

# Thin Thread Analysis

Ver 1.2

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# Overview



- **NCOE Background**
- **The Need to Close a Potential Analytical Gap**
- **Purpose of Thin Thread Analysis**
- **The Architecture-Based Thin Thread Approach**
- **Initial Development of the Thin Thread**
- **Results to Date**

# Background



- **NCOE study - two parallel tasks done in FY05 under accelerated timelines**
  - **Task 1 – Joint Integrating Concept (JIC) development**
  - **Task 2a – NCOE Baseline and Roadmap**

# Background – the NCOE JIC

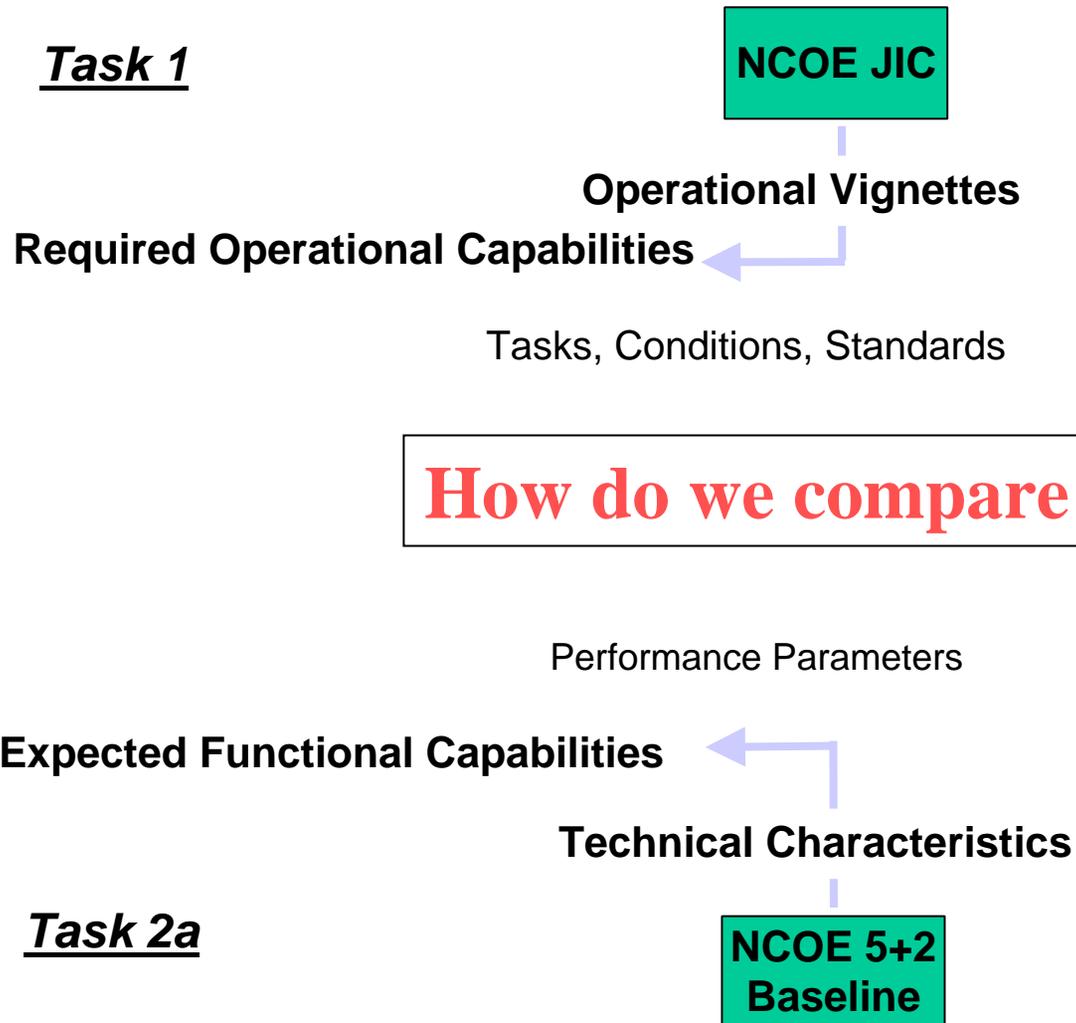


- **Focuses on Joint Task Force (JTF) operations within the context of a Major Combat Operation (MCO)**
- **Defined three interrelated capability areas**
  - Knowledge Management
  - Network Management
  - Information Assurance
- **Defined three enabling constructs**
  - Information Transport
  - Enterprise Services
  - Applications
- **Used illustrative examples to explore ideas**

# Background - the NCOE Baseline & Roadmap

- **Description of the DoD's Net-Centric Vision**
- **Summary of the principal components that are being developed to enable achievement of the vision**
  - **Transport (Communications)**
  - **Network Management**
  - **Enterprise Services**
  - **Information Assurance (IA)**
- **Programmatic and technical interdependencies among the NCOE programs and initiatives**
- **Descriptions of capabilities expected to be available to selected types of users between FY08 and FY20**

# The Need to Close a Potential Analytical Gap



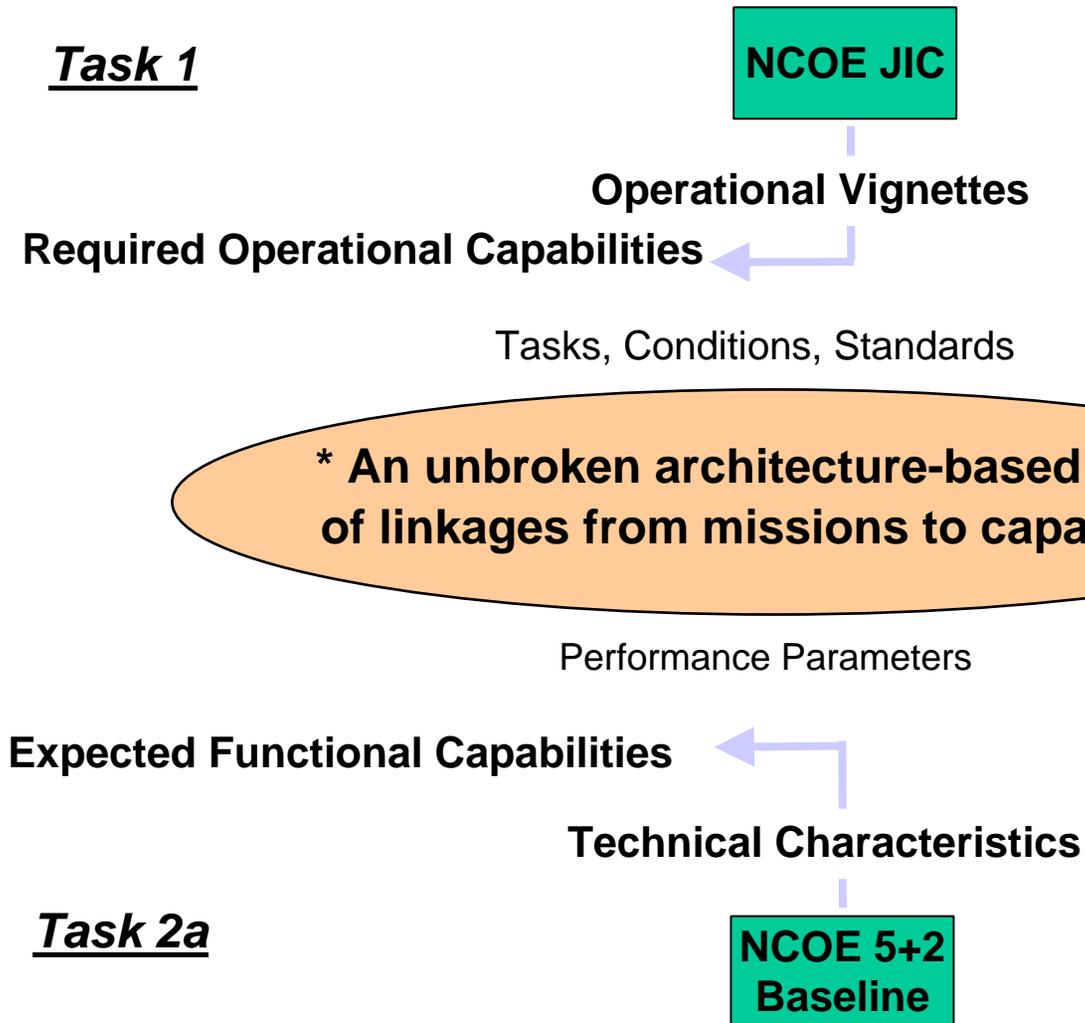
Source: MITRE Briefing to ASD (NII) 24 Jan 2005



