



## Breakout Session

Exploring the Differences between  
Enterprise and System Architectures  
— A Look at the Different Methods,  
Tools, and Techniques

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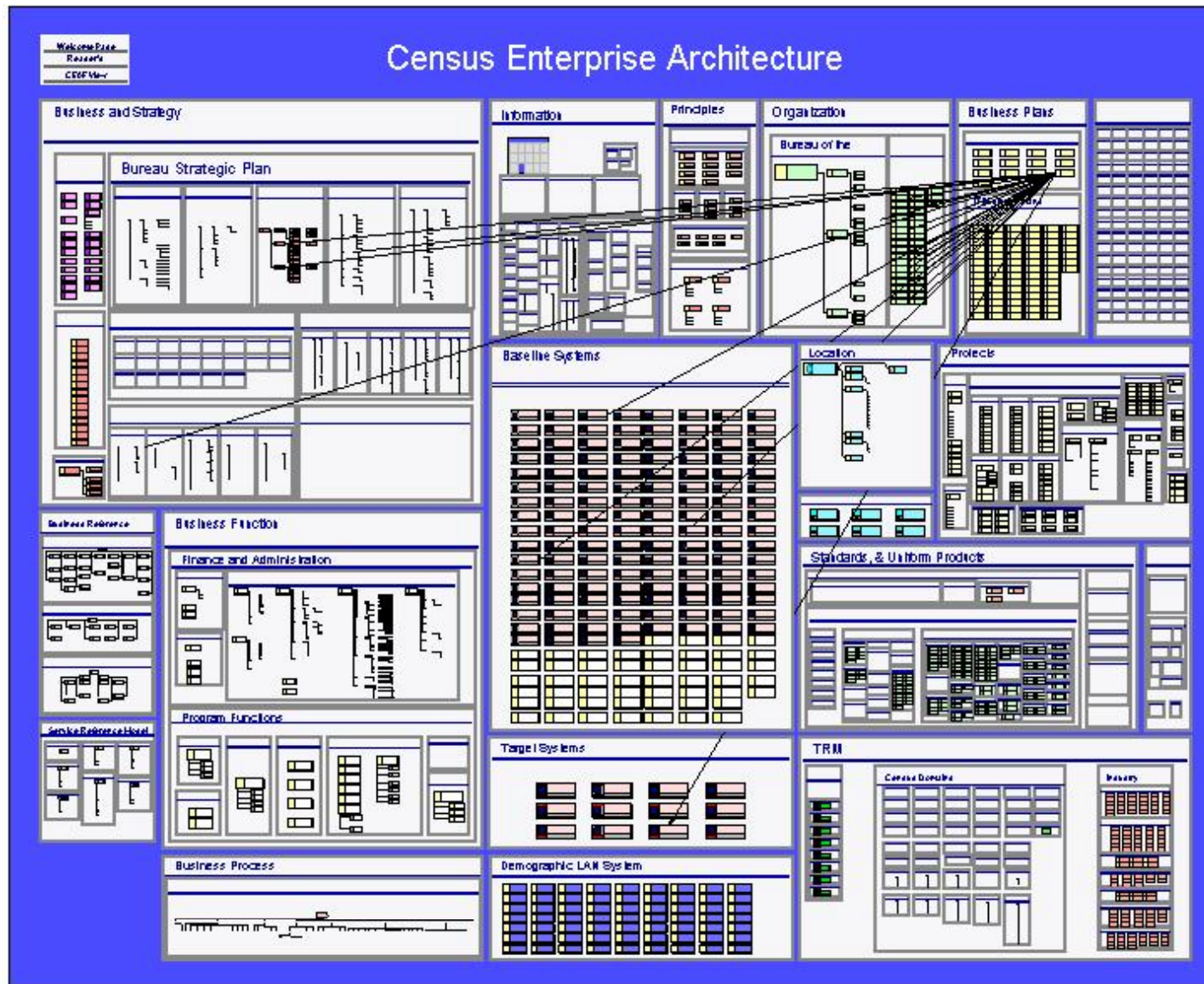
*Jeff Diehl*

