The Role of Simulation Based Acquisition in Test and Evaluation

Mr. Les Bordelon

Executive Director

Air Force Flight Test Center

Edwards AFB, CA

What is the Common Theme?

These Programs Didn't Use Simulation Based Acquisition!

- What is SBA?
- AFFTC's Role in the Acquisition
- How We Use SBA at AFFTC
- Challenges
- Summary

What is SBA?

Simulation Based Acquisition:

A New Approach

"Simulation Based Acquisition is an iterative, integrated product and process approach to acquisition, using modeling and simulation, that enables the warfighting, resource allocation, and acquisition communities to fulfill the warfighter's materiel needs, while maintaining Cost As an Independent Variable (CAIV) over the system's entire life cycle and within the DoD's system of systems." [1]

Simulation Based Acquisition:

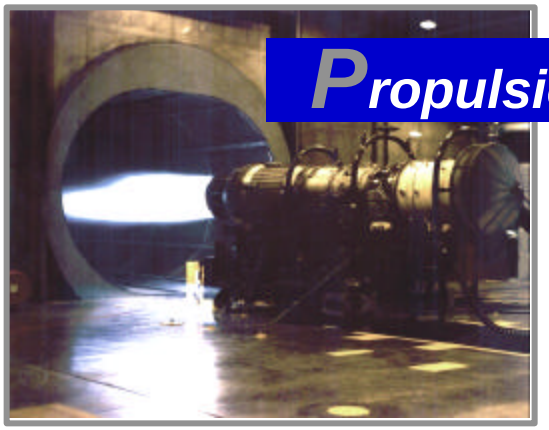
- An iterative, integrated product and process approach
- Uses M&S to enable the resource allocation and acquisition communities to fulfill the warfighter's materiel needs
- Maintains Cost As an Independent Variable (CAIV) over the system's life cycle and within the DoD's system of systems.

