

Headquarters U.S. Air Force

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Air Force Standard Analysis Toolkit and Analysis Approach



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Outline

- **AFSAT Description**
 - What is it?
 - Why Created?
 - Approach used to develop AFSAT?
 - Process used for M&S tool to enter AFSAT?
- **SURVIAC Description**
- **Relationship between AFSAT and SURVIAC**
- **Ex. Analysis approach using AFSAT/SURVIAC tools**
- **Summary**



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AFSAT Description

What is it?

- The Air Force Standard Analysis Toolkit (AFSAT)
- Foundational set of AF analytic community (AFAC) accepted modeling and simulation (M&S) tools
 - Stand-alone, data driven constructive simulations
 - User picked, well understood, formally evaluated (stamp of approval)
 - Use of AFSAT tools encouraged
- Goals
 - Improve consistency and quality of AF analyses
 - Standardize model management, configuration management, VV&A, etc. *best practices* across the AF analytic community
 - Provide framework for analytic M&S capability investments
- Oversight
 - AFAC Steering Group provides direction and guidance
 - AFSAA/SAA – executive agent
 - Subject Matter Expert model managers (MM) responsible for individual models

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AFSAT Description

Why Created?

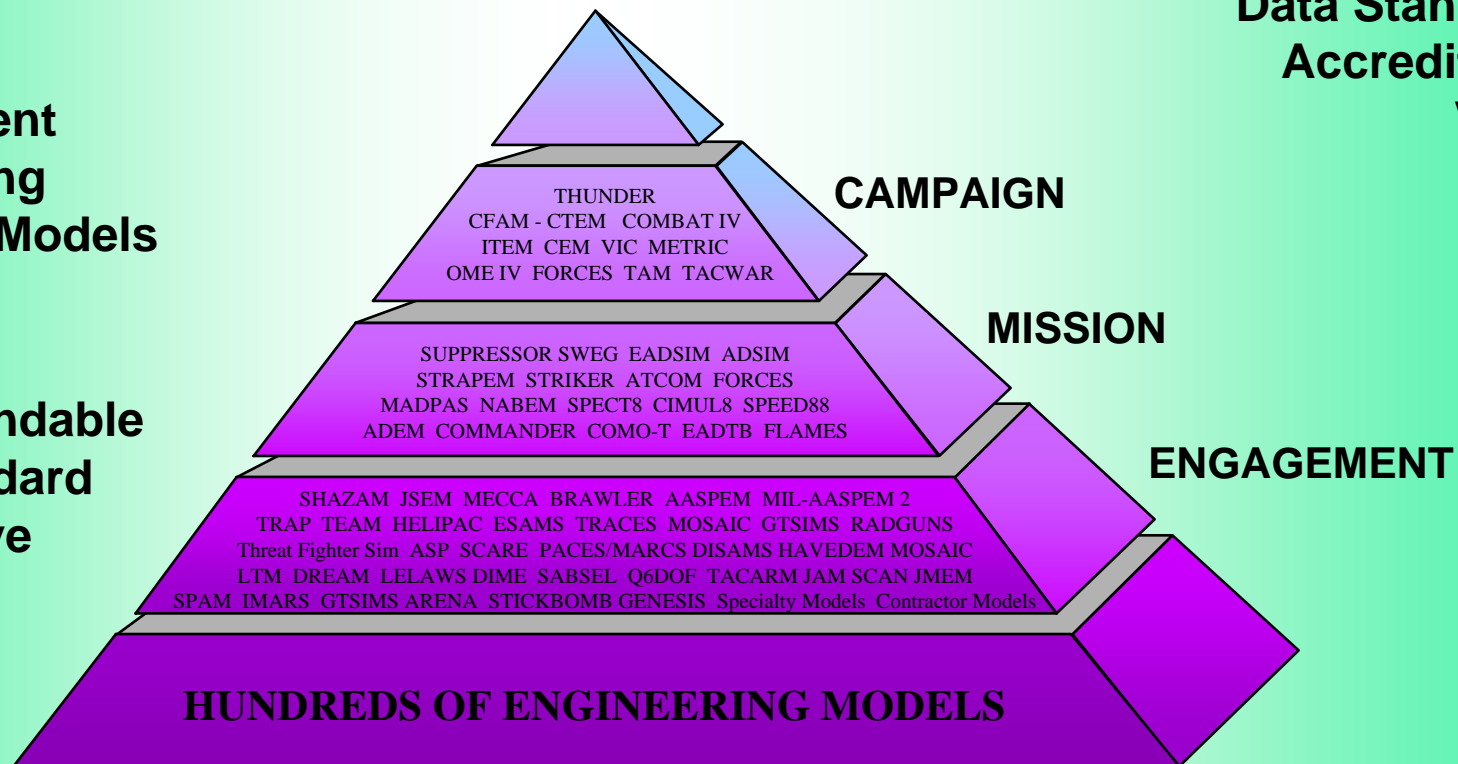
Numerous Analysis Tools

Campaign
Mission
Engagement
Engineering
Specialty Models

Mandates
Data Standards
Accreditation
VV&A

Issues

Non-Defendable
Non-Standard
Duplicative



Analysis

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AFSAT Description

Approach used?

AF Analyses Benefits

Life cycle costs lowered via
reduced duplication of cap-
ability via enabling reuse
Results analytically more
consistent



Analysis

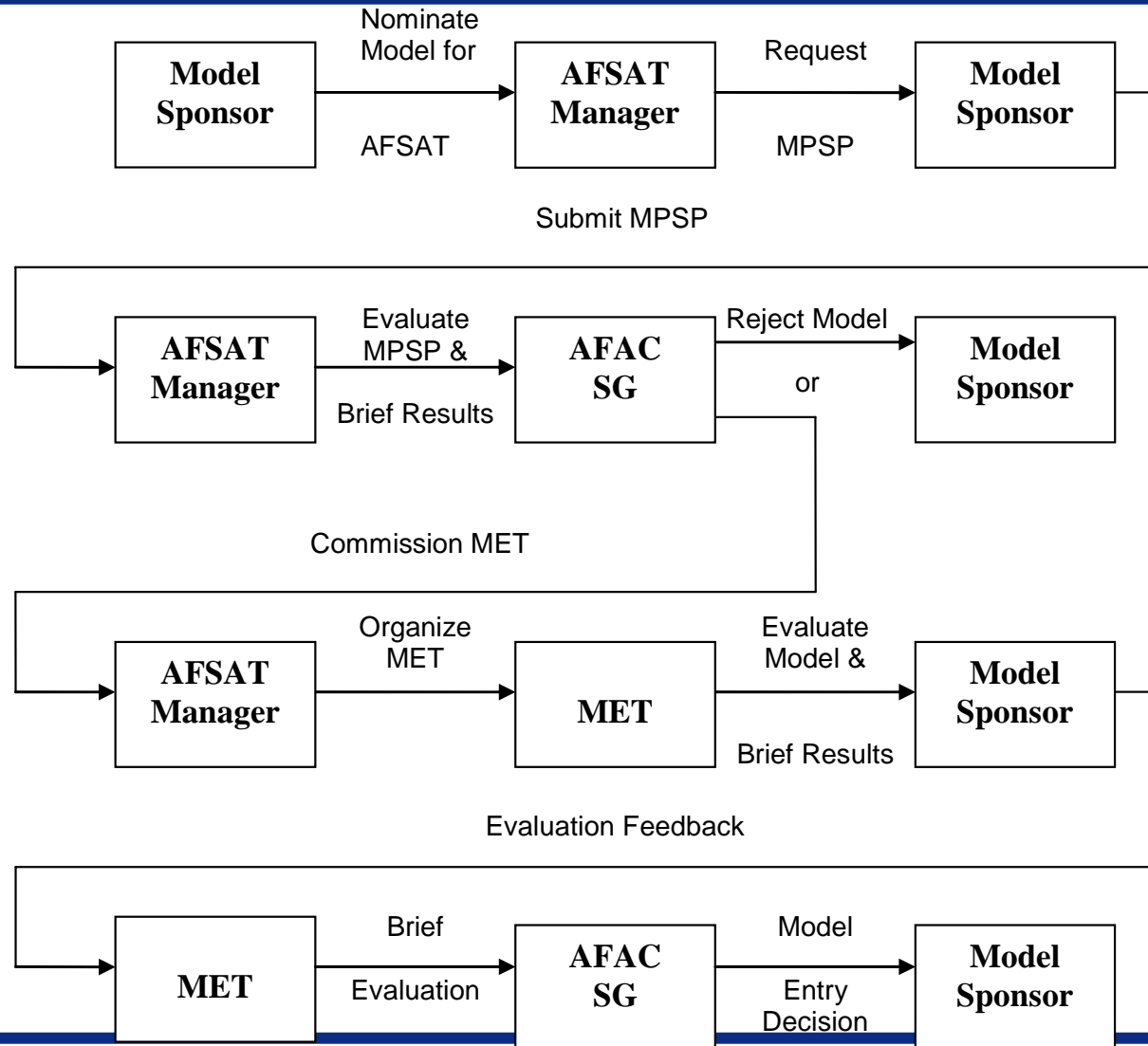
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AFSAT Description

