

# Distributed Mission Training (DMT)

Warfighter Training  
Research Division

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**AFRL**

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AFRL/HEA

# REPORT DOCUMENTATION PAGE

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# AFRL/HEA Mission



**Develop and transition technologies and methods to train warfighters to win**

**Peter Drucker: “The best way to predict the future is to create it”**



# Live Fly Training Constraints Growing

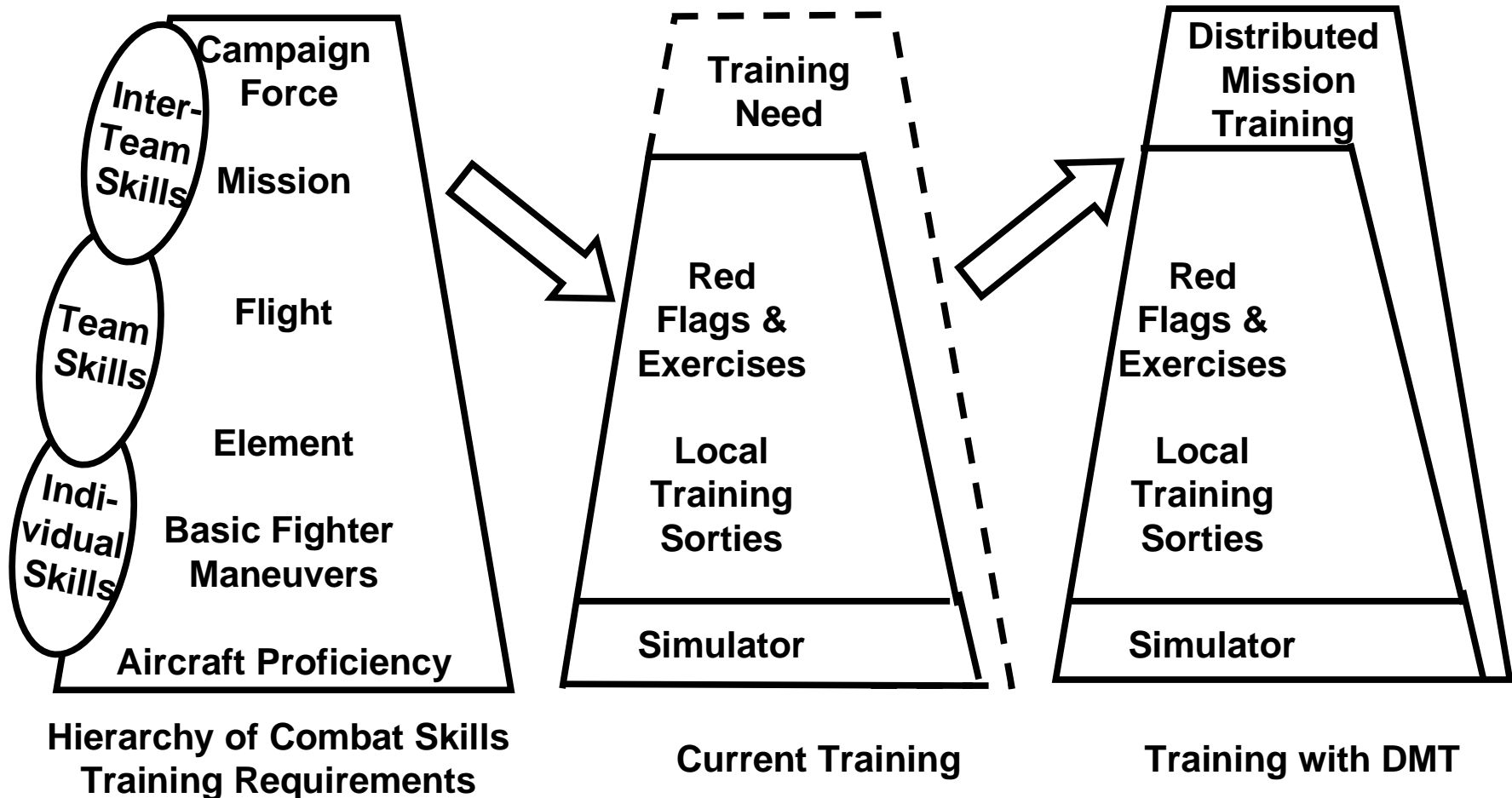


- **Resources and funding...**  
Airspace, ranges, flying time
- **Equipment and personnel...**  
airframe wear, opstempo, perstempo
- **Safety and security...**  
live weapons employment, classified systems

