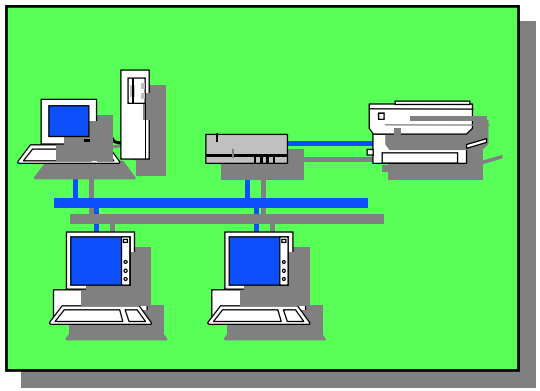
Electronic Order of Battle Creation

Voice Transmission Tool

Player Products

Intelligence Detectables

Extensible (C4I) Instrumentation Suite Fire Support Application (ExCIS FSA)



Fire Support

Fire Control

- **Integrated system designed to test all Field Artillery (FA) systems: AFATDS, MLRS, HIMARS, ATACMS, Paladin, Firefinder Radar, and selected ABCS.**

- **Supports all aspects of operational testing to include test planning, test driver, simulation-stimulation, data collection, and data reduction.**

- **Uses commercial off-the-shelf hardware and software products.**

- **Modular design incorporating the latest software development procedures to make it affordable and user friendly.**

Instrumentation

Common Vehicular Instrumentation Initiative (CVII)

Module Diagram

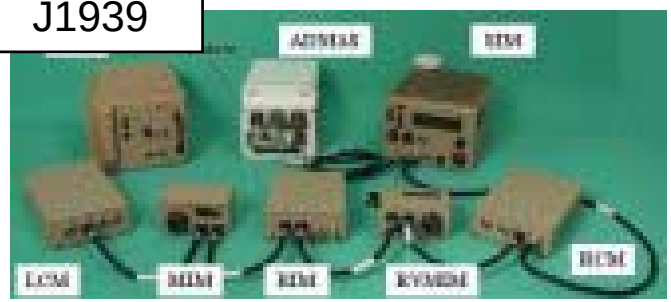
Shared | **TTD** | **ATC** | **Future**

IEEE 1394 Bus*

- HSTMS
- MASS STORAGE
- 1553 Data Bus
- SYSTEM INTERFACE MODULE
- GPS Input
- 10A @ 28VDC
- Direct Methanol Fuel Cell (DMFC)
- LAN Monitor
- Radio Monitors
- DVER
- OT-TES WPM
- Legacy Interface Module
- Legacy Module(s)
- Gateway
- Video
- Voice
- Utility
- CDDI
- Analog/ Digital
- RS422
- J1939
- Module x
- Module Y
- Module Z

STARSHIP/ OT-TES C3

***Connection to Embedded Instrumentation**



Improved Field Data Collector (IFDC) v3

- o Collects Lower TI digital data from moving or stationary platforms
- o Does radio, buss, LAN, GPS and network data collecting
- o Collects 100% of all data requested
- o IFDCv2, single chassis unit dependent on vehicle for power
- o IFDCv3, modular units connected by FireWire, self powered
- o VFDC, single small unit, designed w/ORNL & EPG, self powered, collects encrypted data

Operational Test – Tactical Engagement System (OT-TES)

•OT-TES is a fully mobile, high fidelity, encrypted, real-time casualty assessment (RTCA) and test instrumentation system. OT-TES supports operational and force development testing of current and future weapon systems.

OT-TES C3
CENTER INTERIOR

•OT-TES will support tests requiring realistic force development in a combined arms environment. The instrumentation suite is capable of data collection, test/exercise control, and combat simulation for RTCA during force-on-force engagements. OT-TES has the capability to emulate threat and friendly weapons systems.

Mini C3

Key System Characteristics

- direct fire engagements
- indirect/area weapons effects (mines, chemical, artillery)
- real-time test monitor and control
- automatic data collection
- day and night operations
- adaptable and transportable
- AAR/playback of engagements

Objective
Real Time Casualty Assessment (RTCA) and Instrumentation Suite

- Builds upon OT-TES to overcome system shortcomings and provide the Operational Test Community with a high fidelity, realistic, real time capability to measure the performance of hardware and personnel under tactical conditions

- Allows the US Army to test all Legacy-to-Objective capabilities and Future Combat System in a force-on-force operational environment

- Supports Transition from primarily Live to Live-Virtual-Constructive testing

- Moves from Platform-centric to Network-centric testing

- Supports Operational and Force-on-Force testing of Future Combat System, Land Warrior, FBCB2, Comanche, XM29, LOSAT, TUAV, etc)

Issues Facing OASIS

- Emerging requirements to perform “System-of-Systems” for testing and training (e.g. UA)
- Integration of M&S with Instrumentation
- Interoperability of multiple “stove-pipe” systems
- Integration of test and training technologies
- Integration of Live-Virtual-Constructive (LVC-IA)
- Distributed technology challenges
- Scalability and Extensibility for multiple uses
- Configuration controls

Points of Contact

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Questions?