*Scott Bernard*

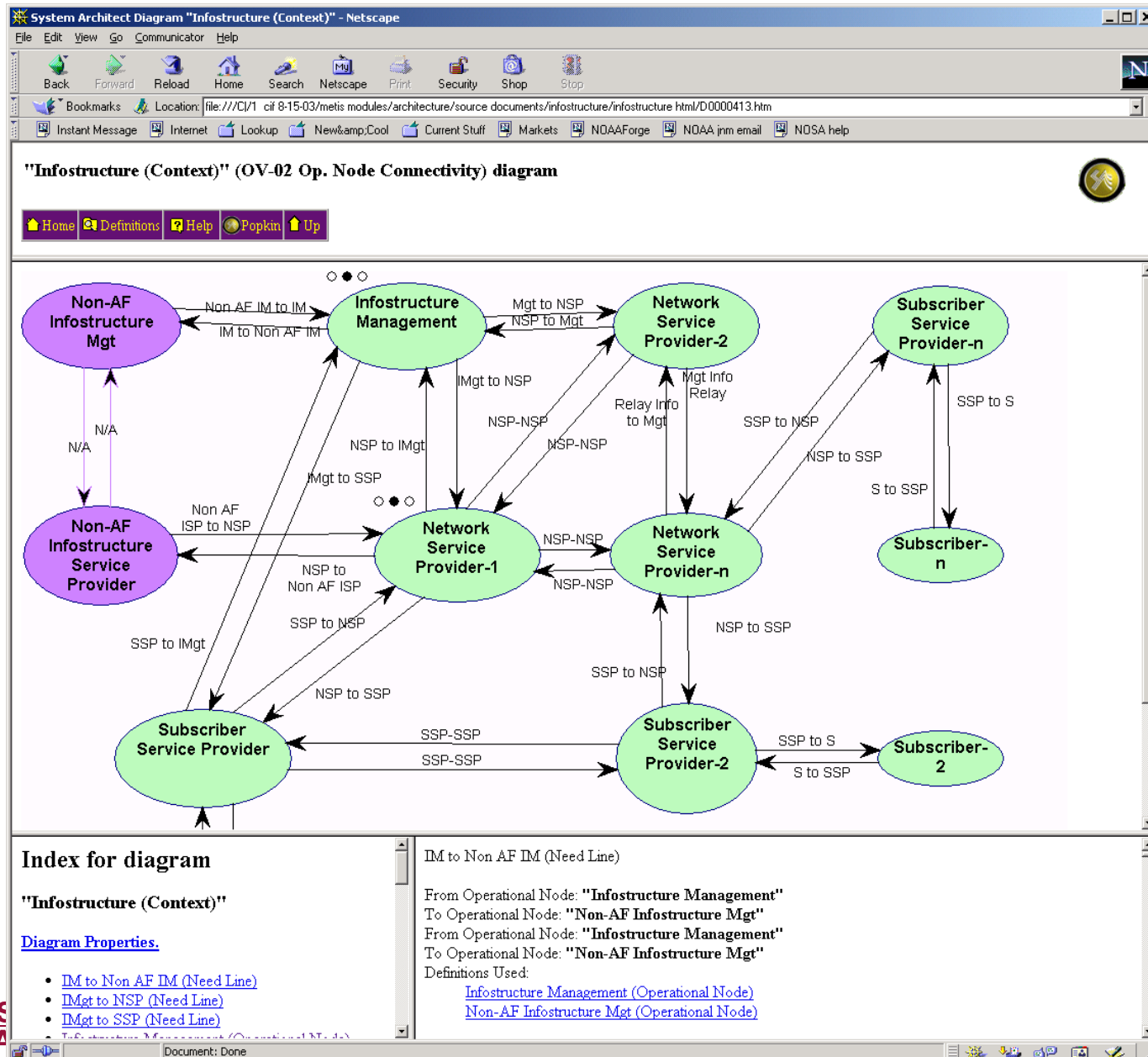
# Abstract

- **Point:** Most of the ground system architectures for military systems use the **DOD Architecture Framework (DODAF)**.
- **Counterpoint:** It might be more appropriate in many cases to use the **Federal Enterprise Architecture Framework (FEAF)** or perhaps even a different framework.
- This panel will explore the different approaches to architectural modeling of enterprises (like FEAF) versus warfighting systems (per DODAF).
  - We will look at case studies where FEAF and DODAF have been applied and extract lessons learned to determine when each framework is appropriate.
  - We will develop the selection criteria to assist in the planning stages of an architecture task for determining the best one or more frameworks to use.

# Enterprise Architecture Example



# DODAF Example



# Potential Work Items

- **Definitions**
  - System
  - Enterprise
  - (System) Architecture
  - (Enterprise) Architecture
- **Architectural Goals**
  - Enterprise Architecting
  - Systems Architecting
- **Framework Benefits**
  - DODAF
  - FEAF
  - Others?
- **Case Studies**
  - NOAA
  - AFSCN
  - Others?
- **Lessons Learned**
  - For above and others
- **Selection Criteria**
  - Key attributes of each framework
  - Key drivers of architecture

# Topics

- 1. Introductions**
- 2. DOD Architecture Framework**
- 3. Federal Enterprise Architecture Framework**
- 4. Air Force Enterprise Architecture Framework**
- 5. Discussion**

# Introductions

- **Background**
  - Development (mainly)
  - Military
  - Other
- **Technology Domain**
  - Space
  - Airplane
  - Avionics
  - Ground
  - Communications
- **Business Domain**
  - Commercial
  - Aerospace
  - Defense
  - Other Government
  - Other
- **Discipline**
  - Systems Engineering
  - Software Engineering
  - Hardware Engineering
  - Other
- **Job Responsibility**
  - Management
  - Architecting
  - Engineering
  - Other
- **Architecture Level**
  - Enterprise
  - Mission
  - Program
  - System
  - Software

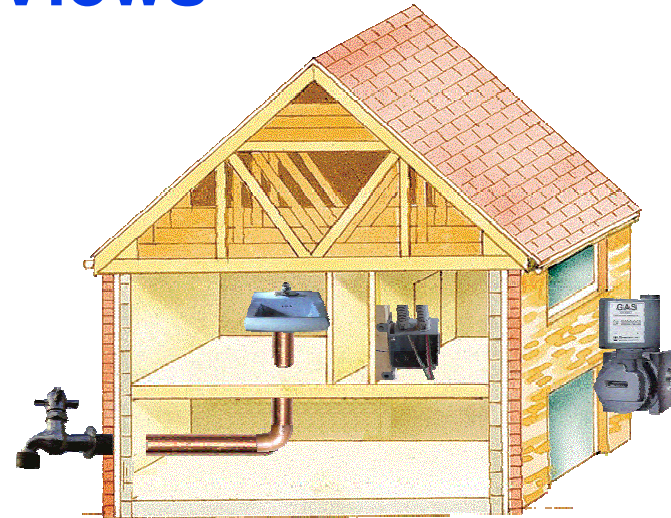


# An Architecture has Multiple Views

A view represents the whole system from a particular viewpoint

Reduces perceived complexity through separation of concerns

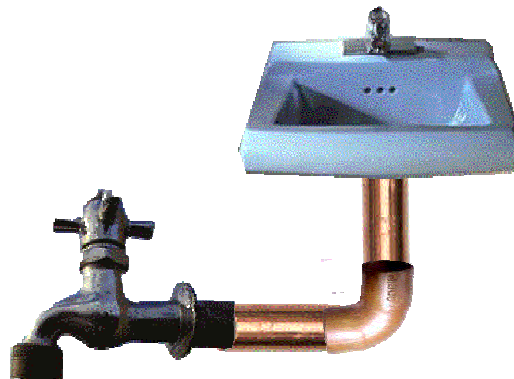
Architecture views are an end result of doing “architecting”



