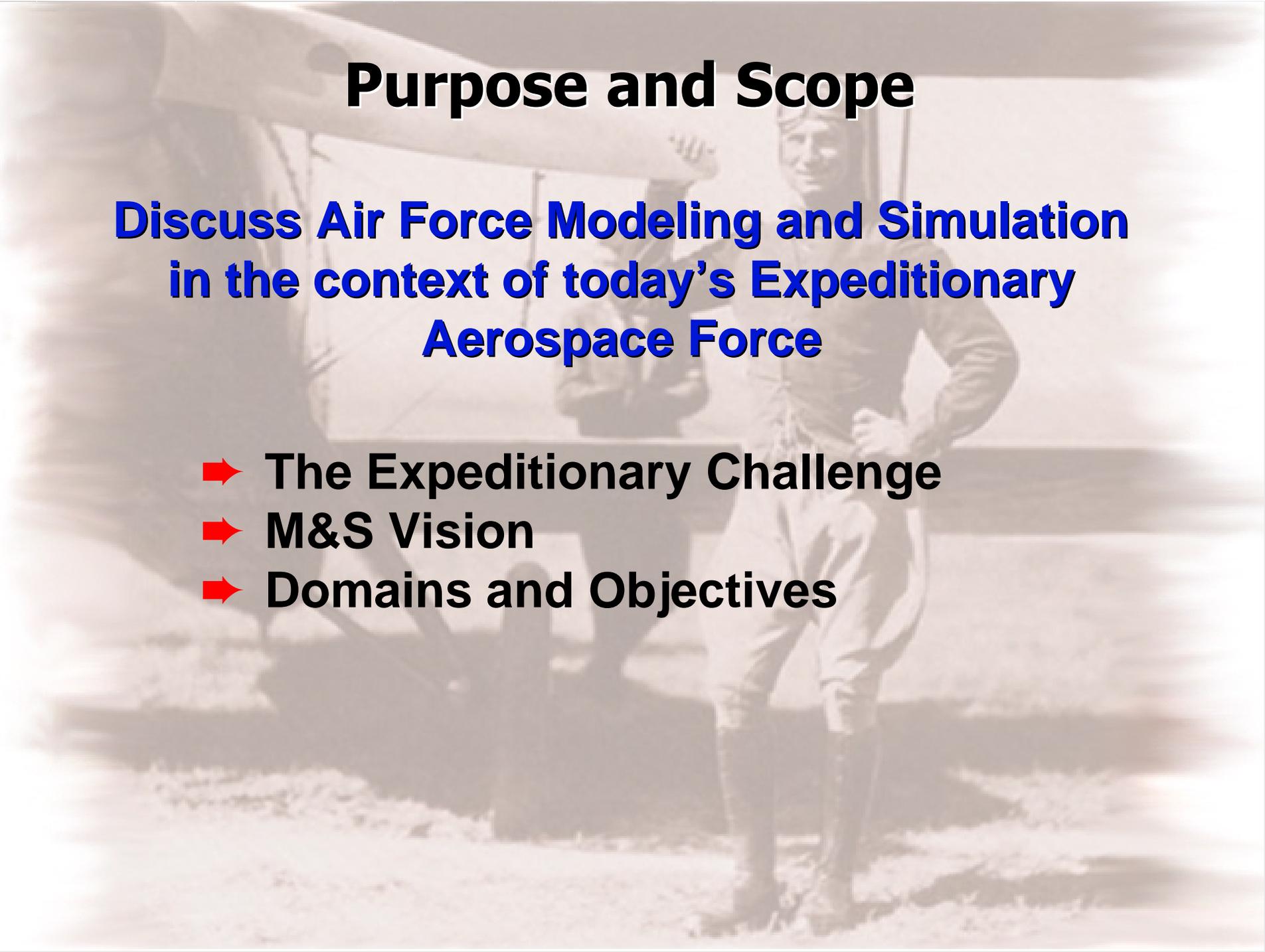


The title is centered on a circular seal of the Department of the Air Force, United States of America. The seal features an eagle with wings spread, perched on a shield with a cross. The text 'DEPARTMENT OF THE AIR FORCE' is arched above the eagle, and 'UNITED STATES OF AMERICA' is arched below. The Roman numeral 'MCMXLVII' is at the bottom. The background is a dark blue field with a pattern of lighter blue stars and a red, white, and blue arc on the left side. The title text is in a bold, blue, 3D-style font with a white outline.

# ***Air Force Modeling & Simulation***

**Dr Jacqueline Henningsen  
Associate Director for MS&A  
Command and Control Directorate  
DCS Air & Space Operations**



# **Purpose and Scope**

**Discuss Air Force Modeling and Simulation  
in the context of today's Expeditionary  
Aerospace Force**

- ➔ The Expeditionary Challenge**
- ➔ M&S Vision**
- ➔ Domains and Objectives**

# The Problem: A Changing "Sight Picture"



- ➔ Cold War Air Force - Focused on **Containment**
  - ➔ Garrison State -- robust basing and manning
  - ➔ Operating from bases with large infrastructures
- ➔ 21st Century Air Force - Focused on **Engagement**
  - ➔ Reduced force structure and fewer forward locations
  - ➔ Austere operating bases with limited infrastructure
  - ➔ Still forward based, but **Responding Globally**
  - ➔ Integrated Force Protection & Agile Logistics

**Requires an Expeditionary Approach**

# We Must Evolve in a Way That...



- Meets National Needs
- Ensures Joint Effectiveness
- Leverages AF Strengths
- Uses the Total Force

*Requirements to meet the National Military Strategy with . . .*

## ***Relevant Forces***

- Rapidly responsive
- Trained and ready
- Modern and capable
- Lean and agile
- Appropriately structured