Entry Process per AFI 16-1003



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SURVIAC Description

Survivability/Vulnerability IAC

- DoD sponsored Information Analysis Center (IAC)
- DoD's institution for collecting, analyzing, and disseminating scientific and technical information (STI) related to all aspects of survivability and lethality for aircraft, ground vehicles, ships and spacecraft, to conventional homeland security threats including chemical, biological, directed energy, and non-lethal weapons.
- Contractor operated, DoD sponsored service available to all government and industry users to provide studies, analyses, data gathering, and other operational, and logistics requirements related to survivability and lethality technologies.
- Includes maintenance and distribution of approved set of models and simulations used to evaluate survivability and vulnerability.

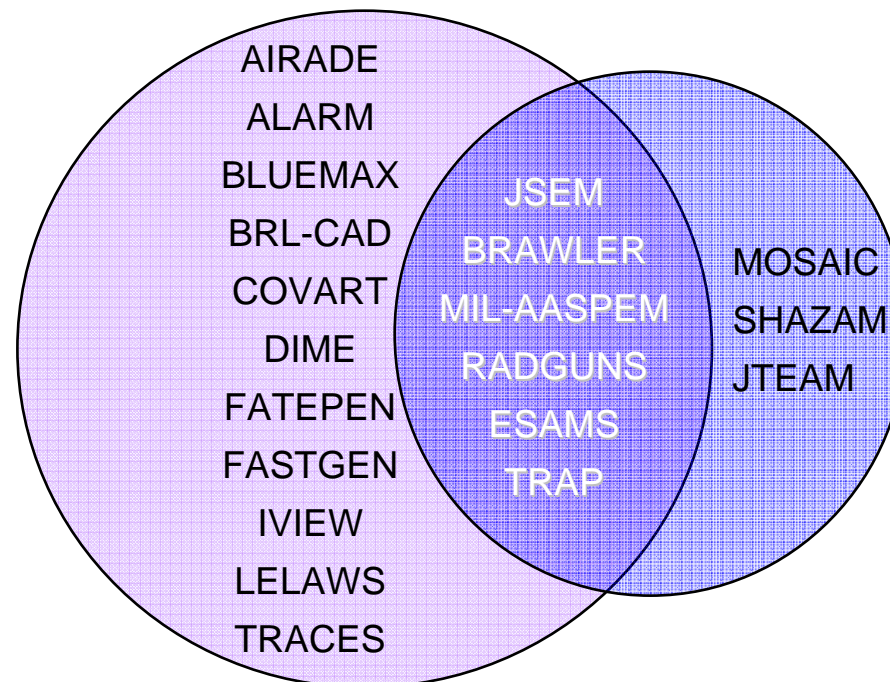


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AFSAT and SURVIAC M&S

How are they related?

SURVIAC



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Aircraft Survivability

Where the Rubber Meets the Road

Work backwards—understand the physics and effects



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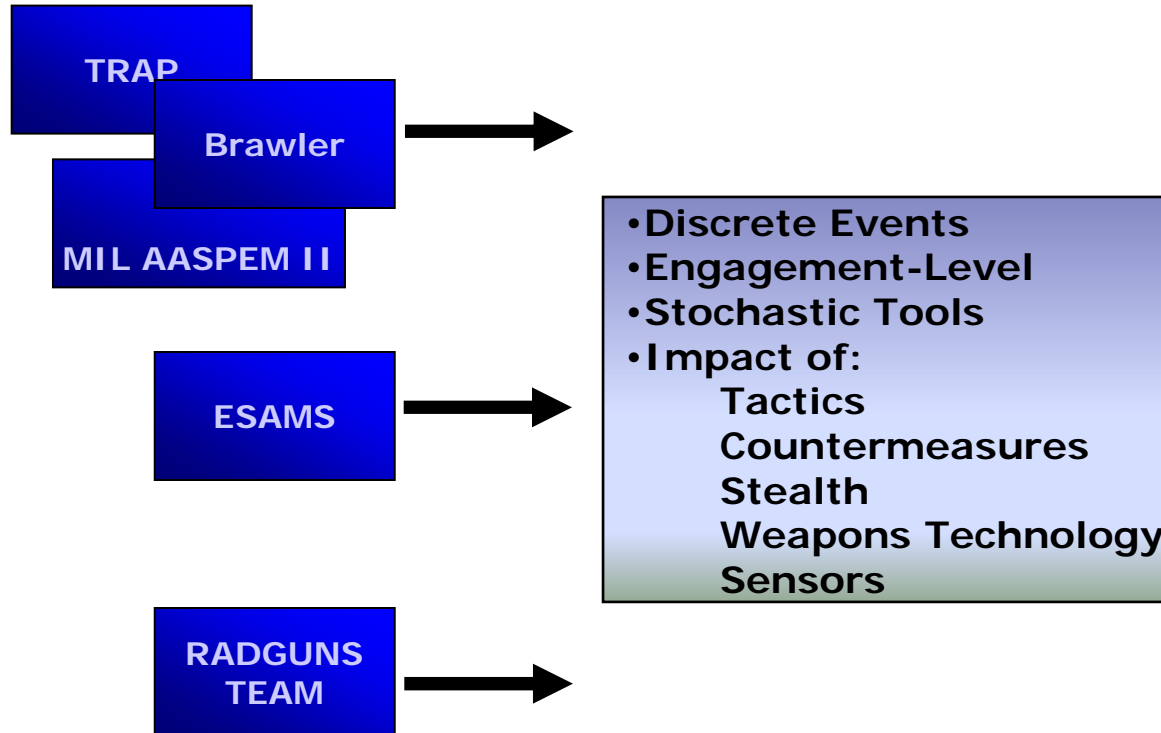
GERALD BENNETT, SURVIAC



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Survivability & Vulnerability