[1] Simulation Based Acquisition: A New Approach, DSMC, December 1998

AFFTC T&E Mission Areas

Airframe

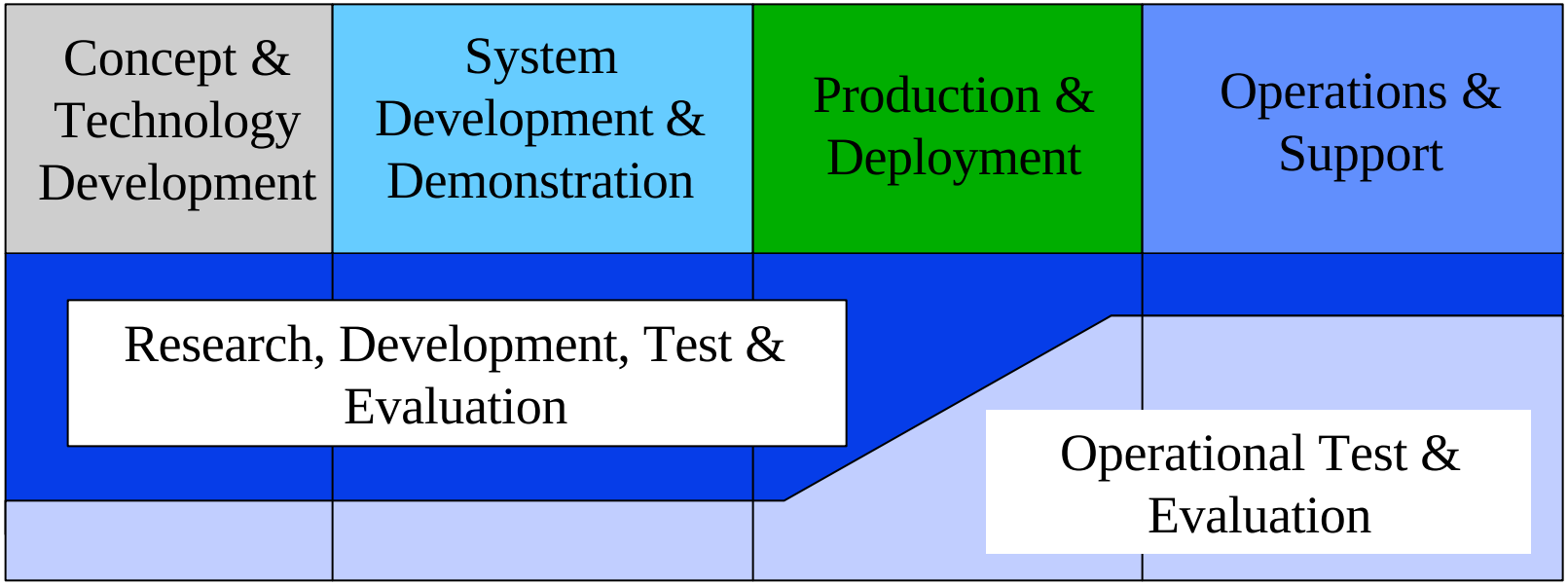
Propulsion



Avionics

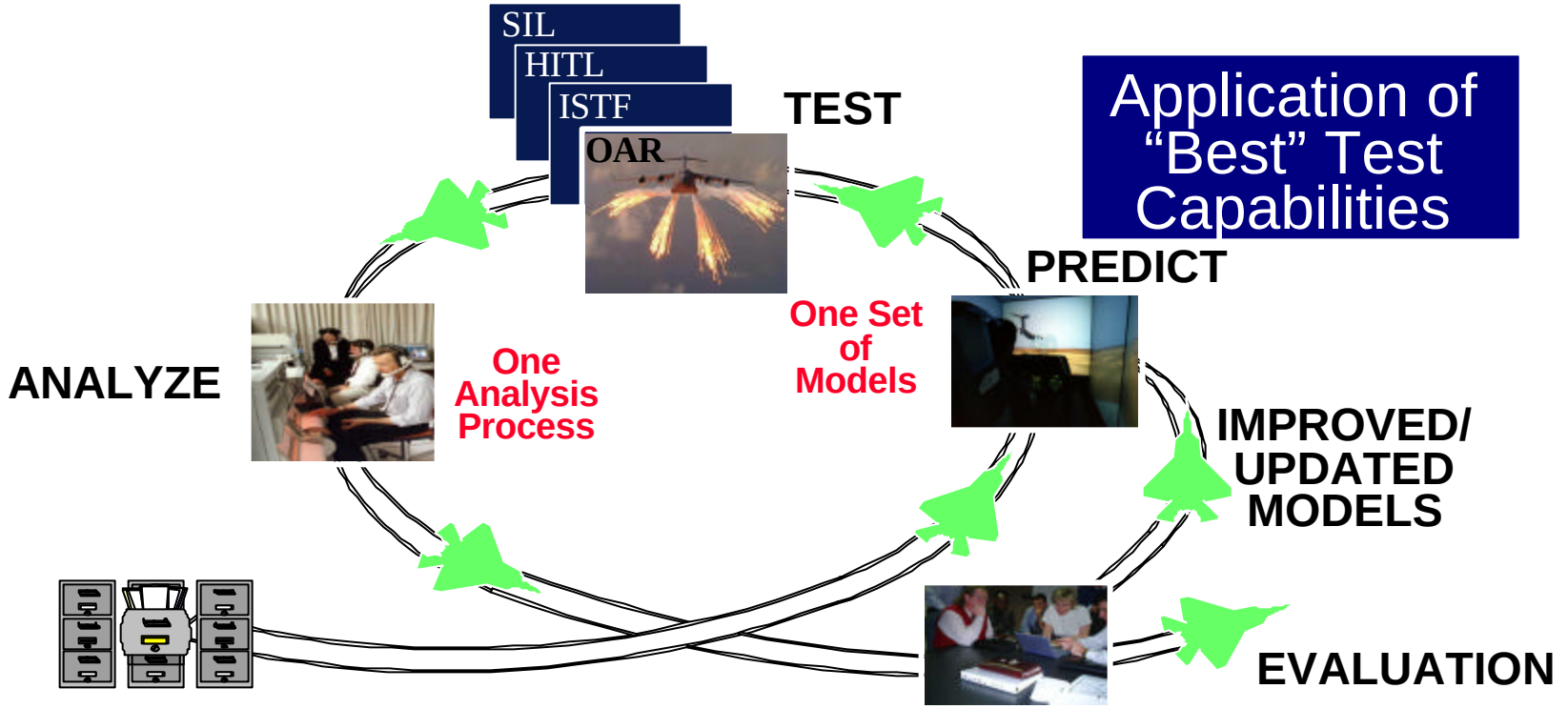