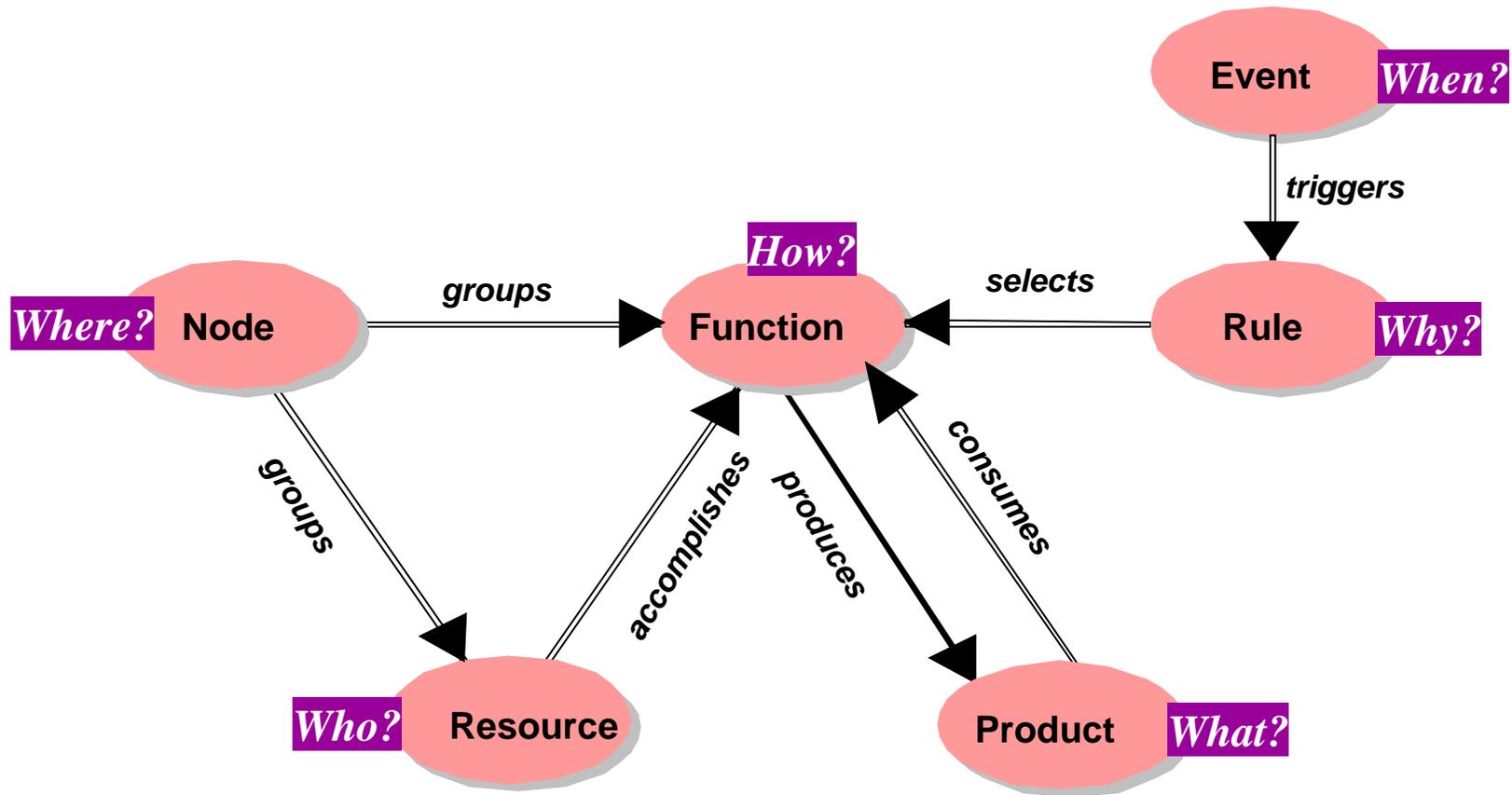
# The NCOE Capabilities Based Analysis

- **NCOE Capabilities Based Analysis (CBA) planned for FY06**
  - Conduct Functional Area Analysis (FAA)
  - Conduct Functional Needs Analysis (FNA)
- **MITRE tasked to use existing materials to define a process and demonstrate results**
  - Use existing NCOE JIC materials
  - Focus on Time Sensitive Targeting process
  - Augment information with extant materials from Joint Battle Management Command and Control (JBMC2) Roadmap