Engineering & Engagement Level Analysis



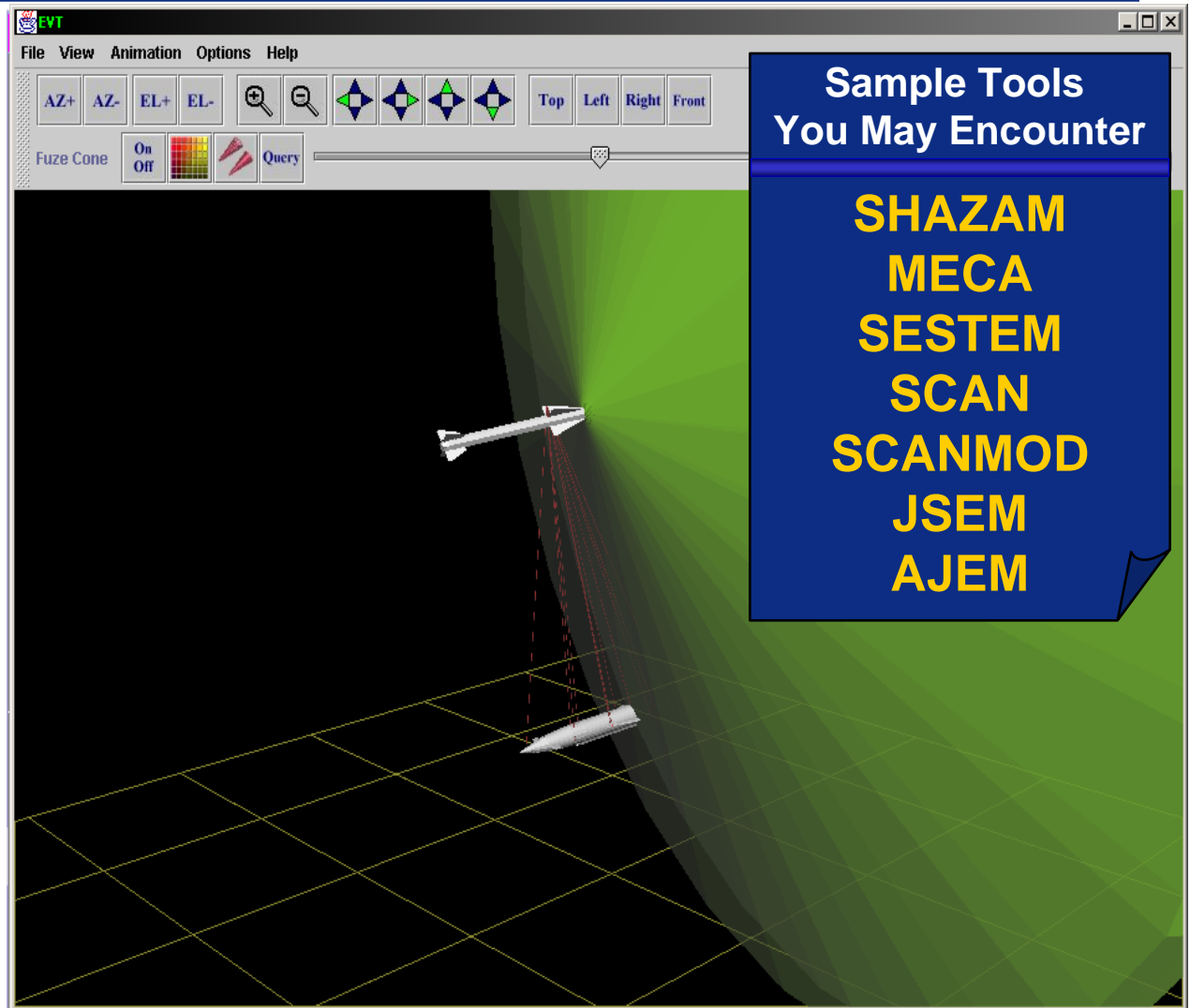


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Engineering-Level

The Munitions: Endgame

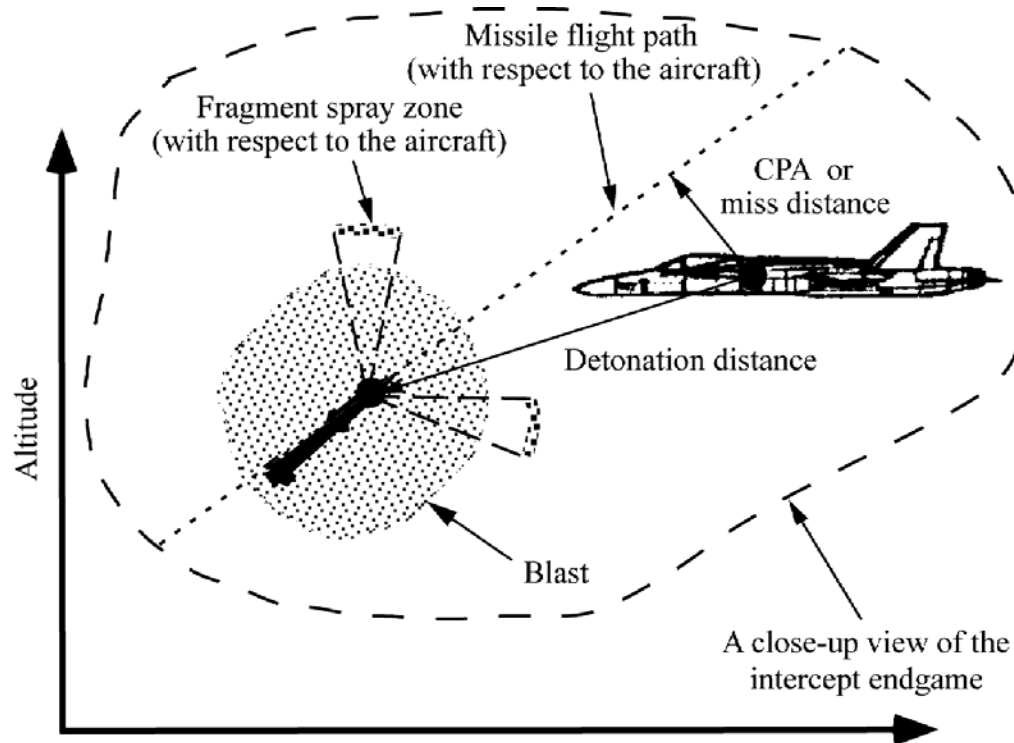
- Terminal effectiveness of fragmenting munitions
- 3D terminal-encounter simulation
 - Last few milliseconds (fuzing/warhead interaction)
- Calculates aerial target kill by threat missile (Pkss)
- Accounts For Major Damage Mechanisms
 - Direct Hit
 - External Blast
 - Warhead Frag





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Engineering-Level Summary



HUNDREDS OF ENGINEERING MODELS

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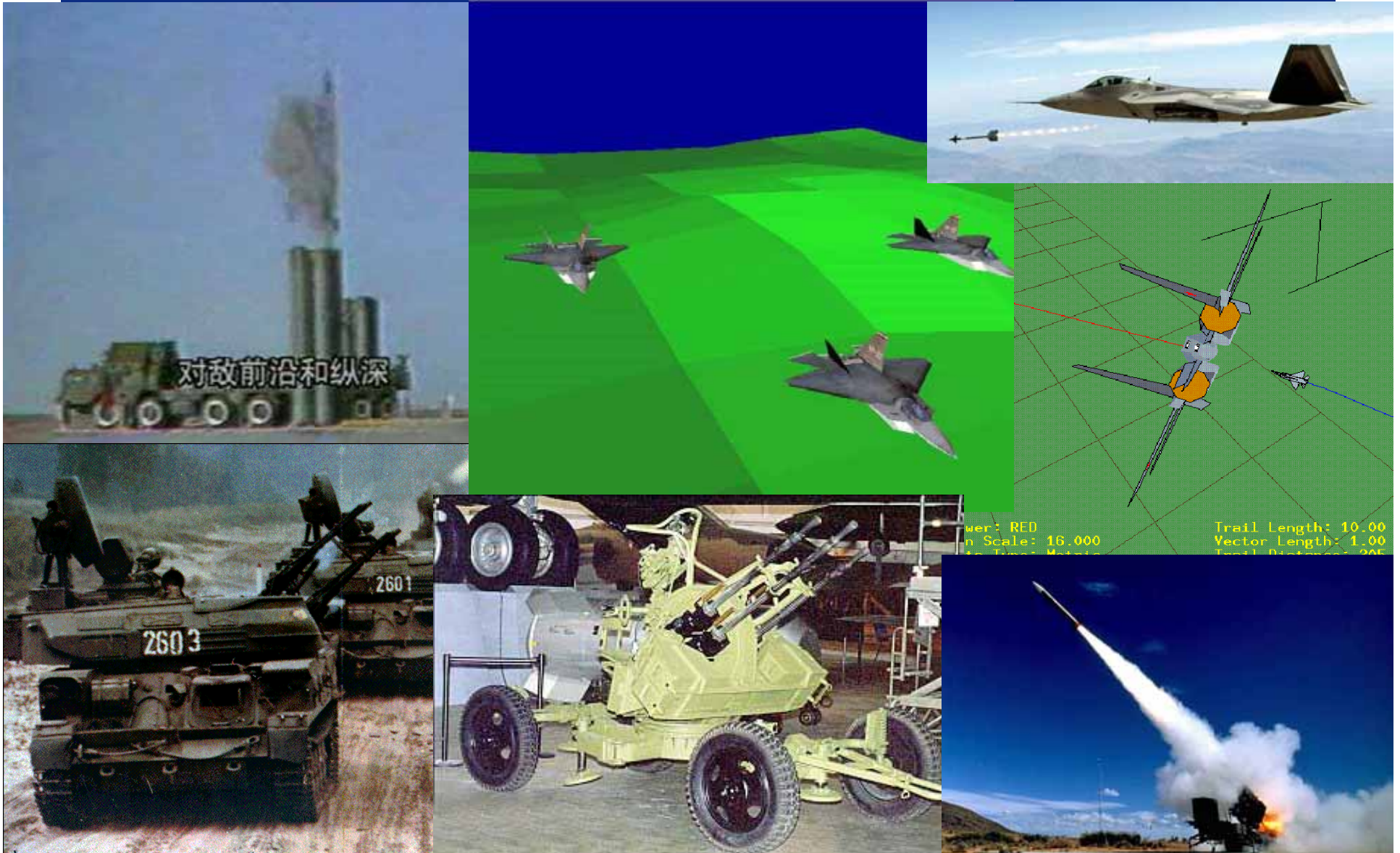
DR. ROBERT BALL, Naval Postgraduate School



