DoD Enterprise Architecture Conference

Applied Joint Mission Threads

Christopher Behre
Architecture Integration Division
Architecture Driven Analysis Branch
(757) 203-4424

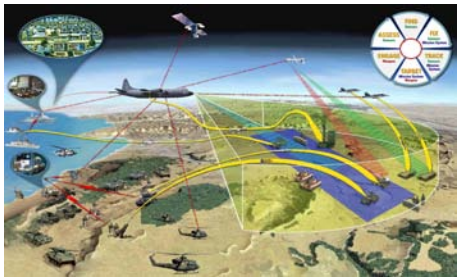
AGENDA

- Customers
- Joint Missions Threads
  - Background
  - Definition
  - Framework
- JMT Use Case
- Roadmap for way ahead
- Portal Analysis Demonstration

Objective: Overview status and way forward for applying Joint Mission Threads to meet operational requirements.

JMT Customers

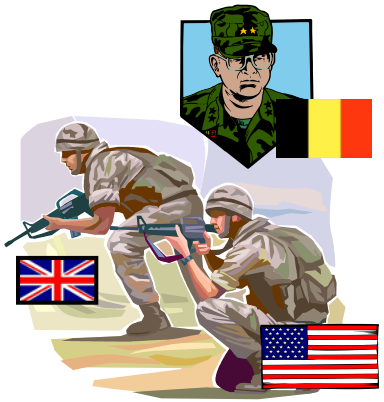
Conduct a CBA



Assessment of Strategic UAS

Prepare a TEMP

Accessing the Portal is key

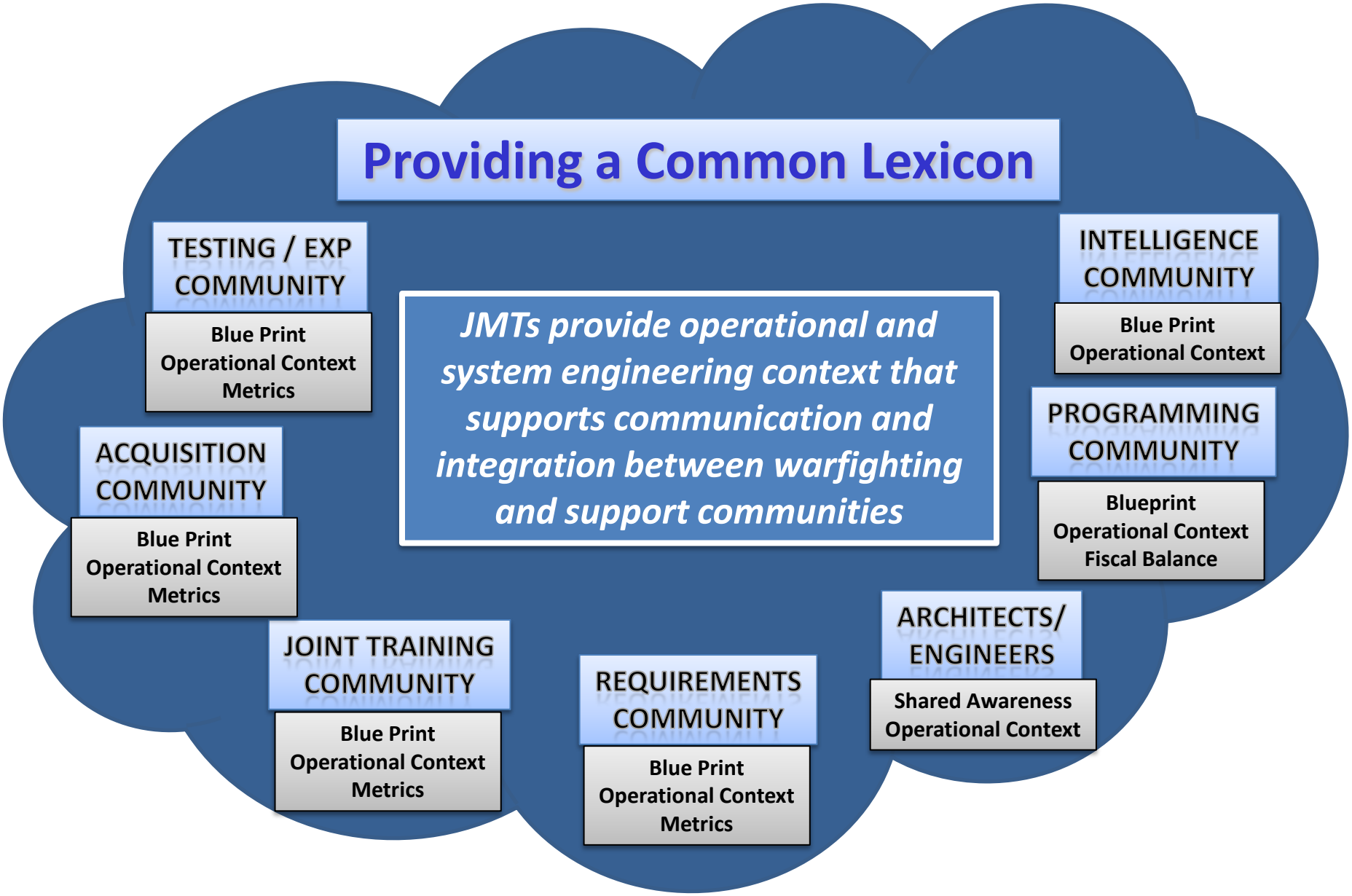


Coalition Operations Planning

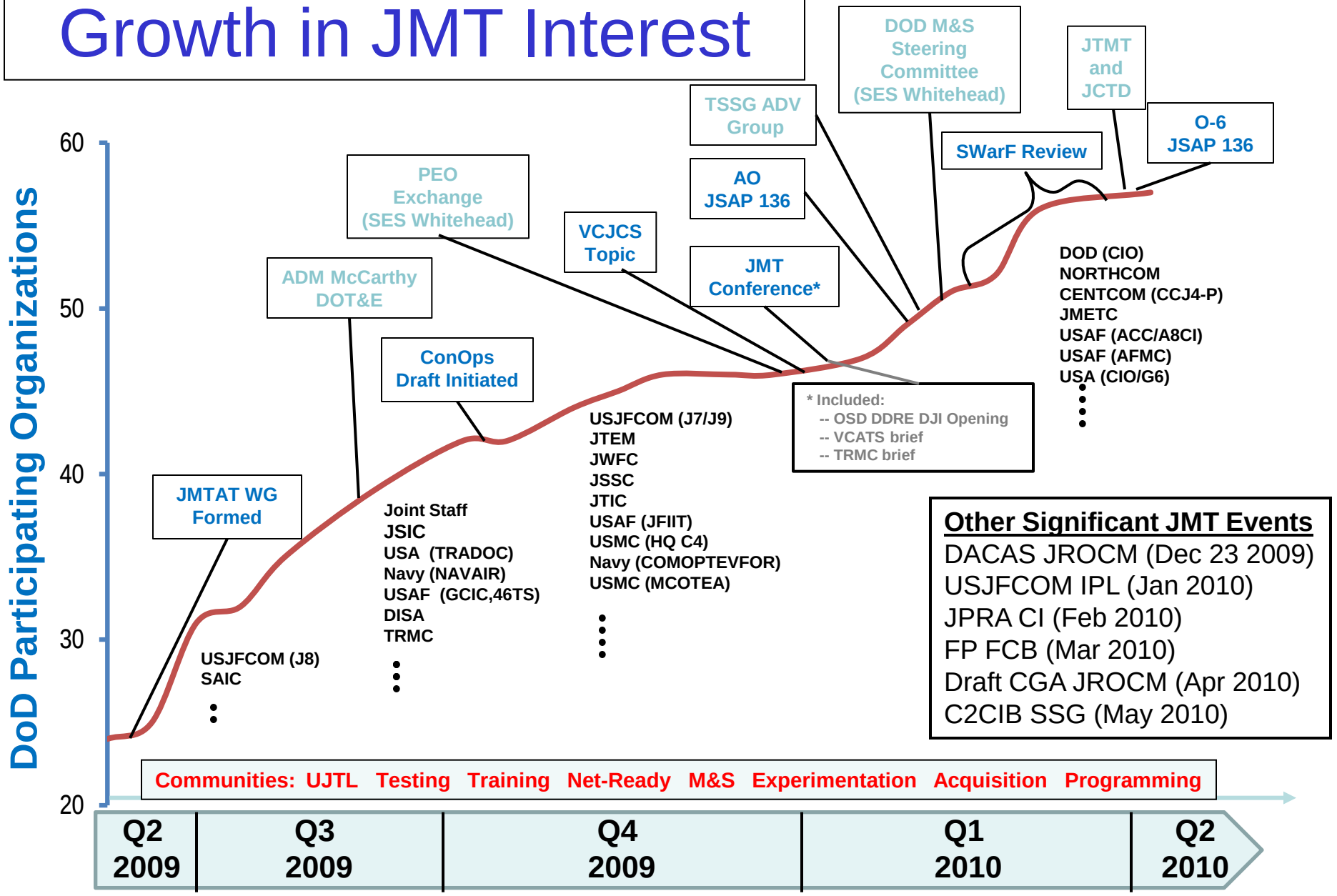
PM researches business case

Conduct developmental testing

Train to Multiple Scenarios


Providing a Common Lexicon
JMTs provide operational and system engineering context that supports communication and integration between warfighting and support communities
TESTING / EXP COMMUNITY
Blue Print
Operational Context
Metrics
INTELLIGENCE COMMUNITY
Blue Print
Operational Context
PROGRAMMING COMMUNITY
Blueprint
Operational Context
Fiscal Balance
ACQUISITION COMMUNITY
Blue Print
Operational Context
Metrics
ARCHITECTS/ ENGINEERS
Shared Awareness
Operational Context
JOINT TRAINING COMMUNITY
Blue Print
Operational Context
Metrics
REQUIREMENTS COMMUNITY
Blue Print
Operational Context
Metrics

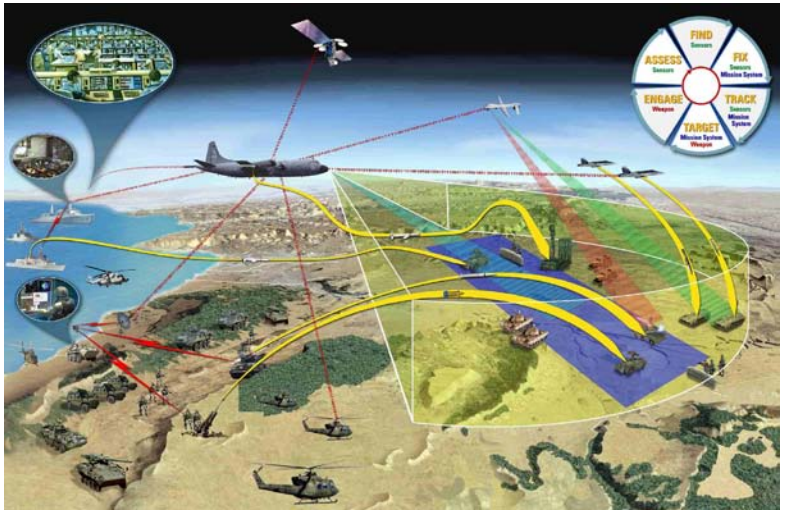
Growth in JMT Interest



DoD Community support for Joint-focused, established, certified, re-useable JMTs

JOINT MISSION THREADS 101

Joint Mission Threads Will:



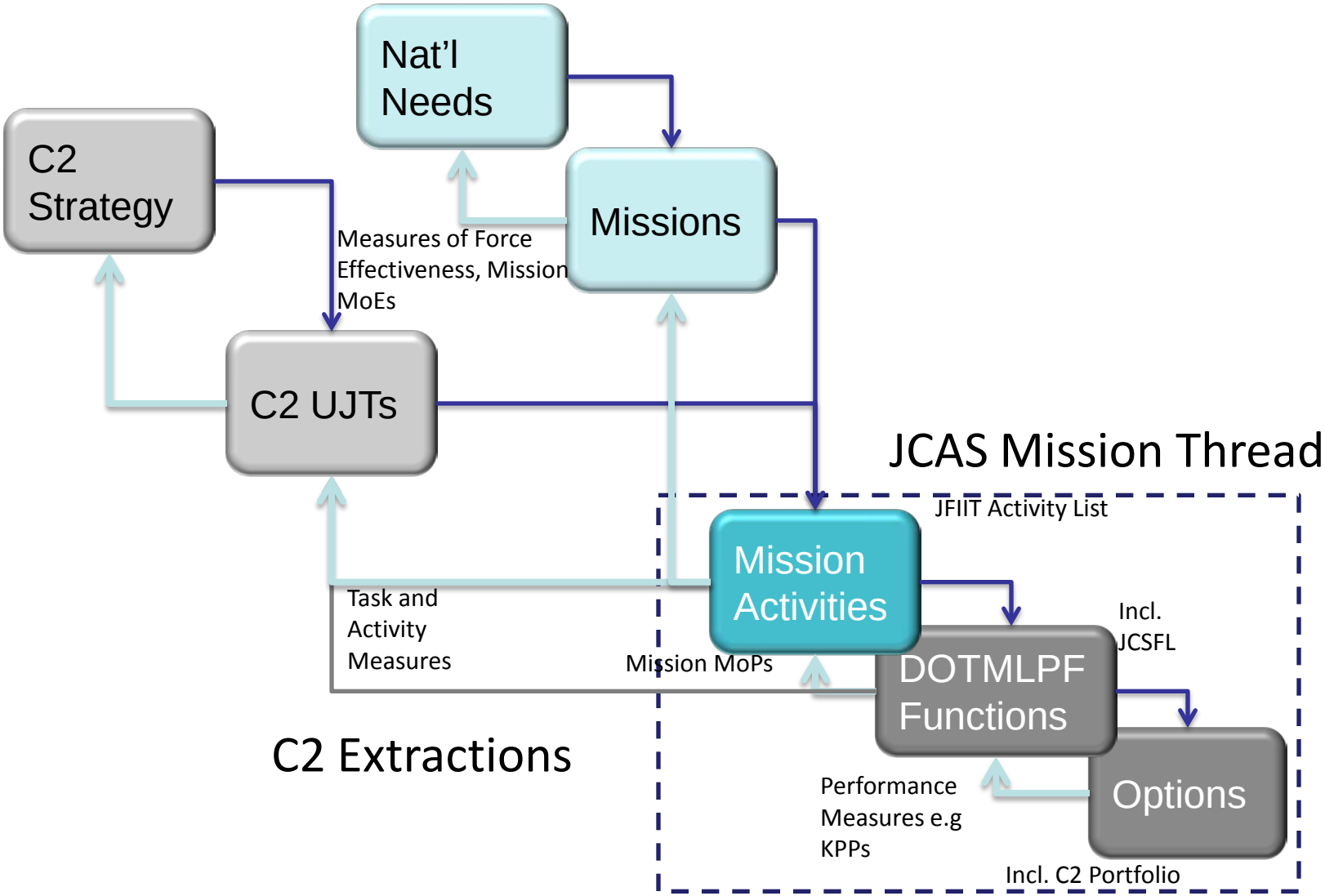
Providing the Operational & Technical Context

Joint Mission Thread (JMT):

An operational and technical description of the end-to-end set of activities and systems that accomplish the execution of a *joint mission*. (CJCSI 6212.01E)

- **Clarify Joint operational and technical requirements to improve interoperability and integration**
- ***Provide operational and technical context for objective Joint analysis, assessment , testing, and training***
- **Establish common standards to verify operational & technical effectiveness of info exchanges**
- **Enable improved cross-Joint Capability Area (JCA), cross-portfolio analysis of Joint & coalition capabilities**
- **Detail the interaction of systems & processes in support of mission engineering at the technical system of systems level (Tier II and III JMTs).**

JMTs Support to C2 System Testing



Developing Reusable JMT Information

A Joint Approach, Based on:

- UJTL information
  - from the Joint Doctrine, Education and Training Electronic Information System (JDEIS) Web Portal: https://jdeis.js.smil.mil/jdeis
- Authoritative Doctrine, Policy, Procedures, TTPs
- Service Documentation – JCIDs, METLs, technical specification and standards, Testing data, findings, etc
- JCA Tiers do not map directly to JMT Tiers – a JMT supports multiple JCAs

Operational Sponsor Critical to Success

Range Of Military Operations
Types of Military Operations

- Crisis Response
- Strikes
- Raids
- Limited Contingency Operations
- Military Engagement
- Security Cooperation
- Show of Force
- Deterrence
- Major Operations
- Campaigns
- Protection of Shipping
- Combating Terrorism

MISSION AREAS

(Operational Templates, Strategic National, Strategic Theater)

Many to Many

- Provide Global Strike Capabilities
- Space
- Tailor Joint Forces for Deployment
- Joint Interdiction
- Antisubmarine Warfare
- Determine and Report Force Readiness
- Air Assault
- Humanitarian Assistance
- Manage National Strategic Firepower
- Manage Personnel Recovery
- Coordinate Joint/Multinational Training Events
- Destroy Enemy Bases
- Develop Prototypes of Improved or New Capabilities for the Warfighter
- Synchronize Strategic Attack
- Information Warfare
- Theater Missile Defense

Many to Many

MISSION THREADS

(Operational, Tactical)

- JCAS
- Interdiction
- CIED
- Non-Lethal Attack
- JPR
- Joint Fires
- JSEAD
- Countermine
- TST
- Defensive Countermeasures
- EW/EA
- Mine Operations
- Non combatant evac
- CWMD
- Interdiction
- Military deception
- Amphibious Assault
- MEDEVAC
- PSYOP
- CND/CAN/CNE
- Tactical Airlift
- Counter Drug
- Maritime interception

ENABLING Universal Joint Tasks

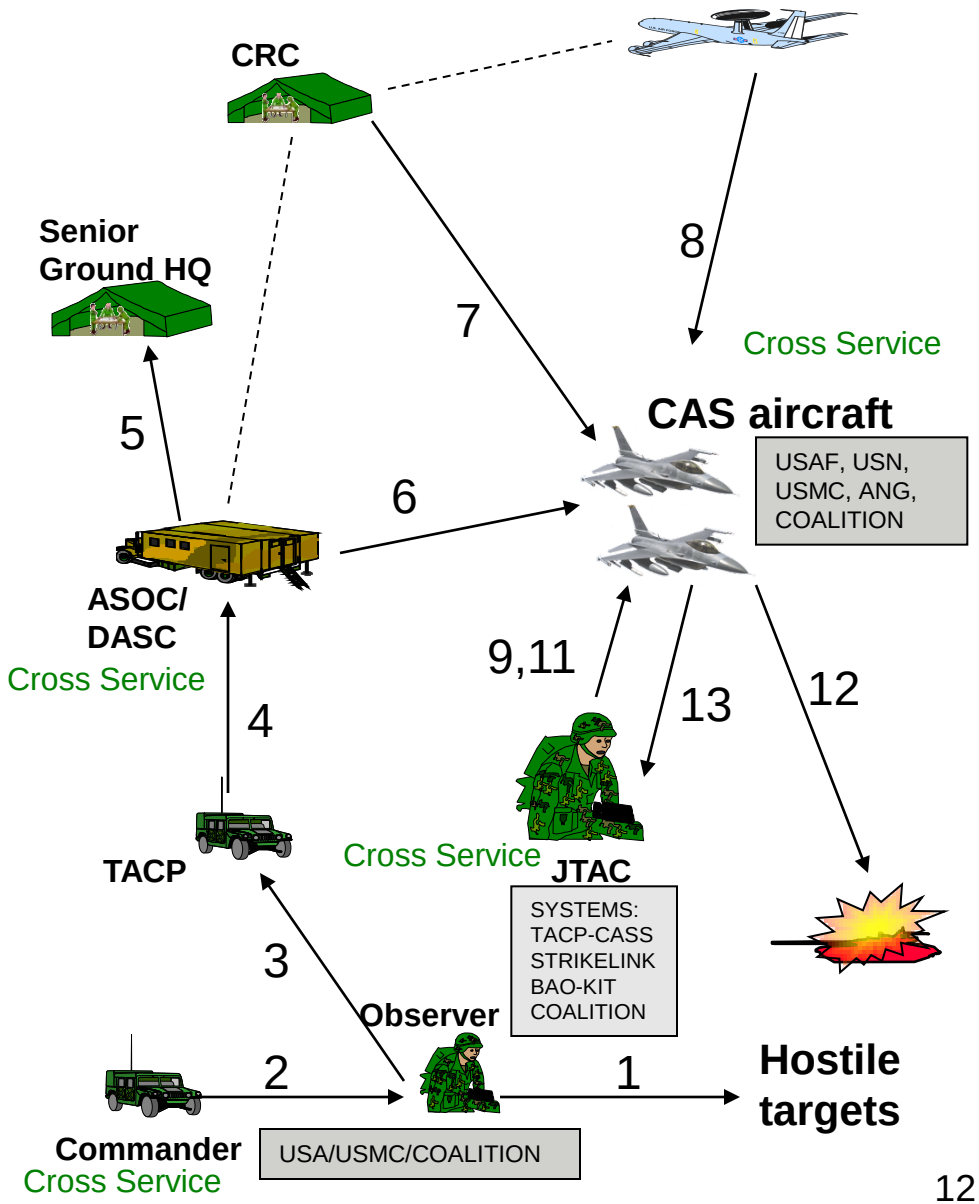
(Operational, Tactical)

- Intel Support
- Coalition Support
- Prepare Plans
- Supply
- Analyze COAs
- Mission Planning
- OPSEC
- Air Refueling
- CID