# An Architecture-Based “Thin Thread”\*

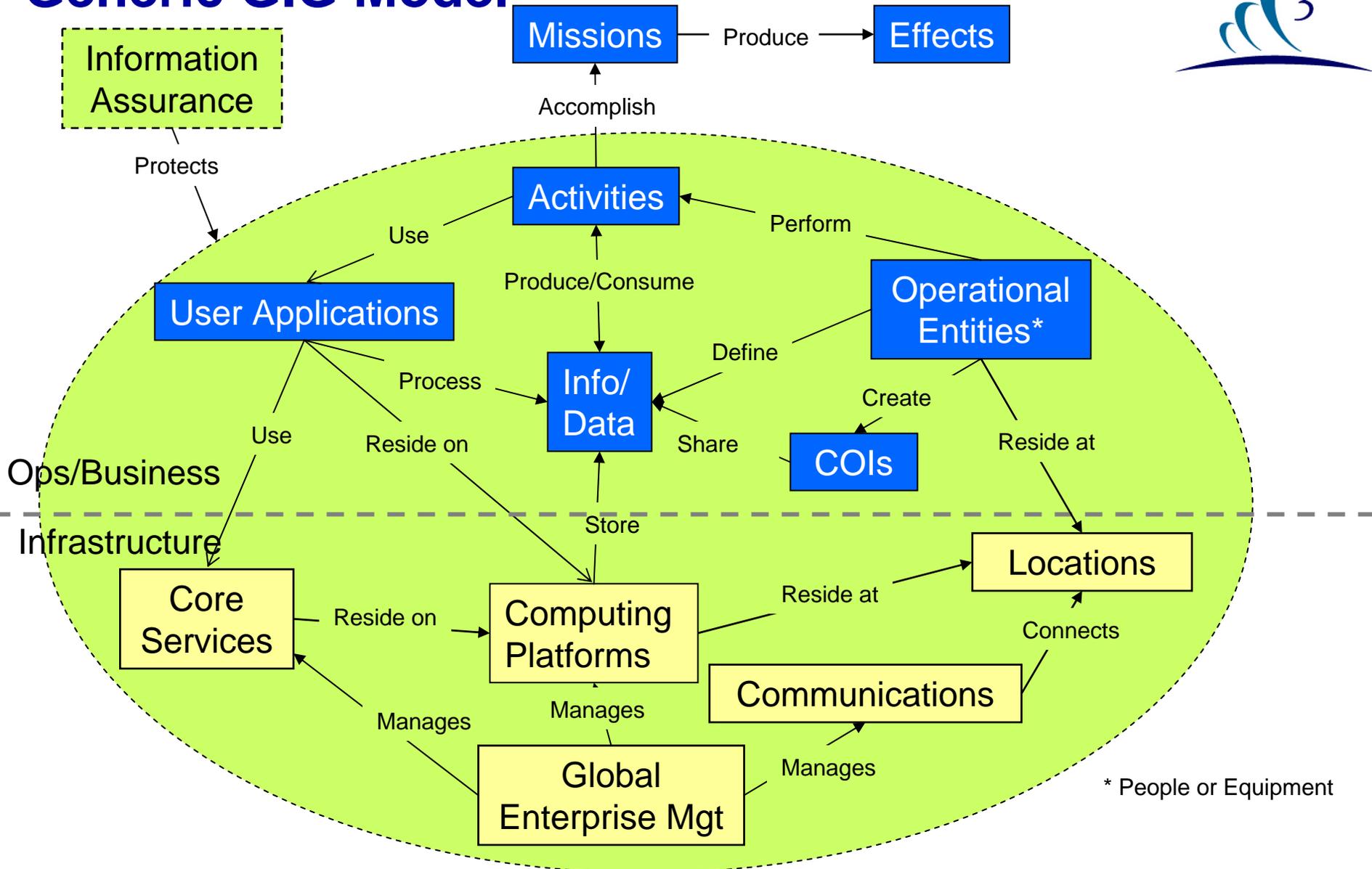


# Architecture Specification Model (ASM) Overview\*



\* ASM Developed by MITRE under USAF Sponsorship

# Generic GIG Model





# Needs are Driven by Operational Characteristics

## ■ Activity

- Operational Role – what activities are performed?
- Criticality – how important are the activities?
- Precision – how accurate do the result of the activity need to be?
- Knowledge – what information is needed to accomplish the activity?
- Tempo - how often is the activity performed?
- Timeliness – how fast is the activity performed?
- Operational Security – how much does it need to be protected?

## ■ Operational Entity

- Organizational affiliation – who are they?
- Physical Location – where are they located?
- Environment – what kind of conditions prevail or are possible?
- Degree of mobility – how much do they move?

## ■ Community of Interest

- Community affiliations – what COIs are involved?
- Vocabulary – what “language” do they speak?



## ■ Information

- **Existence** - has anyone created the information?
- **Content** – what is the substance of the info (intel, ops, weather, logistics, etc.)?
- **Currency** – when was it created or last updated?
- **Perishability** – what is the “shelf life” of the information?
- **Availability** – can it be physically obtained?
- **Format** – what form is it in (text, audio, video, imagery, etc.)
- **Discoverable** – is it tagged and indexed so it can be readily found?
- **Accessibility** – is interaction with it possible and allowed?

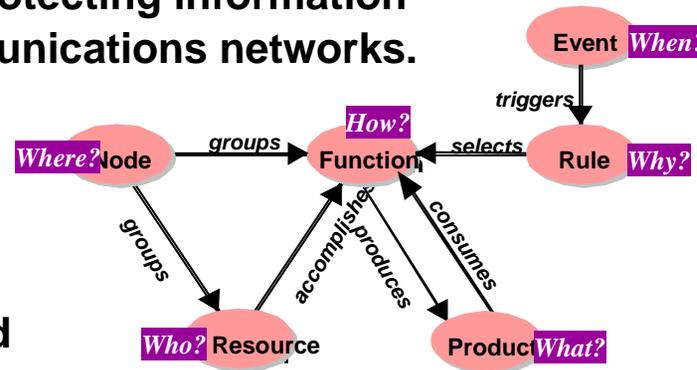
# Architecture-Based Linkages for TST



F2T2EA **functions** include locating and identifying targets, determining, analyzing and preparing plans of attack, selecting best courses of action, engaging the targets, and evaluating the results; as well as supporting functions such as protecting information and managing communications networks.

In response to an **event**, a need to defend friendly forces from attack, triggers a response.

Predefined **rules** (e.g., in an SOP) are invoked to select the F2T2EA chain of activities.



Participating **nodes** include sensors, decision-makers, and shooters; as well as network managers.

**Products** include orders of battle, target coordinates, weather reports, terrain descriptions, engagement orders, combat reports, etc.

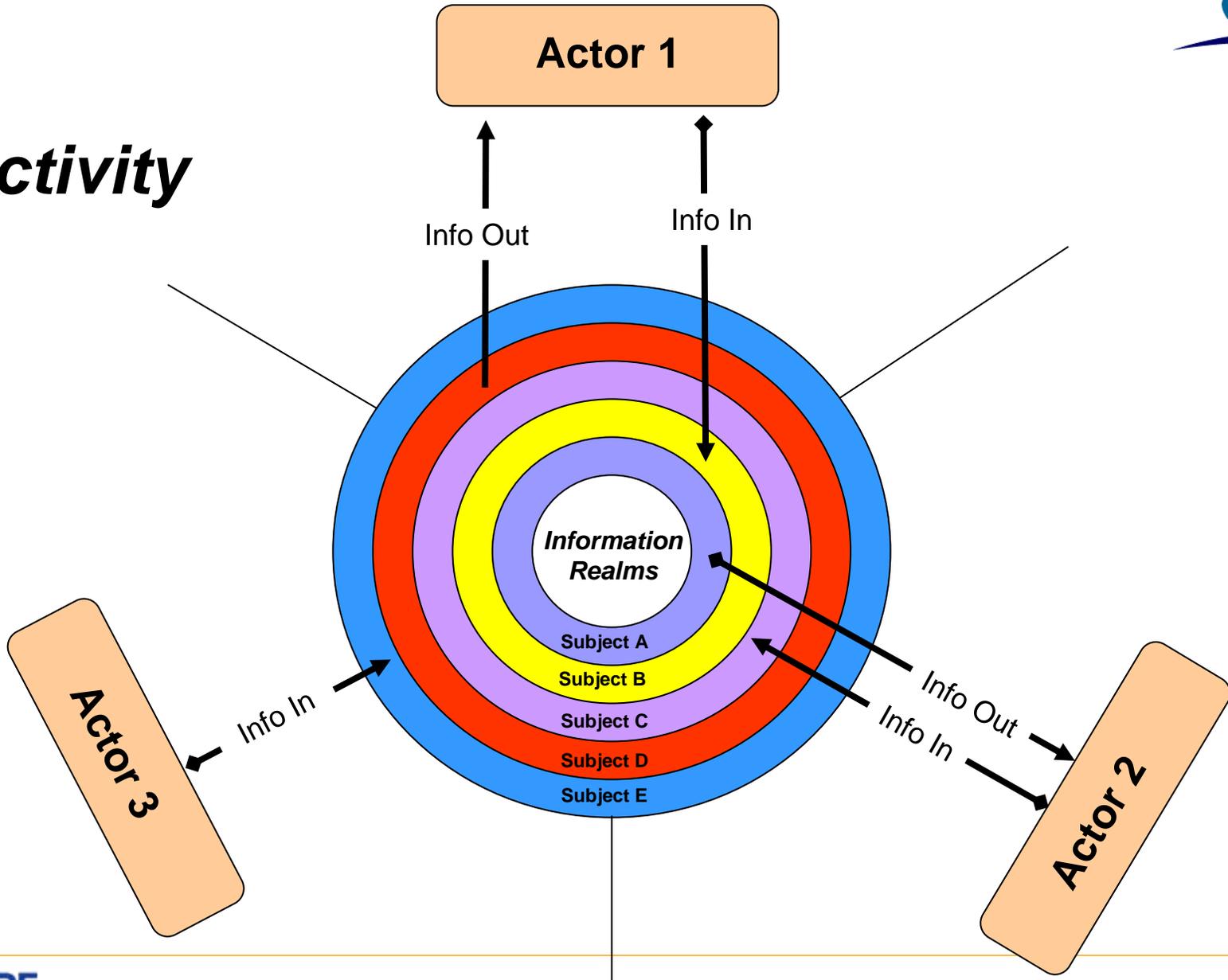
**Resources** employed include ISR sensors, C2 platforms, combat vehicles and weapons, and the supporting communications, computing, security, and network management infrastructure.



