

**13th Annual International C2 Research &
Technology Symposium**

**Modeling Impacts of
Operational Changes on
Joint Campaign Effects**

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Modeling Impacts of Operational Changes on Joint Campaign Effects

- Purpose
- Air Mobility Command – Background
- Implications for Strategic Responsiveness
- Traditional Analysis
- Current Modeling Methodology
- Proposed Process
- Results & Examples
- Conclusions

Purpose

- **Develop analytical approach to calculating value of air mobility to COCOM**
- **Provide analysis of impact of changes in air mobility capabilities on Joint Warfighting**
- **Better articulate value of air mobility investments at AF and OSD based on achieving Joint effects**

Link air mobility capabilities to achievement of Joint effects

Air Mobility Command Background

- **USTRANSCOM Component**
- **Global Air Mobility Capabilities**
 - Strategic and Tactical Airlift
 - Aerial Refueling
 - Patient Movement
- **Humanitarian, Contingencies, etc.**



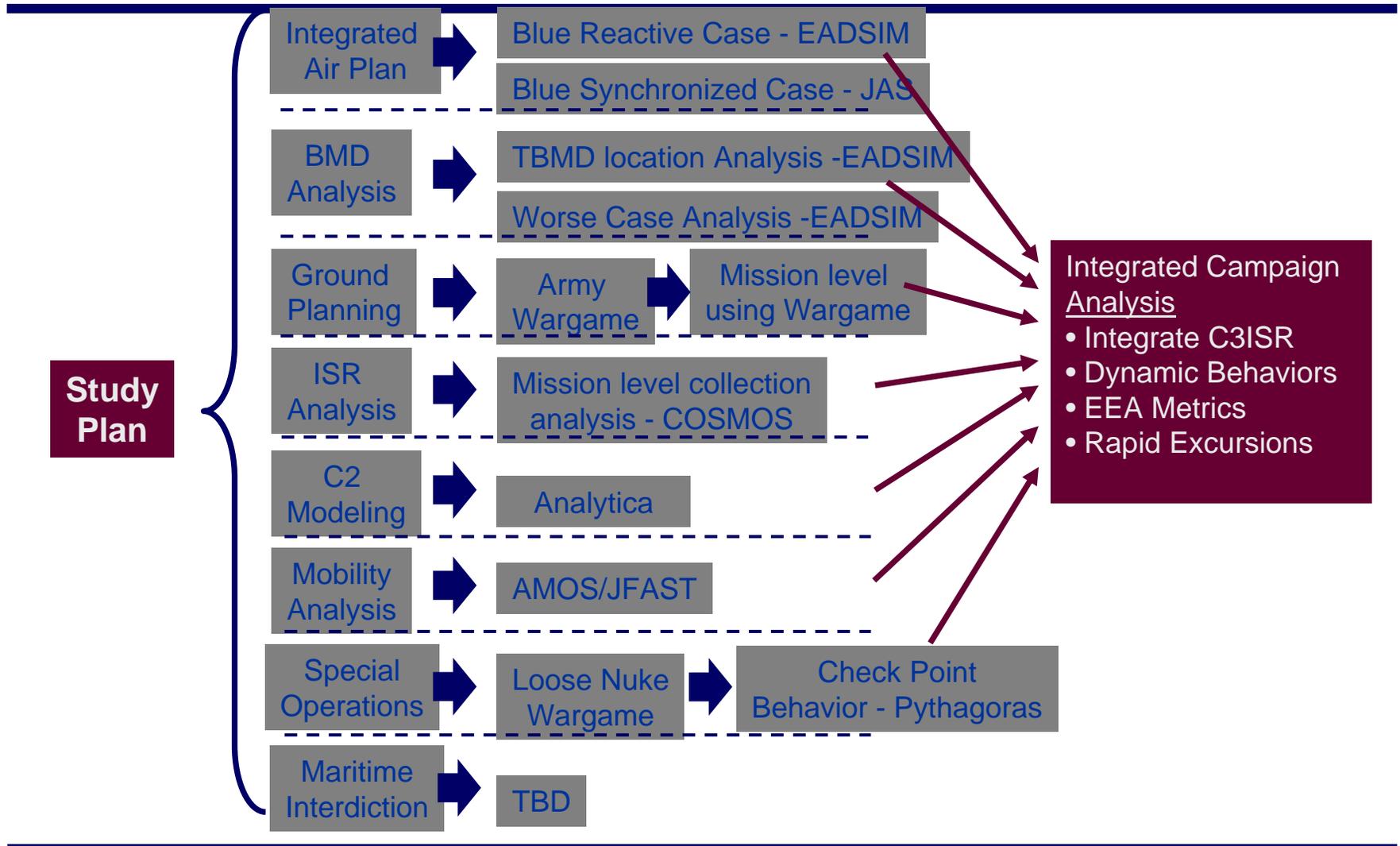
Implications for Strategic Responsiveness