Joint Mission Thread

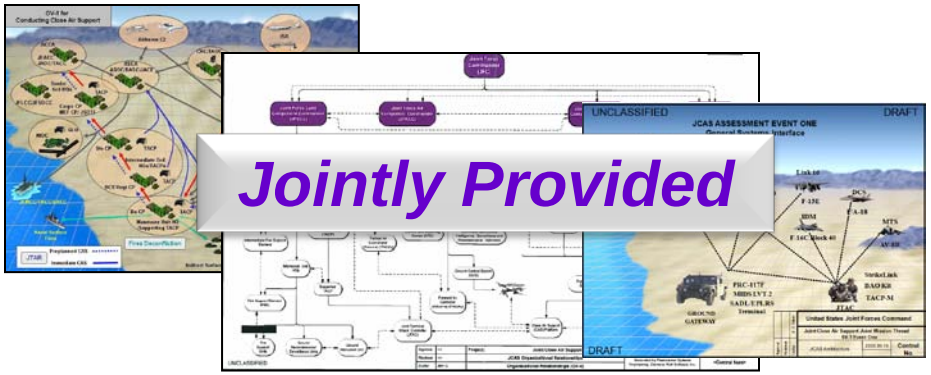
Joint Close Air Support

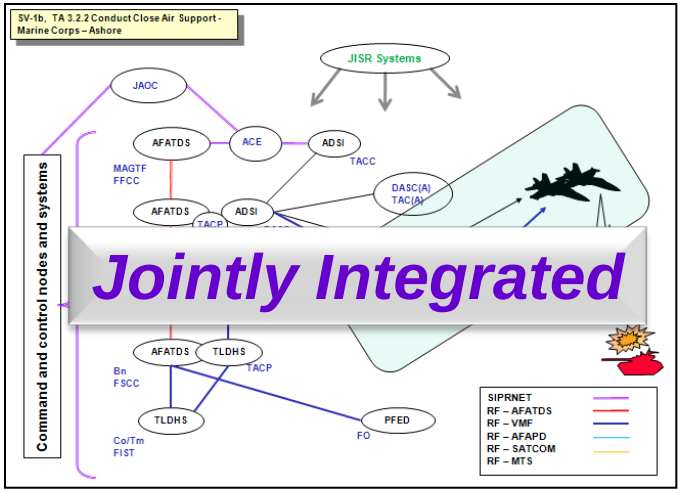
Mission Event No.	Description
1	Unit detects target
2	Commander decides to request CAS
3	Unit notified TACP
4	TACP passes request to ASOC < 5 min
5	ASOC coordinates with senior ground HQs which approve request
6	ASOC assigns on-call aircraft
7	CRC send aircraft to contact point (CP)
8	AWACS passes critical updates to aircraft > 95% Acrcy
9	JTAC briefs aircraft < 3 min
10	Aircraft depart initial point (IP)
11	JTAC controls CAS aircraft
12	Bombs on target > 98.9 % PK
13	Assessment



Tier 1 JMT

High level generic data description – totally reusable architecture-based info sets.





Tier 2 JMT "Strands"

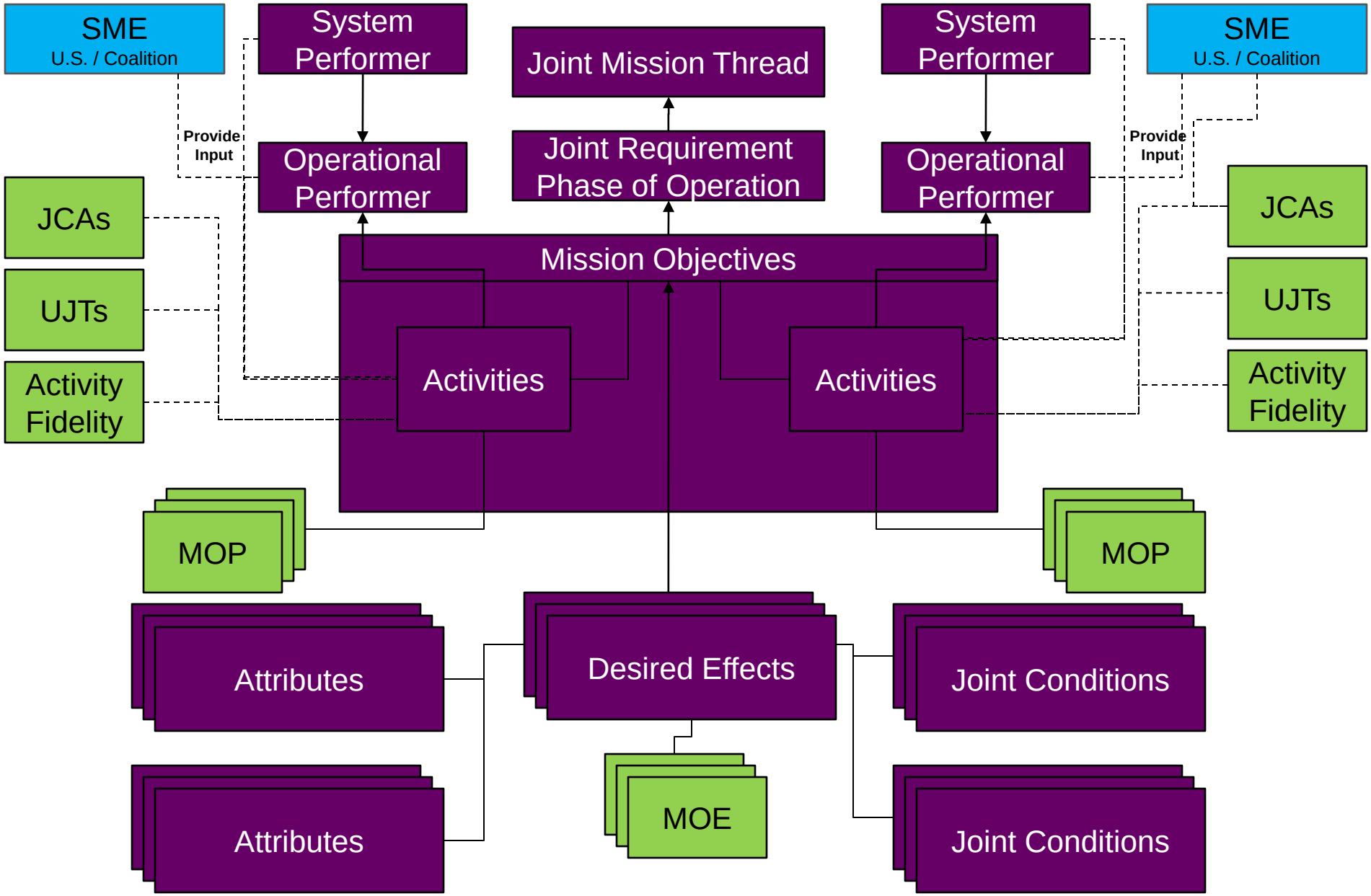
Information represents specific documentation required to answer a particular question or solve a problem.

Tier 3 JMT

Systems engineering level of detail. Bit-level analysis with enough rigor to inform Test/Eval and Mod/Sim communities.

Results in Coordinated Implementation

JMT Architectures



Tier 1 JMT Priorities

FY10 FY11 FY12 FY13 FY14

- Joint Close Air Support (JCAS)
- Air and Missile Defense
- Joint Personnel Recovery (JPR)
- Counter IED
- Global Force Management
- EW/EA

- Joint Fires
- Dynamic Targeting (TST)
- Integrated Tactical Warning & AA
- CND/CNA/CNE (CYBER)
- HA/DR
- Interagency Interoperability

- Non Combat Evacuation
- Counter Drug
- Tactical Airlift
- Strategic Attack
- Maritime Interception
- DSCA

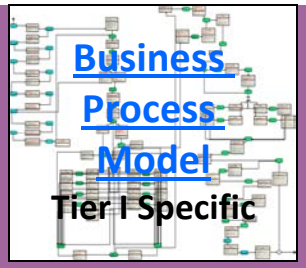
- Interdiction
- CWMD
- Casualty Management
- Military Information Support Operations
- Non-lethal Capabilities
- Counter Mine

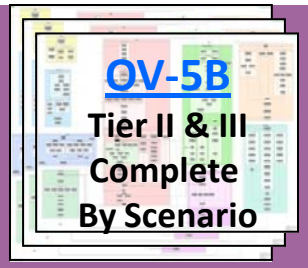
- JSEAD
- Anti Air Warfare
- Amphibious Assault
- Mine Operations
- Defensive Countermeasures
- Military Deception

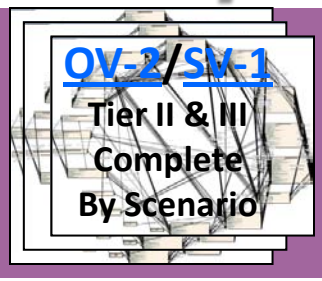
Tier 1 complete
Tier 1/2/3 work
Tier 1 in progress

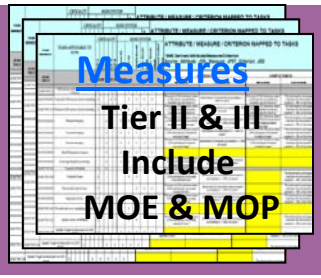
TIER 1 JMT composition funded.
Plan in place to accelerate data-rich out year JMTs per MG Rudesheim's direction.

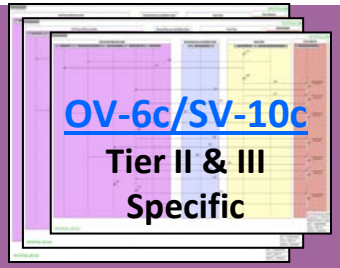
JMT Development Products

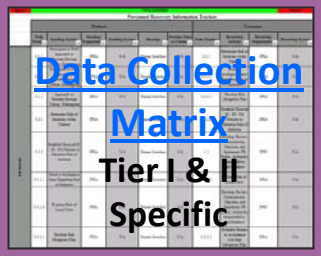












Tier 1:
JMT: AV-1 (High Level), OV-1, OV-2, OV-4, OV-5a, SV-1, Measures, High-Level Executable Architecture (EA) & IV

JMT generic data description – totally reusable architecture-based info sets

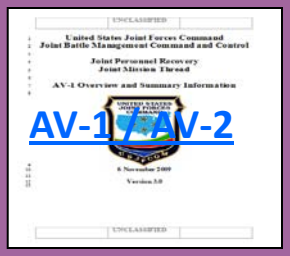
Tier 2/3:
JMT "Strands": (Additional) AV-1 (Specific), OV-2, OV-3, OV-4, OV-5b, OV-6c, SV-1, SV-3, SV-5s, SV-6, SV-10c, DIV-1, DIV-2, StdV-1, StdV-2, Baseline EA, or documents that show:

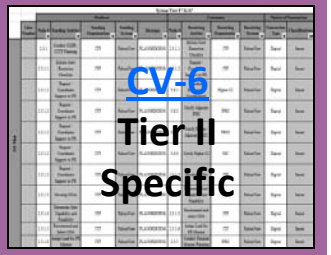
- Node/System Pairing
- Message Order
- Distributions
- Timings
- Decision processes
- System attributes
- System Functionality (IAW JCSFL)
- Information Exchange Requirements (IERs)
- Message composition
- Interoperability Matrix
- Data Exchange Requirements (DERs)
- System Capabilities

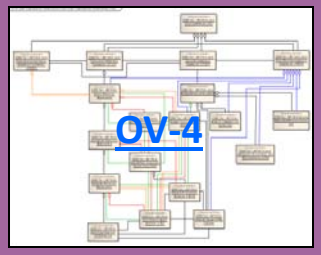
JMT "Strand" Tier 2 information represents specific documentation required to answer a particular question or solve a problem. JMT Strands are unique JMT segments that will have specific actors for each node, might use a Service-specific set of TTPs or CONOPS, may be AOR-specific or use a unique set of systems and apps – all subset of Tier 1 information (OV-5, SV-1, etc.).