# Activity-Based Net-Centric Diagram (OV-X)



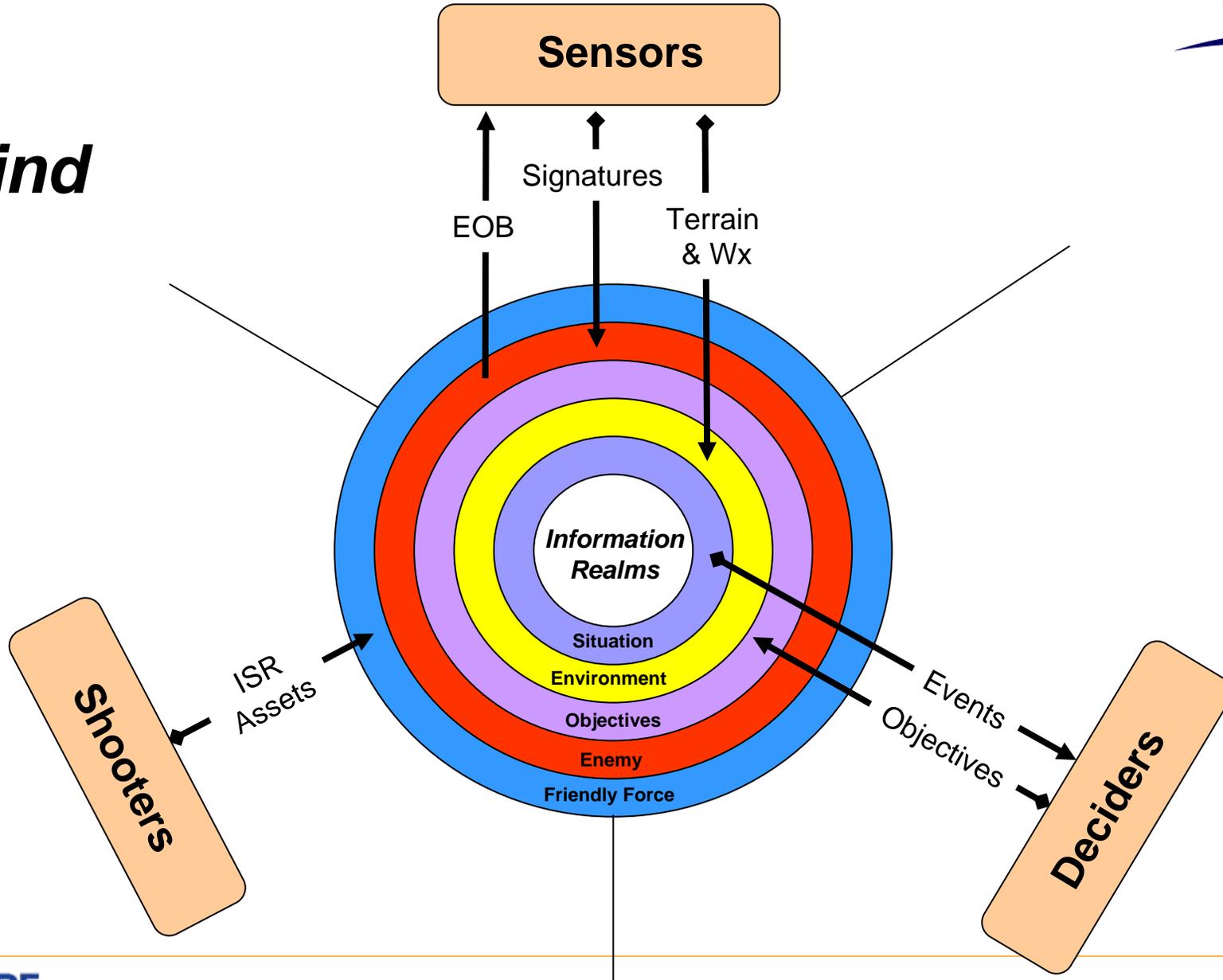
**Activity**



# Notional Activity-Based TST OV-X



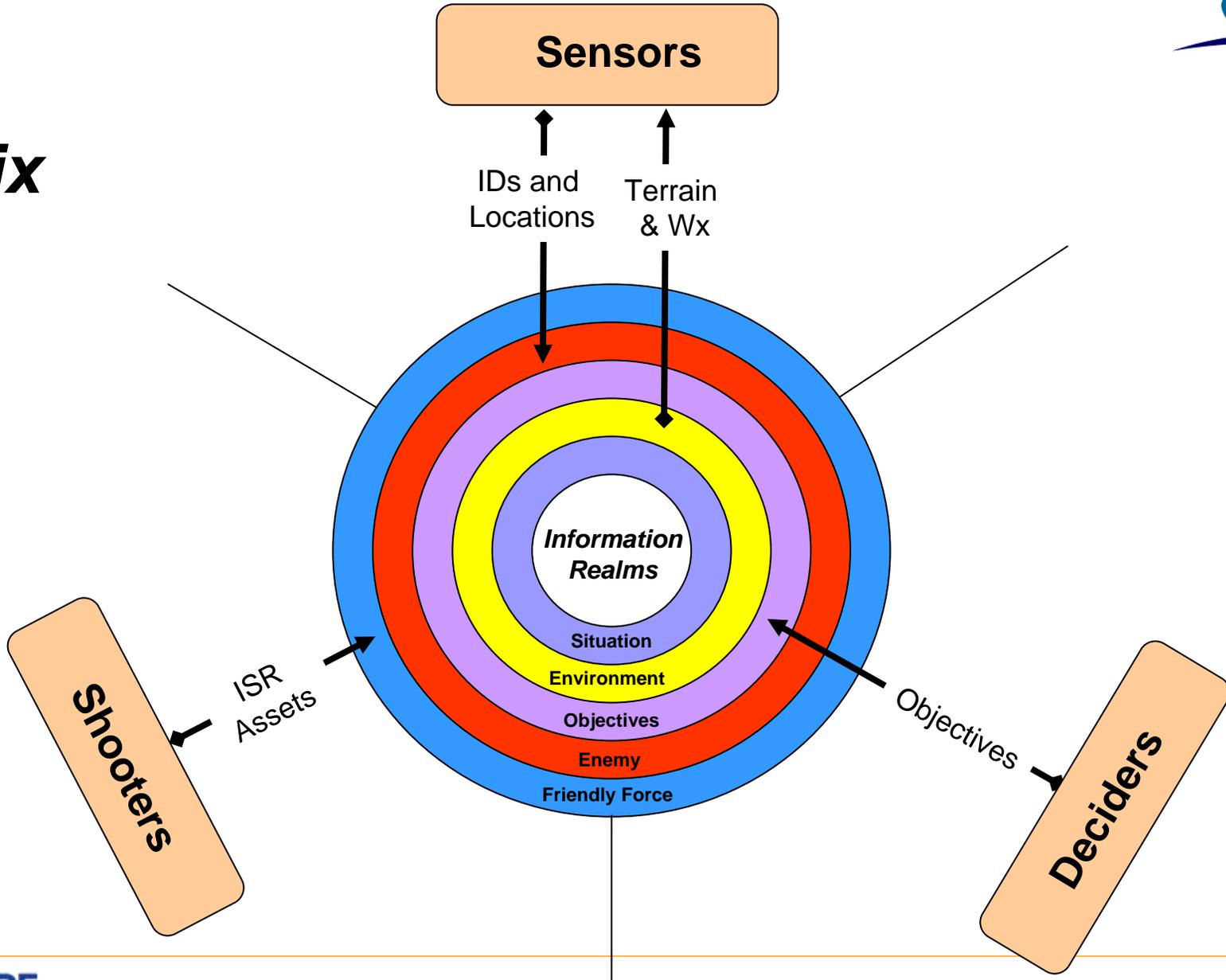
**Find**



# Notional Activity-Based TST OV-X



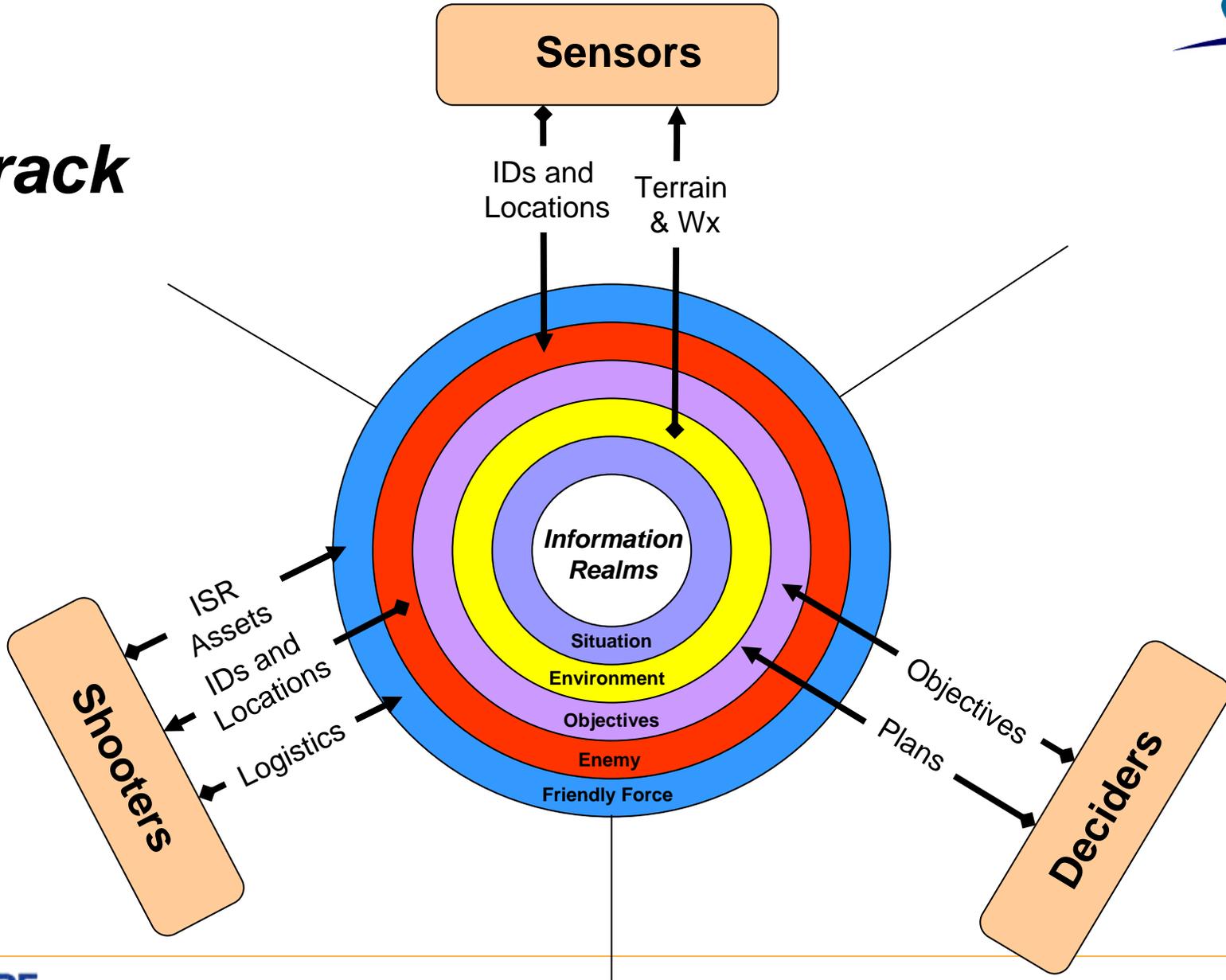
**Fix**



# Notional Activity-Based TST OV-X



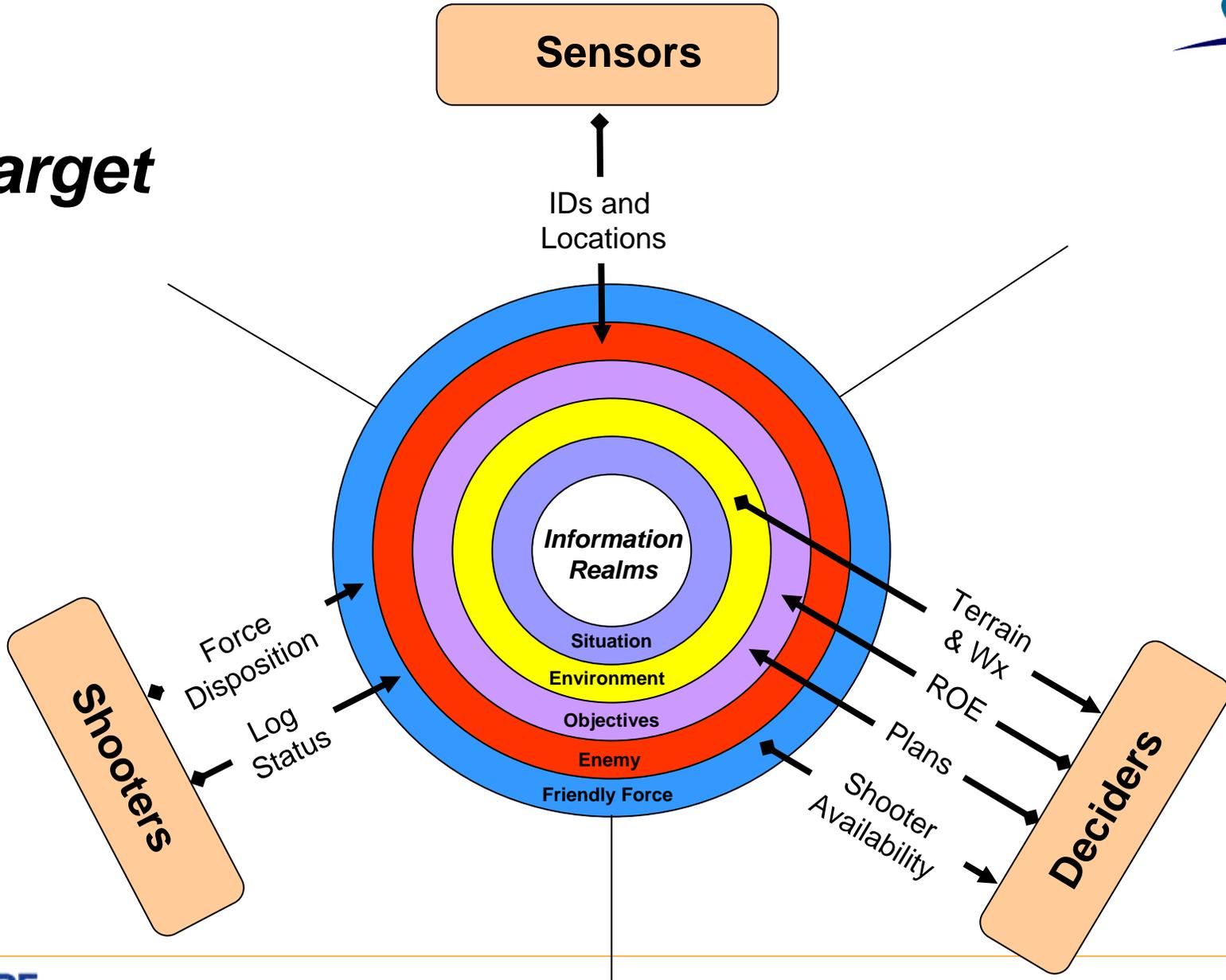
**Track**



# Notional Activity-Based TST OV-X



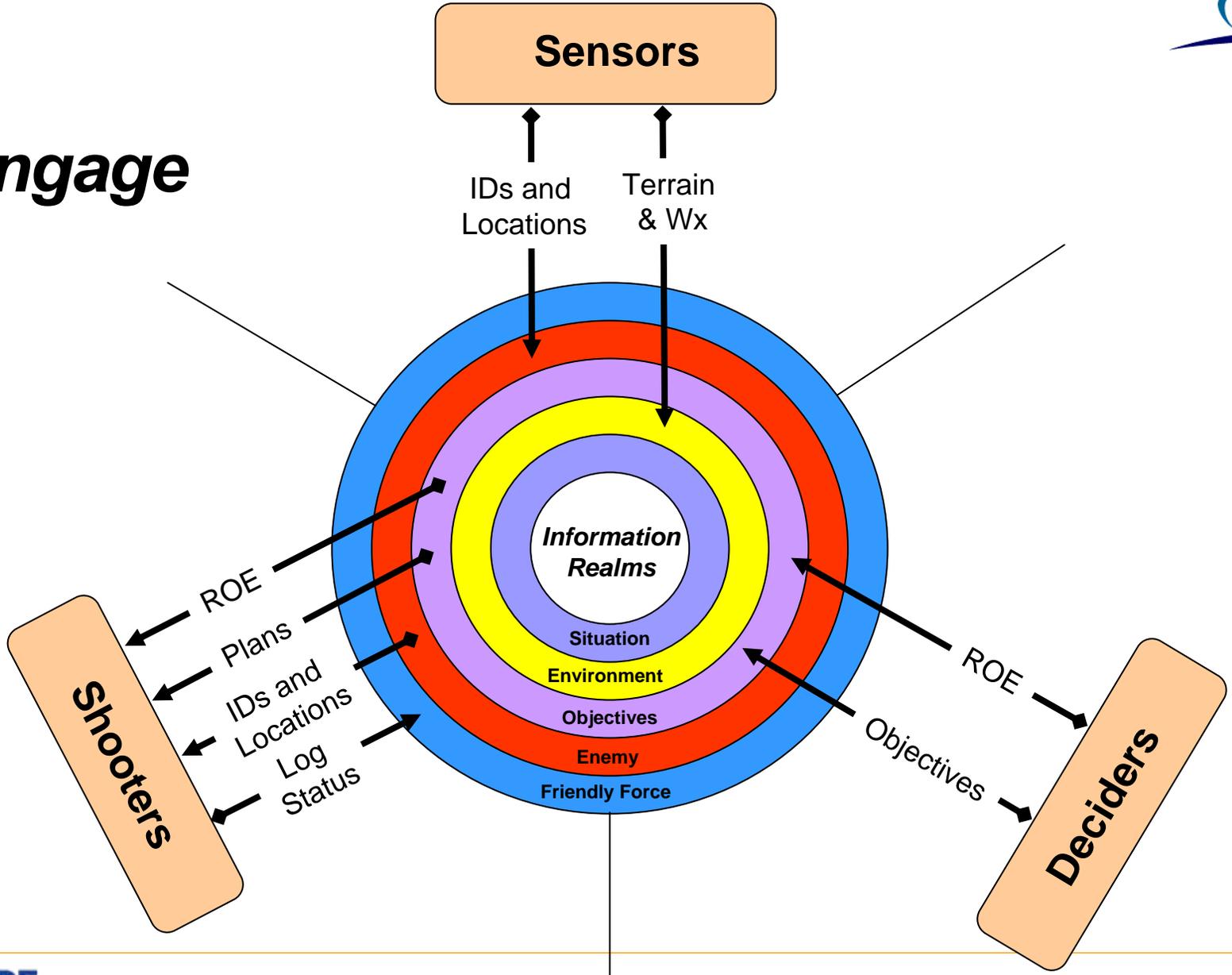