**Expeditionary  
Aerospace  
Force**

*We are operating in a . . .*

## ***Constrained Environment***

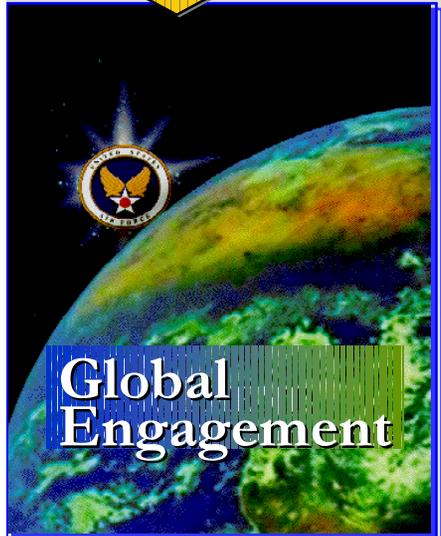
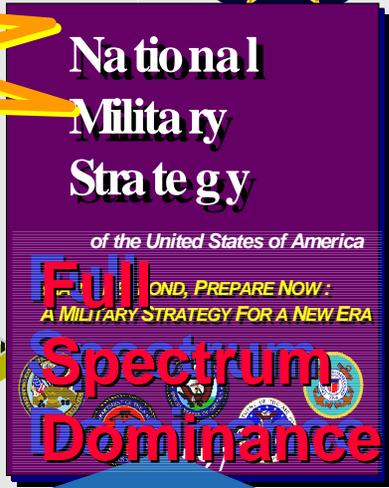
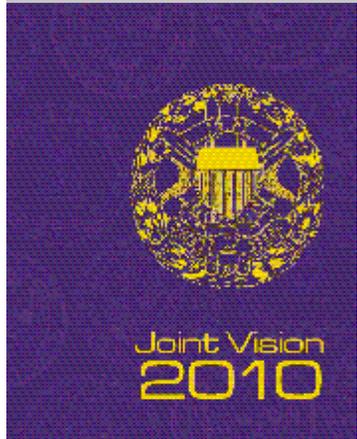
- Fiscal limits
- Political realities
- TEMPO demands
- Qlty of life needs
- Readiness challenges