***... modern weapons and employment concepts require extensive airspace, large ranges, and more composite training opportunities.***

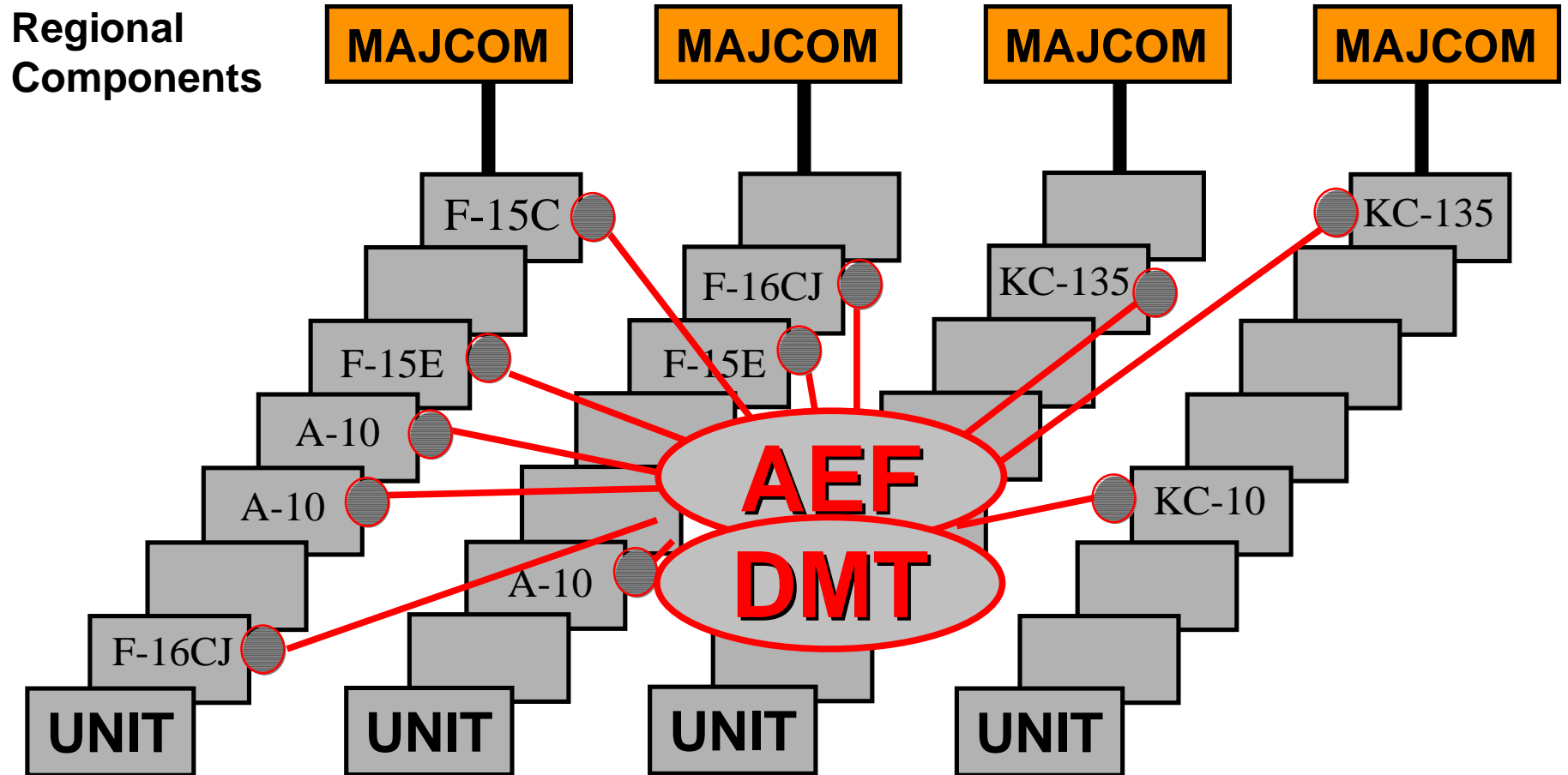


# Current Training Constraints Prevent Full Mission Skills Training





# DMT Ties Training Together for Air Expeditionary Forces



*Distributed Mission Training Research and Development Program*

*Expeditionary Air Force Enabler*



# USAF EAF Director, MGen Cook's Statement on DMT



## ***DMT for the AEF***

- ***AEF forces are geographically distributed***