- Global reach and strategic responsiveness are becoming more important, not less so
 - Future OE will demand more frequent and more timely action by the US and international community to counter aggression and prevent conflict
 - US must be able to project power rapidly to any point in the globe to conduct effective military operations in any environment, in any terrain, and against any threat, in the face of determined opposition to intervention
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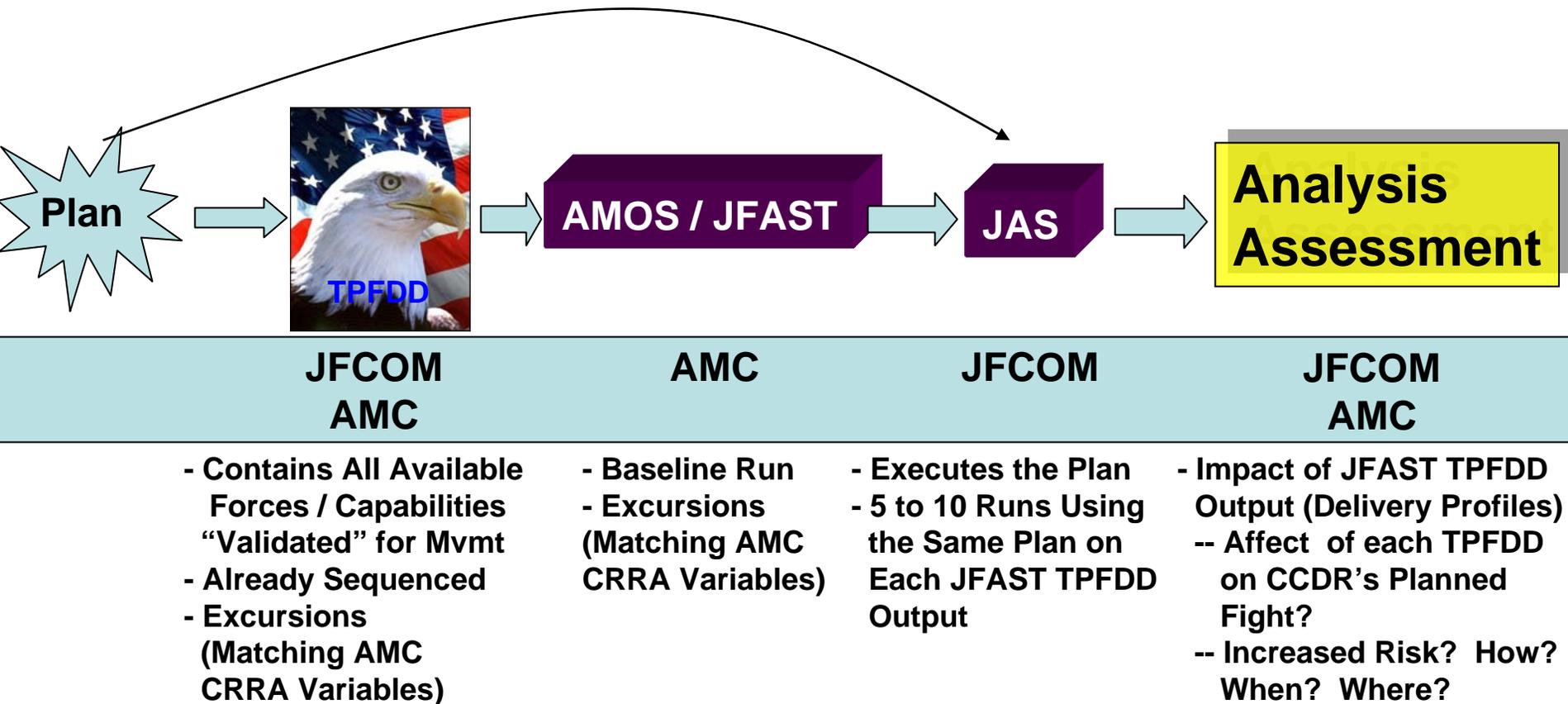
Traditional Analysis