**Creating a Better 21<sup>st</sup> Century Air Force  
Maintaining Continuity of Purpose**

# Joint and Service Vision



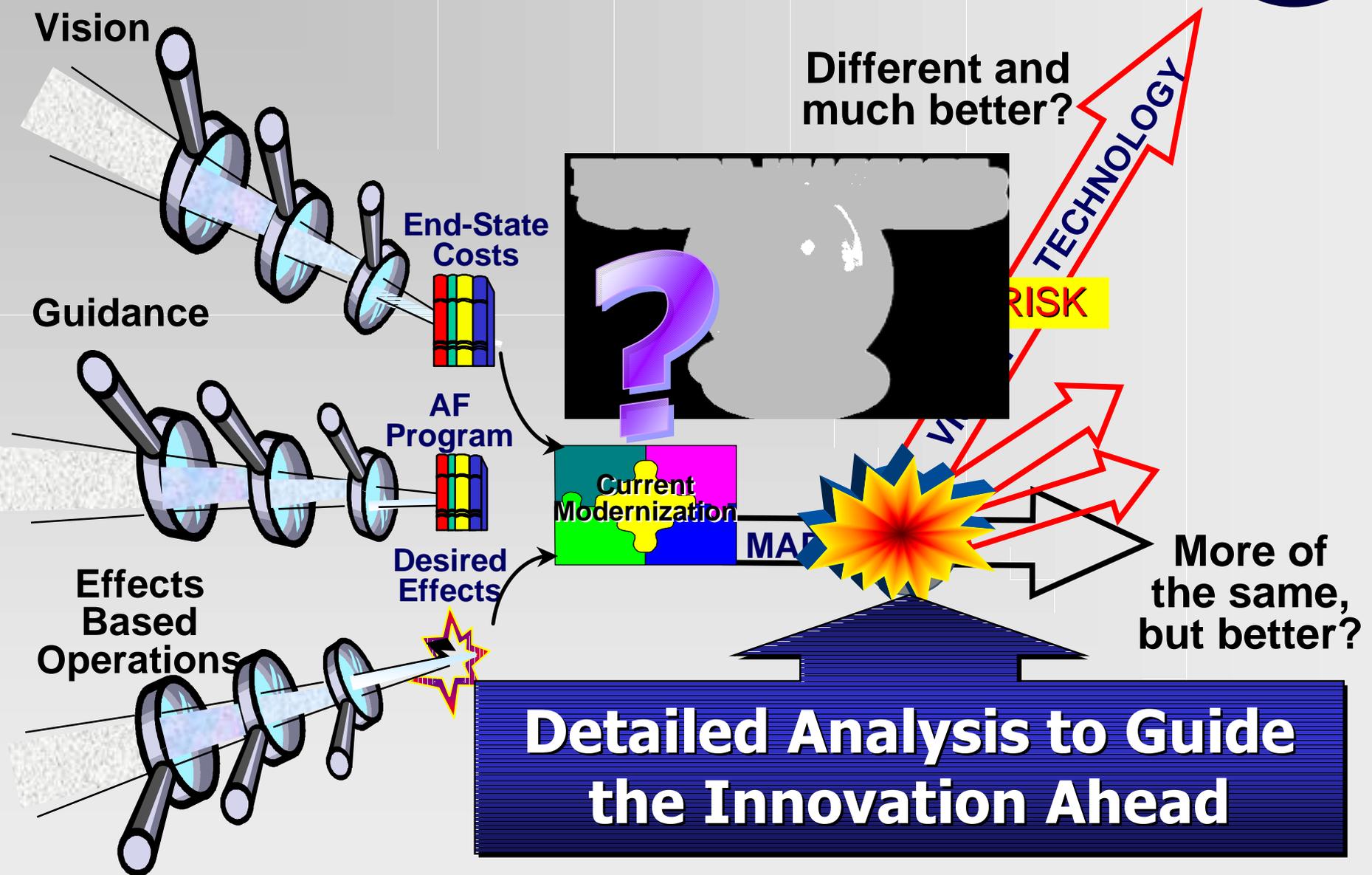
**Integration**



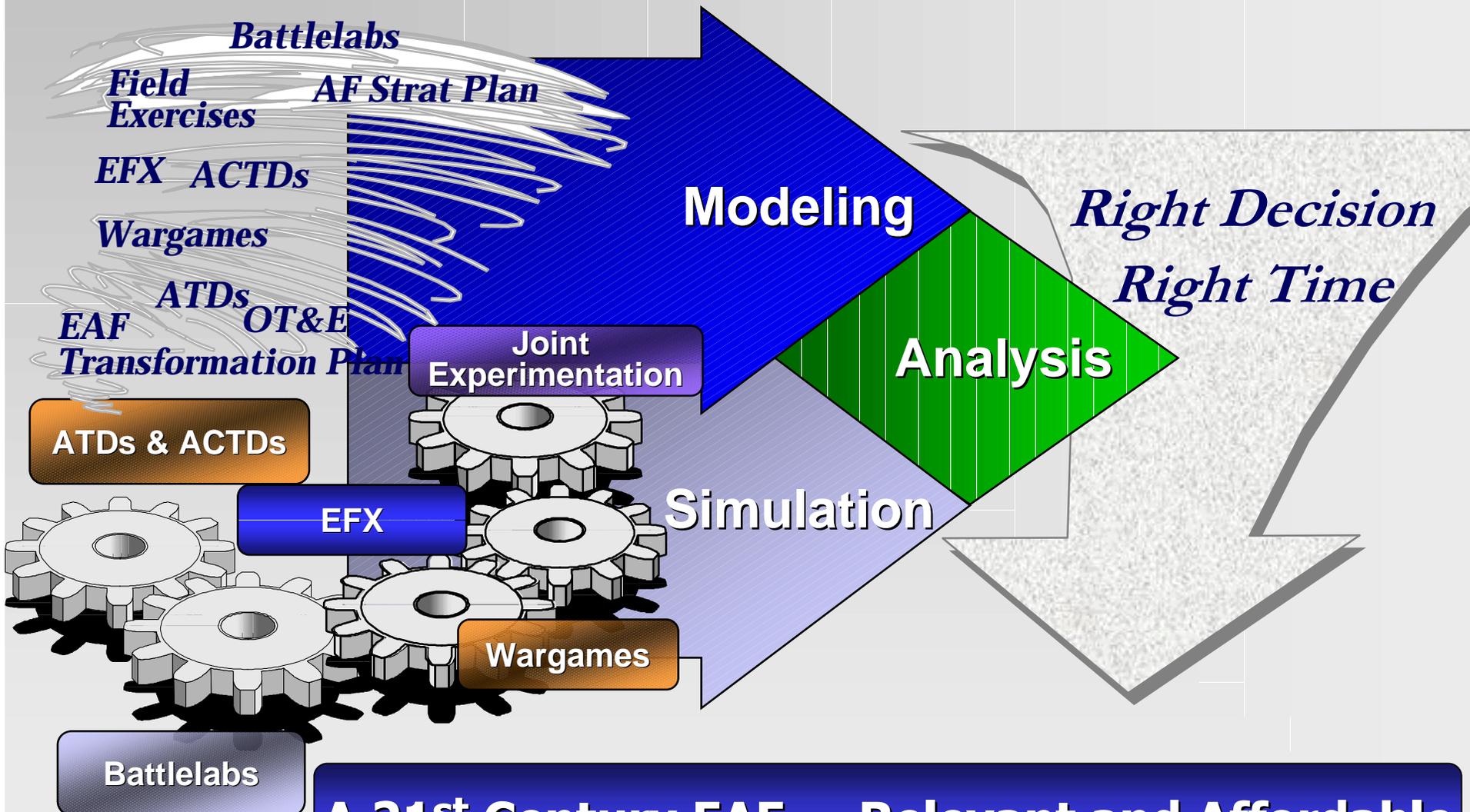
# USAF Core Competencies

- Air and Space Superiority
- Information Superiority
- Global Attack
- Precision Engagement
- Rapid Global Mobility
- Agile Combat Support

# The Analytic Nexus



# AF Modeling, Simulation & Analysis Integration



**A 21<sup>st</sup> Century EAF ... Relevant and Affordable**

# ***The M&S Vision***

## ***... a Joint Synthetic Battlespace***



- **Supporting multiple functional areas**
- **Through Live, Virtual, and Constructive Simulation**
- **With Joint, Interoperable, Re-useable models**

## **DOMAINS OF MS&A**

## **MS&A STRATEGIC OBJECTIVES**



### **ANALYSIS**

#### **Accurate Aerospace Capability Analysis**

- ➔ Ensure MS&A capabilities capture the capacity of modern Air and Space power as critical components required to meet the challenges of the world environment as US military force structure is molded to support current and emerging national military strategy

### **ACQUISITION**

#### **Optimized Weapon Systems**

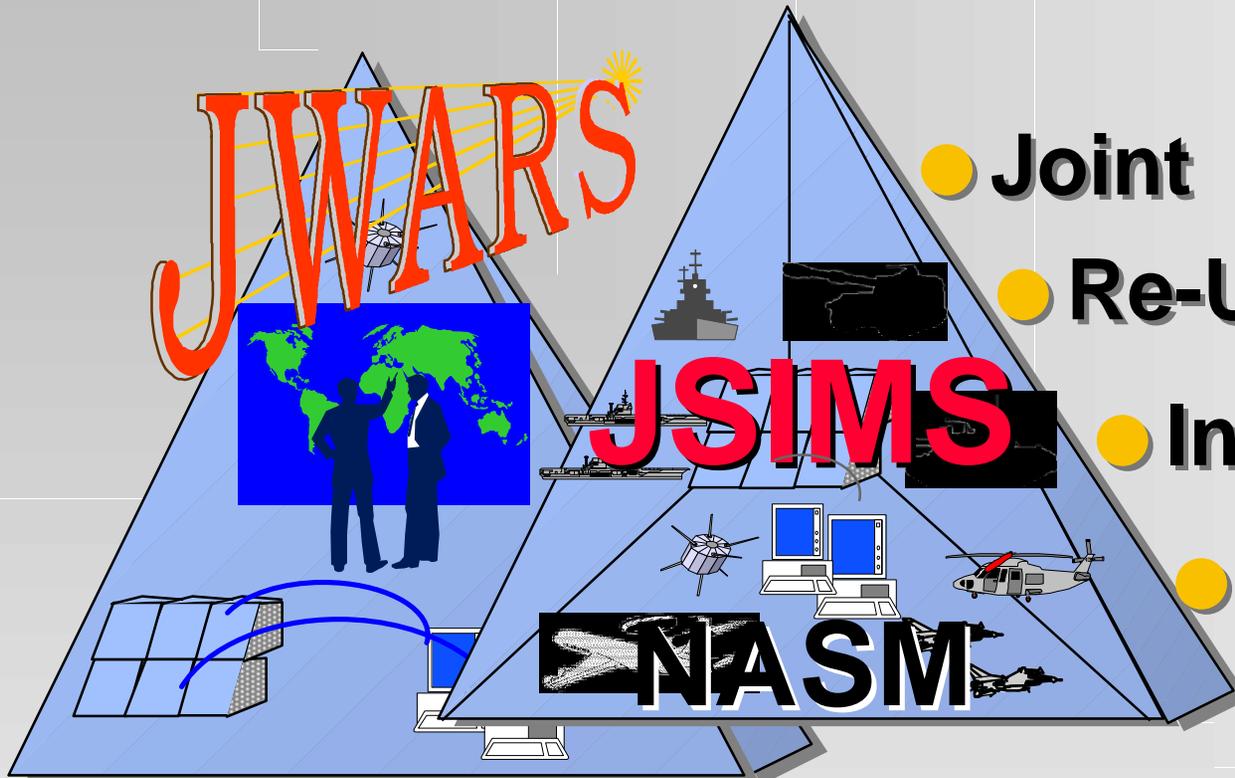
- ➔ Apply MS&A as a means to objectively and consistently compare, evaluate, perform trade-off analysis, and review current and proposed military weapon systems' capabilities against existing and emerging threats throughout a weapon system's life-cycle [all phases of acquisition and sustainment.]

### **TRAINING**

#### **Combat Ready Forces**

- ➔ Utilize MS&A capabilities to support US combat and combat support personnel readiness to meet the challenges of military employment in peace time and throughout the conflict spectrum.