**Family Usage  
(Operational)**



**Plumbing View (System)**

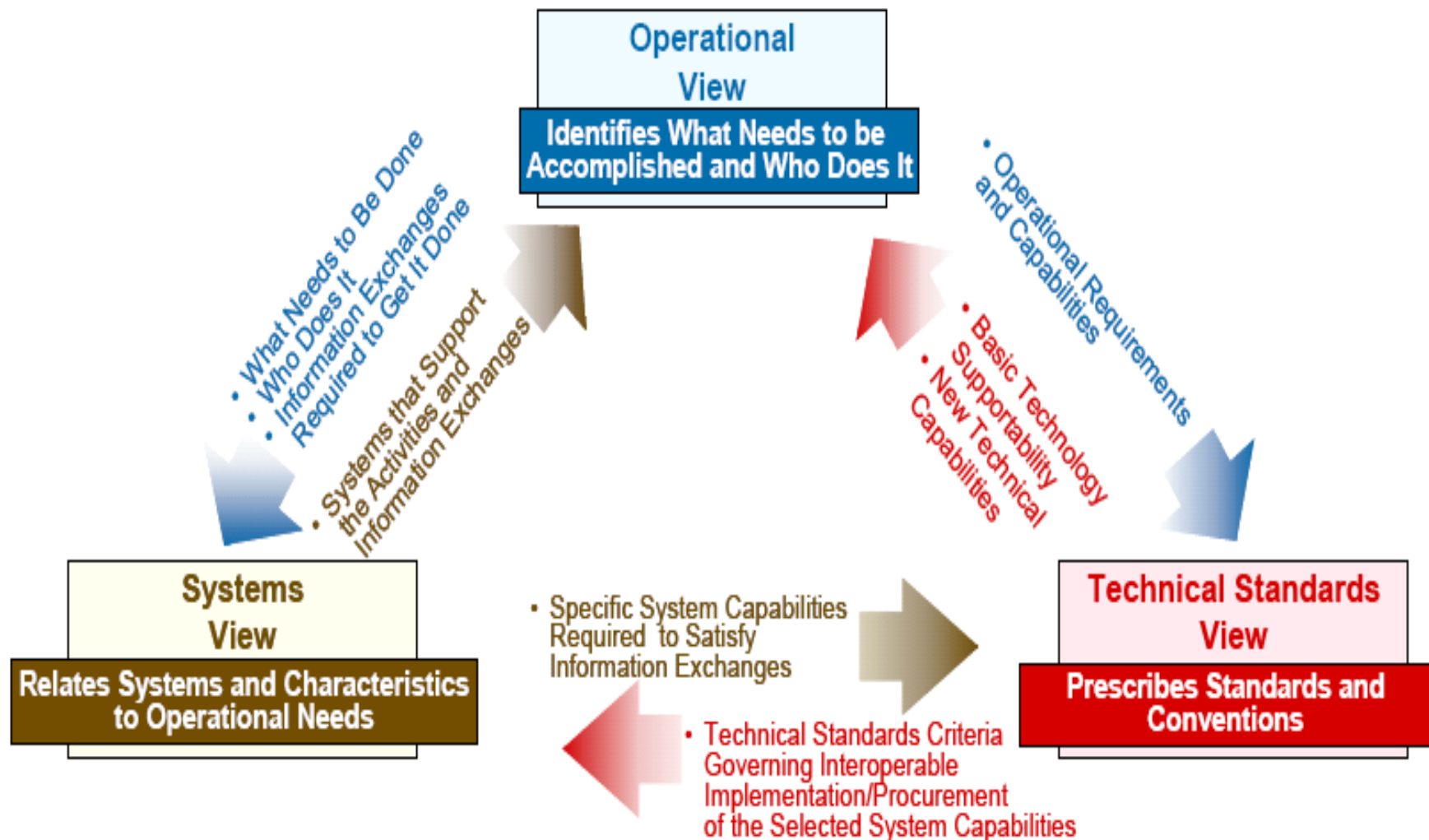


**Plumbing Code  
(Technical)**





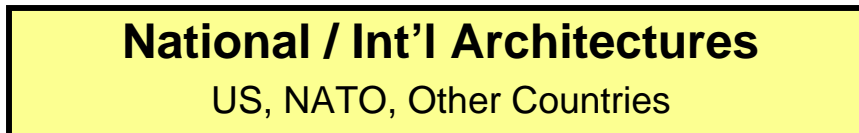
# The Three Main Views in the DOD Architecture Framework



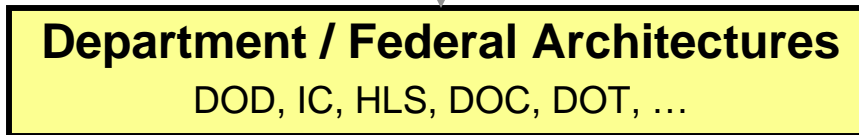
View Type	Framework Product	Framework Product Name
All Views	AV-1	Overview and Summary Information
	AV-2	Integrated Dictionary
Operational	OV-1	High-Level Operational Concept Graphic
	OV-2	Operational Node Connectivity Description
	OV-3	Operational Information Exchange Matrix
	OV-4	Organizational Relationships Chart
	OV-5	Operational Activity Model
	OV-6a	Operational Rules Model
	OV-6b	Operational State Transition Description
	OV-6c	Operational Event-Trace Description
	OV-7	Logical Data Model
Systems	SV-1	Systems Interface Description
	SV-2	Systems Communications Description
	SV-3	Systems-Systems Matrix
	SV-4	Systems Functionality Description
	SV-5	Operational Activity to Systems Function Traceability Matrix
	SV-6	Systems Data Exchange Matrix
	SV-7	Systems Performance Parameters Matrix
	SV-8	Systems Evolution Description
	SV-9	Systems Technology Forecast
	SV-10a	Systems Rules Model
	SV-10b	Systems State Transition Description
	SV-10c	Systems Event-Trace Description
	SV-11	Physical Schema
Technical	TV-1	Technical Standards Profile
	TV-2	Technical Standards Forecast