**Target**



# Notional Activity-Based TST OV-X



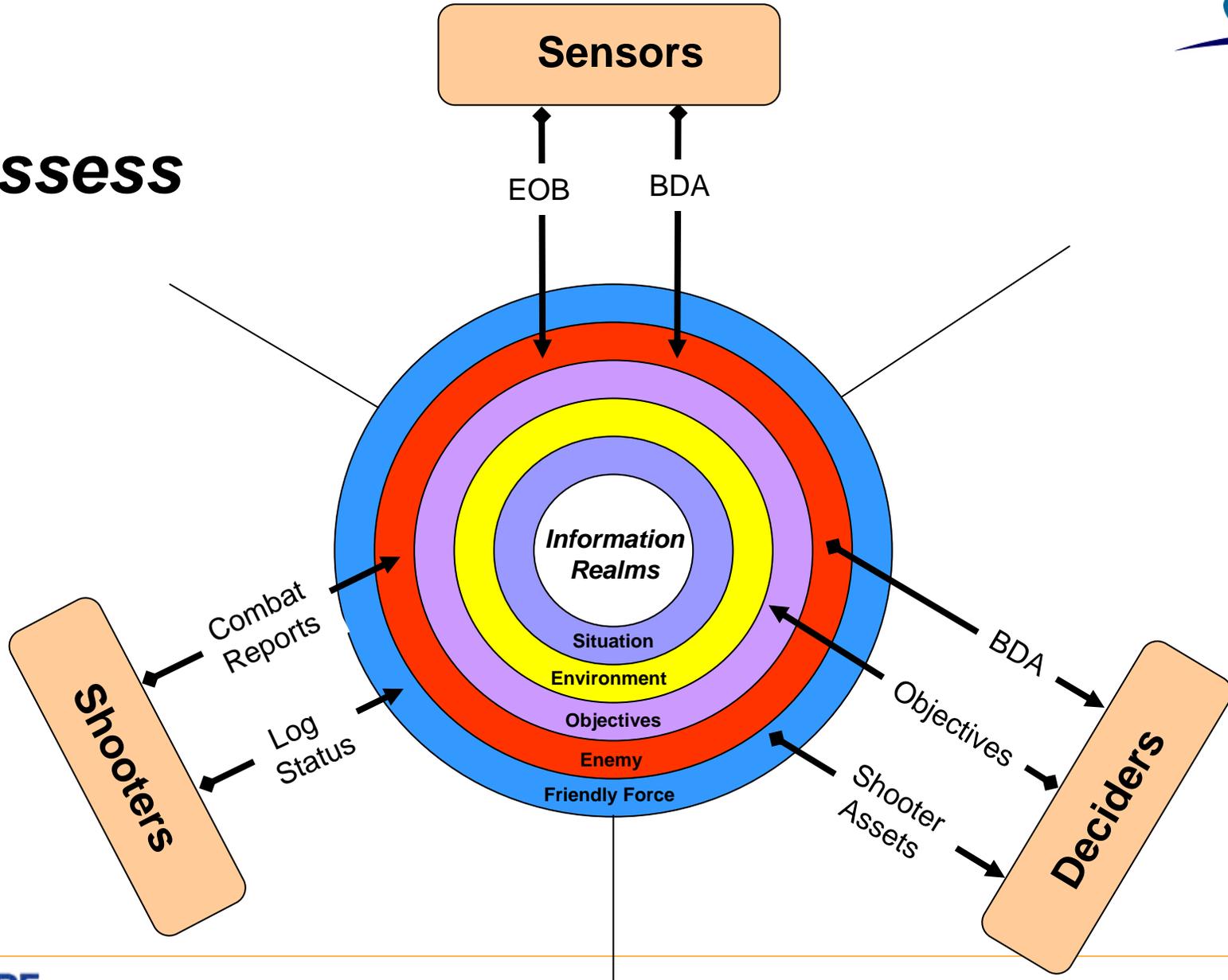
**Engage**



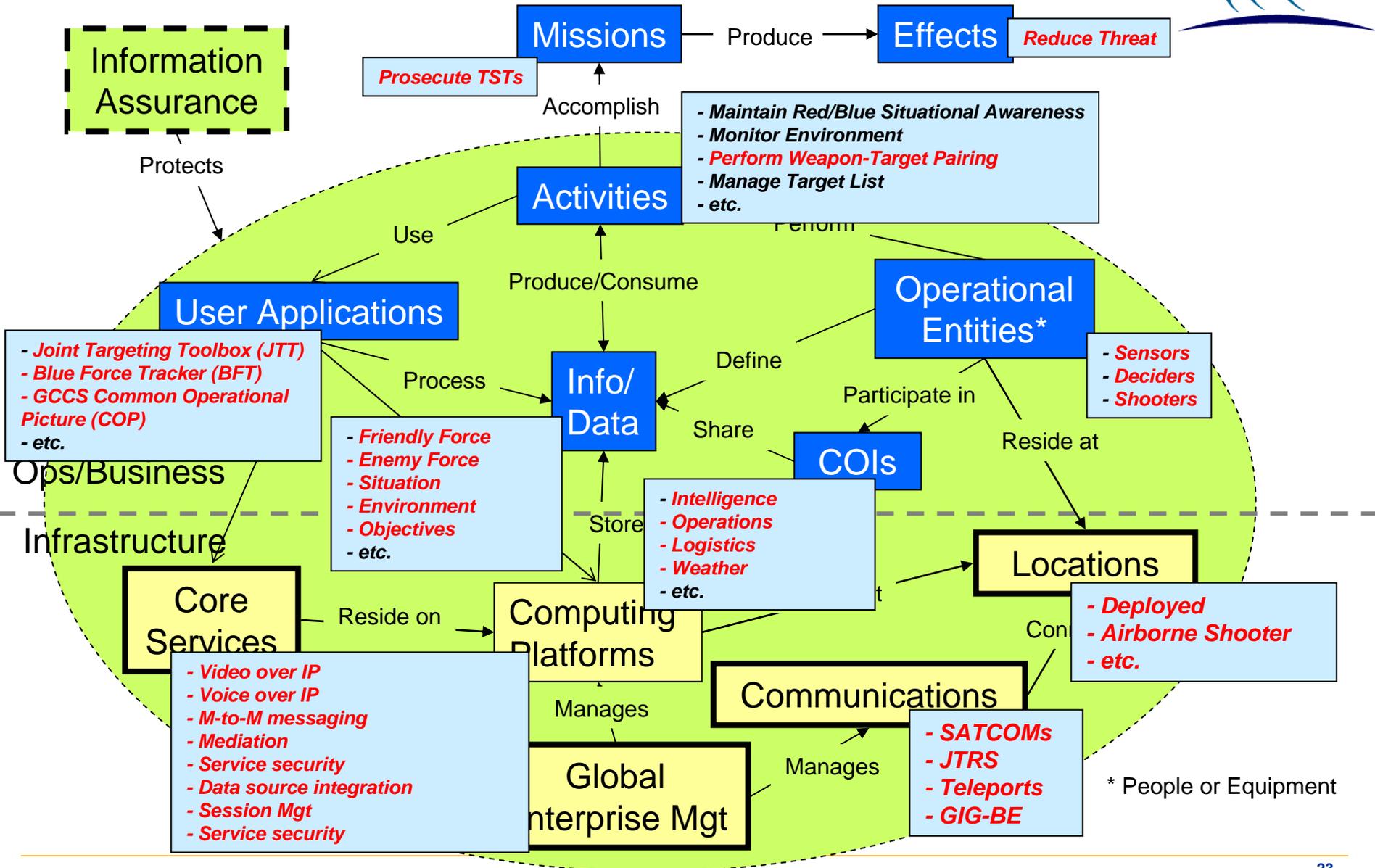
# Notional Activity-Based TST OV-X



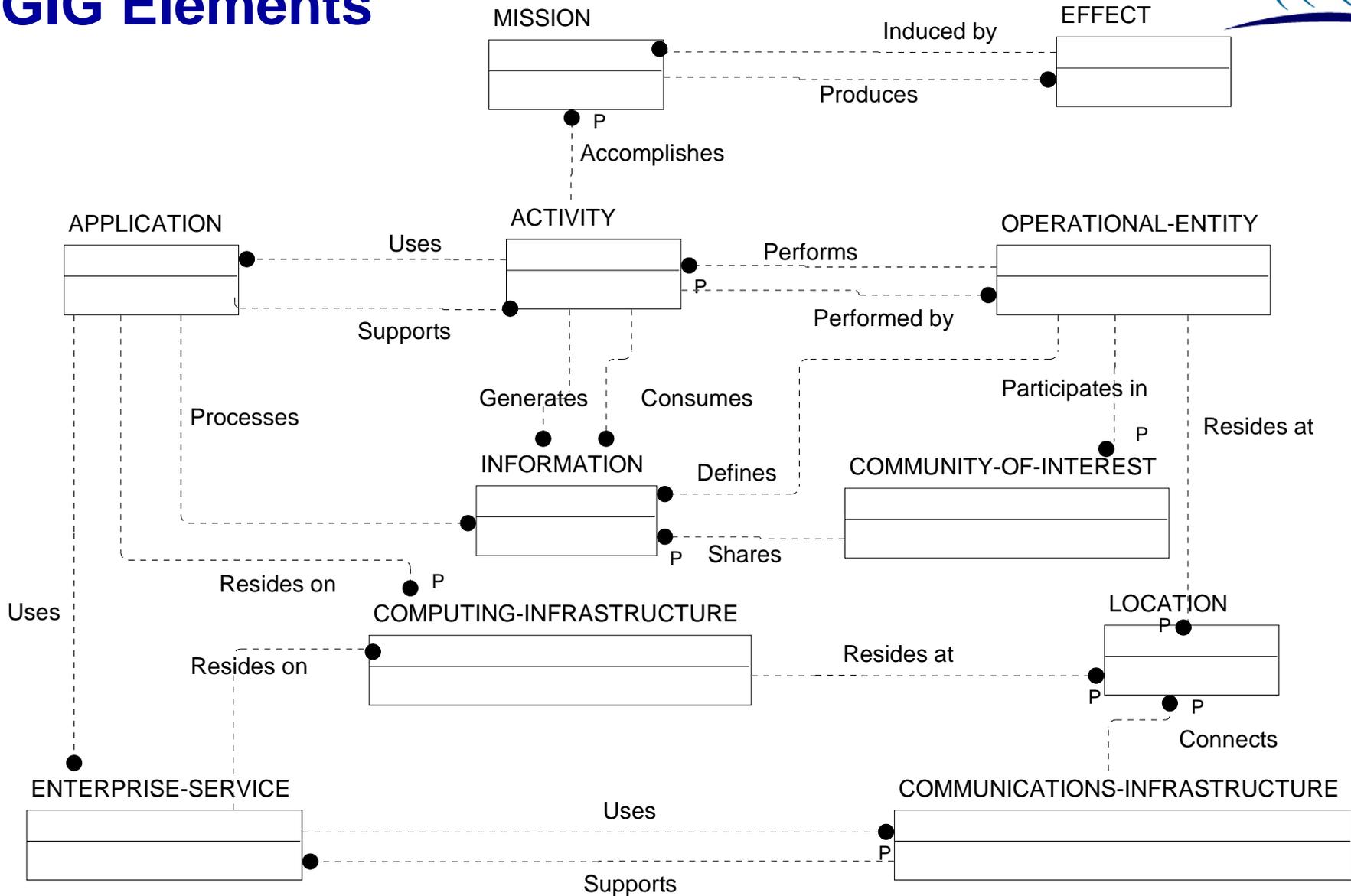
## Assess



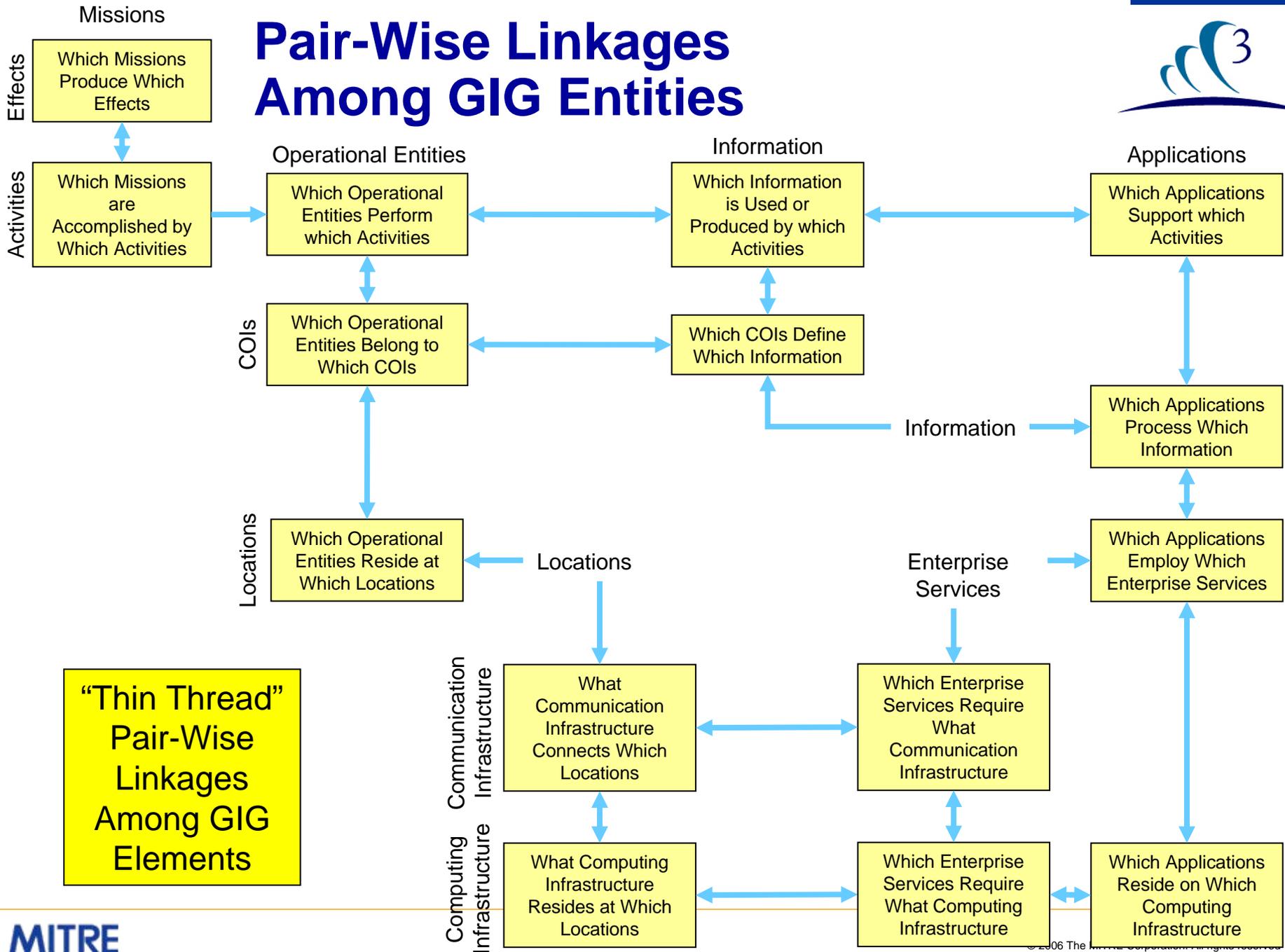
# NCOE-Relevant Thin Thread Operational and Infrastructure Elements



# Entity Relationship Model of Selected GIG Elements



# Pair-Wise Linkages Among GIG Entities



# Sample TST Thin Thread Linkages



		Missions								
