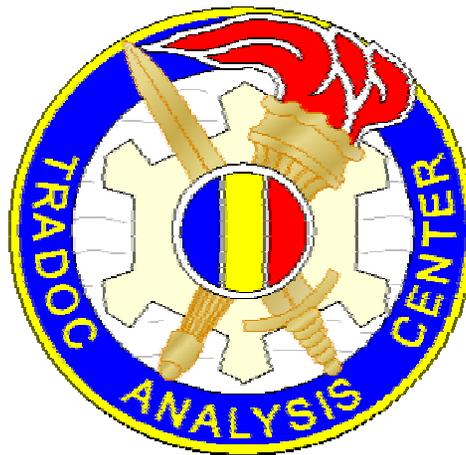


# **DMSO Industry Days 2000**



**Michael F. Bauman, SES, USA  
Director, TRADOC Analysis Center**

**24 May 2000**



# Analysis Mission



**Provide relevant, credible analysis  
to inform decisionmaking**



# Changing Environment

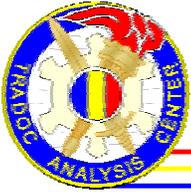
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1. Military problem set is different, complicated by an *asymmetric and adaptive adversary*.
2. Military solution set leverages IT, thereby placing more emphasis on *human dimension*.
3. Pace of development of new military concepts requires greater investment of *intellectual capital*.



**Unprecedented Collaboration**  
**Leaders--Warriors--Industry--Developers--Testers**



# The *Calculus* of Operations Analysis

## **3rd Order Conclusions based on strongly predictive methodologies**

- ✓ Full experimental design
- ✓ Controlled variables
- ✓ Certified model algorithms and data, classified if necessary
- ✓ Statistical confidence limits

## **1st Order Insights based on quantitative and qualitative analysis**

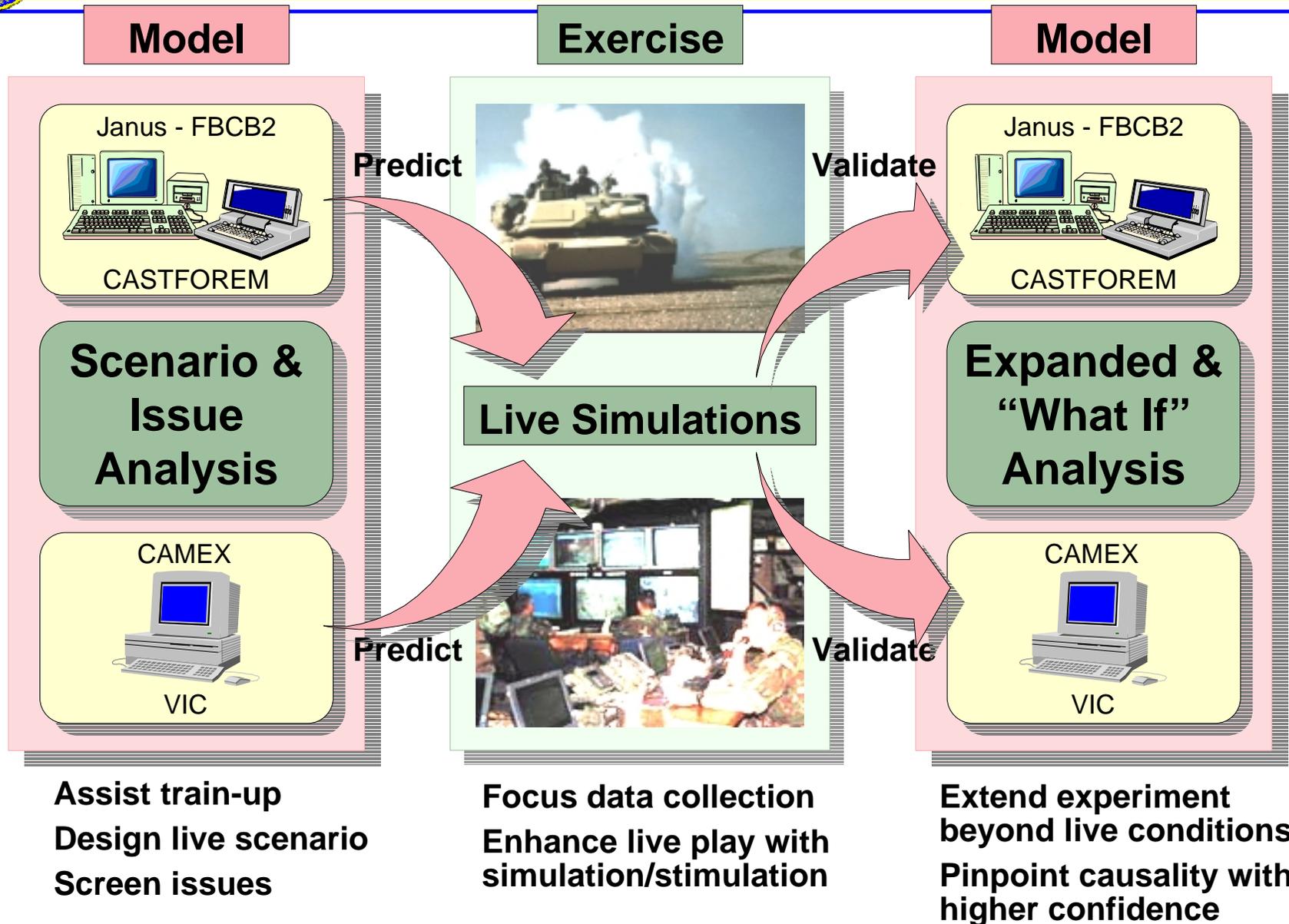
- ✓ Incomplete experimental design
- ✓ Surrogated data
- ✓ Structured exercise AARs and soldier-in-loop simulation results
- ✓ Inferred causality