# Tiered Hierarchy of Architectures

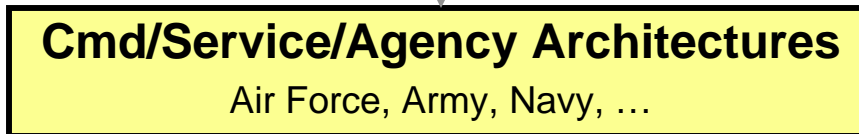
## TIER 0



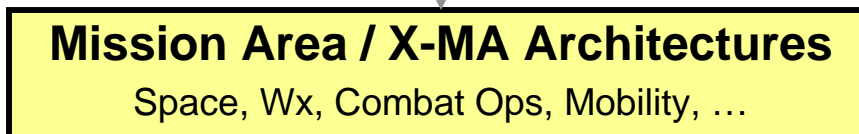
## TIER 1



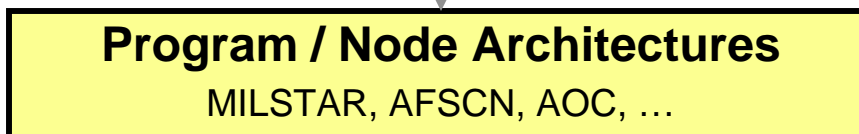
## TIER 2



## TIER 3



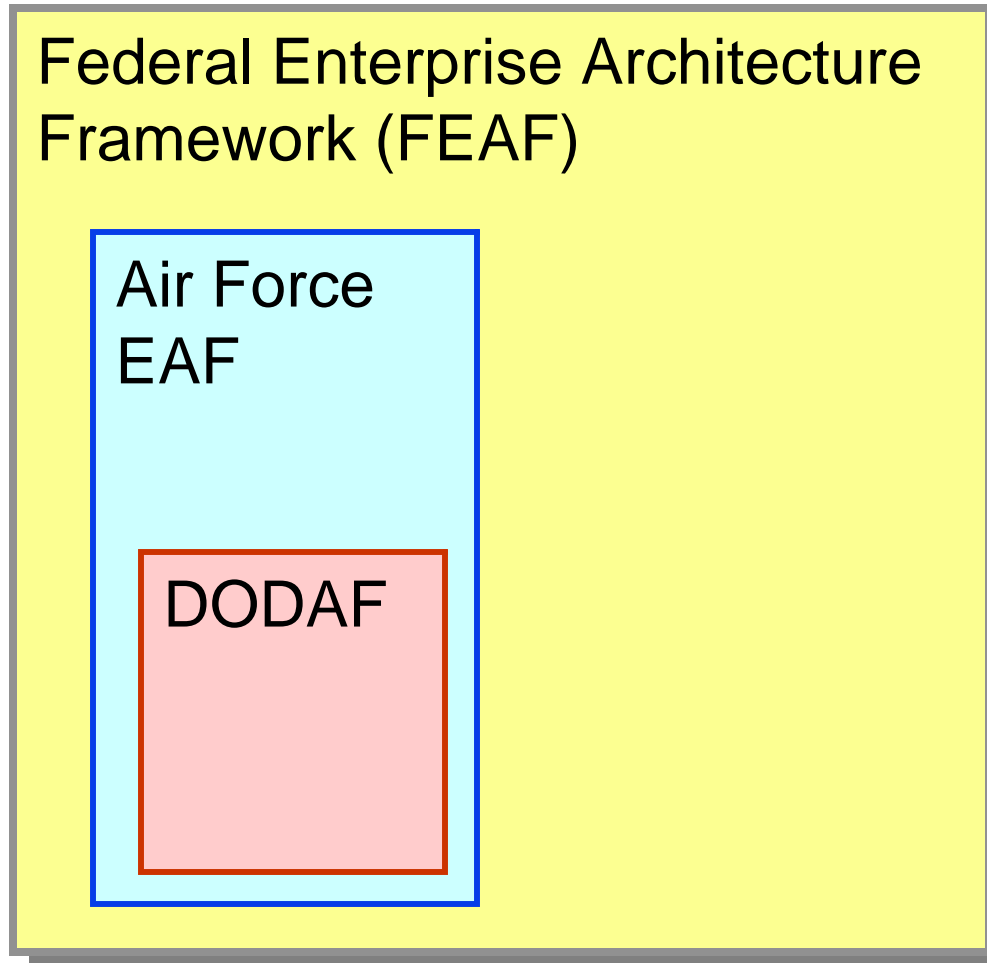
## TIER 4



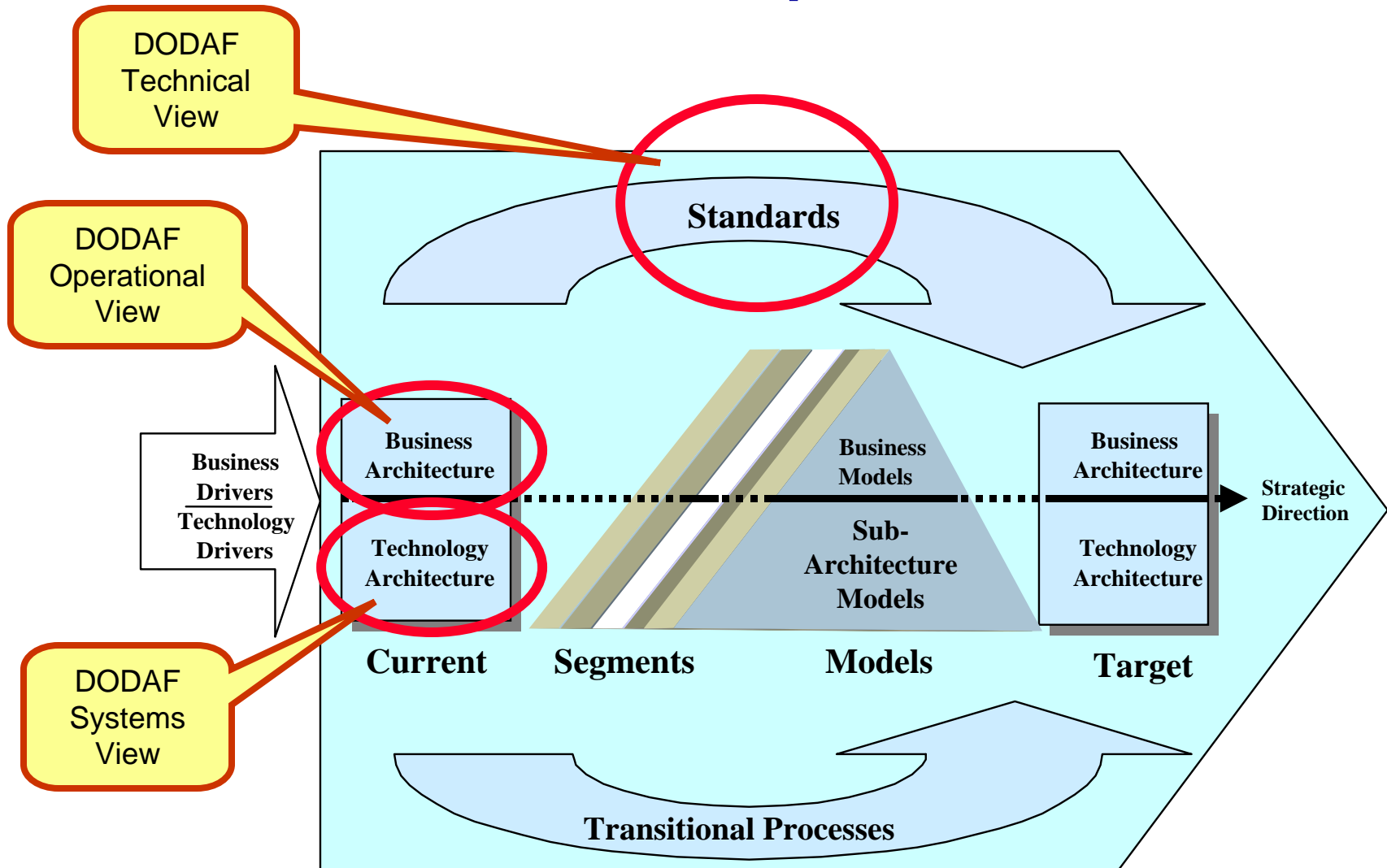
Enterprise  
Architectures

Architectures for  
Mission Areas,  
Programs, Nodes  
& Systems