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Engagement-Level

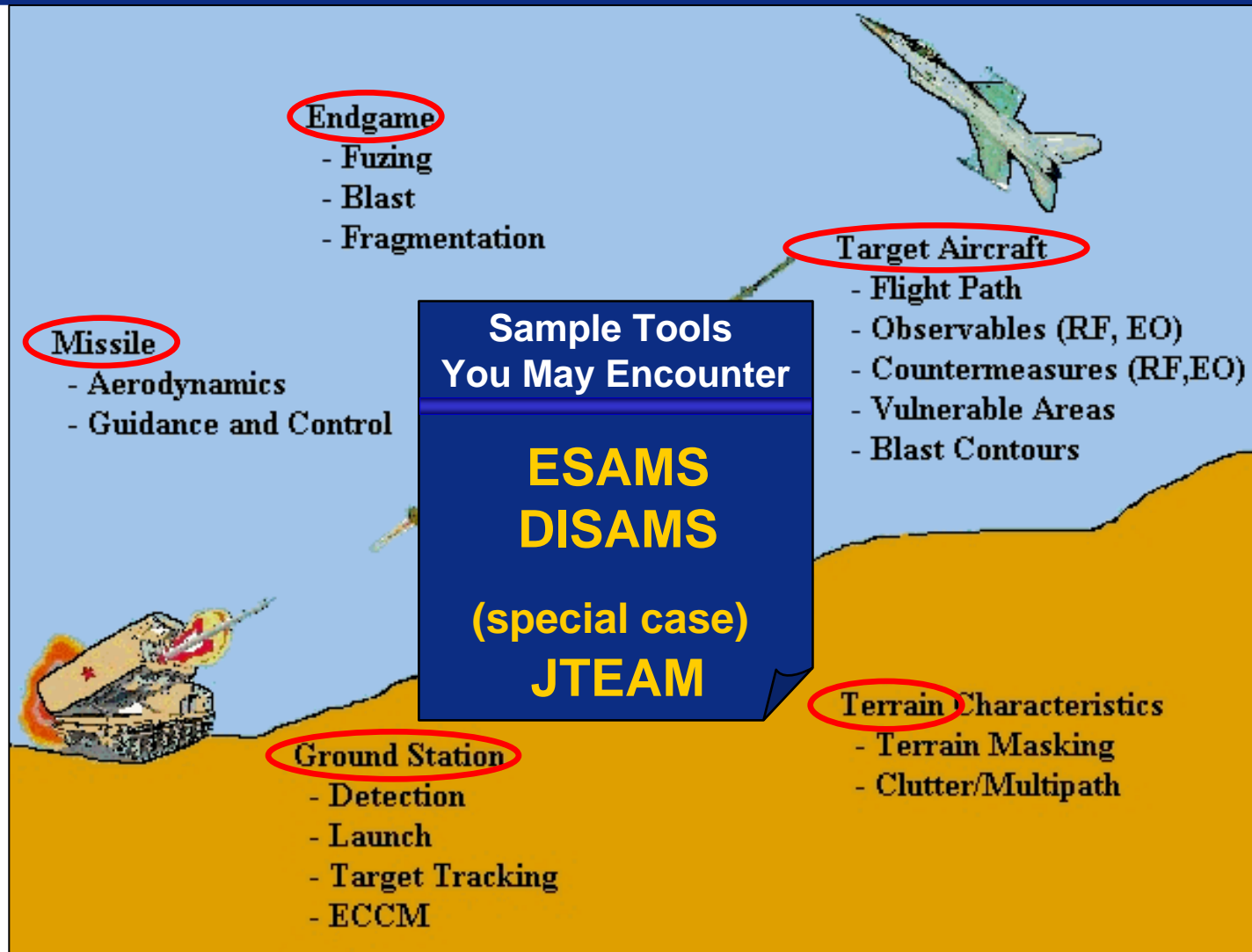
Aggregating Engineering-Level to Few-v-Few





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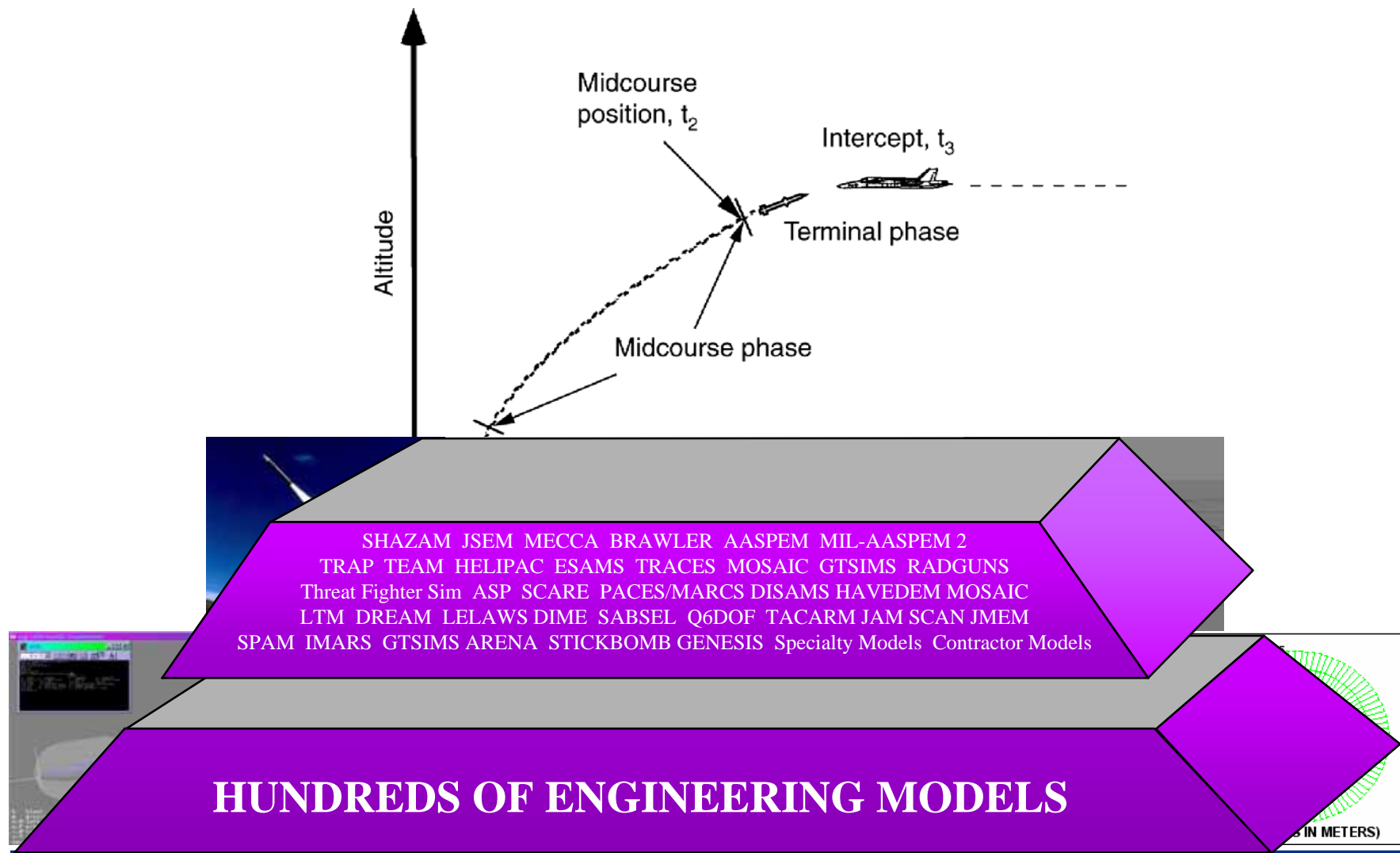
Engagement-Level Surface-to-Air Missile