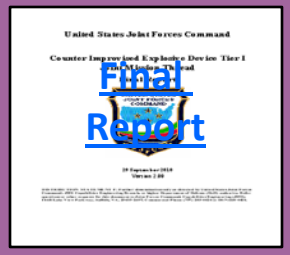
Tool suite will include JACAE, Architecture-Driven Analysis (ADA) EAs, augmented by:

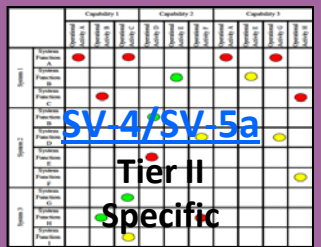
- JDEIS
- JCSFL
- Joint Style Guide (Army's Joint Test Threads +)

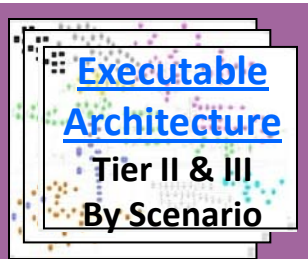


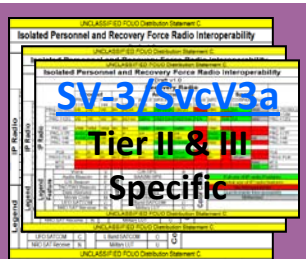


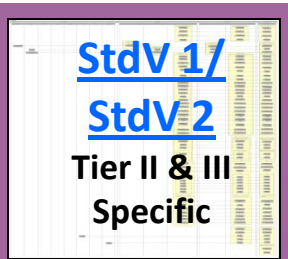


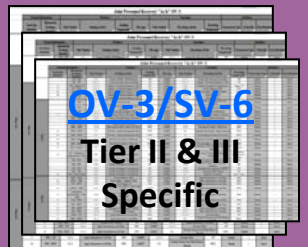


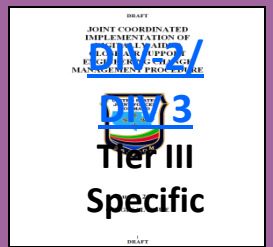








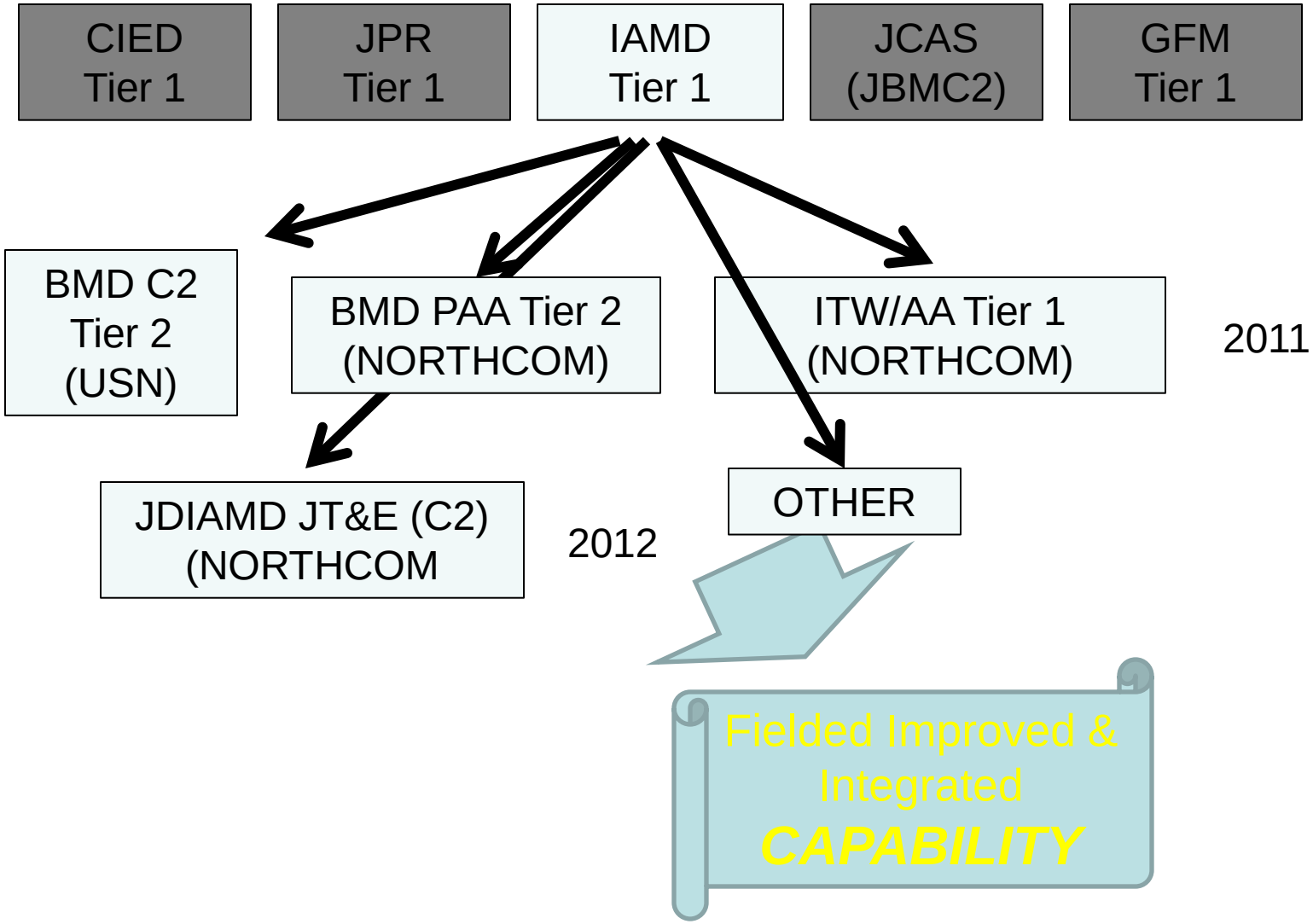




FY-10 Tier 1 JMT Current Utilization

CIED Tier 1	JPR Tier 1	IAMD Tier 1	JCAS (JBMC2)	GFM Tier 1

FY-10 Tier 1 JMT Current Utilization



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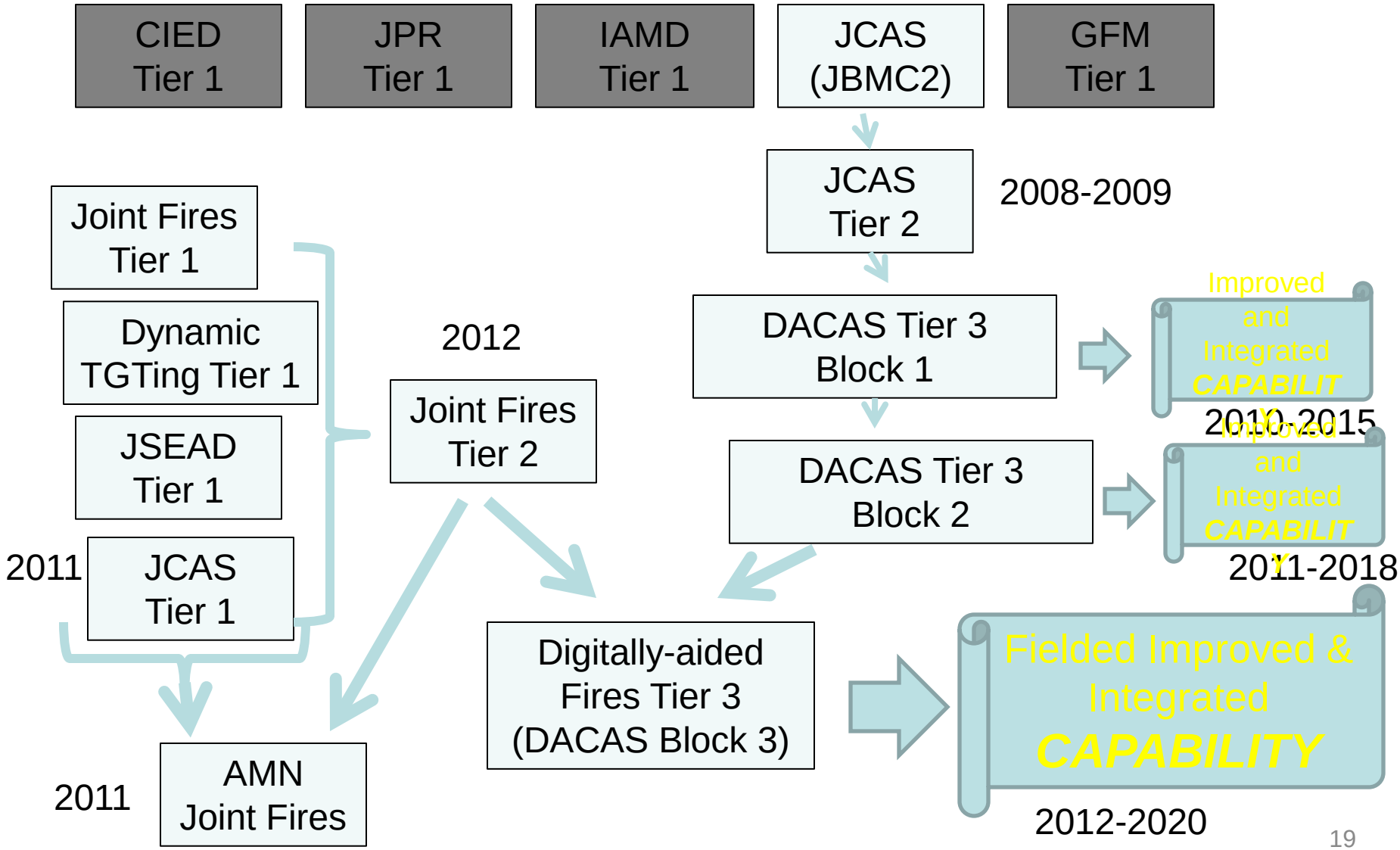