# Air Force & Federal Frameworks are the “Context” for DODAF

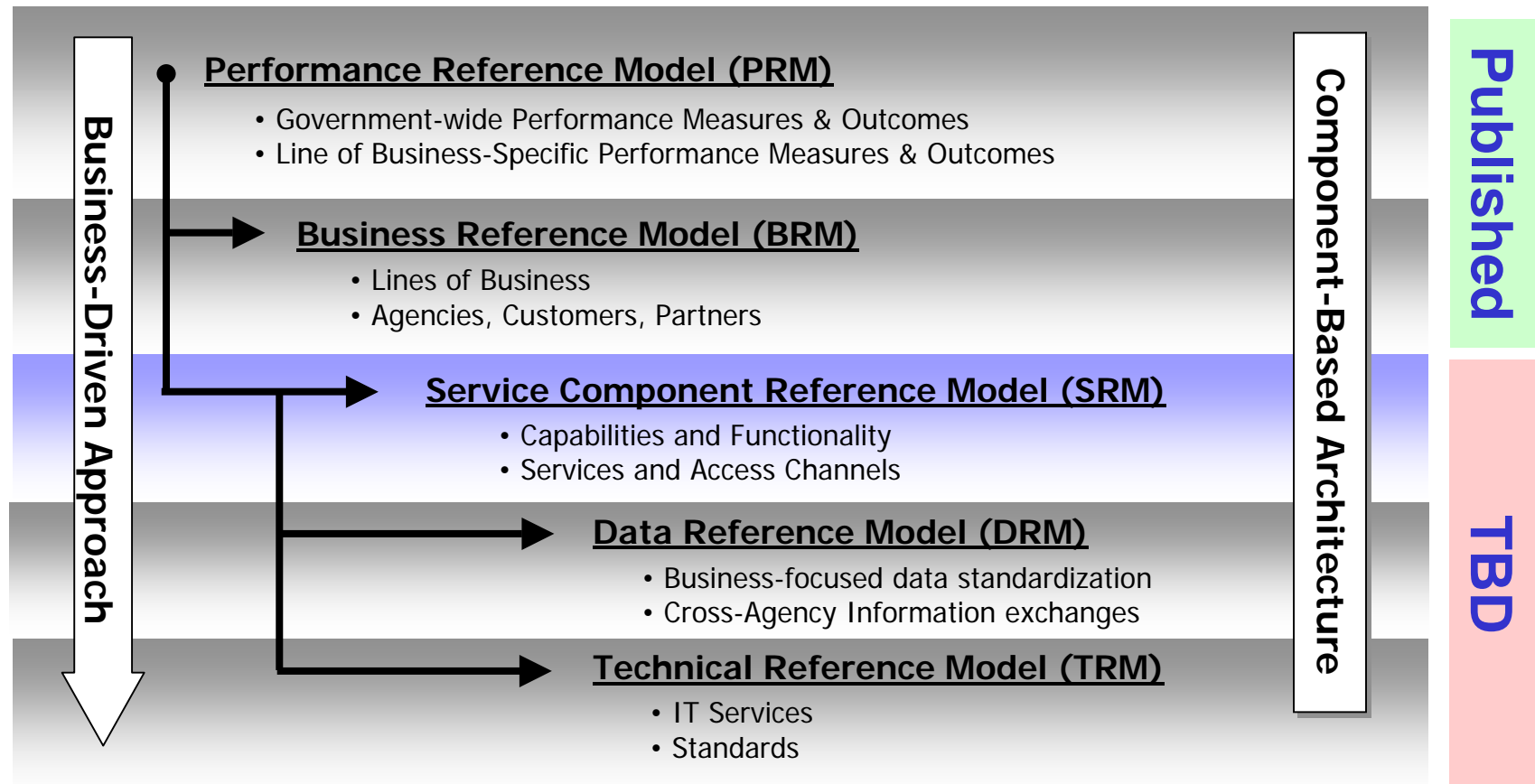


# The FEAF Components



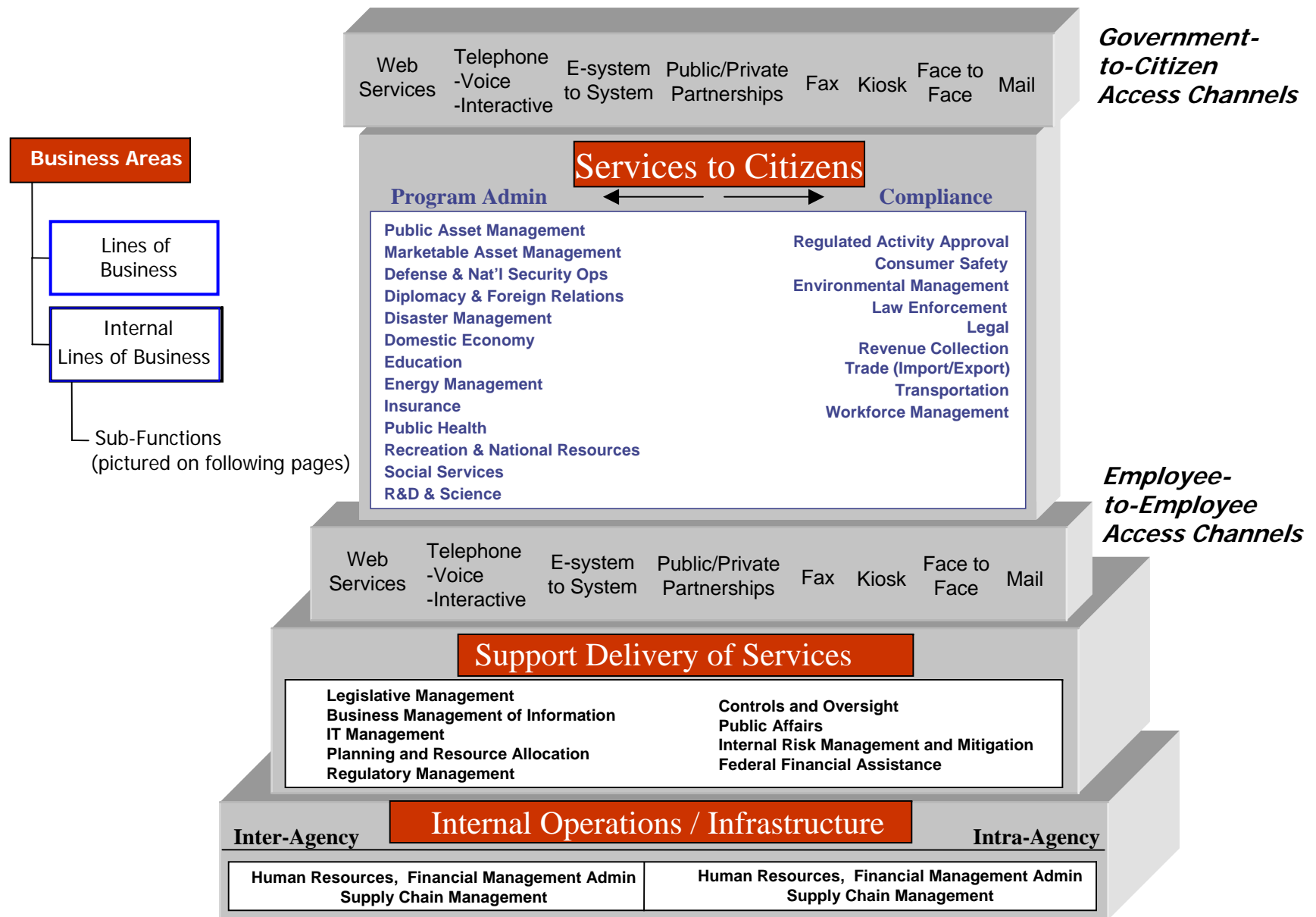
# OMB's Family of Reference Models

The Federal Enterprise Architecture (FEA) is being constructed through a collection of inter-related “reference models” designed to facilitate cross-agency analysis and opportunities for collaboration