- ***Preparing these forces for expeditionary employment requires a detailed plan and a philosophy relying on DMT***
- ***AEF is at the right point to capitalize on DMT***

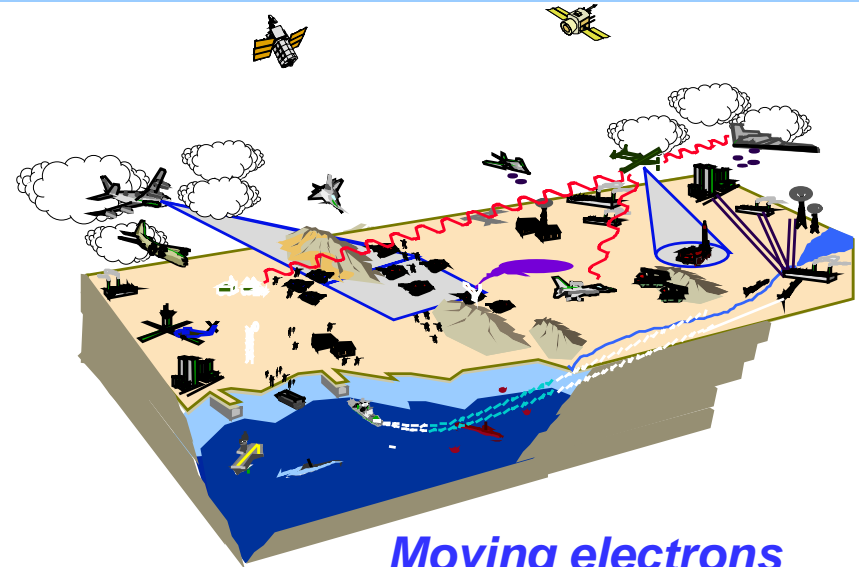


# AEF Training / DMT



## *What AEF really needs:*

- ◆ Realistic, robust training system to compensate for loss of training resources (aircraft, flying time, etc)
- ◆ Full Sensor & C2 Representation
- ◆ Composite force operations
- ◆ Mission rehearsal
- ◆ Connectivity for disparate sites
- ◆ Sensor-Decision Maker-Shooter