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Engagement-Level *Few-v-Few Summary*

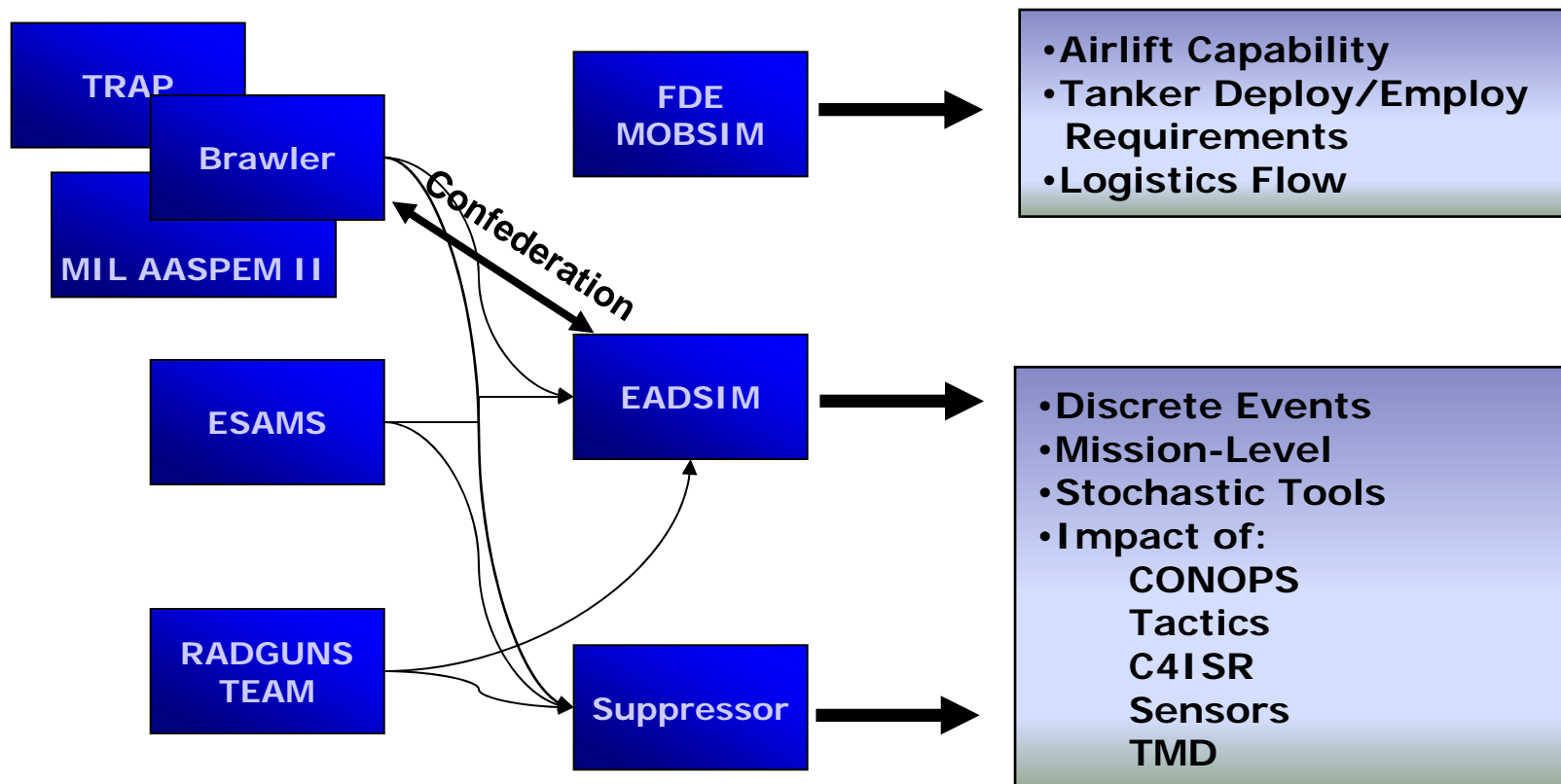




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Survivability & Vulnerability:

Impacts on Mission Level Analysis



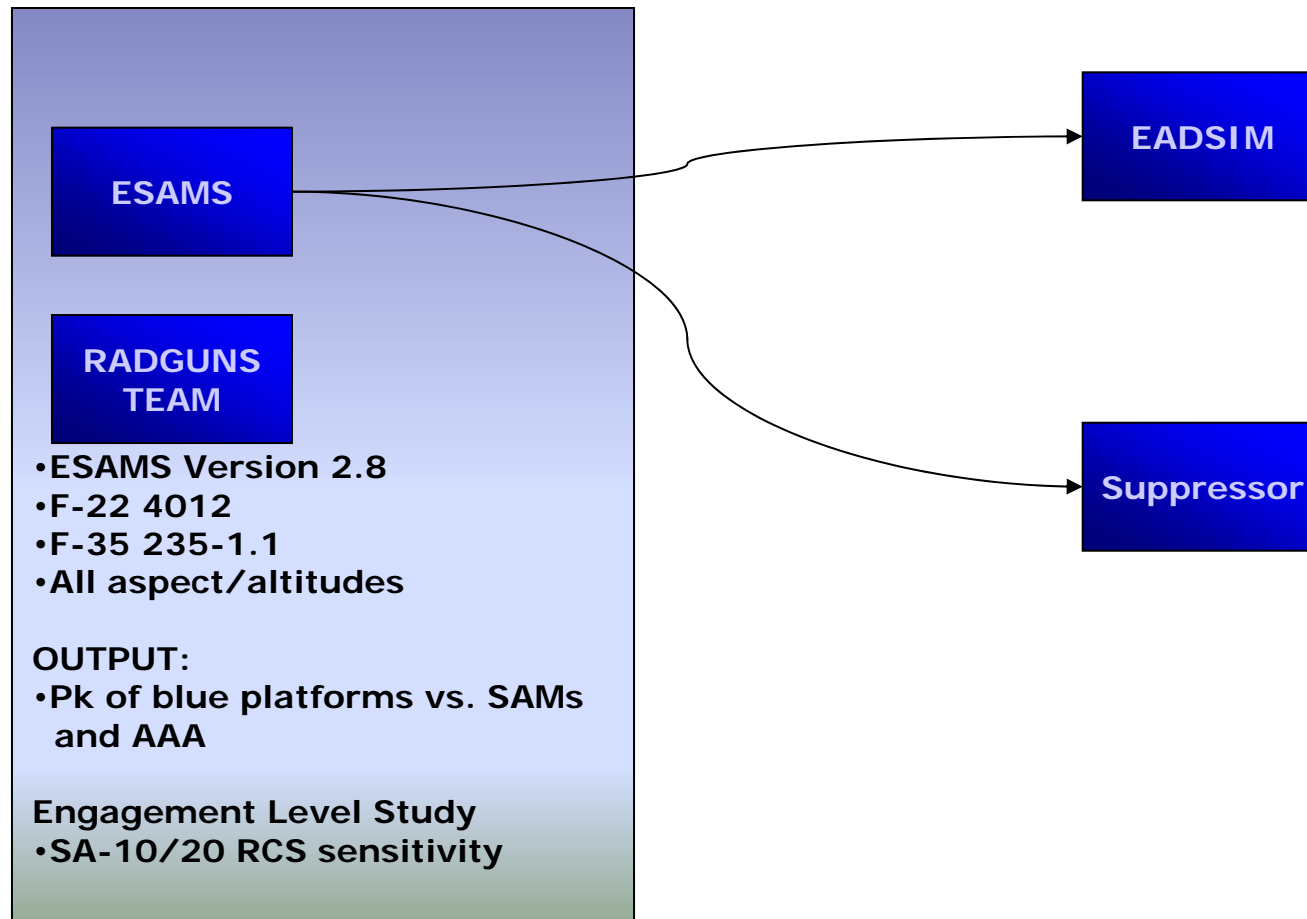
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ESAMS, RADGUNS and JTEAM