Electronic Warfare

The AFFTC Role in the Acquisition Process

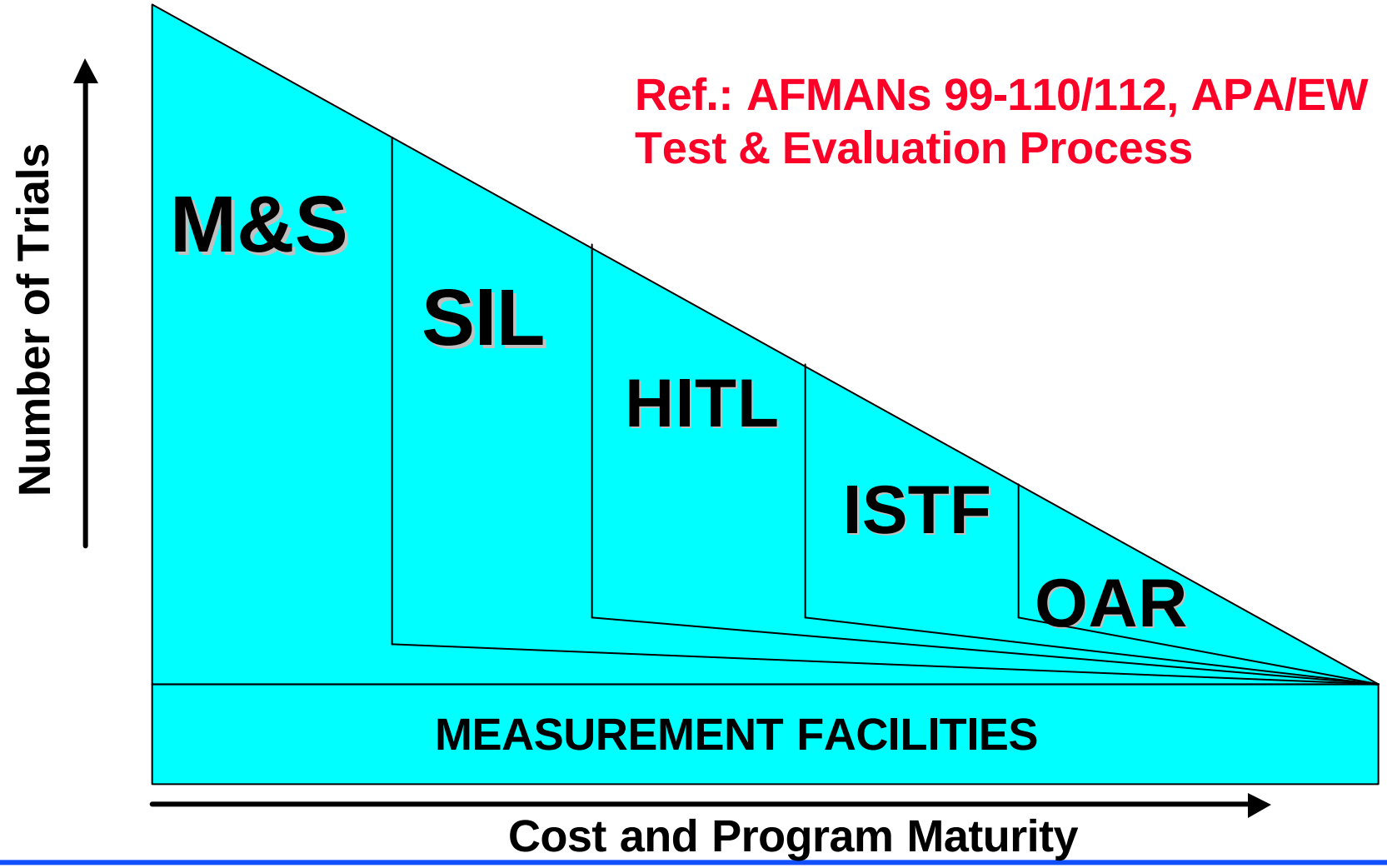


The T&E Process

Engineers Using Capabilities to Reduce Risk

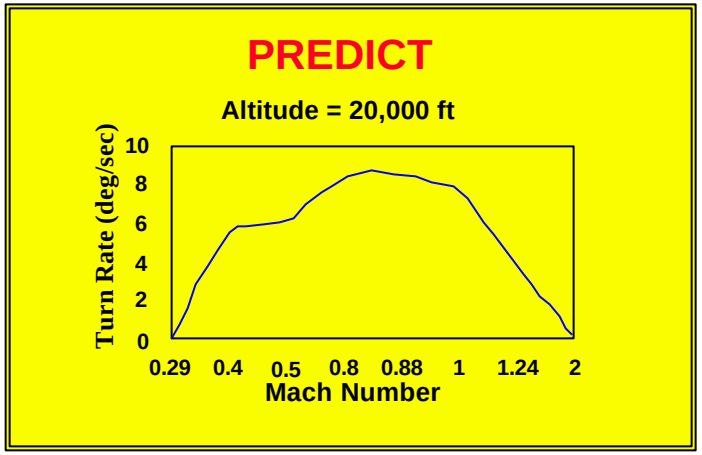