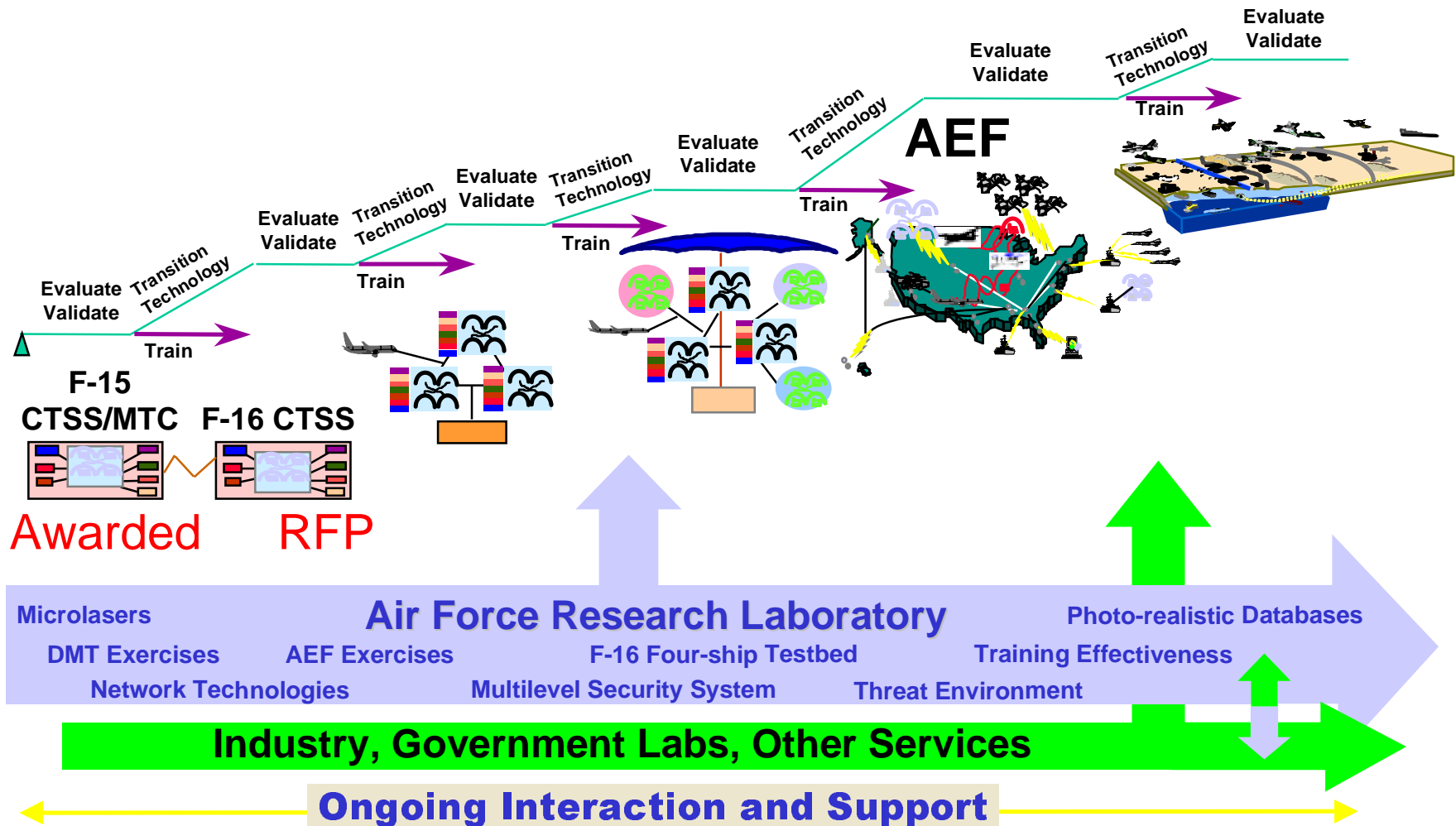
*Moving electrons  
not people*

***WAR IN A BOX  
Integrated Battle-space  
Geo-Specific Terrain  
ISR Validated Threats  
Weather Effect***





# Distributed Mission Training Technology and Environment Evolution



CTSS - Commercial Training Simulation Services  
MTC - Mission Training Center



# DMT Demonstration at AFA Convention



- **Deployed Systems (minimum configuration)**
  - **2 AFRL/HEA F-16C MultiTask Trainers (MTTs)**
    - » **With 360° Field of View Visual**
    - » **High Resolution, Photo-Realistic Nellis AFB Database**
    - » **Networked back to 2 Vipers at AFRL/Mesa**
  - **6 Screen Large Video Wall**
  - **Mission / Exercise Control Station**
  - **Large Smartboard® w/Briefing Room Interactive**