Source: "Enterprise Architecture: Your Blueprint for Transformation"  
Norman Lorentz, OMB, Chief Technology Officer

# The FEA Business Reference Model (BRM), V. 1.0



Source: "Enterprise Architecture: Your Blueprint for Transformation"  
Norman Lorentz, OMB, Chief Technology Officer

October 7-8, 2002

Slide 15

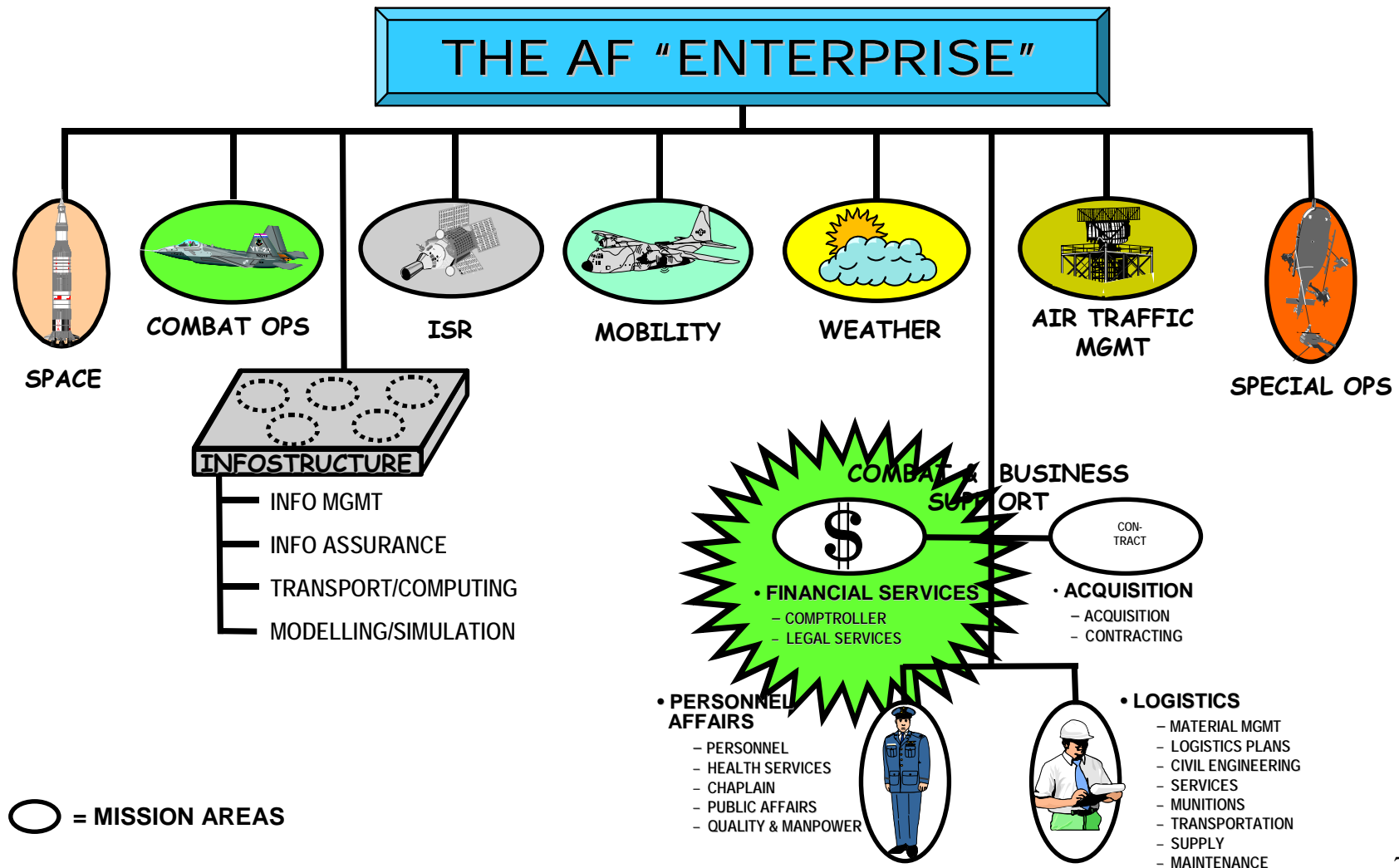




U.S. AIR FORCE

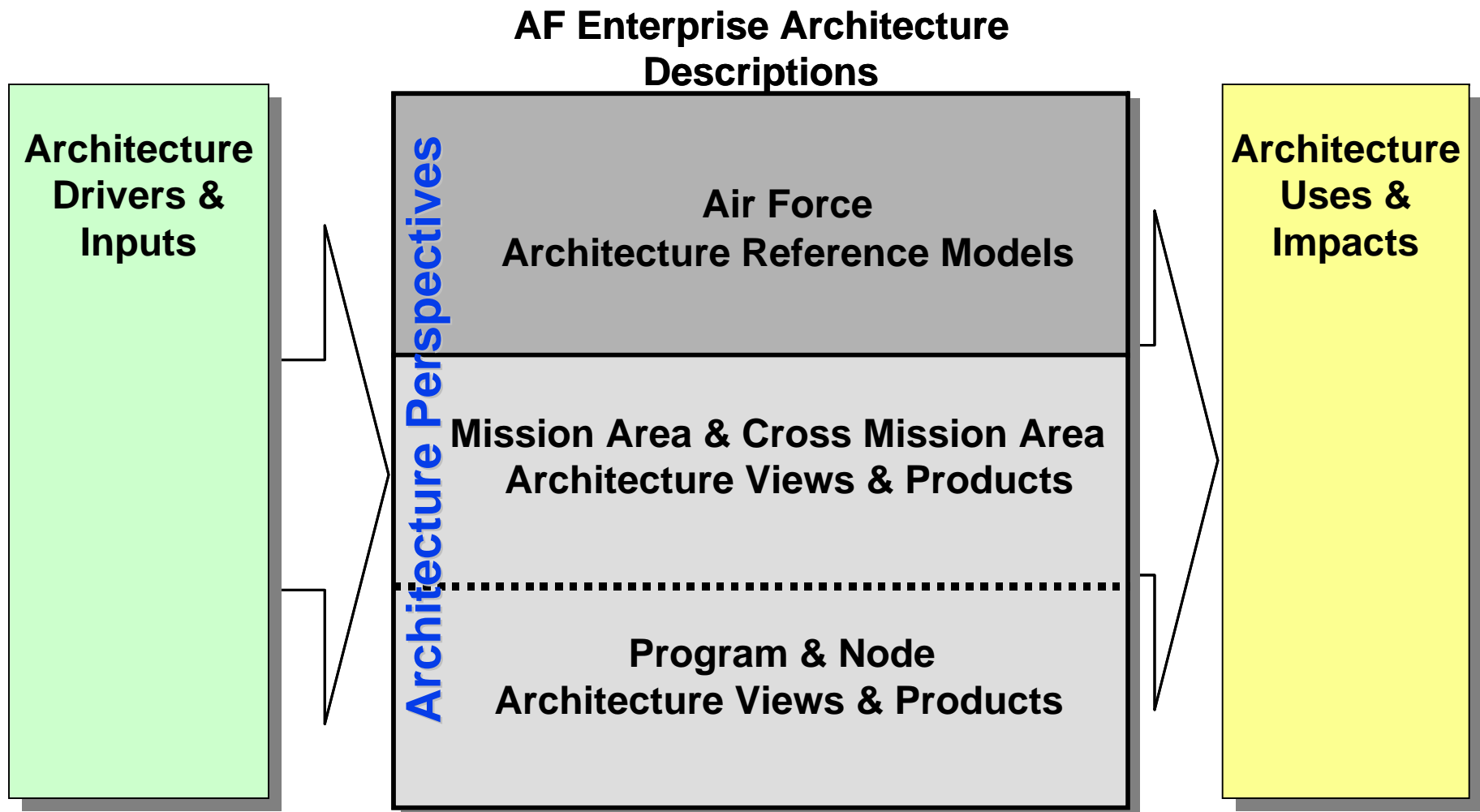
# The AF "ENTERPRISE"