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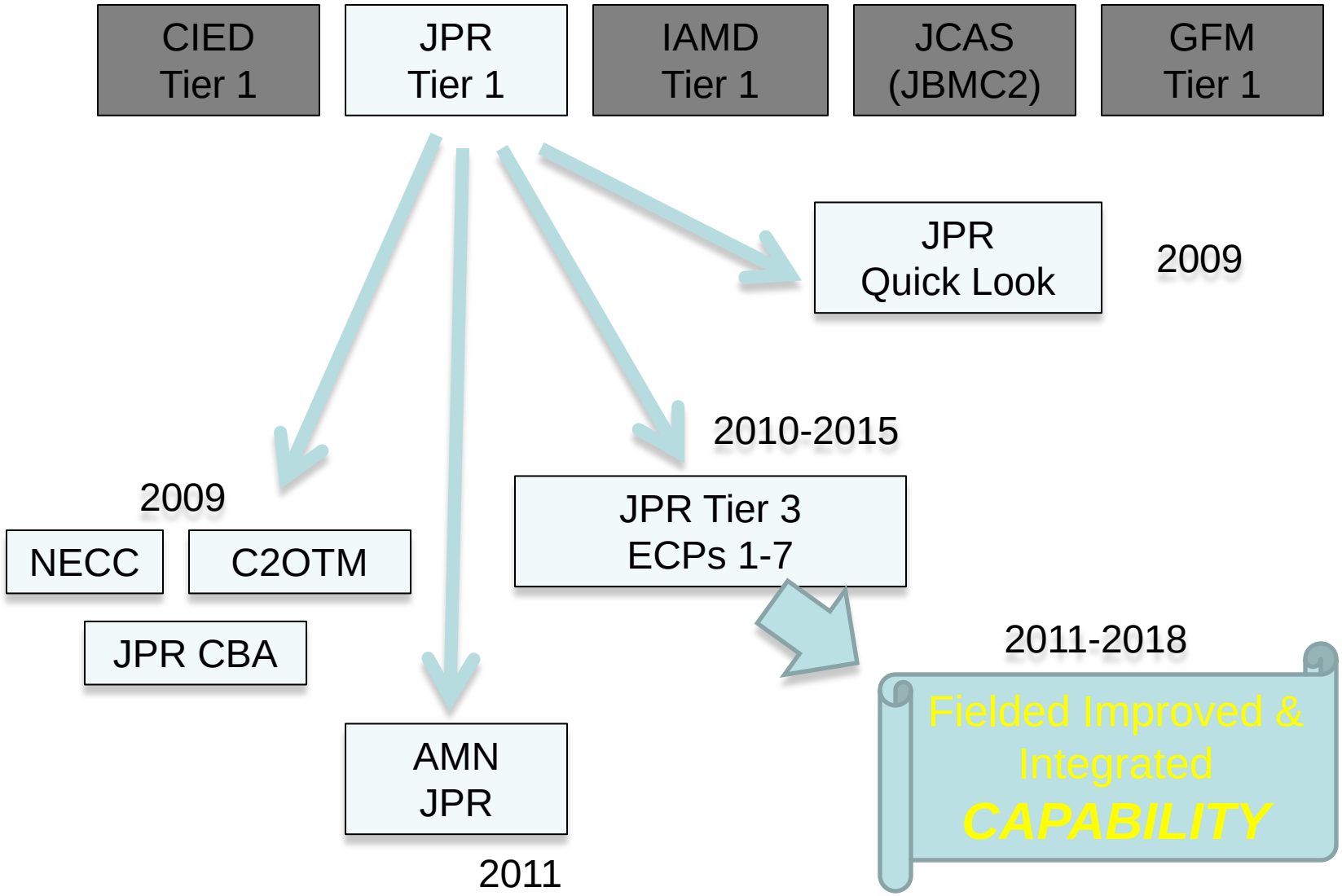
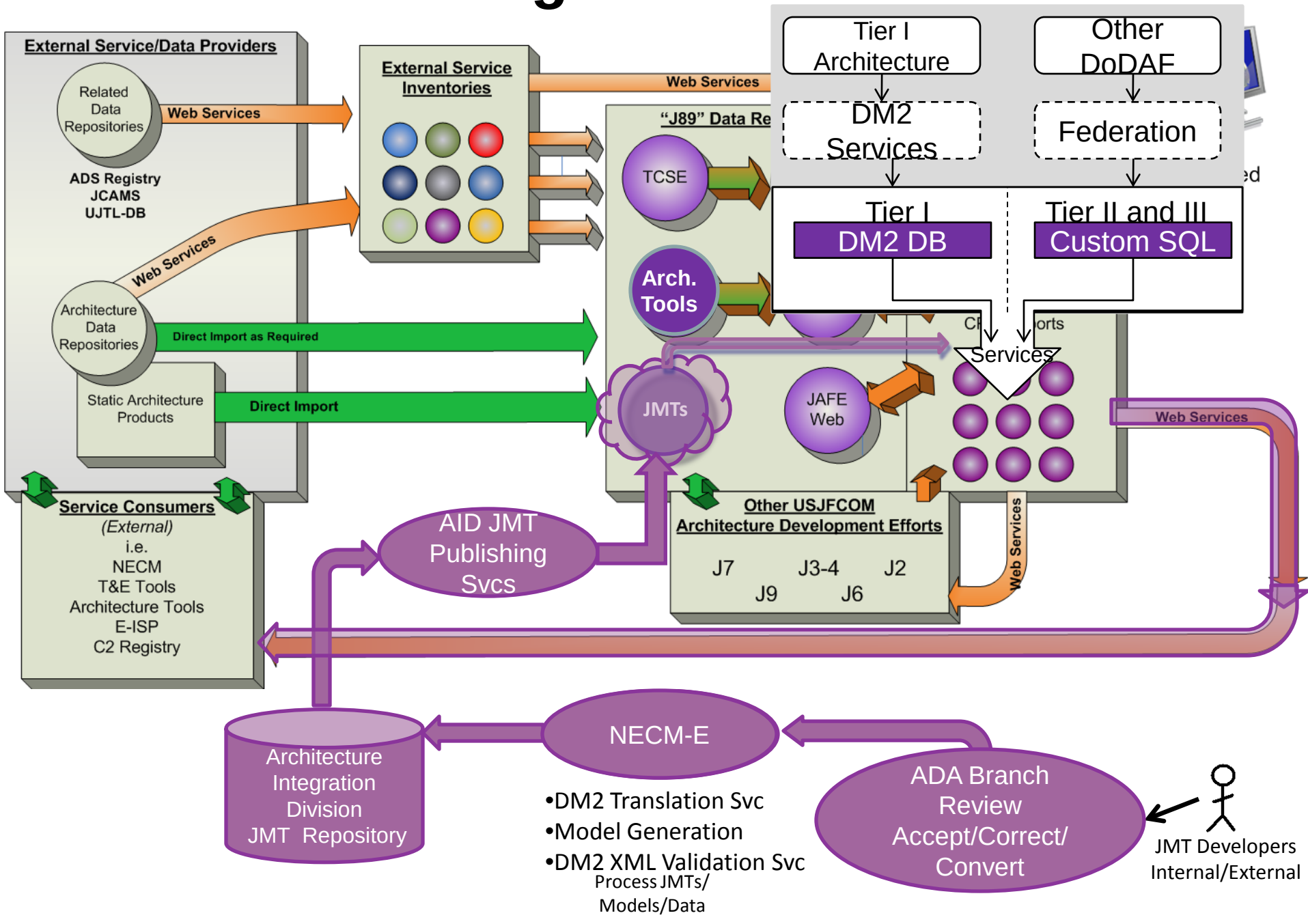
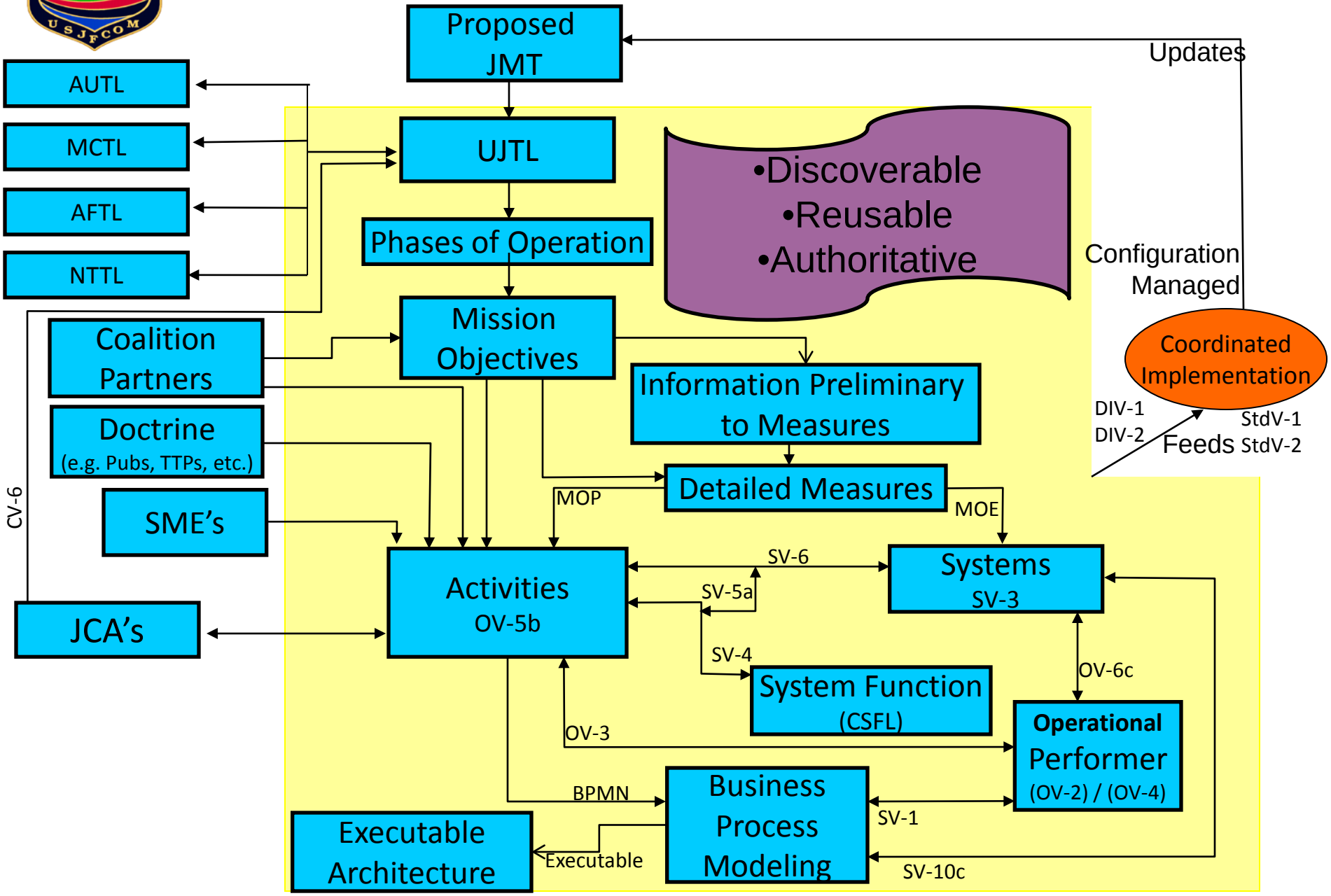