# Desirable Additions to AFA Convention



- **On Site**
  - **UAV Simulator**
  - **Night Vision Training System (NVTs)**
- **Long Haul Network for Distributed Training**
  - **Theater Battle Arena (TBA)**
  - **TACCSF: F-15C, Red Air Stations & Constructive Forces**
  - **Mesa: A-10 MTT**
  - **AFRL, Brooks AFB AWACS training system**
  - **Thomson Training Systems UK**
  - **AWACS possible live downlink/uplink**
  - **AFSOC AC-130 Simulator**
  - **AFRL/HEA ANG A-10 Simulator**



# DMT Program



## Distributed Mission Training

### A System of Systems Goals

- Effective, affordable training
- Fully integrated unit level ground-based training environment
- Validated techniques & technologies
- Realistic training environment
- Scalable, tailorable training capability available at unit level

## Capabilities

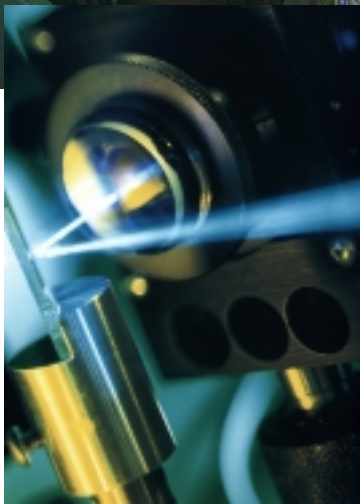
- **Affordability**
  - Reduced training system acq/sustain costs
  - Reduced flying hour programs
  - Reduced time to train
- **Availability**
  - Deployable, distributed full mission training
  - Train where the warfighter operates
  - Reduce PERSTEMPO stress
- **Aging Aircraft**
  - Reduced flying hours
- **Safety**
  - Reduced operator error accidents
- **Readiness**
  - Improved individual/team performance
- **Validation**
  - Improved validation tools
  - Improved data generation and evaluation

## Technology Challenges

- High Resolution Visual Systems
- Multi-Level Security Manager
- Electronic Combat Environment
- Databases
- Information Technologies
- Interconnection Technologies



# High Resolution Visual System



## Warfighter Needs

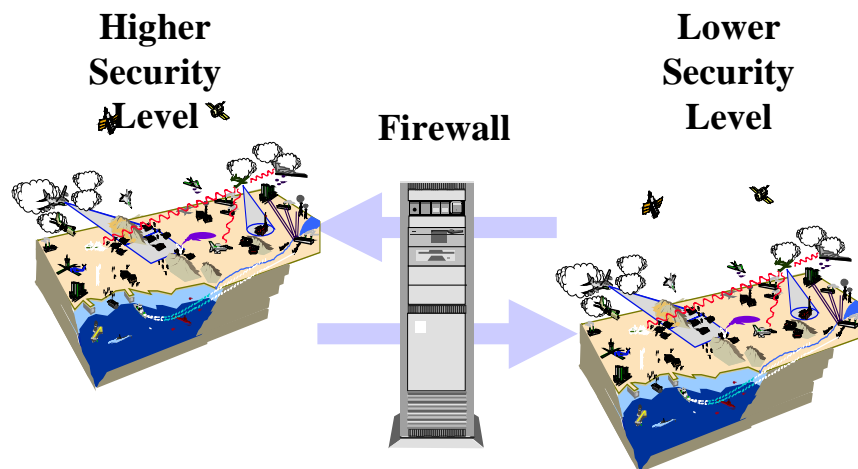
- Increase fidelity (field of view, scene complexity, resolution, contrast, and brightness) of simulations
- Increased visual acuity (20/20) to enable true human visual resolution for high precision missions
- Increased affordability, modularity and deployability of simulators

## Research Areas

- Visual Displays
- Microlaser Projection systems
- Helmet Mounted displays
- 3D Monitors



# Multi-Level Security



## Warfighter Needs

- **Interaction between simulators with different security classification levels**
- **Critical combat assets to be part of DMT environment**
- **Joint and Coalition DMT-based exercises and mission rehearsals**