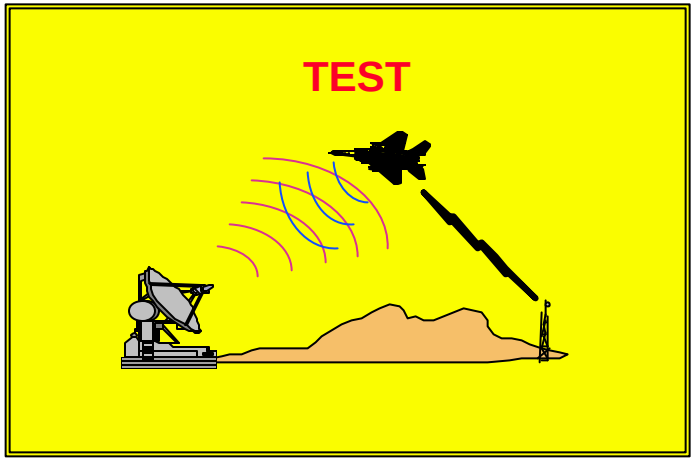
The T&E Process Tools

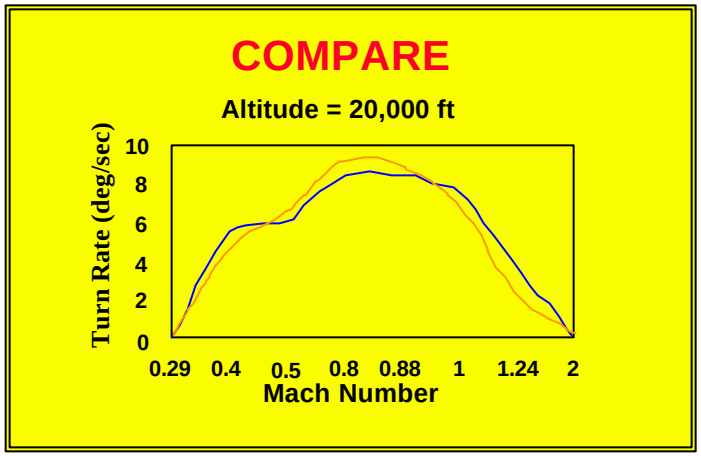


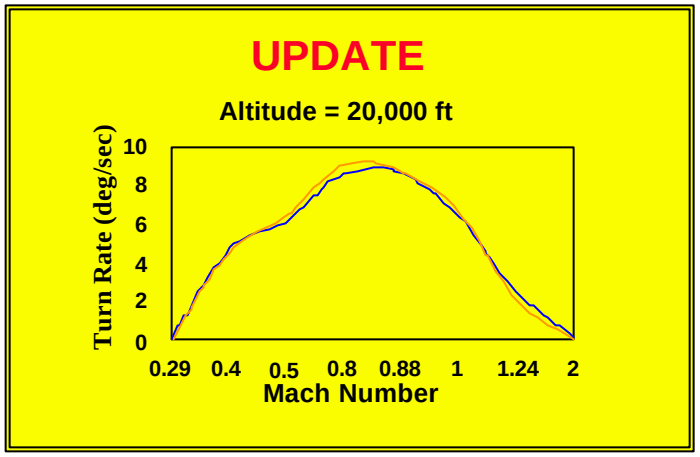
A Simpler View of the Process

- AFMs 99-110 & 112 "PREDICT-TEST-COMPARE-UPDATE"