- **AMC Focused on Narrow Definition of Air Mobility Performance**
 - **Joint Analyses Produced Airlift “Capability Windows” Based on Deployment of Forces**
 - **Resulting conclusions define upper and lower risk limits and “acceptance” of lower capability levels**
 - **Example: DOD Mobility Capabilities Study 2006 (MCS 06) Assessed Air Mobility Capabilities “Adequate”**
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Current Modeling Methodology



Air Mobility Effects-based Warfighting Assessment



No Federation exists between Air Mobility and Joint Campaign Models

Proposed Process

Air Mobility Capabilities

Air Refueling
Airlift

Vary Factors

- Availability
- Min Loads
- Max on Ground
- Forward Basing
- Fuel Offloaded
- # Receivers
- Air Refueling
- Tracks

Joint Effects

Measured By:

- Changes to Operational Phasing
- Personnel Cost (Losses)
- Improved "Kills"
- Forces' Availability to Support Next Fight
- Combat Red COAs

Use credible models for each phase

Results and Examples

- **Air Refueling**

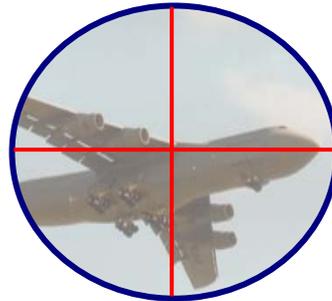
- **Airlift**

Air Refueling Examples



Air Refueling: Defensive Systems

- **Surface to Air Threats**
 - Identified in the 80's
 - AMC MNS in the 90's
 - OEF / OIF Experience
 - Shot at 236 Times
 - 5 times a week
 - Hit 6 Times in FY06
 - 2nd only to Helicopters



**Large Aircraft
Infrared
Countermeasure
(LAIRCM) Solution**



Defensive systems improve survivability



Airlift Examples



Airlift Example



Campaign Execution Timeline

FDO 2 (+ADVON)

FDO 1 (Trans to Phase 1)

Operation Commence Execution

Operation Completed

Phase 1c
Degrade C2 **25%**

Phase 1a
Seize KPODs **95%**

Phase 1b
Secure PODs, Key Mil Sites

Phase 1d
Secure Key Gov't, Civil Sites

Phase 2 (Early Option)
Consolidate, Extend

Phase 2
Consolidate, Extend

Example:
CCDR wargaming indicates shows Early Phase 2 execution compresses overall campaign by 10-days & reduces risk in friendly losses, destruction of local infrastructure, etc.