## Research Areas

- **Automated, real-time (60Hz) multi-level security system manager**
- **Latency impacts over long-haul networks in training scenarios**





# Electronic Combat Environment



## Warfighter Needs

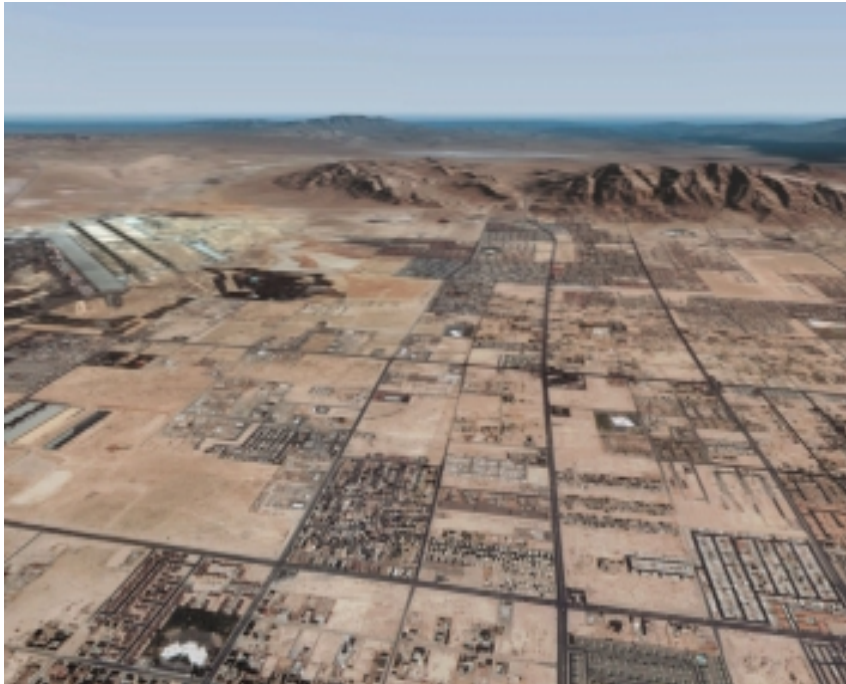
- Realistic representation of real-world threats
- Comprehensive training at home station to enhance survivability in combat

## Research Areas

- Integrate realistic, physics-based threat emitter models
- Real-time DMT threat environment that supports time-correlated signal and weapon system operations
- Realistic electronic combat environment with land-based, space-based, shipborne, and airborne systems
- Validated threat system able to exhibit real-world effects/behaviors



# Databases/Database Generation



## Warfighter Needs

- **Correlated databases across all image generator types and across all visual and sensor types**
- **Accurate and correlated moving models and special effects**
- **Increased realism through actual representation of real-world environment in simulation**