JMT Logical Data Flow



Process Linkage For JMT Architectures



JMT Points of Contact:

Mr. Christopher Behre, USJFCOM/J892 Branch Chief

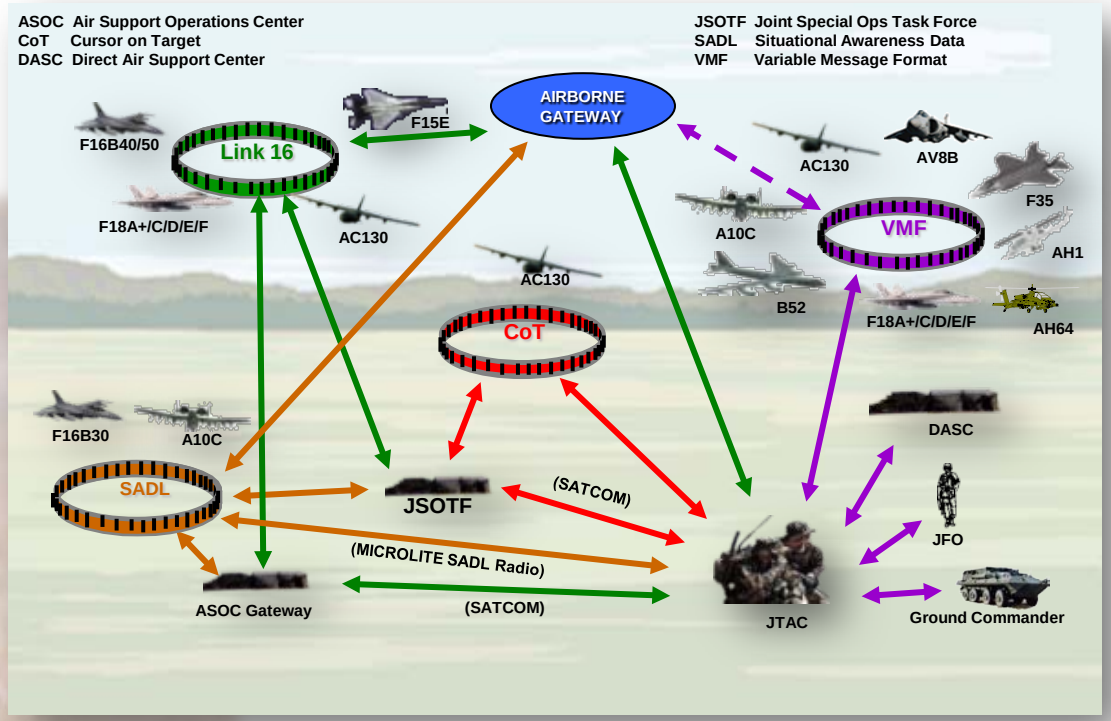
christopher.behre@jfcom.mil 757-203-4424

Mr. Jeff Springer, JMT Government Lead, USJFCOM/J892

Jeffrey.springer@jfcom.mil 757-203-4418

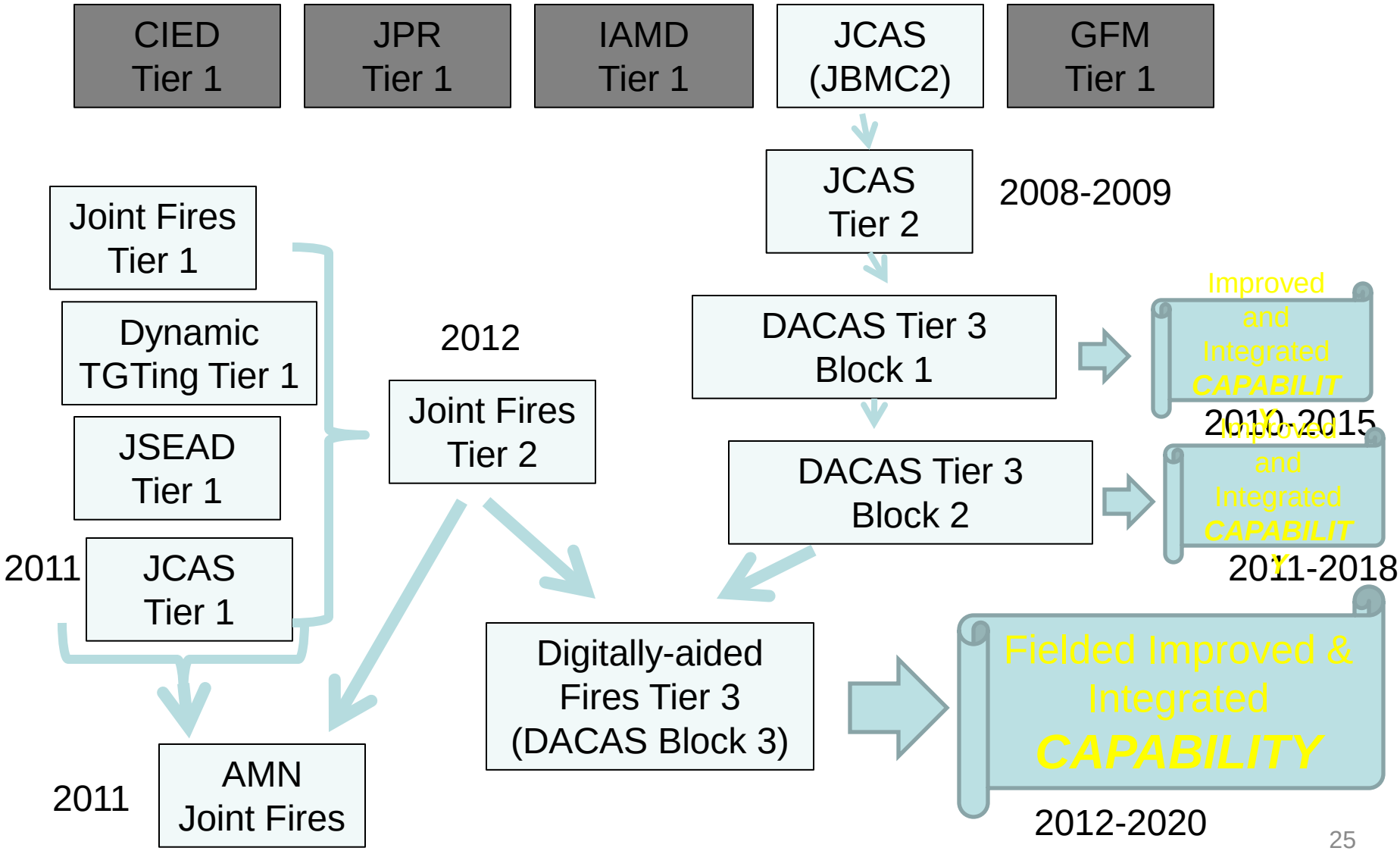
JCAS, CIED, GFM, IAMD, and JPR Tier 1 JMTs can be accessed via JAFE Portal:
https://sadie.nmci.navy.mil/jafe/jmt/jmt.aspx

JMT Architecture and Testing Working Group documents can be accessed via JKO:
https://www.us.army.mil/suite/page/525239



USE CASE: JCAS

FY-10 Tier 1 JMT Current Utilization



Problem Statement

- Non-standard, non-interoperable, Service-specific digital data exchange capabilities
  - **Inhibit digital collaboration when conducting CAS resulting in voice-only as default method**
  - **Increase potential for human errors**
    - **JTAC verbally passing target data**
    - **CAS platform operators manually entering target data**
    - **Exacerbated by language difficulties**
  - **Lead to aborted attacks due to inability to positively identify targets on first pass**
  - **Reduce situational awareness contributing to increased potential for civilian casualties**
  - **Are identified as contributing factors in several fratricide incidents**

Joint Mission Thread

Joint Close Air Support

Mission Event No.	Description
1	Unit detects target
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3	Unit notified TACP
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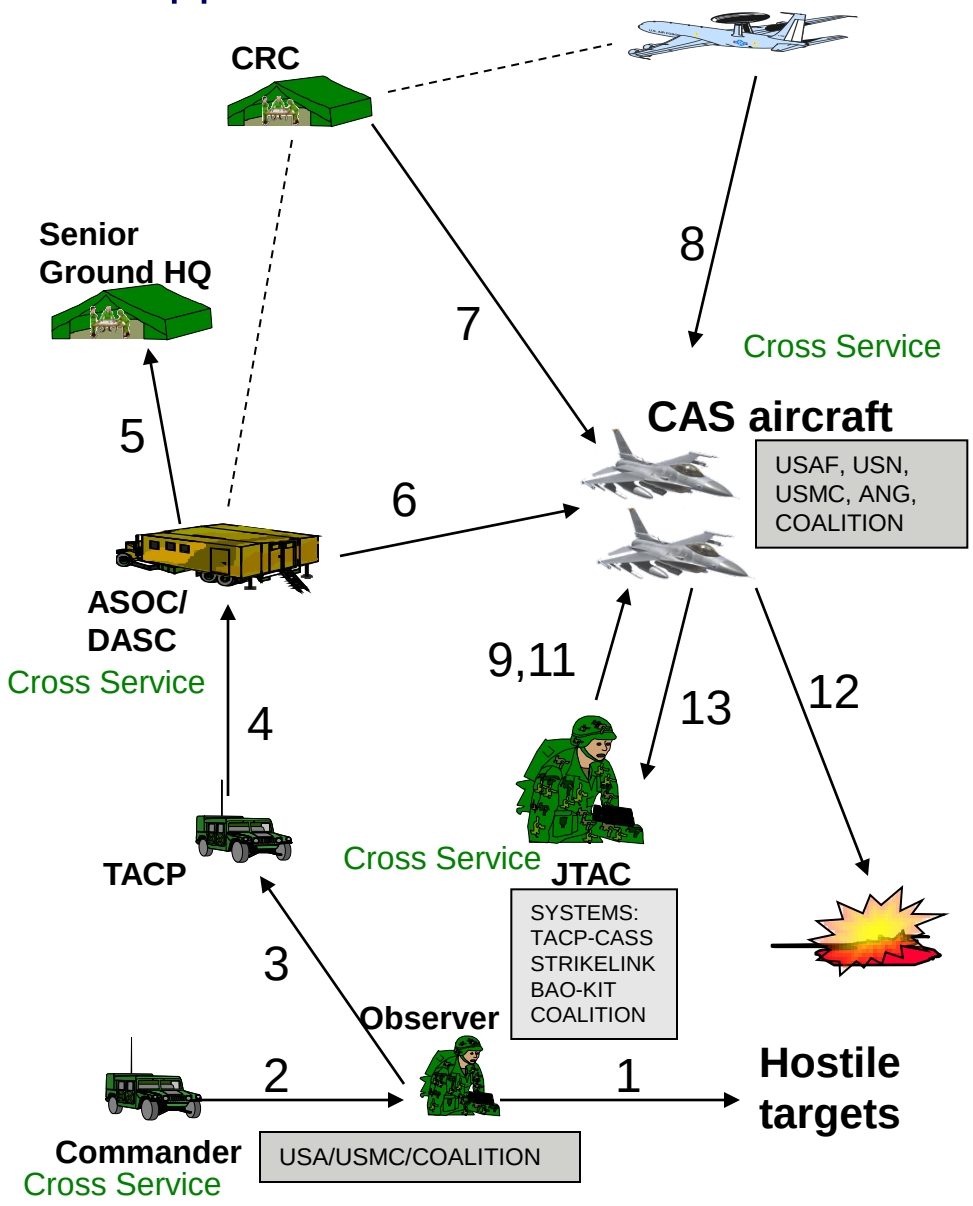


Current vs. To Be

Basis of Comparison

Current Human functions vs. functionality to be incorporated into the Close Air Support Process.