# Next Generation Joint Models

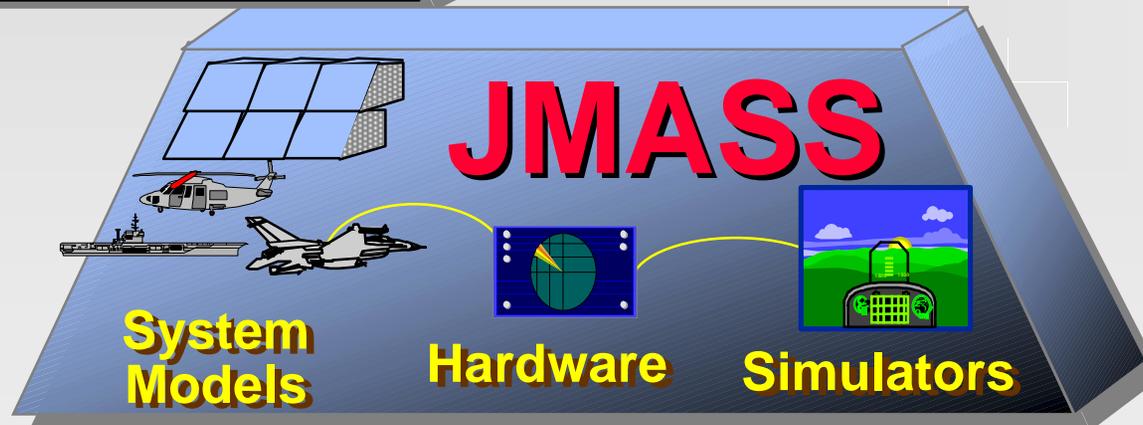


● Joint

● Re-Useable

● Interoperable

● Credible



System Models

Hardware

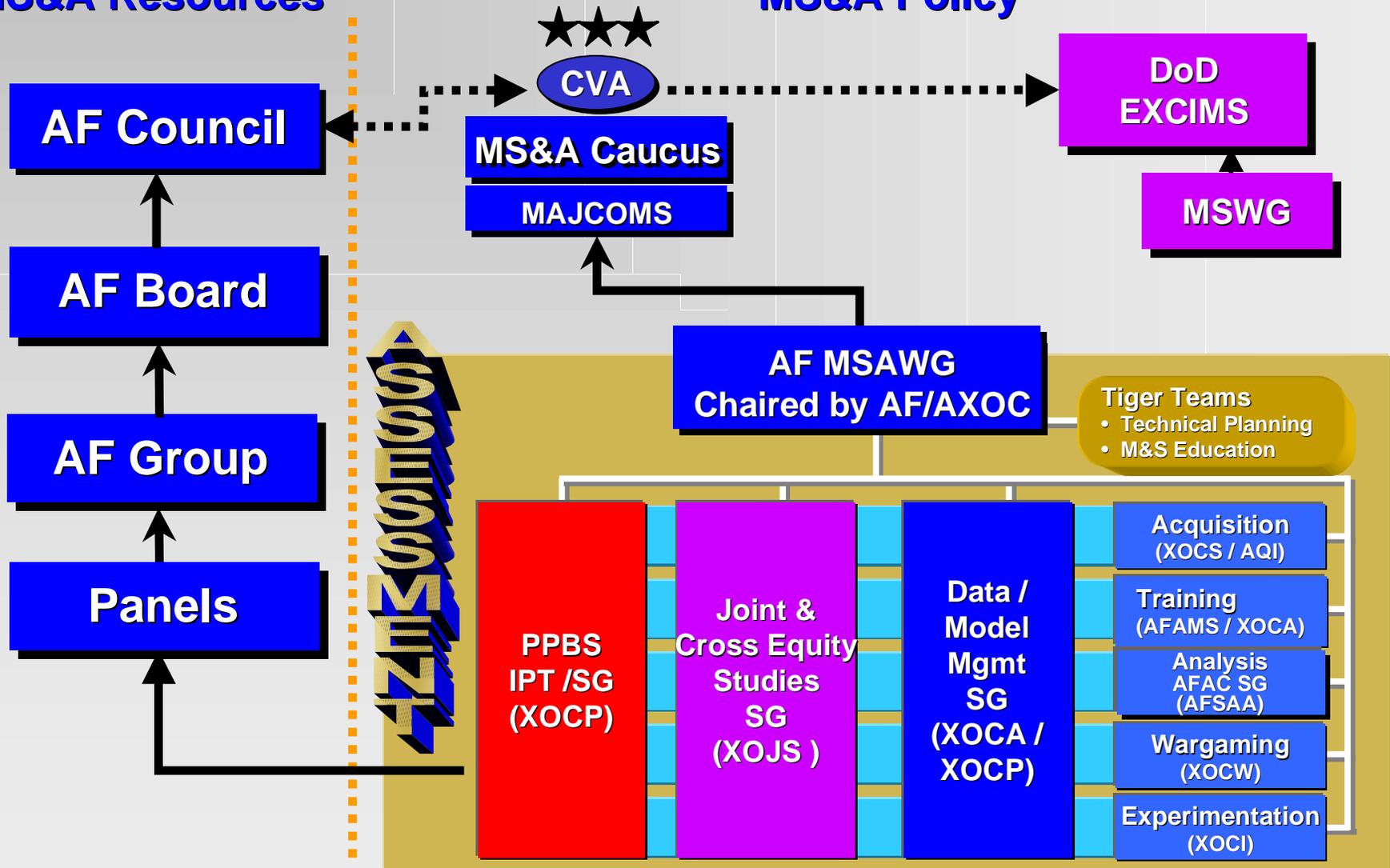
Simulators

# AF MS&A Caucus Structure



**MS&A Resources**

**MS&A Policy**



**AF Council**

**AF Board**

**AF Group**

**Panels**

**MS&A Caucus**

**MAJCOMS**



**CVA**

**DoD  
EXCIMS**

**MSWG**

**AF MSAWG  
Chaired by AF/AXOC**

- Tiger Teams**
- Technical Planning
  - M&S Education

**PPBS  
IPT /SG  
(XOCP)**

**Joint &  
Cross Equity  
Studies  
SG  
(XOJS)**

**Data /  
Model  
Mgmt  
SG  
(XOCA /  
XOCP)**

- Acquisition  
(XOCS / AQI)**
- Training  
(AFAMS / XOCA)**
- Analysis  
AFAC SG  
(AFSAA)**
- Wargaming  
(XOCW)**
- Experimentation  
(XOCI)**