## **PMJ Professional Military Judgement of SMEs**

- ✓ Relevant military experience
- ✓ Operations lessons learned
- ✓ Historical precedent
- ✓ Training AARs

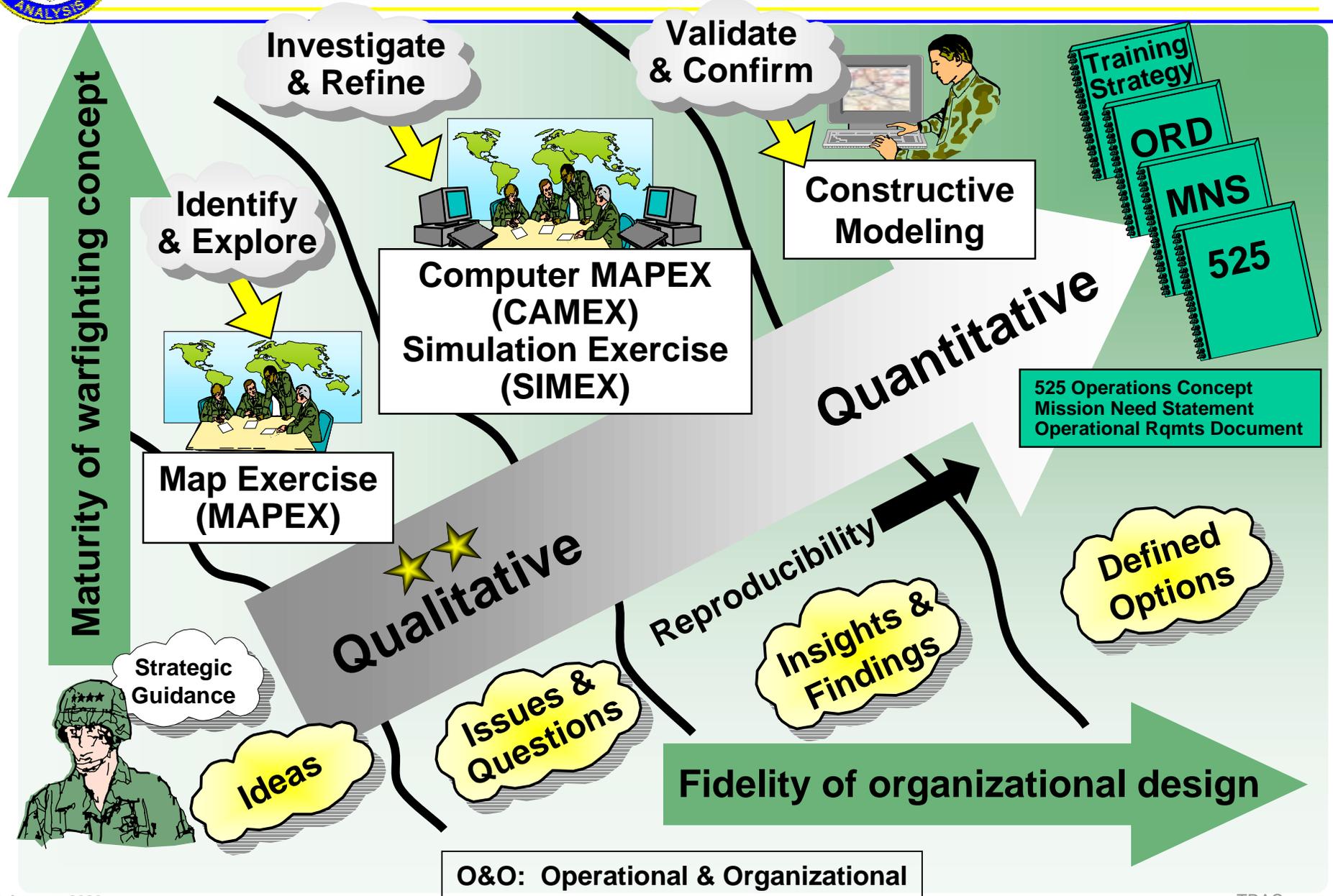