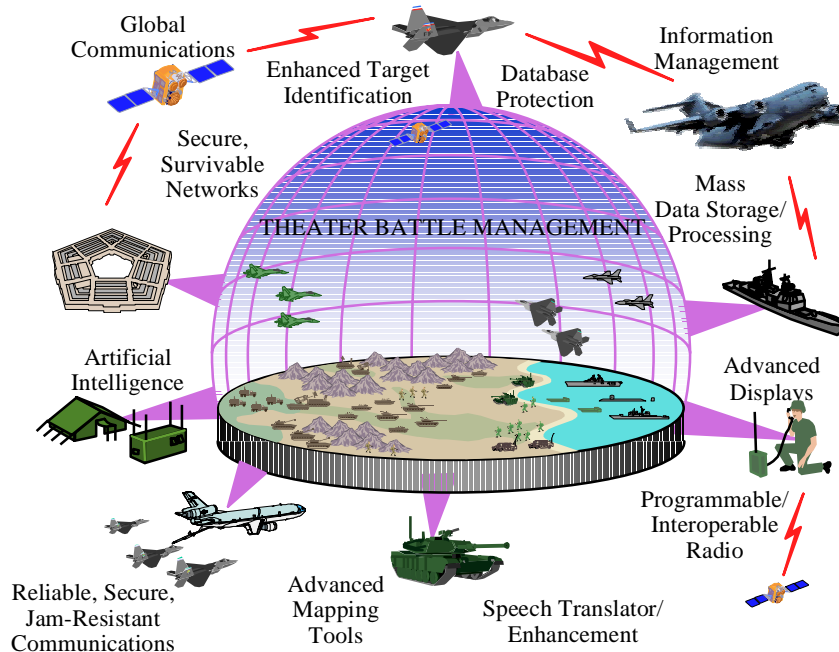
## Research Areas

- **Multispectral physics based data at the texal level**
- **Standards and interfaces for databases and image generation systems**





# Information Technology



## Warfighter Needs

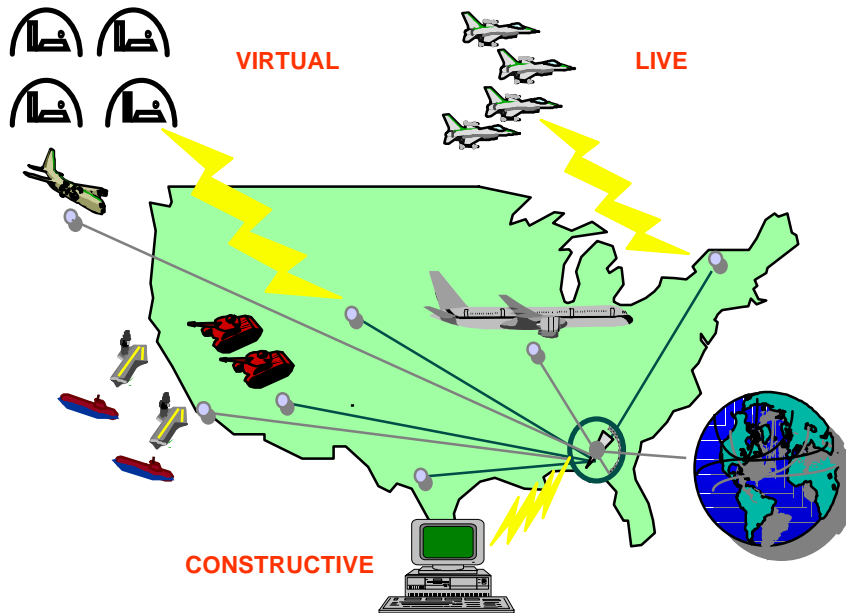
- **Long-haul, High-fidelity Briefing / Debriefing Capability Providing Quality Performance Feedback Through**
- **Rapid Mission Planning Integrated Into DMT Environment**
- **Real Time Infusion of Intelligence (Intel) Information Into DMT**

## Research Areas

- **Instructional tools such as eye-tracker playback and analysis, video capture, and automatic performance feedback**
- **Incorporation of space, air and information warfare in DMT environment for robust warfighter training**



# Interconnection Technology



## Warfighter Needs

- **DMT Connections Enabling Real-time (60hz) Operations Without Compromising Training Capabilities (I.E. Latency Minimized)**
- **Secure DMT Networks**
- **Multi-national Connectivity & Tech Sharing**
- **Multiple Player / Site Inter-connectivity**

## Research Areas

- **High Level Architecture Optimized for High Fidelity AF DMT Operations**
- **Bandwidth Requirements for DMT**
- **Latency Training Impacts Over Long-haul Networks in Training Scenarios**
- **Baseline Network Topology and Communication Protocols for DMT**
- **Live/Virtual/Constructive Interface**



# The Road Ahead



- **There is a Long Way to Go**
  - **Maintain Clear Focus on Providing Tailored Training and Education to the EAF**
  - **Incremental, Planned Integration of Technologies**
    - » **Partner With Industry to Develop Needed Technologies**



**Questions  
and Comments**

[www.williams.af.mil](http://www.williams.af.mil)