**SOLUTIONS**

# AF Standard Analysis Toolkit

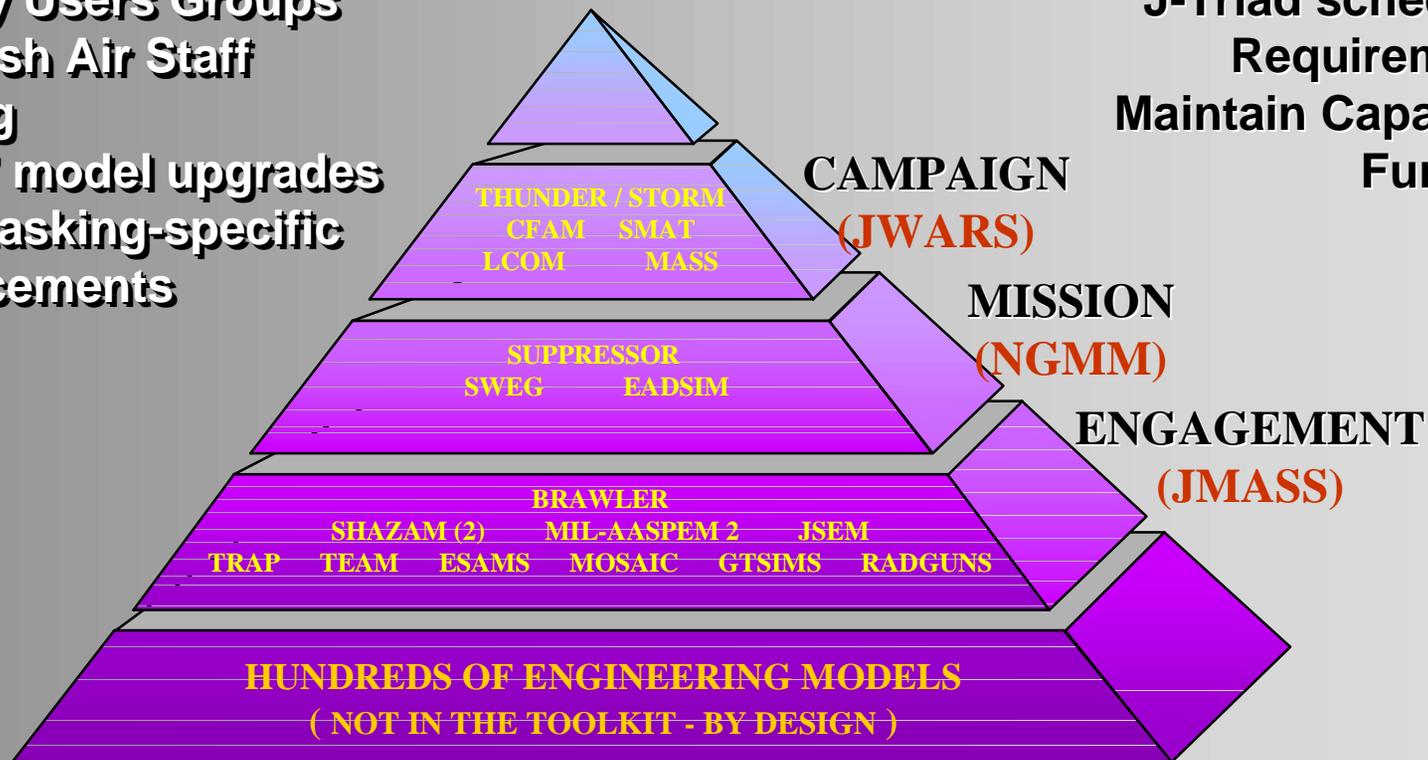


## Transition Plan

- ➔ Identify Users Groups
- ➔ Establish Air Staff funding
- ➔ “Lock” model upgrades
- ➔ Allow tasking-specific enhancements