# Experiment M-E-M Protocol





# Concept-to-Requirements

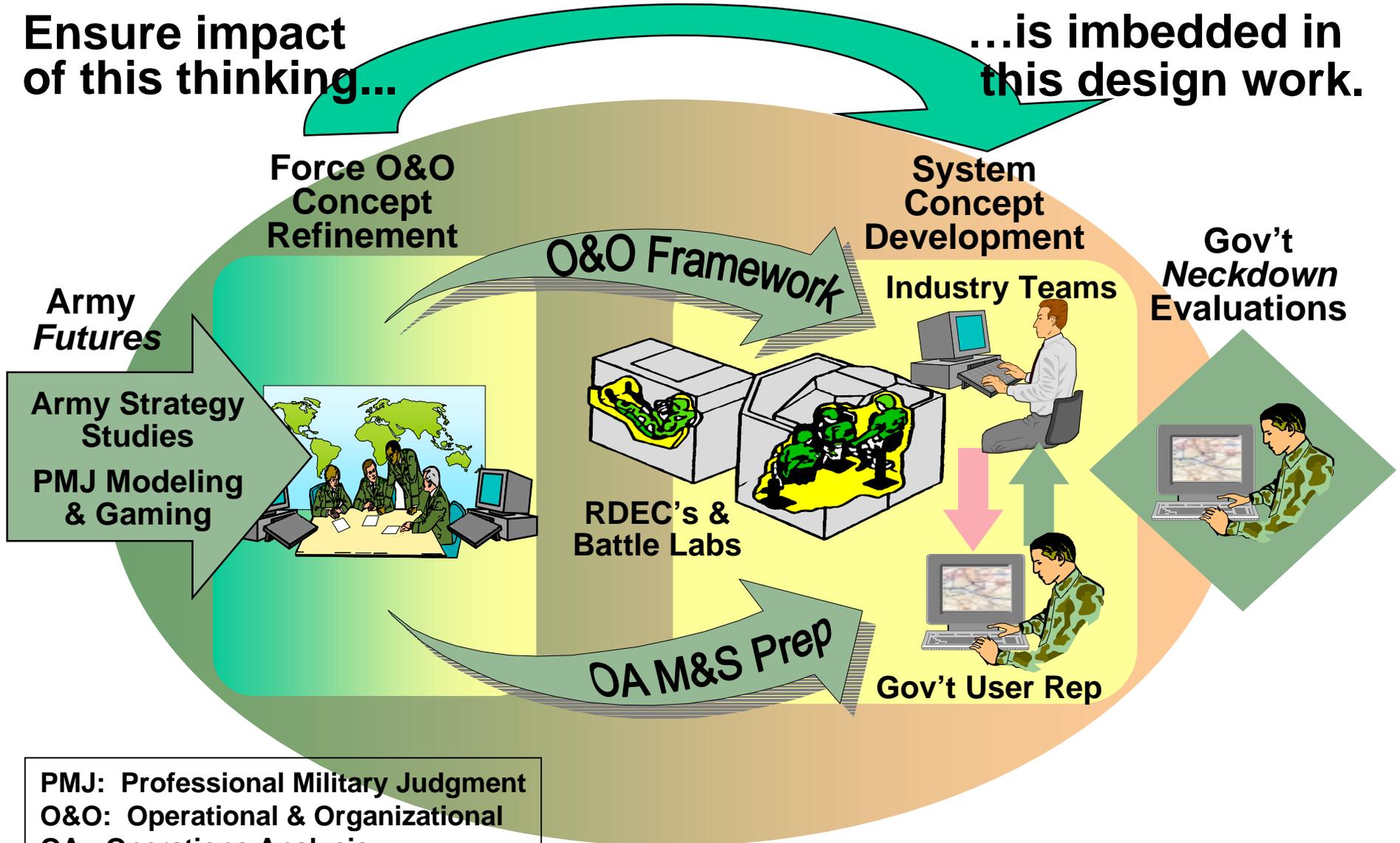




# Future Combat System Collaboration

Ensure impact  
of this thinking...