Input to EADSIM & Suppressor



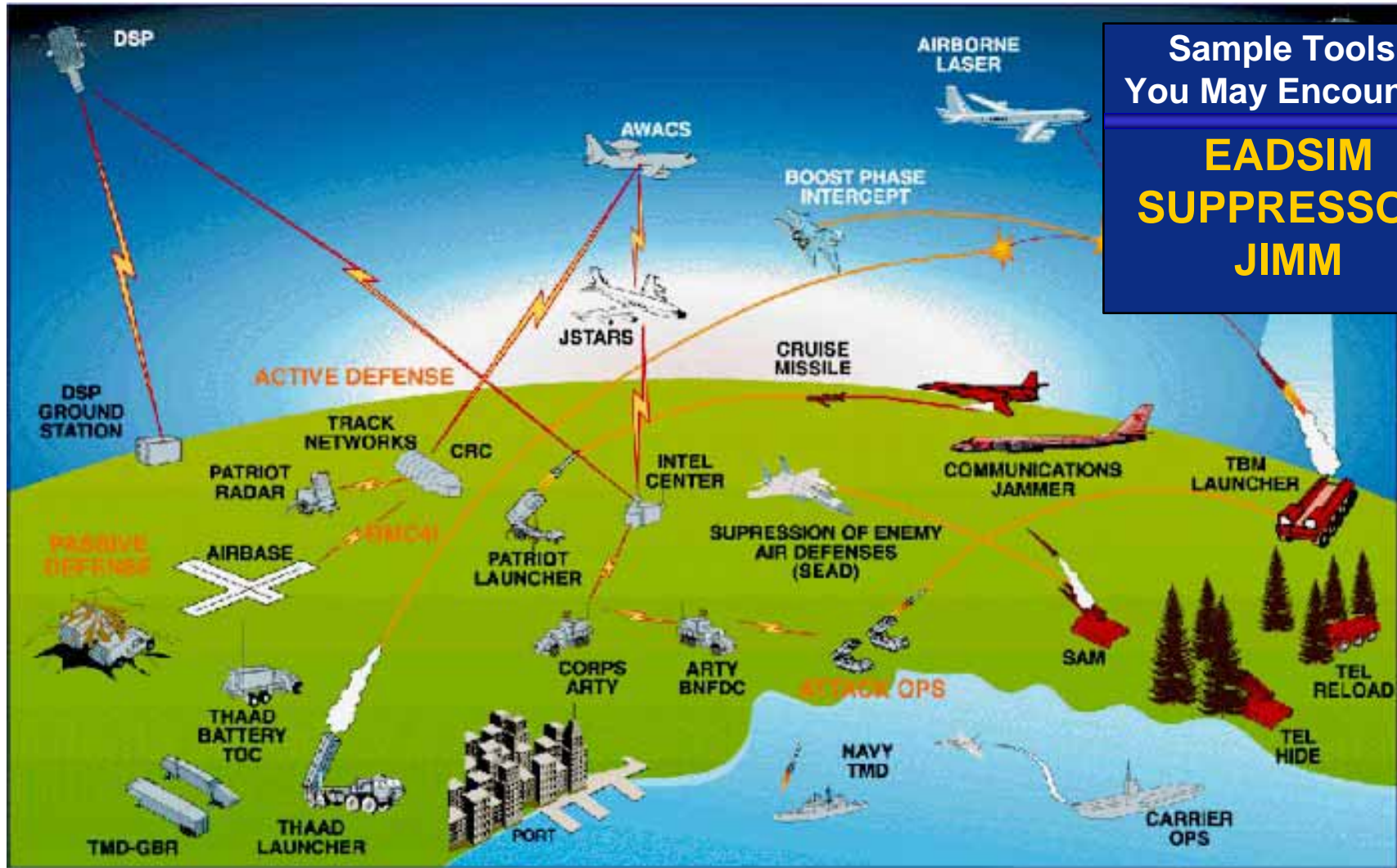
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Mission-Level

Many-on-Many



Sample Tools
You May Encounter

EADSIM
SUPPRESSOR
JIMM

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EADSIM



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Mission-Level *Many-v-Many Summary*



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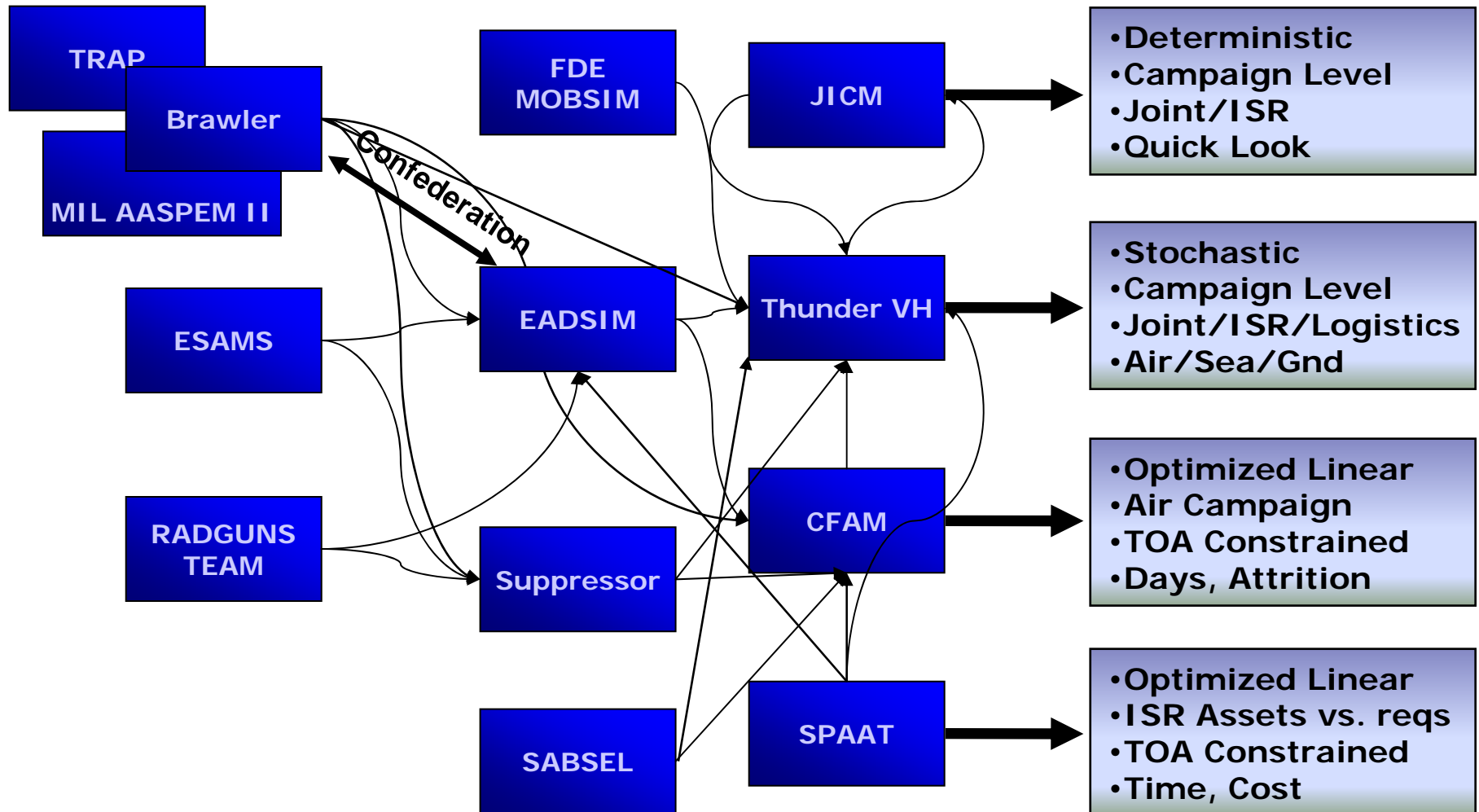
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Survivability & Vulnerability:

Impacts on Campaign Level Analysis



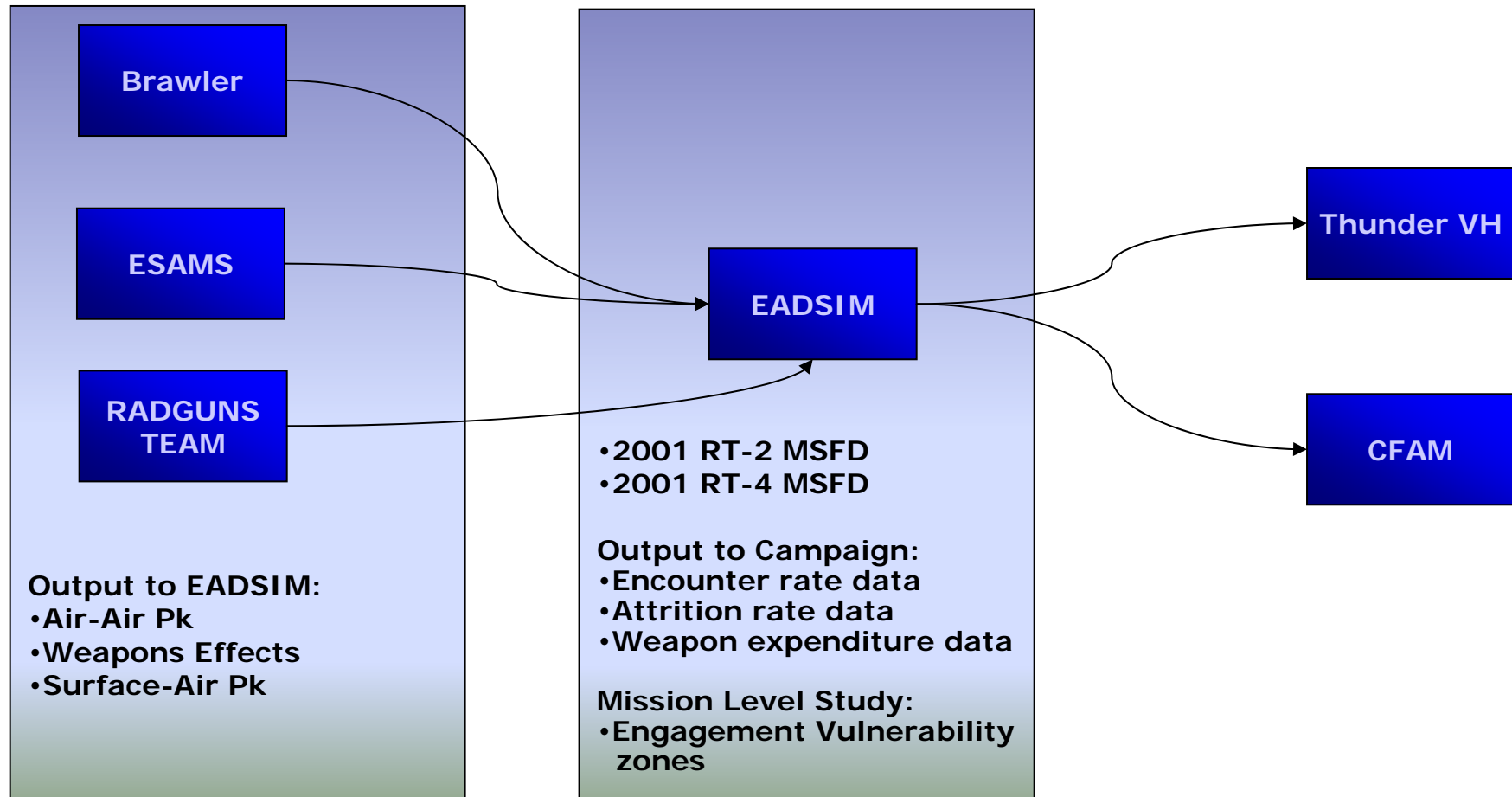
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EADSIM

Input to THUNDER & CFAM

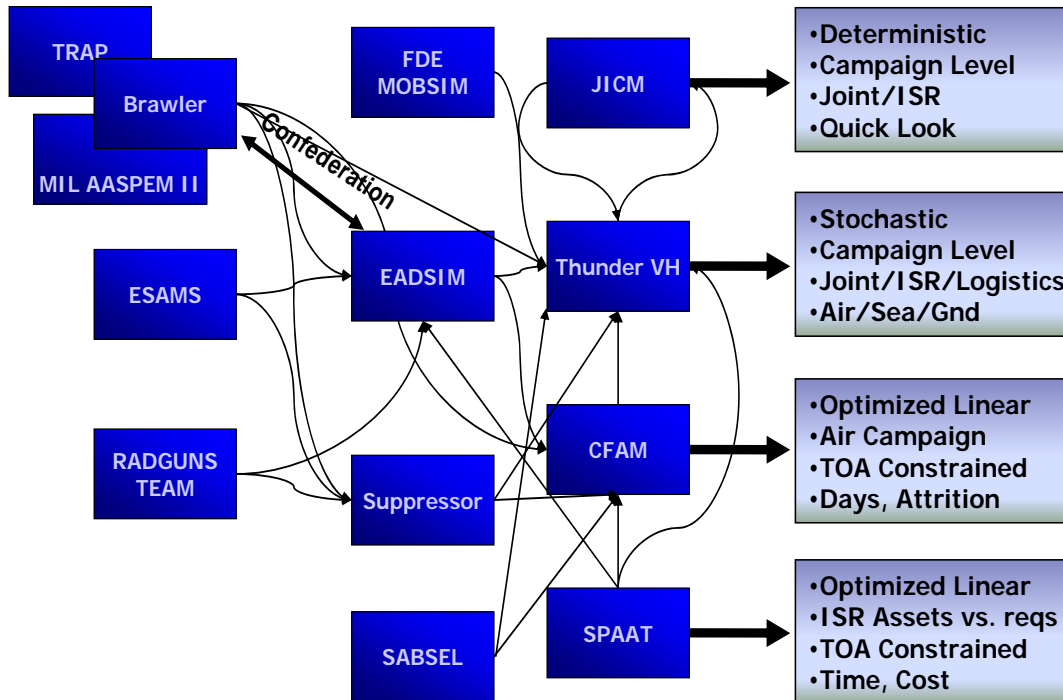




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S&V Impact Analysis

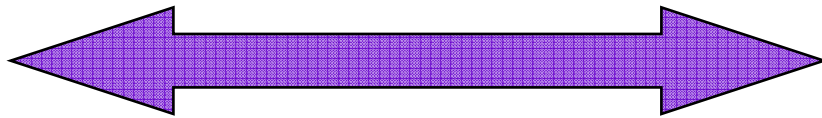
Consistent Scenario, CONOPS & Data Set



To answer high level questions to show the impact of S&V, Analyst must use

- Same scenario
- CONOPS
- Data sets

for all levels of M&S and data generation.



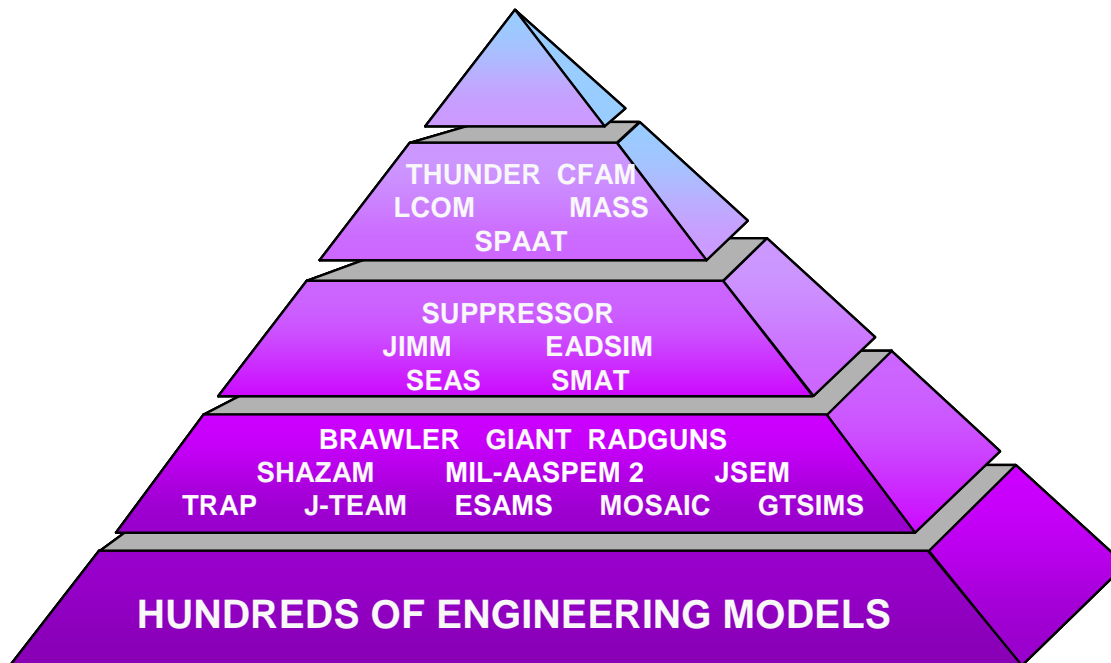
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AFSAT Value Added *Summary*