D+0 D+1 D+2 D+3 D+4 D+5 D+6 D+7 D+8 D+9 D+10 D+11 D+12 D+13

N-3 N-2 N-1 C+0 C+1 C+2 C+3 C+4 C+5 C+6 C+7 C+8 C+9 C+10 C+11 C+12 C+13 C+14 C+15 C+16

SOF PKG 1 100%

SOF PKG 2 100%

1 BCT(S)

82 ABN (2 BCT / RDY BDE, 18 ABN CP C2E) 99%

25 ID(AVN)(Med)(-) 50%

432 MPBN(+) 99%

3 ACR(-)

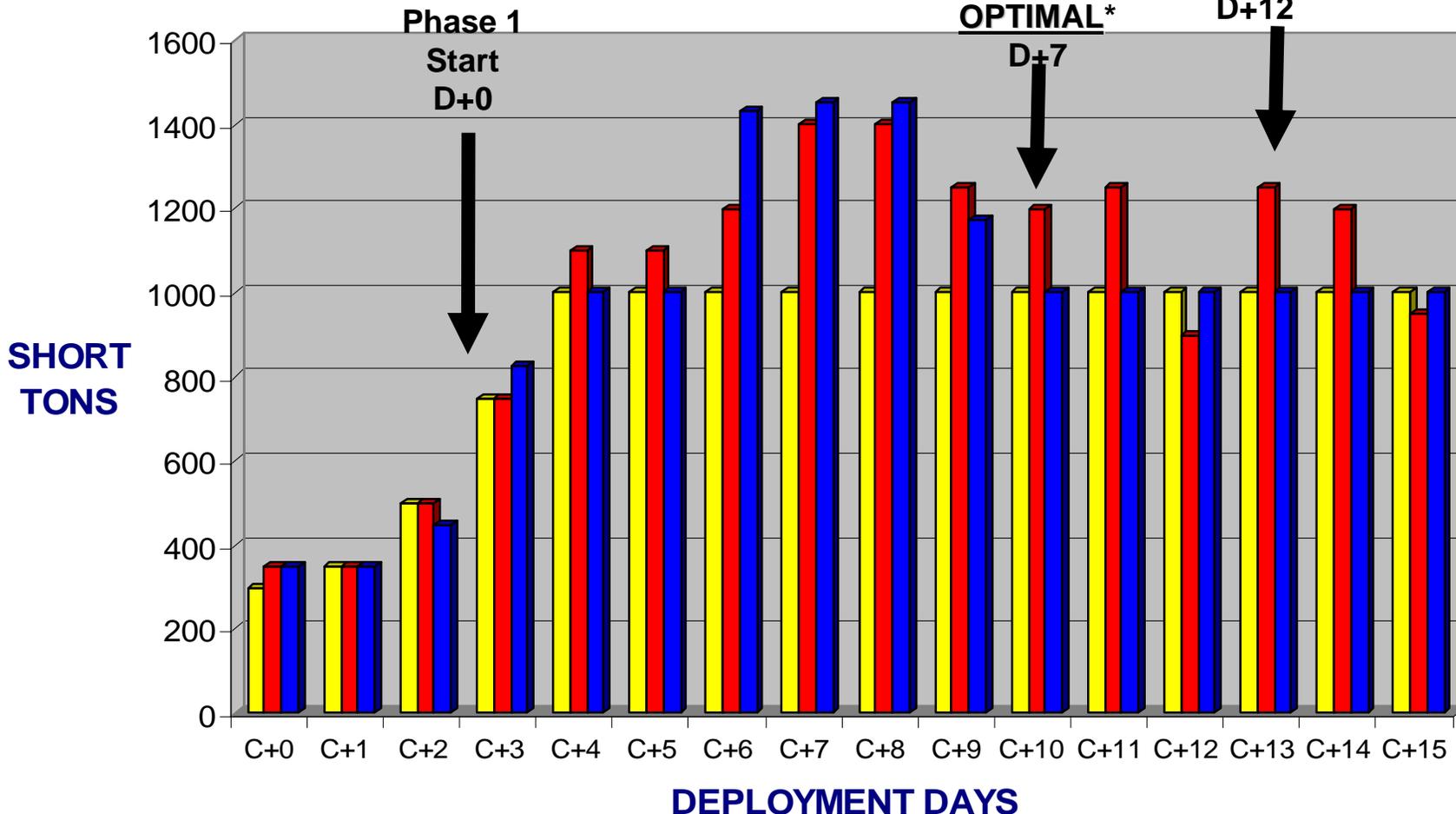
Strategic Deployment Timeline (Air)

- =/>25% Closed at APOD
- =/>50% Closed at APOD
- =/>80% Closed at APOD (OPERATIONALLY AVAILABLE)
- Final Closure at APOD