## Issues

- J-Triad schedules
- Requirements
- Maintain Capability
- Funding

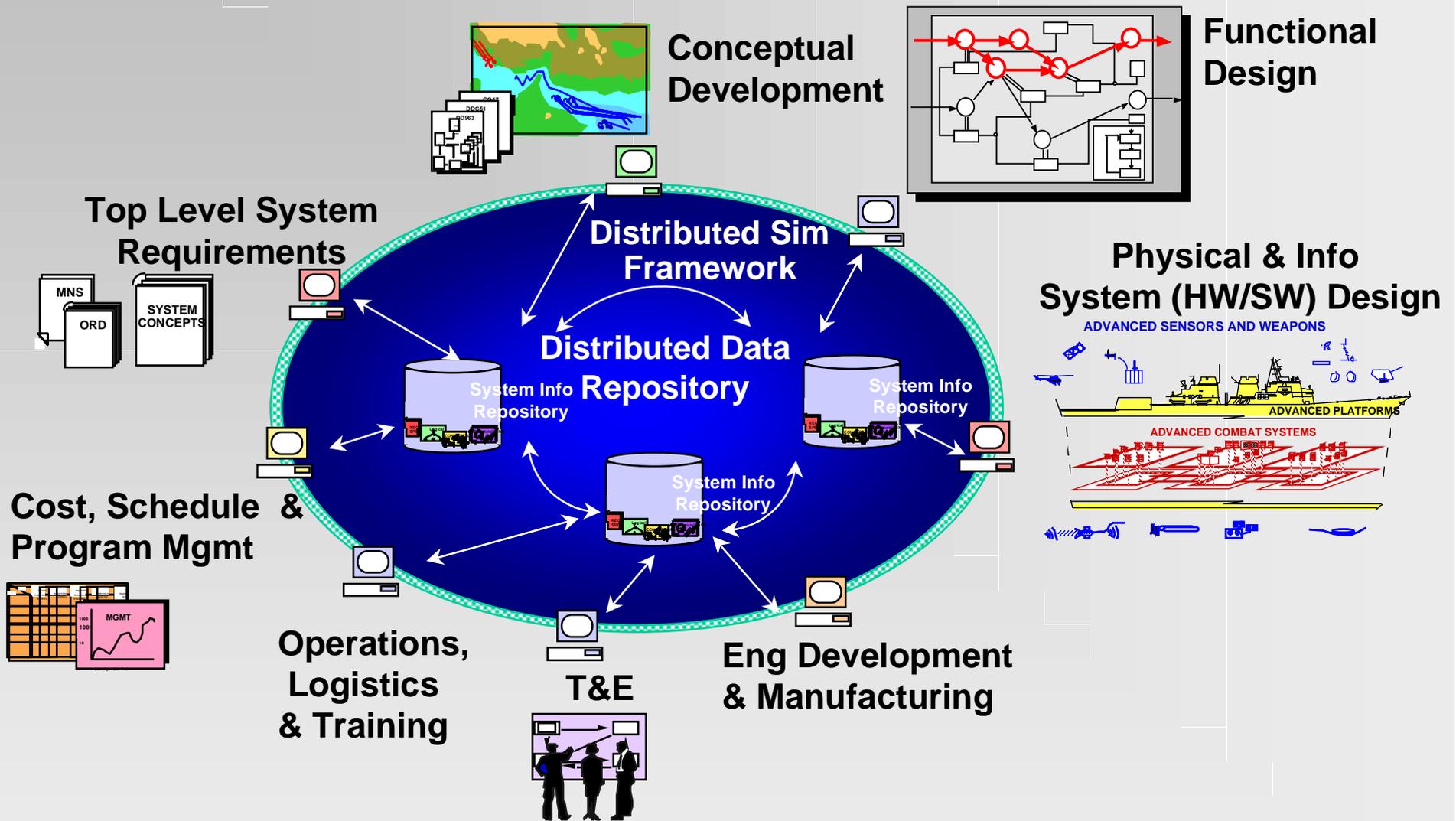


Requirements

Acquisition

Test & Evaluation

# OSD's SBA Operational Concept



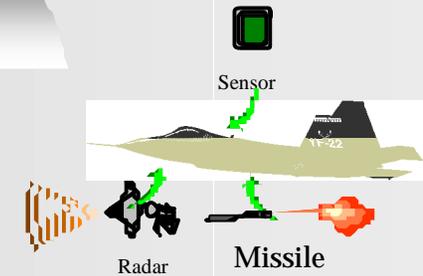
**Extensive Re-use Across Phases and Across Acquisition Programs**



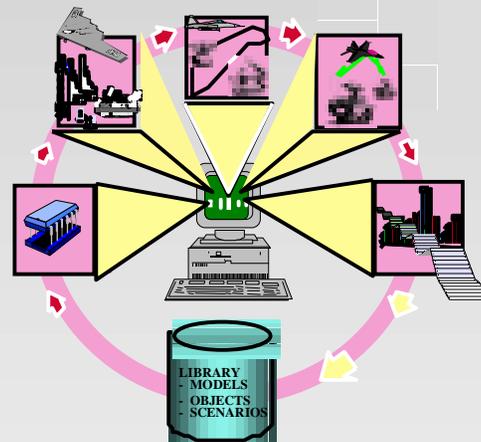
# Populating JMASS

Missile Flyout  
Endgame  
Pilot Mental Model  
etc.

“Legacy Model Functions”



Blue  
“Digital System Models”

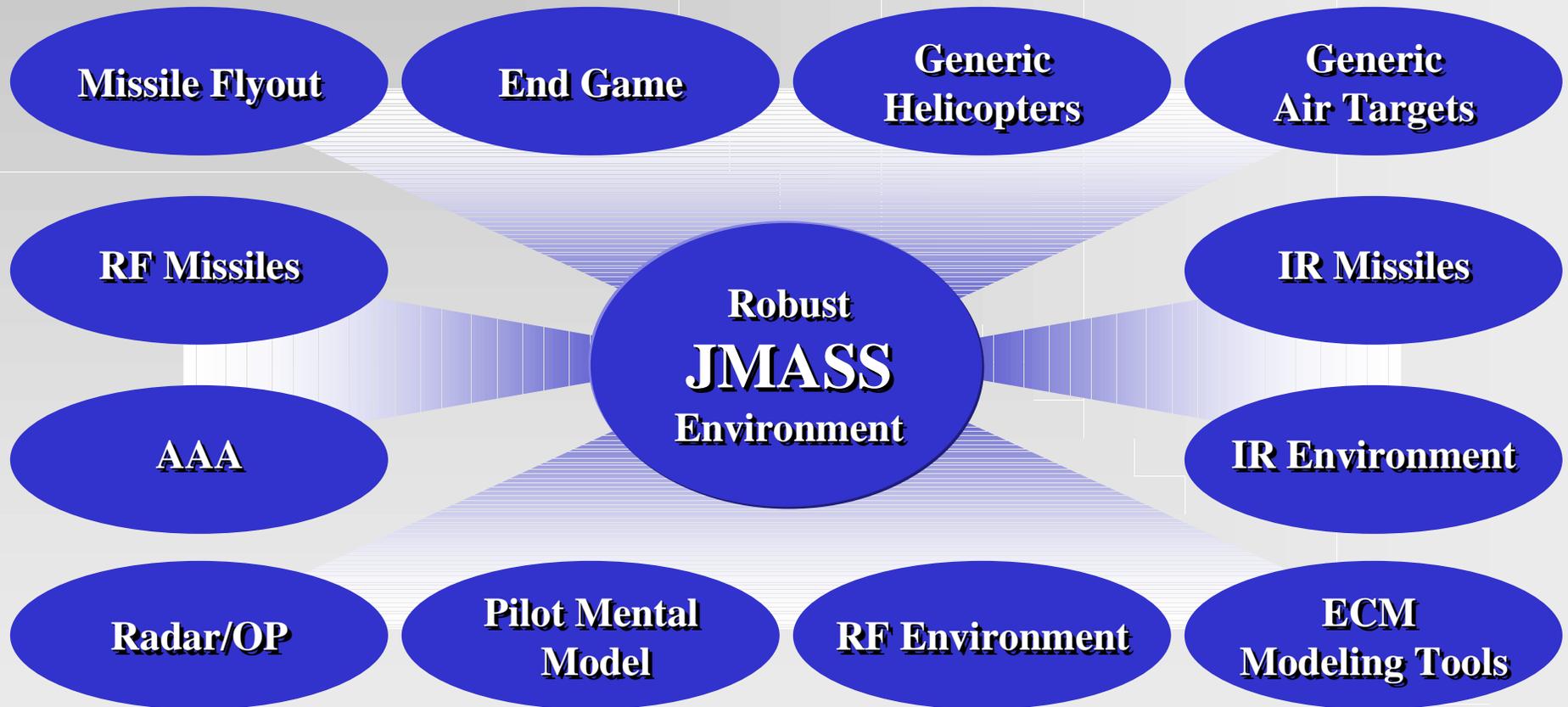


JMASS Program Office  
“Support Environment”  
(Tools, services, standards and interfaces)

DRAFT

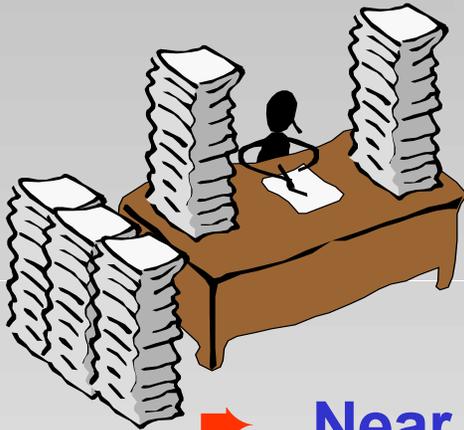
# Transitioning to JMASS

*Legacy Model Functions*





# Scoping JMASS: Blue Digital System Model (DSM) Requirements Survey

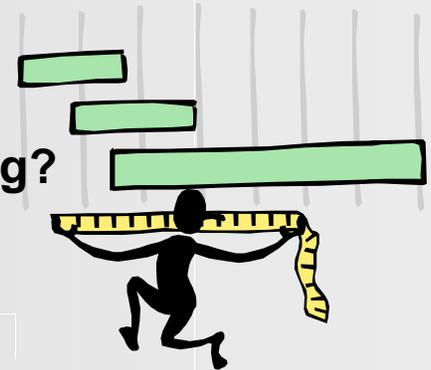


## ➤ Over 800K Air Force End Items

- We don't **NEED** DSMs for **ALL** of them!
- We can't **AFFORD** them all!
- Which are the critical ones?