- AF Analytic Community approved set of M&S
- Ability to demonstrate impacts at mission and campaign levels



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Back Up Slides

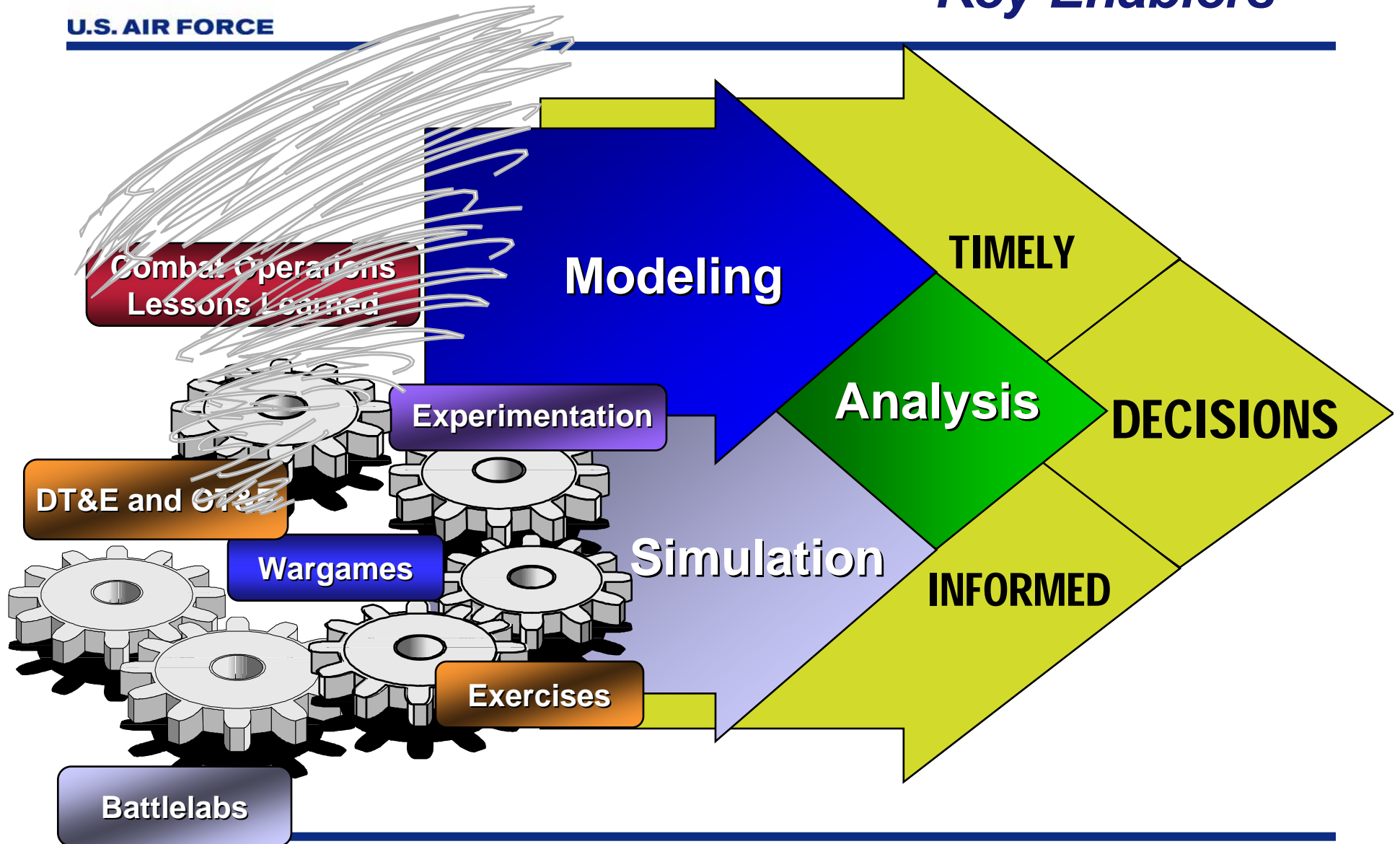
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Capability-Based Decisions

Key Enablers



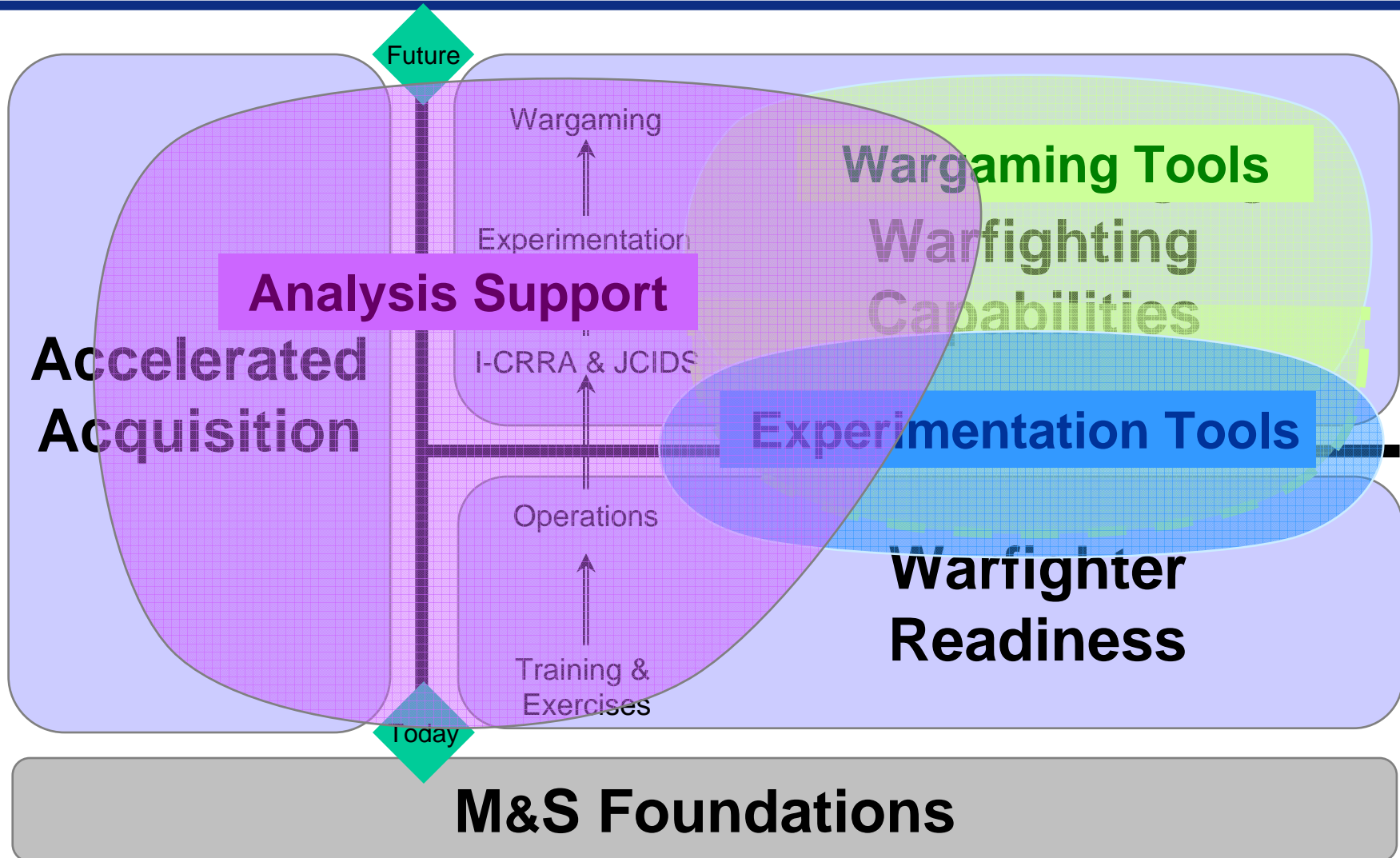
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NEWC IPT AOR



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