(a mission area decomposition)

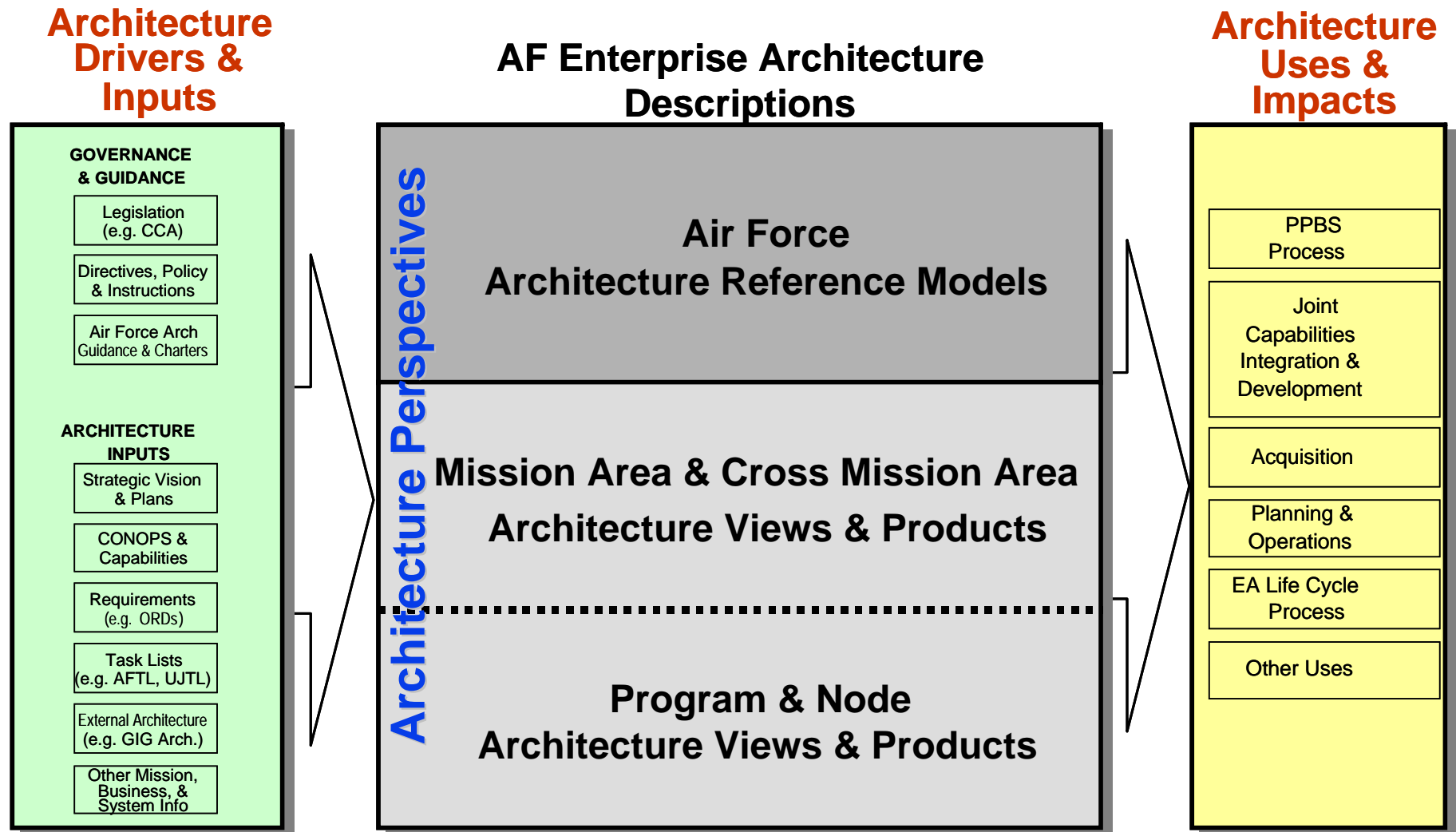


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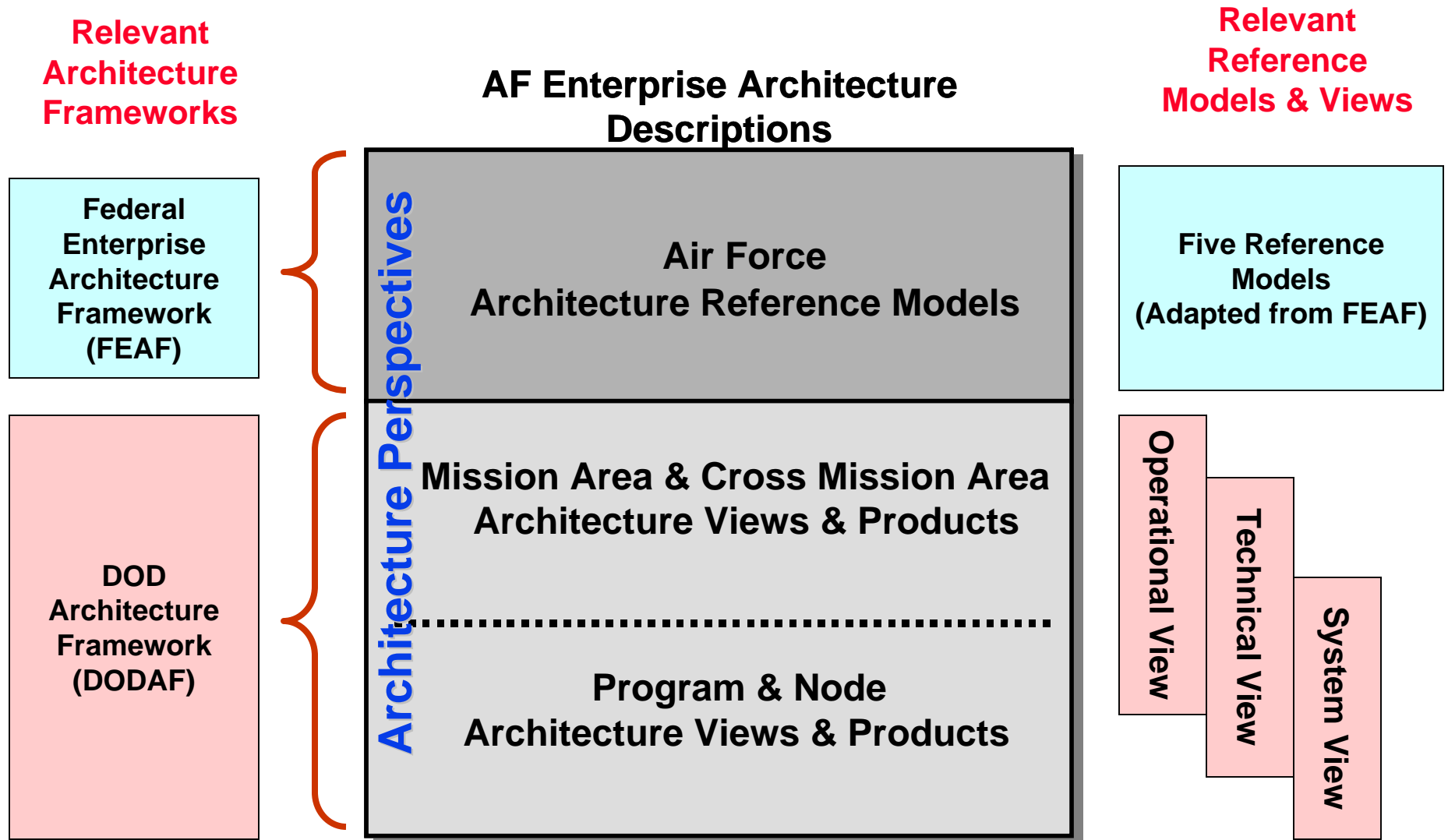
# Air Force Enterprise Architecture Framework



# AF-EAF Inputs & Outputs

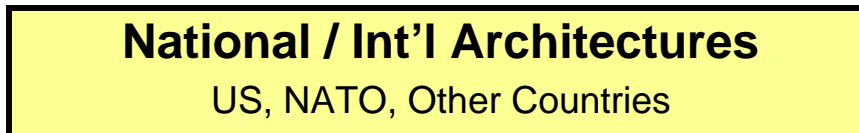


# Relationship to FEAF and DODAF



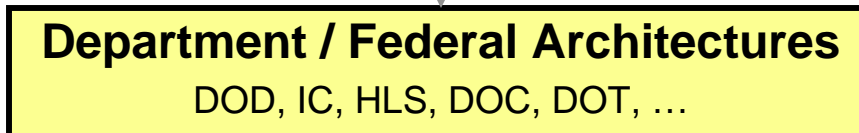
# Example Architectures at Different Levels

## TIER 0



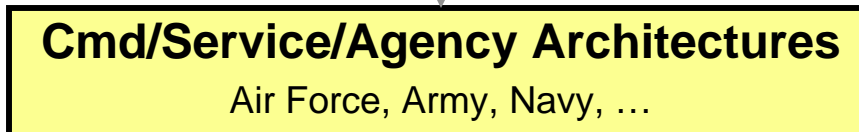
Integrated Global Environmental Observing System (IGEOS)

## TIER 1



Global Information Grid (GIG)

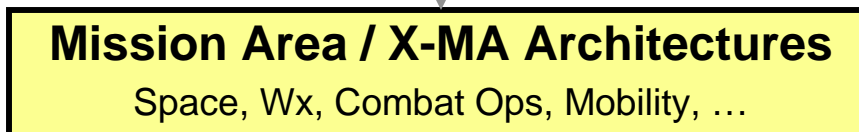