## ➤ Near Term Requirement Study

- Where are the big money decisions coming?
- What DSMs are needed for them?



## ➤ The Initial Answer:

- 48 DSMs
- 6 for JMASS

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### **TRAINING**

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# C2 Training Environment



“The basis of readiness is a combined and joint exercise program....”

General John H Tilelli, Jr, USA  
CINC, Combined Forces Command

## Yearly C2 Training Impact:

- Over 3000 AF warfighters
- Over 4000 Sister Service warriors
- Over 14,000 coalition partners
  - ... in readiness exercises
  - ... in multiple scenarios
  - ... immersion through M&S

*Modeling and Simulation  
(M&S) Creates Environment*



“M&S has improved air component readiness.”

Lieutenant General Hurd, 7th AF/CC

# C2 Training Environment

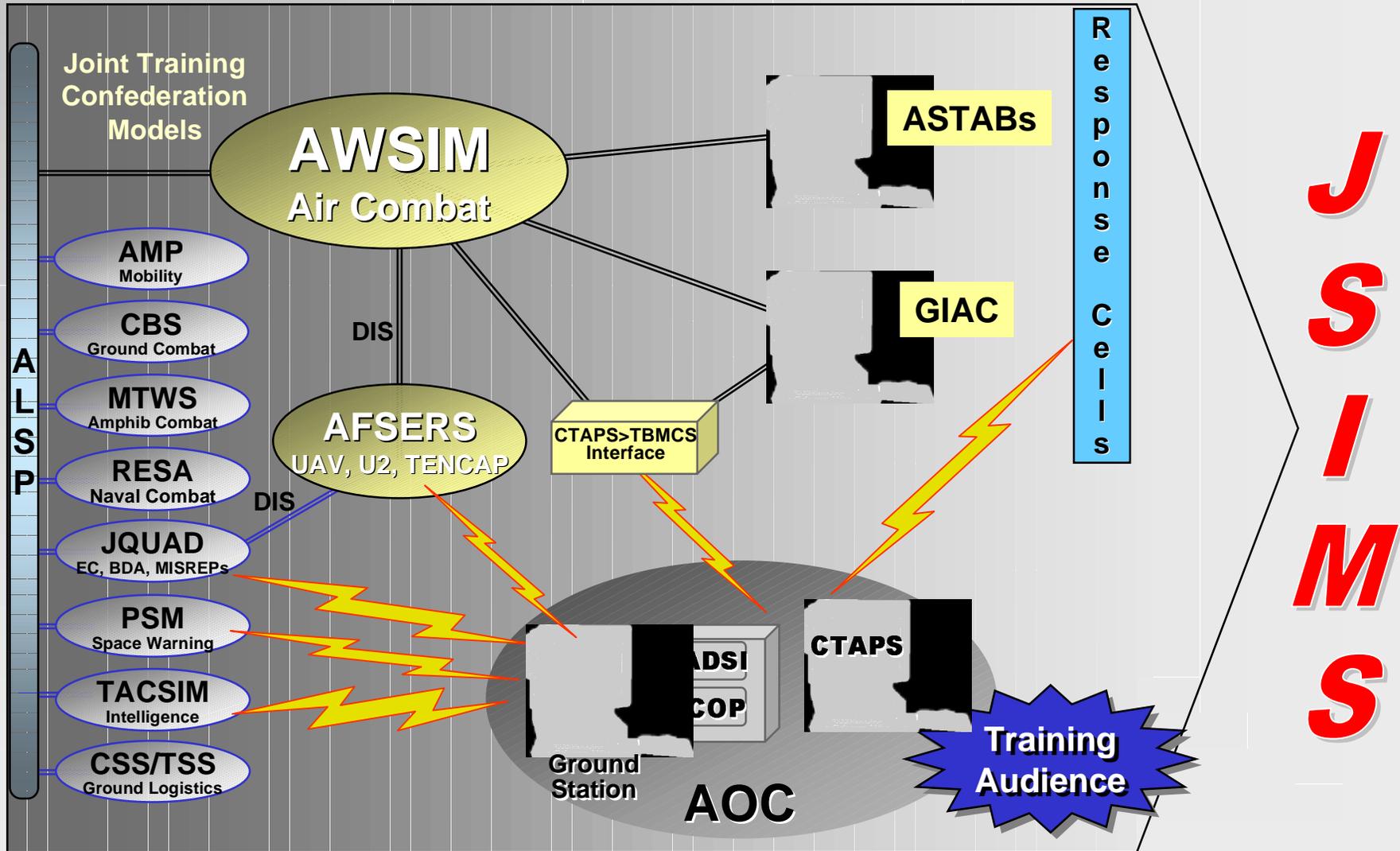


## Modeling and Simulation (M&S) Creates Environment

- ➔ Role of training environment: stress people, equipment, processes
- ➔ During EFX 98, M&S provided
  - ➔ 2,500 USMTF intel messages per day through TBMCS
  - ➔ 2,106 mission updates per day through TBMCS
  - ➔ 12,677 TADIL J, TIBS, TRAP messages via C4ISR every 10 min
  - ➔ With an average of 420 sorties per day
- ➔ Typically, UFL and Blue Flag include 2000-3000 sorties/day