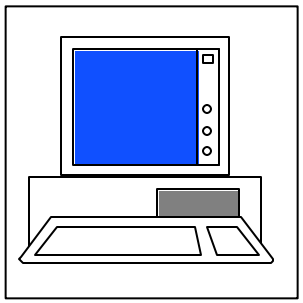




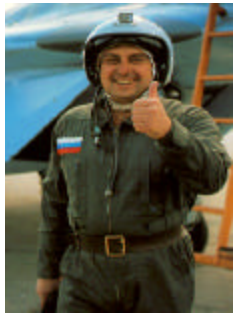




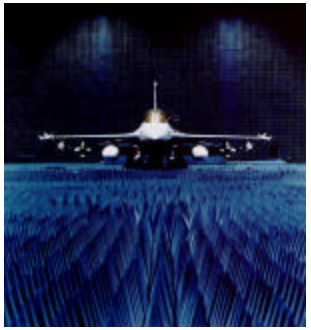
SBA Benefits T&E



Digital

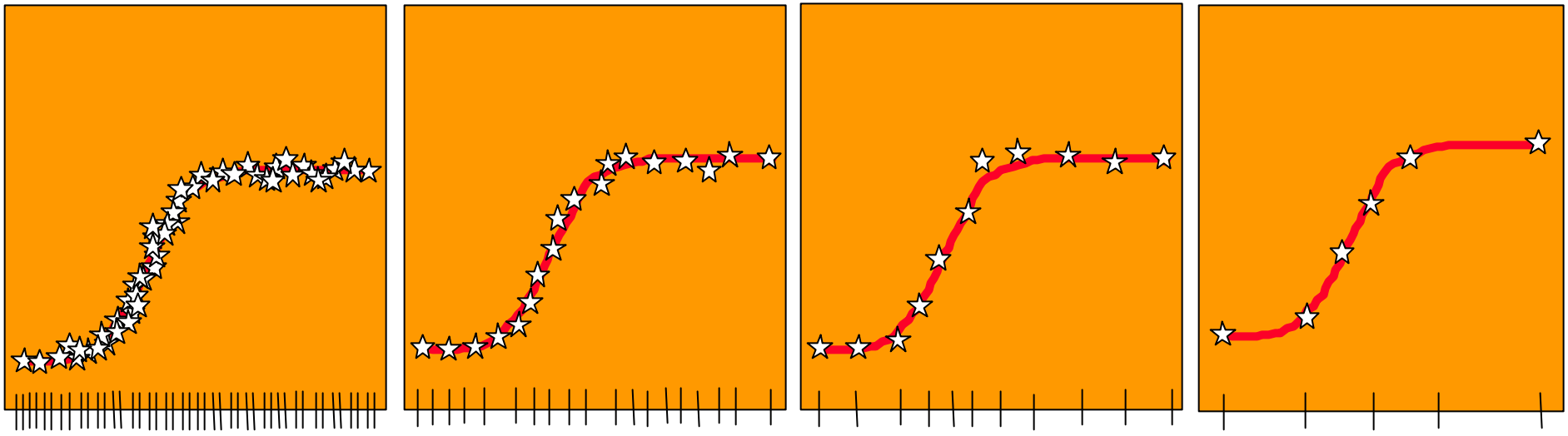


MITL/HITL/SIL



ISTF

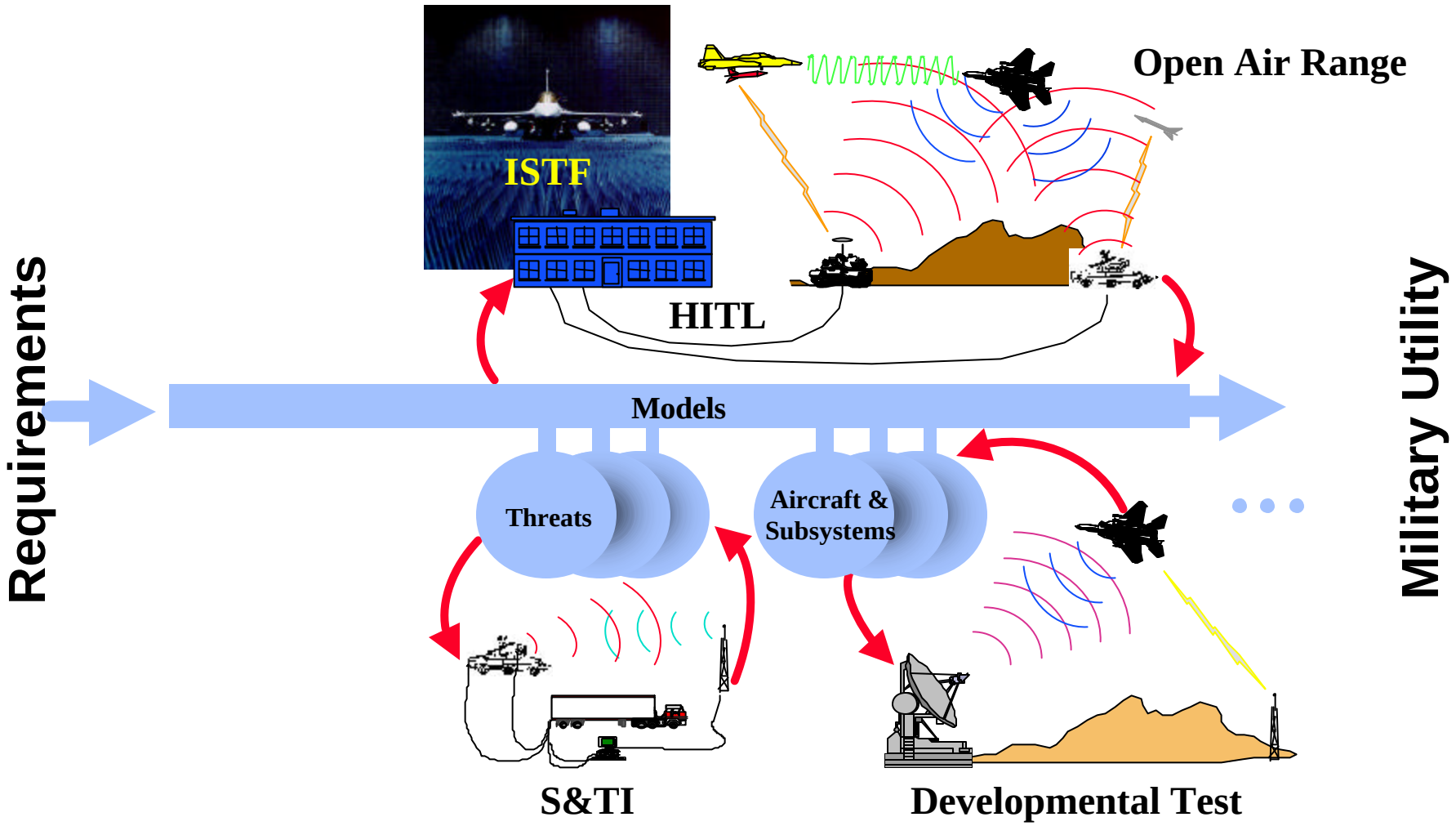
Flight Test



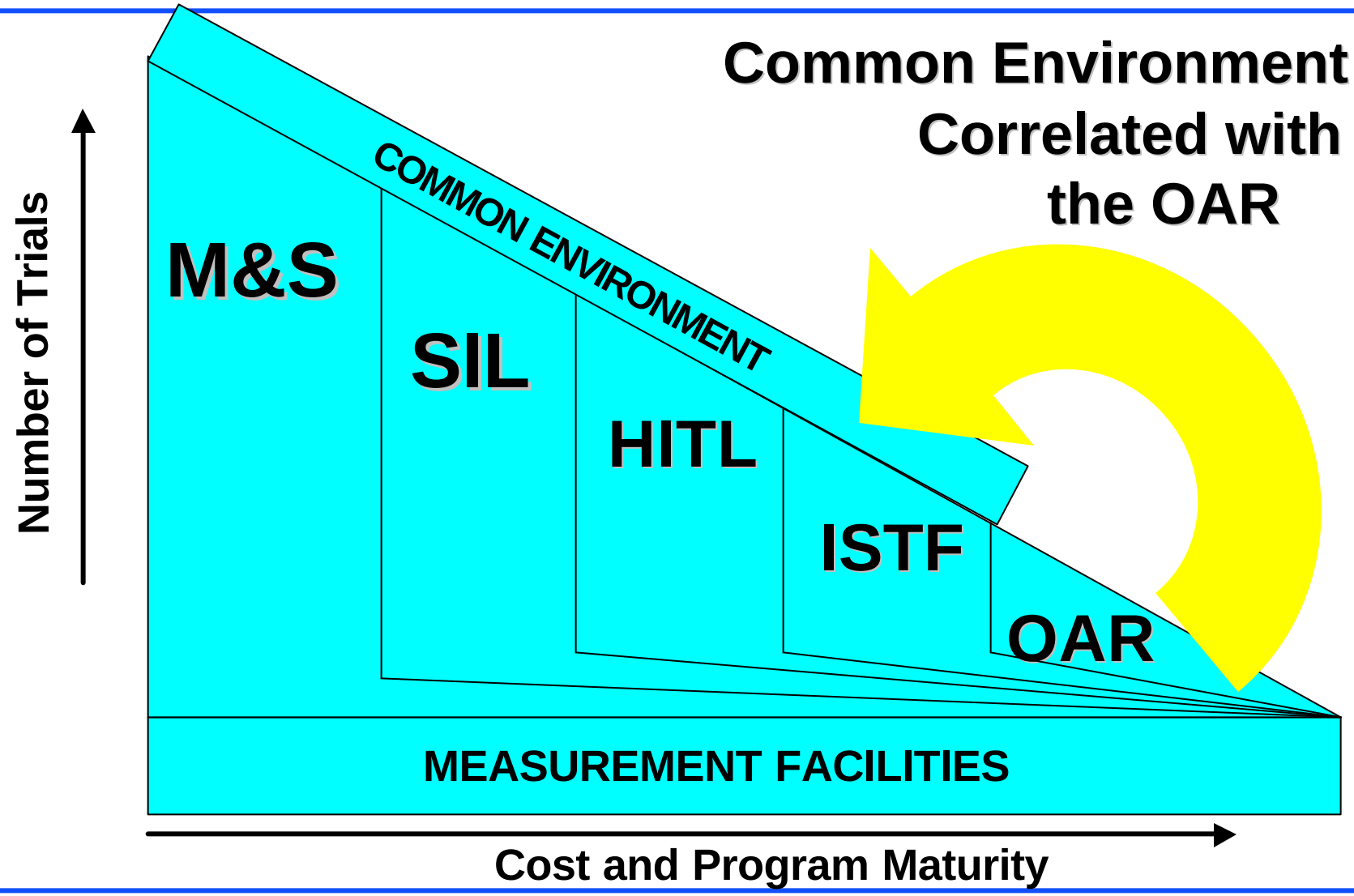
1000's **100's** **10's** **1's**

NUMBER OF DATA POINTS

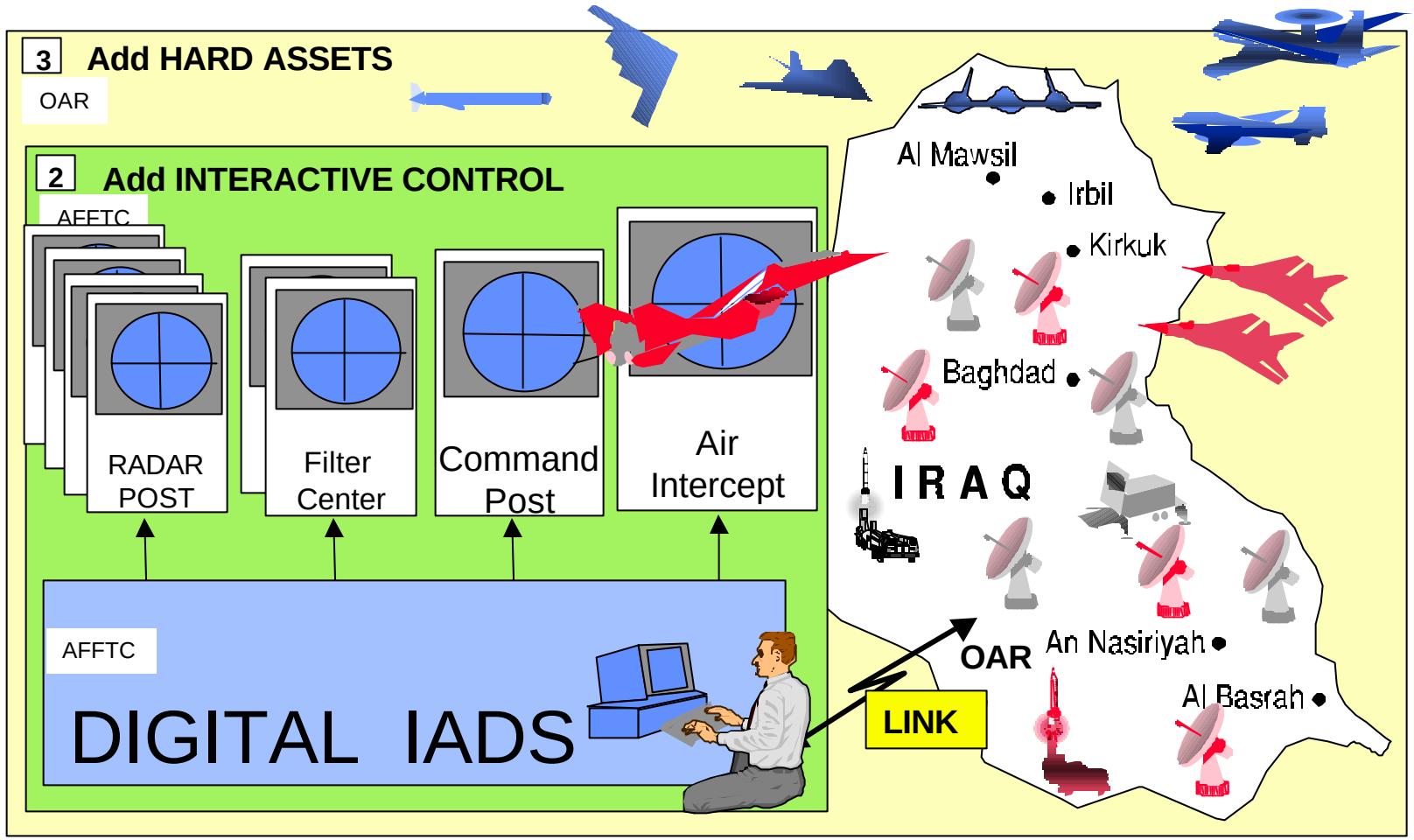
SBA Support to Military Utility



The Total Picture

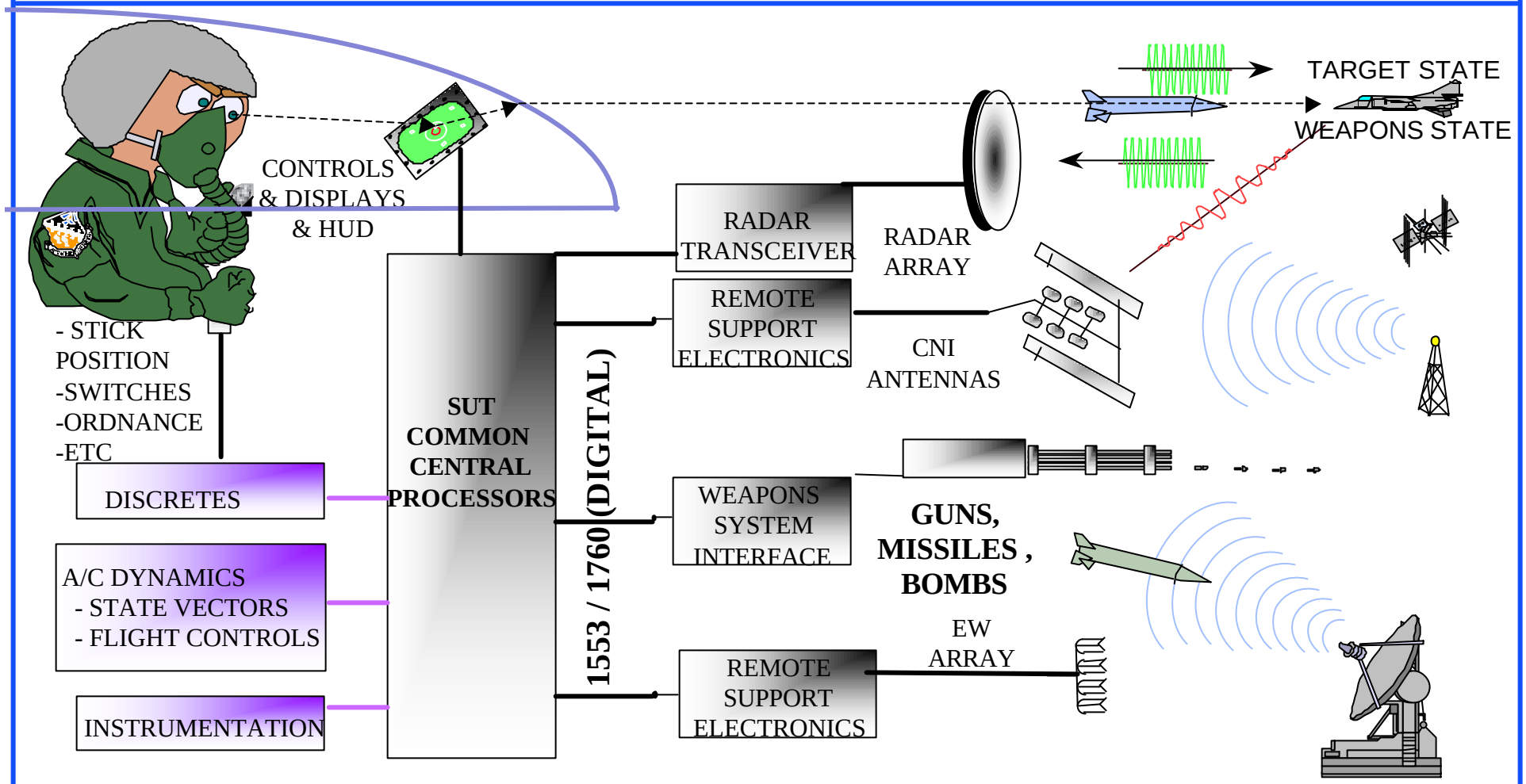


A Mission Level View



A Challenge