JTAC

Voice CAS

As Is System

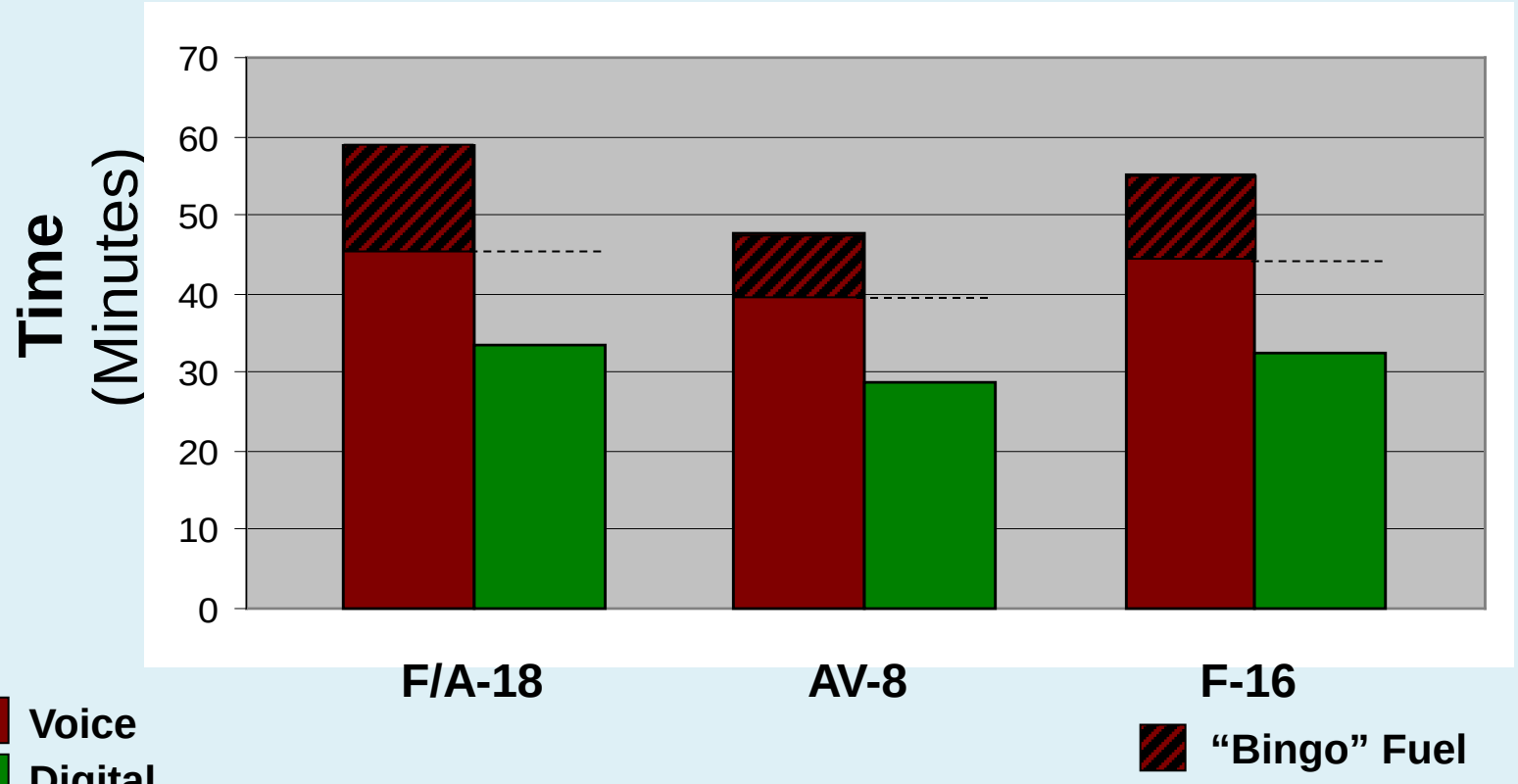
To Be System

Digital CAS

NEW

Executable Architecture Findings

Complete XCAS Mission
(mission assignment through mission completion)



40-44% Time Savings Using Digital
More Weapons Employed, More Fuel Available

Digital vs. Voice Analyzed

10 Day Operations

	A-10		F-16		F/A-18		B-1		B-52		AV-8	
	Voice	Dig	Voice	Dig	Voice	Dig	Voice	Dig	Voice	Dig	Voice	Dig
Avg number of strikes/section	5.0	6.0	6.4	8	6.9	12.6	13.4	24	11	12	3.5	3.9
12 Ship (surge) squadron strikes (10 days)	900	1080	1151	1440	1259	2273	1605	2880	1324	1440	1050	1170
Days needed to strike same number of targets	10	8.34	10	7.99	10	5.54	10	5.57	10	9.19	10	8.97

*Based on average loiter times & sortie rates

Results Feed Other Models (EADSIM, JAS, STORM, etc)

Solution

- Achieve Joint interoperability through coordinated implementation of digital messaging standards
  - **Better defined standards to eliminate "soft" options**
  - **Collaborative development, testing, and verification**
  - **Block upgrades to manage version control while providing incremental DACAS improvements**
- Can be leveraged by Partner Nation CAS participants to ensure coalition interoperability

JMT Logical Data Flow

Service Consumers
(External)

Capability Development Tracking and Management (CDTM) Tool

Capability Development Framework (CDF)

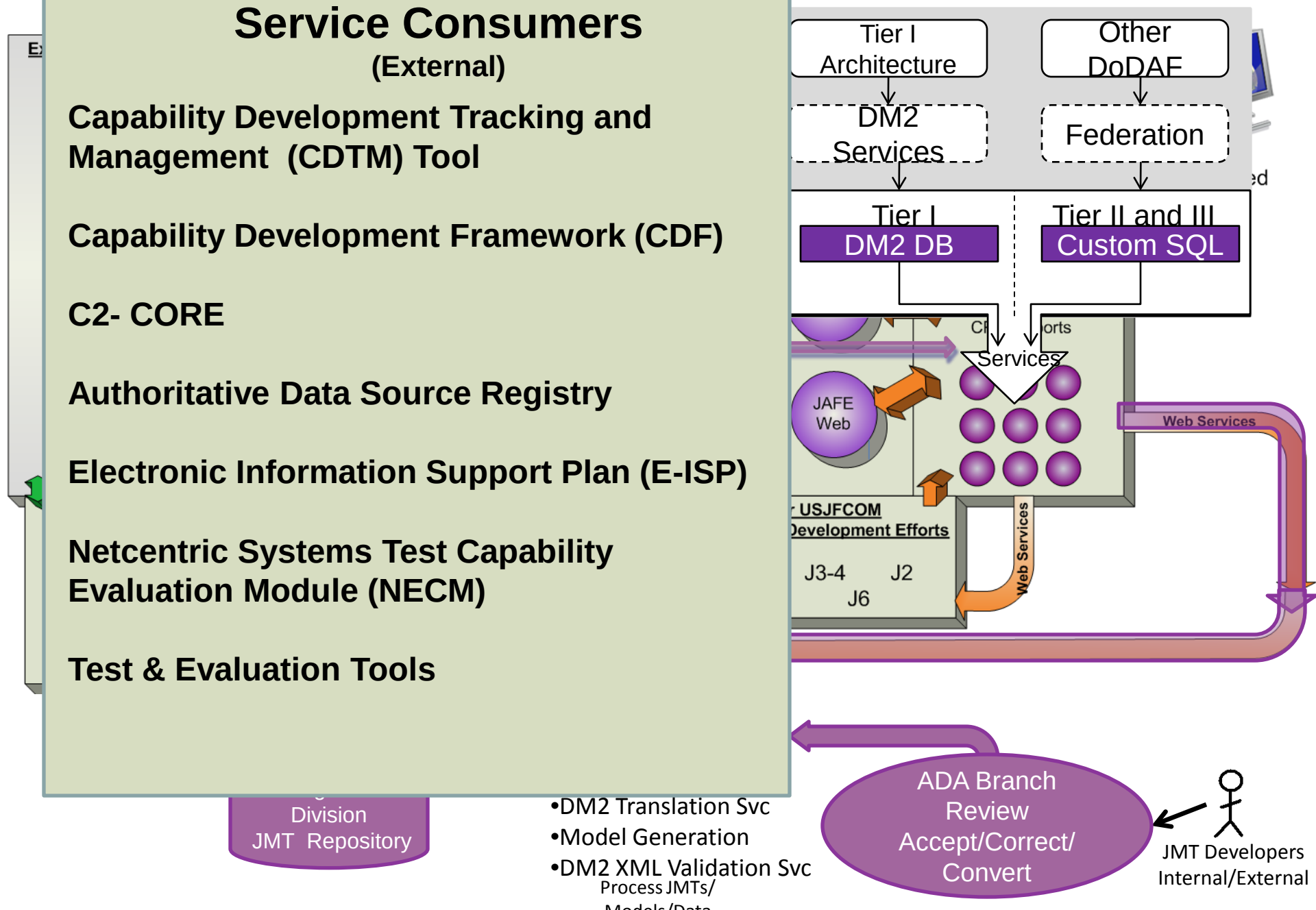
C2- CORE

Authoritative Data Source Registry

Electronic Information Support Plan (E-ISP)

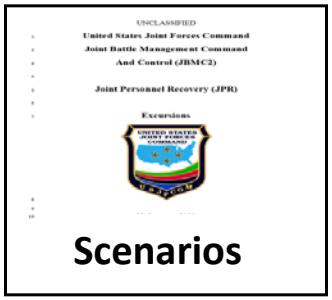
Netcentric Systems Test Capability Evaluation Module (NECM)

Test & Evaluation Tools



BACK-UP

JMT Development Product Description



Scenario: Will provide future users with a clear understanding of the description of the context in which a series of events, or actions and events are executed. The scenario describes the view of the specific actors (performers) and systems, as well as their relationship to a specific sequence of events. Scenarios, in concert with the associated AV-1 provide the overarching guidance for development of Tier II/III architectures.