<b>Effects</b>	Which Missions Produce What Effects	Prosecute	TST							
	Reduce Threat	x								
		Missions						Operational Entities		
<b>Activities</b>	Which Missions are Accomplished by What Activities	Prosecute	TST				Which Operational Entities Perform What Activities	Sensor	Decider	Shooter
	Find	x					Find			
	Fix	x					Fix			
	Track	x					Track			
	Target	x					Target			
	Weapon-Target Pairing	x					Weapon-Target Pairing			
	Determine Desired Effects	x					Determine Desired Effects		x	
	Determine Constraints	x					Determine Constraints		x	
	Determine Target Vulnerability	x					Determine Target Vulnerability	x		
	Select Weapon	x					Select Weapon		x	
	Determine Shooter Availability	x					Determine Shooter Availability		x	x
	Select Shooter						Select Shooter		x	
Engage	x					Engage				
Assess	x					Assess				

# NCOE Thin Thread Results



- Existing TST materials in JIC and in JBMC2 Roadmap provided insufficient level of detail to adequately exercise the concept
- Insufficient time and resources to gather additional information
- Only a Few Characteristics Could be Addressed
  - Activity operational role – what activities are performed?
  - Operational entity organizational affiliation – who are they?
  - Operational entity physical Location – where are they located?
  - Information availability – can it be physically obtained?
- Joint Staff chose to discontinue funding of NCOE Thin Thread effort
  - Considered the architecture-based approach to be too time consuming to pursue



**Questions?**