C Day: Deployment begins
D Day: Operations begin



Airlift Example



C-DAY = DEPLOYMENT OF FORCES BEGINS

* Early Execution Supports Operational Risk Reduction by:

- XX% Fewer Friendly Casualties
- XX% Faster Phase Transition



TPFDD: Time-Phased Force and Deployment Data

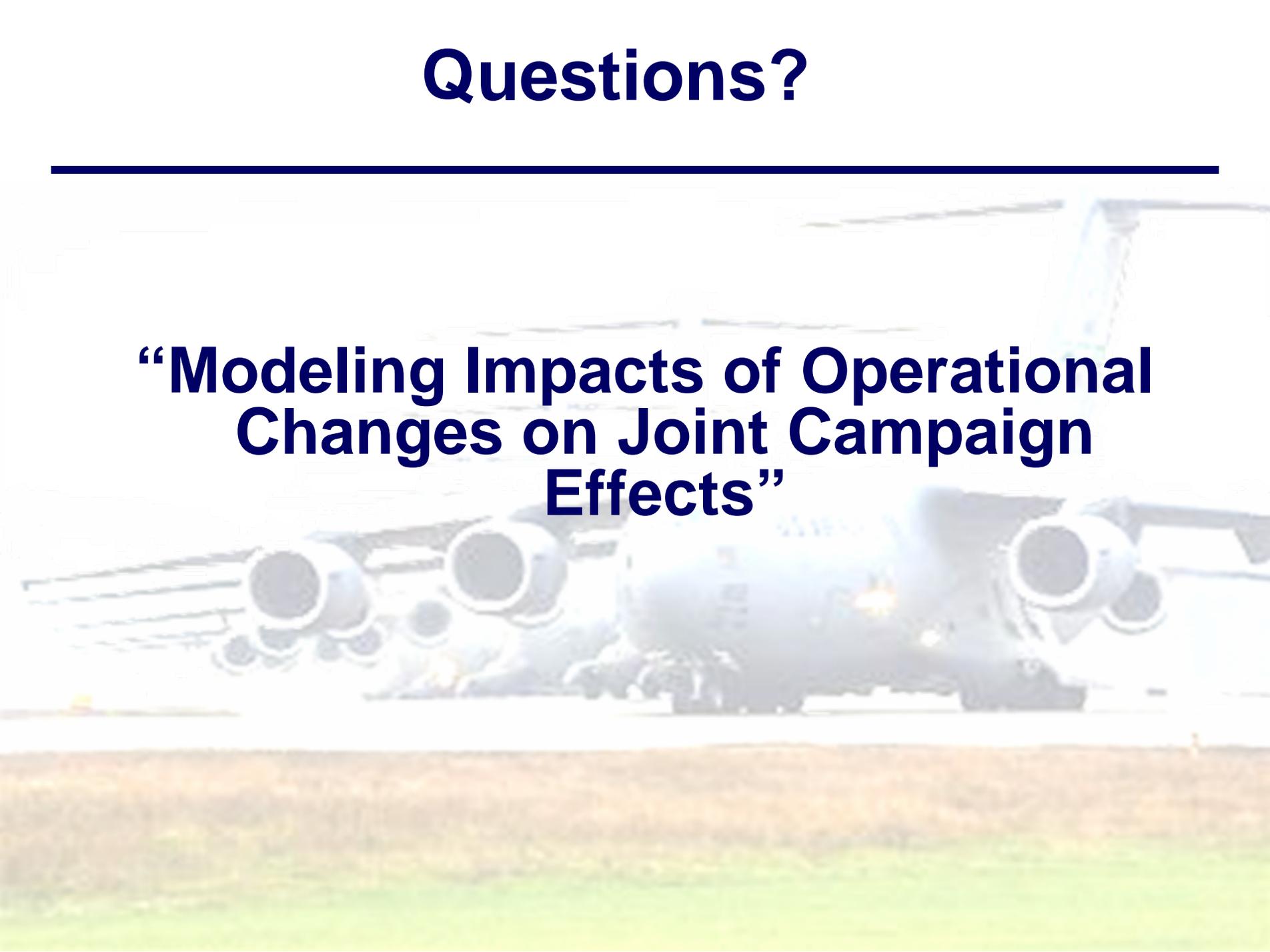
Conclusions

- **No Single Integrated Joint Campaign Model**
- **Major Limitations To Modeling Airlift & Air Refueling**
- **No federation capability**