**Train the way we expect to fight....and win**

# AFSOM / Joint Training Confederation

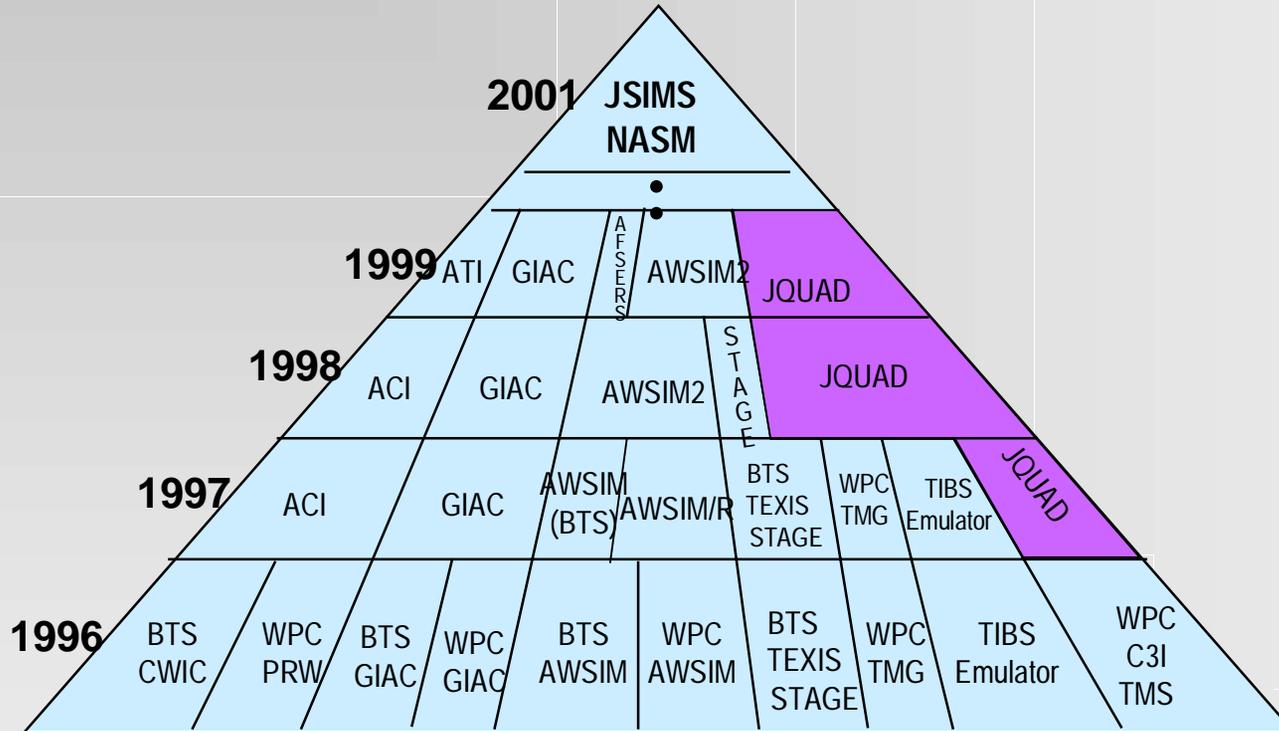


# M&S for C2 Training



## Today: AF Suite of Models (AFSOM)

- Standard AF suite of C2 training models
- Baselined training tools
- Reduced models from 10 to 4
- Improved C2 training via AWSIM changes
- Added ISR functionality



**Various simulations for readiness training used since 1980s**

# M&S for C2 Training



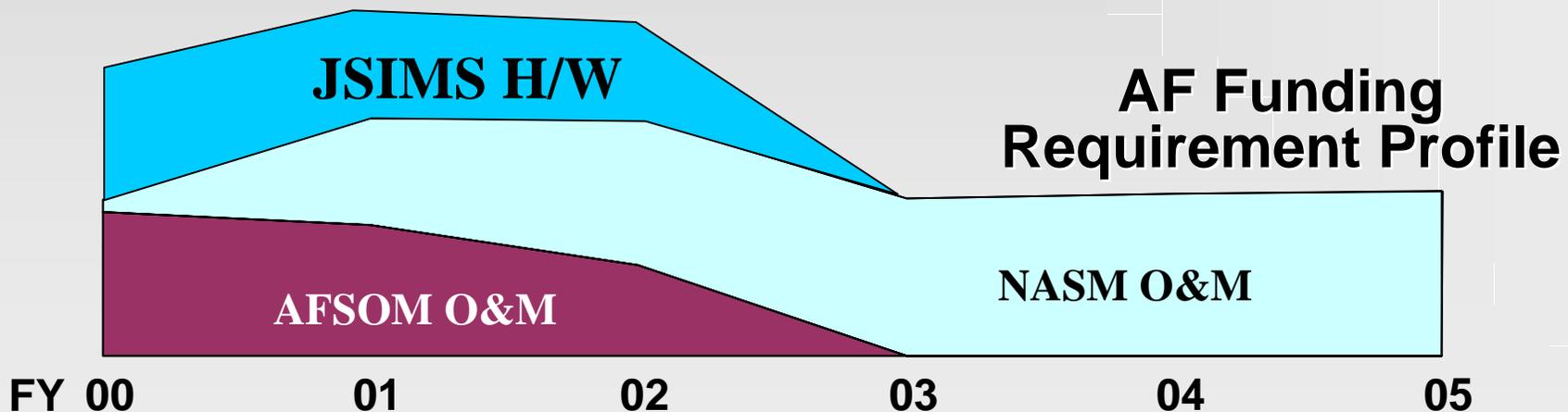
## Tomorrow: Joint Simulation System (JSIMS)



- Increased realism
- Better training
- Improved readiness

	FY00	FY01	FY02	FY03	FY04	FY05
TB	JTLS	JTLS	JTLS	JSIMS	JSIMS	JSIMS
UE	AFSOM	JSIMS	JSIMS	JSIMS	JSIMS	JSIMS
SG	AFSOM	AFSOM	JSIMS	JSIMS	JSIMS	JSIMS
YS	AFSOM	AFSOM	AFSOM	JSIMS	JSIMS	JSIMS
BF-2	AFSOM	AFSOM	AFSOM	JSIMS	JSIMS	JSIMS
UF	AFSOM	AFSOM	AFSOM	JSIMS	JSIMS	JSIMS
PW	AFSOM	AFSOM	JSIMS	JSIMS	JSIMS	JSIMS
RS	AFSOM	JSIMS	JSIMS	JSIMS	JSIMS	JSIMS
TMDI		JSIMS	JSIMS	JSIMS	JSIMS	JSIMS
UFL	AFSOM	AFSOM	AFSOM	JSIMS	JSIMS	JSIMS
EFX	AFSOM	AFSOM	AFSOM	JSIMS	JSIMS	JSIMS
BF-4	AFSOM	AFSOM	AFSOM	JSIMS	JSIMS	JSIMS

### M&S Transition Plan



# Distributed Mission Training (DMT)



Provide **aircrews** a realistic, fully integrated environment, capable of supporting the entire spectrum of training from individual up to campaign-level mission rehearsal



# DMT Concept of Operations

*Team training and mission rehearsal to support operational commanders*



## ➔ Team training - Wing/Squadron

- RAP requirements
- Realistic battlespace based on unit's training needs (local area, expected theaters, challenging adversary)

## ➔ Mission rehearsal - AEF/JFACC

- Based on mission essential tasks derived from real-world mission
- Replicate mission battlespace conditions (terrain, weather, imagery, opposition forces)



Team Training

DMT

Mission Rehearsal



# Questions?

## How Air Force M&S supports the Challenges

- ➔ **The Expeditionary Challenge**
- ➔ **M&S Vision**
- ➔ **Domains and Objectives**