...is imbedded in  
this design work.



**PMJ: Professional Military Judgment**  
**O&O: Operational & Organizational**  
**OA: Operations Analysis**



# FCS Ops Analysis & M&S Collaboration

Concept Development Phase

Gov't Assessment Phase

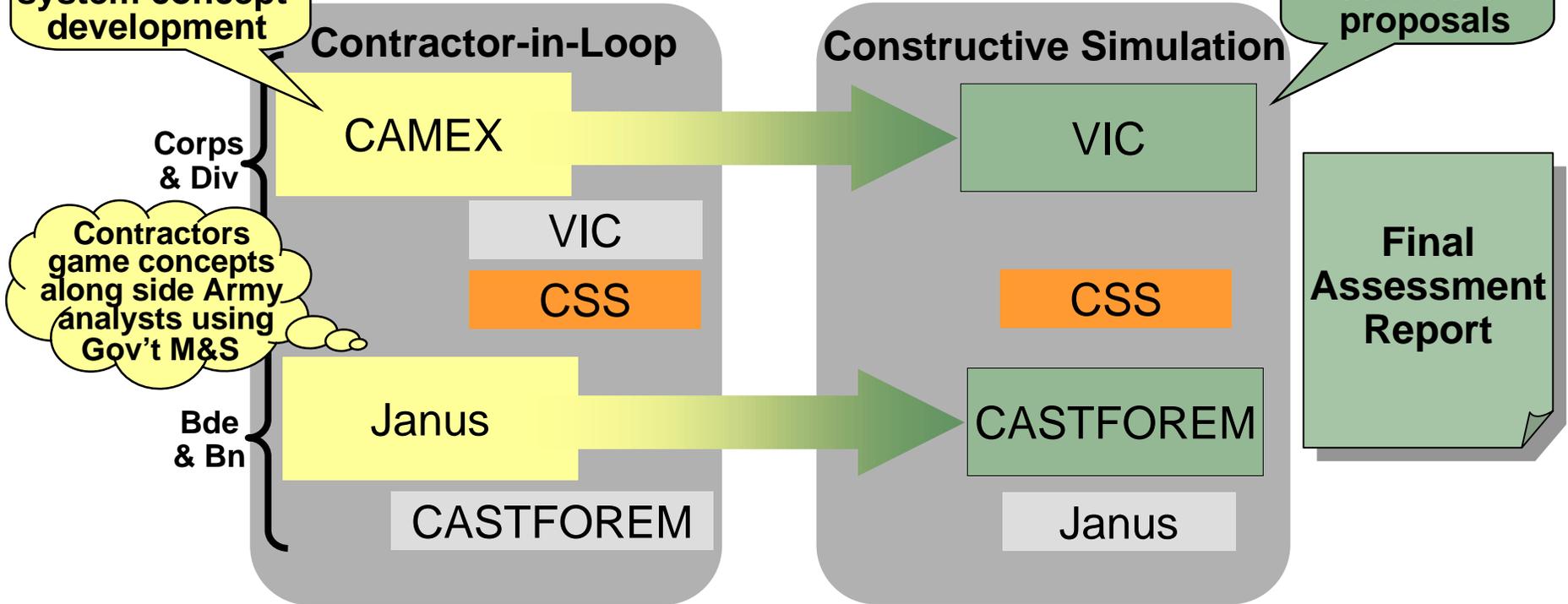
Technical M&S Support & Analysis

Gov't Technical Analysis

## Operational M&S Support & Analysis

Gov't support to contractor system concept development

Gov't-only assessment of contractor proposals





# Modeling Challenges

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- ✓ **Insufficient knowledge base to accurately model operations in urban and complex terrain.**
  - Target acquisition and identification.**
  - Adjudication of fires.**
  - Tactical communication.**
  - Human behavior (all sides).**
- ✓ **Lack of human behavior models (especially for command decision making).**
- ✓ **Some headway made, but still largely a work-in-progress on methods to model and measure value of information in military ops.**



## Infrastructure Roadblocks

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✓ Unable to share sensitive data necessary to create collaborative simulation environments.

Proprietary system data

Intelligence data (basis of scenarios)

✓ Inadequate life cycle management of data for M&S to serve DoD-wide needs.

*Data generation:* Expansion and leverage of JTCG-ME is promising.

*Data management:* JDS has potential.

*Data standards:* “Data dictionary” is DOA.

**Big Impediments to Collaboration  
Necessary for SBA & SMART**