- **Training To Run Models / Do Analyses**
- **Funding Requirements**
- **However, Capability Exists Now To Assess Joint Effects By Linking Air Mobility Variables To Campaign Variables In Joint Models**

Leverage Existing Capabilities Today

Questions?

“Modeling Impacts of Operational Changes on Joint Campaign Effects”

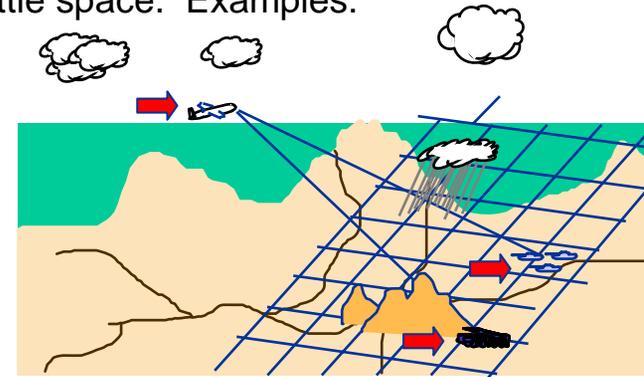


Back-ups

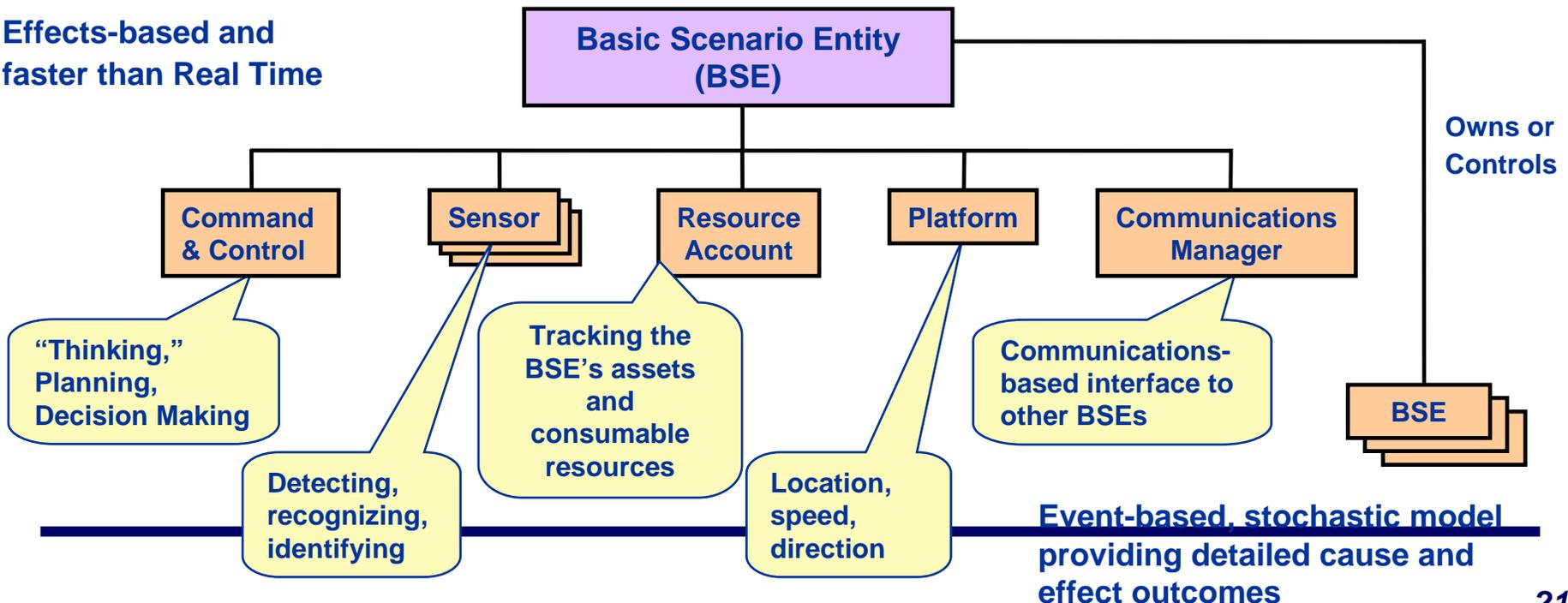
Fundamental Component Basic Scenario Entity (BSE)