AV-1: The All View 1 (AV-1) defines the purpose, scope, objectives, and architectural approach desired by all parties involved. Describes intended users, analytical findings, and environment. It will provide future architecture users with a complete outline of the products and a POC

AV-2: The Integrated Dictionary (AV-2) provides those reviewing/leveraging the architecture a single authoritative source of definitions for all terms used in products. The products include but are not limited to Performers, Activities, Systems, Messages, Attributes, Desired Effects, Objectives and Conditions.

OV-1: The High Level Operational Concept Graphic (OV-1) describes the high level graphical and textual description of operational concept (high level organizations, missions, geographic configuration, connectivity, etc.). Provides those reviewing/ leveraging a clear view of the sponsor intent for the project.

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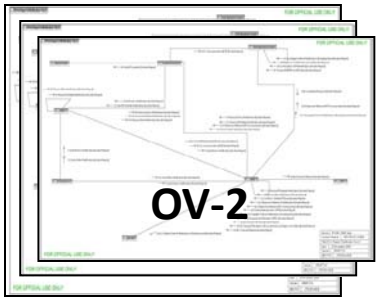

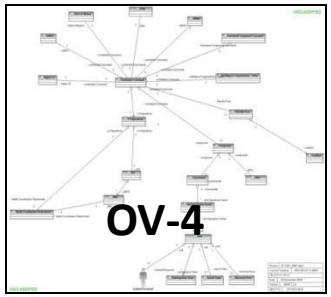

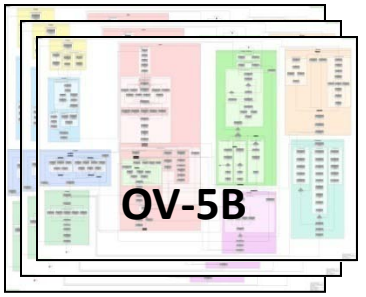

OV-2: The Operational Node Connectivity Description (OV-2) will provide future users with a clear understanding of Operational Performers (boards, centers, cells, etc.) activities conducted at by each Operational Performer, and connectivity's and information flow between Operational Performers. Serves a great value in understanding who must speak to who and what messages are passed between them.

OV-4: The Organizational Relationships Chart (OV-4) depicts the command, control, coordination, and other relationships among organizations within the architecture products. It will provide future architecture users with a complete outline of the organizations in the architecture and their hierarchical relationships.

OV-5b: The Operational Activity Model provides those reviewing/leveraging the architecture with a chronological flow of Activities. It will assist in clearly defining the logical flow and help identify critical paths.

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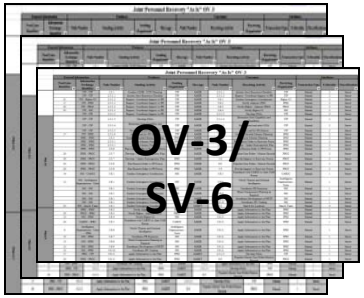

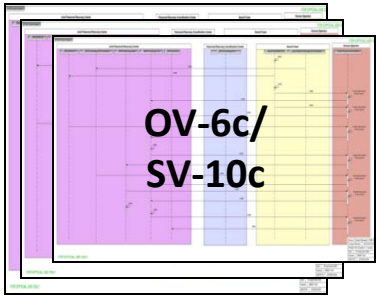

OV-3/SV-6 Combined: Operational Information and Systems/Services Data Exchange Matrix : Provides those reviewing/leveraging the architecture ~~the~~ both Information and system data exchanged between performers and systems. This product focuses on automated information exchanges that are implemented and the system data exchanges. Will serve great value in identifying which exchanges are sent by organizations and their systems. Additionally assists in analyzing redundancy between voice and data transmissions

OV-6c/SV-10c Combined: The System and Operational Event-Trace Description will provide future users with a clear understanding of timing, sequence and flow of activities along with the related performers/systems and the information and data elements exchanged between them. Assists in showing the sequential flow of all activities and the systems utilized by a given performer (board, center, cell, etc.)

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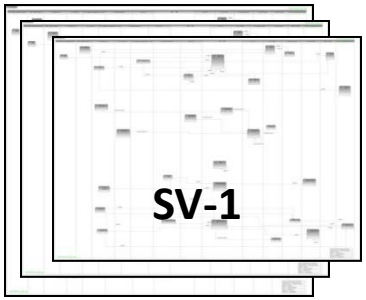

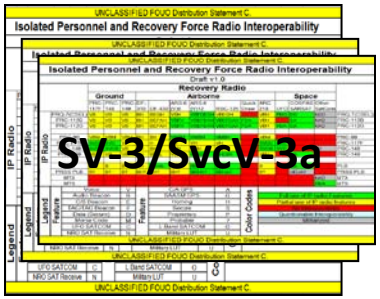

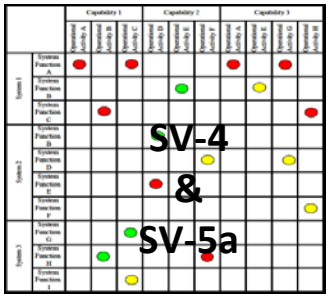

SV-1: The Systems/Services Interface Description (SV-1) will provide future users with a clear understanding of the system to system interfaces and, along with the SV-4, the associated system function interactions with another system. Serves a great value in understanding which system speaks to which but additionally the functions that each performs in common. Very useful for identifying gaps in system capability.

SV-3/SvcV-3a: Systems-Systems Matrix (SV-3) or Systems to Service Matrix (SvcV-3a) provides detail on the interface characteristics described in SV-1 arranged in matrix form. It will provide future architecture users with a complete look at the system to system or system to service interoperability to the lowest required level.

SV-4 and SV5a Combined: System Functionality to System to Activity (SV-4 and SV-5a) Combined: The System and Operational Event-Trace Description will provide future users with a clear understanding of the SV-4 and SV5a combined documents system functional hierarchies and system functions, and the system data flows between them. The system functional hierarchy done in a one-to-one mapping combined with the Activity to Systems Function Traceability Matrix assist users by allowing them to view the activities functions and the appropriate system on a single view.

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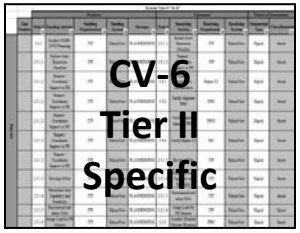

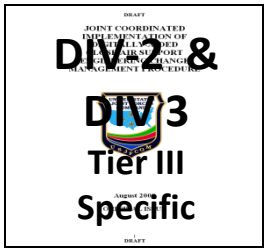

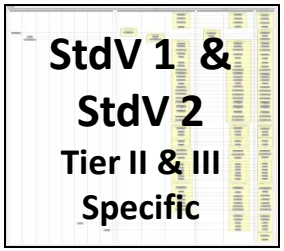

CV-6: The CV-6 describes the mapping between the capabilities required and the activities that enable those capabilities.

DIV-2: The Logical Data Model allows analysis of an architecture's data definition aspect, without consideration of implementation specific or product specific issues. Another purpose is to provide a common dictionary of data definitions to consistently express models wherever logical-level data elements are included in the descriptions.

DIV-3: The Physical Data Model defines the structure of the various kinds of system or service data that are utilized by the systems or services in the Architectural Description. The Physical Schema is one of the models closest to actual system design in DoDAF. DIV-3 is used to describe how the information represented in the DIV-2 Logical Data Model is actually implemented.

StdV-1: The StdV-1 defines the technical, operational, and business standards, guidance, and policy applicable to the architecture being described.

StdV-2: The StdV-2 contains expected changes in technology-related standards, operational standards, or business standards and conventions, which are documented in the StdV-1 model.

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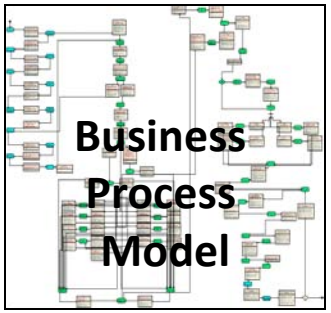

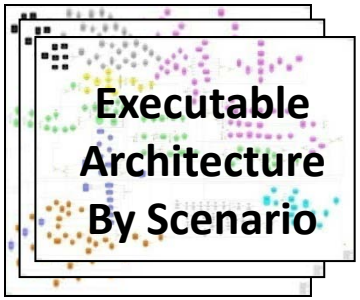

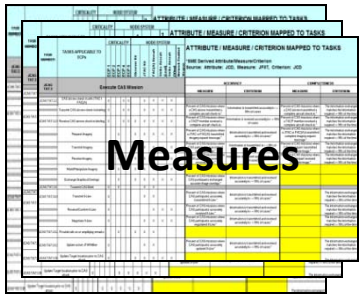

Business Process Model: BPM provides a holistic view of an end to end process and provides the foundation for development of an executable architecture. When criteria and metrics are applied BPM architectures can be executable. Additionally it focuses on aligning all aspects of an organization with its wants and needs. It promotes effectiveness and efficiency while striving for process accountability, flexibility, and integration.

Executable Architecture: Enables the architect to design and model vital operational processes with system and individual resources applied. This allows the sponsor to make informed decisions before deployment through advanced analysis based on modeled and actual data. Simulations are run in a monte-carlo fashion, depicting thousands of runs with many variables in seconds. This allows the customer to visualize and identify bottlenecks and inefficiencies in process, analyze the effects of proposed changes or solutions enabling informed decisions supported by analytical rigor.

Measures: A parameter that provides the basis for describing varying levels of task accomplishment. Assist in identifying the basic questions of who, what, why, and how, and then connects measures to “how capable” is the “who and how” and “how well” is the “what and why.”

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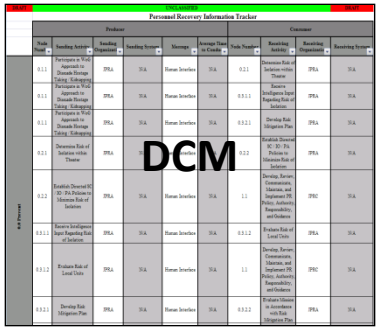

Data Collection Matrix: The DCM provides those developing and referencing the architecture with matrix style view of interactions between performers, activities, systems, messages, and at the appropriate level the associated timing. This document provides the backbone to architecture development while ensuring the architectures remain integrated during data collection

Final Report: The Final Report provides a single document containing the architecture products, a summary of the analysis, findings and proposed solutions.