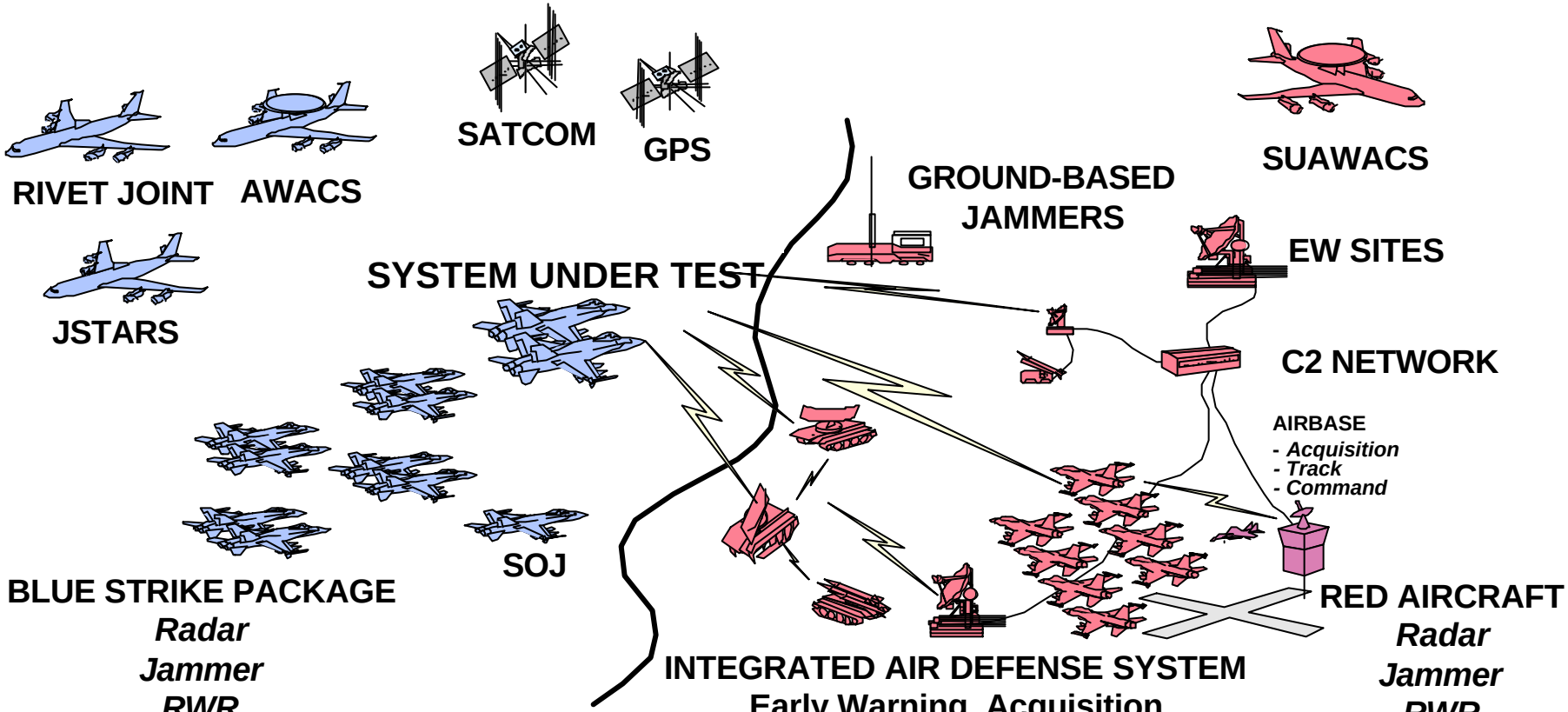
Integrate and Test Complex Avionics Systems…



Everything's Connected! A Regression Testing Nightmare!

More Challenges

…in a Multispectral Virtual Battlespace



Goal: Testing Performance & Effectiveness in a Complex Battlespace Environment, as a System of Systems

Summary

Supporting SBA Goals

•Updating databases & models with test data improves fidelity; enhances reliability of further studies, analyses, training, what-if's throughout the weapon system life cycle; improves reliability of results for decision makers.

•Evolving correlated multispectral virtual battlespace enables mission level assessments of military worth with densities greater than OAR, as a system of systems

• Utilizing various T&E resources to answer the questions enables flight test to focus on high pay-off flight testing, reducing flight hours.

• Correlatable test results across the T&E resources improves the reliability of results for decision makers, throughout the phases of development.

• Robust and well documented V&V enables credible analyses, conclusions and accreditation.

• Pre-flying high risk flight tests in simulation improves test safety, reducing the risk.

Consistent with the goals of SBA:

- **Test data improves results for decision makers.**
- **Virtual battlespace enables mission level assessment of military worth with densities greater than OAR**
- **Enables flight test to focus on high pay-off flight testing, reducing flight hours.**
- **Robust & well documented V&V allows for credible conclusions and recommendations by decision makers**
- **Pre-flying high risk flight tests in simulation reduces safety risk**