■ BSE -- a friendly unit, enemy unit, or major system operating in the battle space. Examples:

- Operational Headquarters
- Support Headquarters
- Airbases and seaports
- Infrastructure: Power, H2O
- Civilians
- Land: Units, Neighborhoods
- Air: Flights, military & civil
- Maritime: Ships, small craft
- Space: Sensors & Comms



Effects-based and
faster than Real Time



JAS

- **Joint Analysis System**
 - **Formerly Known as JWARS (Joint Warfare System)**
 - **Admittedly Weak On Mobility – Less Weak In Other Areas**
 - **Used By USAF A5XS; Defense Threat Reduction Agency; JFCOM J8; JFCOM J2; Coast Guard**
 - **Used For UE 06; Noble Resolve 07-2**
 - **Current Status**
 - **Listed In OSD PA&E's M&S Tool Registry As A Non-Analytical Baseline Core Analysis Tool**
 - **No Immediate Plans To Improve Mobility**
 - **Future – “Hot Potato”**
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THUNDER

- **USAF's Campaign-Level Analytical Simulation**
 - **Used By JS/J8; OSD PA&E; USAF/A3; USAF/A9; ACC; AFSPC; Navy; USFK; PACOM; CENTCOM**
 - **Used For MCS and Numerous Other Studies**
 - **Current Status**
 - **Listed In OSD PA&E's M&S Tool Registry As An Analytical Baseline Core Analysis Tool**
 - **Mature, Legacy Model**
 - **Runs On Sun And SGI Unix And Linux Workstations**
 - **Future – Will Be Succeeded By STORM**
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STORM

- **Synthetic Theater Operations Research Model**
 - **USAF's New Campaign-Level Simulation**
 - **Succeeds THUNDER**
 - **Used By HAF/A9; ACC/A9; UK; JS/J8; OSD PA&E**
 - **Used For Unified Engagement Series of Wargames**
 - **Current Status**
 - **Listed In OSD PA&E's M&S Tool Registry As A Non-Analytical Baseline Core Analysis Tool**
 - **Wrapping Up AF Development – Adding a Navy Piece**
 - **Runs Under Windows XP, SPARC Solaris, & PC Linux**
 - **Future – Some Kind Of A “Federation” With AMOS**
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JICM

- **Joint Integrated Contingency Model**
 - **Used by JS; Services; COCOMs; OSD; Australia; ROK**
 - **Used For**
 - **Assessment Of Ability Of Programmed Forces To Execute Defense Strategy (Joint Staff and OSD)**
 - **Development Of Force Structure And Munitions Requirements (Army)**
 - **Current Status**
 - **Listed In OSD PA&E's M&S Tool Registry As An Analytical Baseline Core Analysis Tool**
 - **Mature, Legacy Model**
 - **Runs On Sun Workstations Under Solaris Operating System**
 - **Future – Federation With AMP/MIDAS**
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As-Is Mobility Air Force Enterprise Architecture (MAF EA) v2.0 High-Level Operational Concept Graphic (OV-1)



MAF Airlift



MAF Air Refueling



MAF Special Operations



MAF Operation Plan 8044



Rapid Global Air Mobility support to the United States Warfighting Forces While Simultaneously Providing Humanitarian Assistance to the Civilian Population at Home and Abroad