## TIER 2



AF Space & C4ISR Conops

NOAA Observing System Architecture (NOSA)

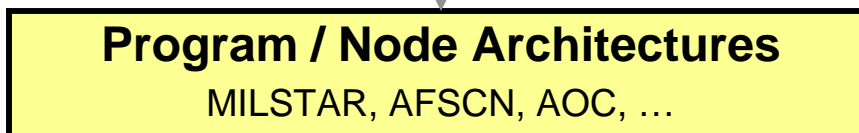
## TIER 3



Combat Operations Mission Area

Spacelift Mission Area

## TIER 4



Integrated Overhead Sigint Architecture (IOSA)

SBR, SBIRS, SBSS, MilSatCom, ...

# Mapping from 5-Tier Hierarchy to Air Force-EAF Perspectives

## TIER 0

**National / Int'l Architectures**  
US, NATO, Other Countries

## TIER 1

**Department / Federal Architectures**  
DOD, IC, HLS, DOC, DOT, ...

## TIER 2

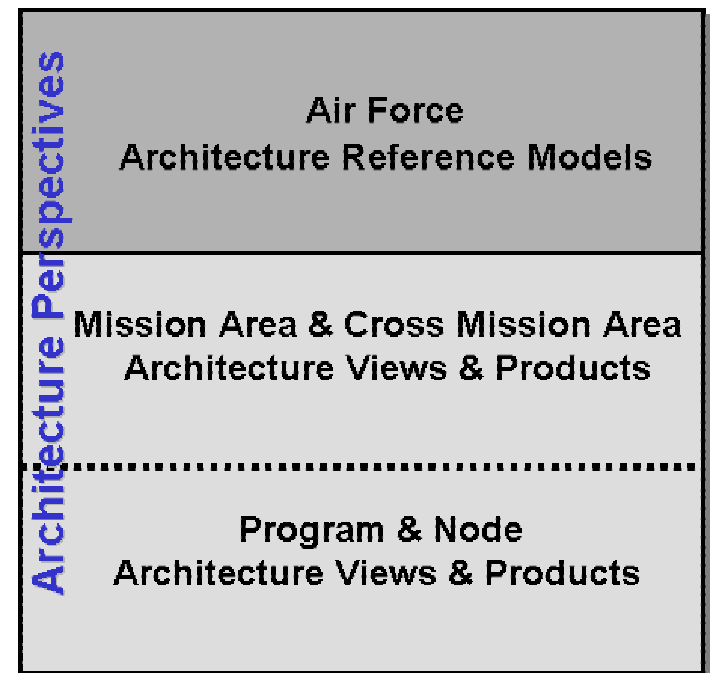
**Cmd/Service/Agency Architectures**  
Air Force, Army, Navy, ...

## TIER 3

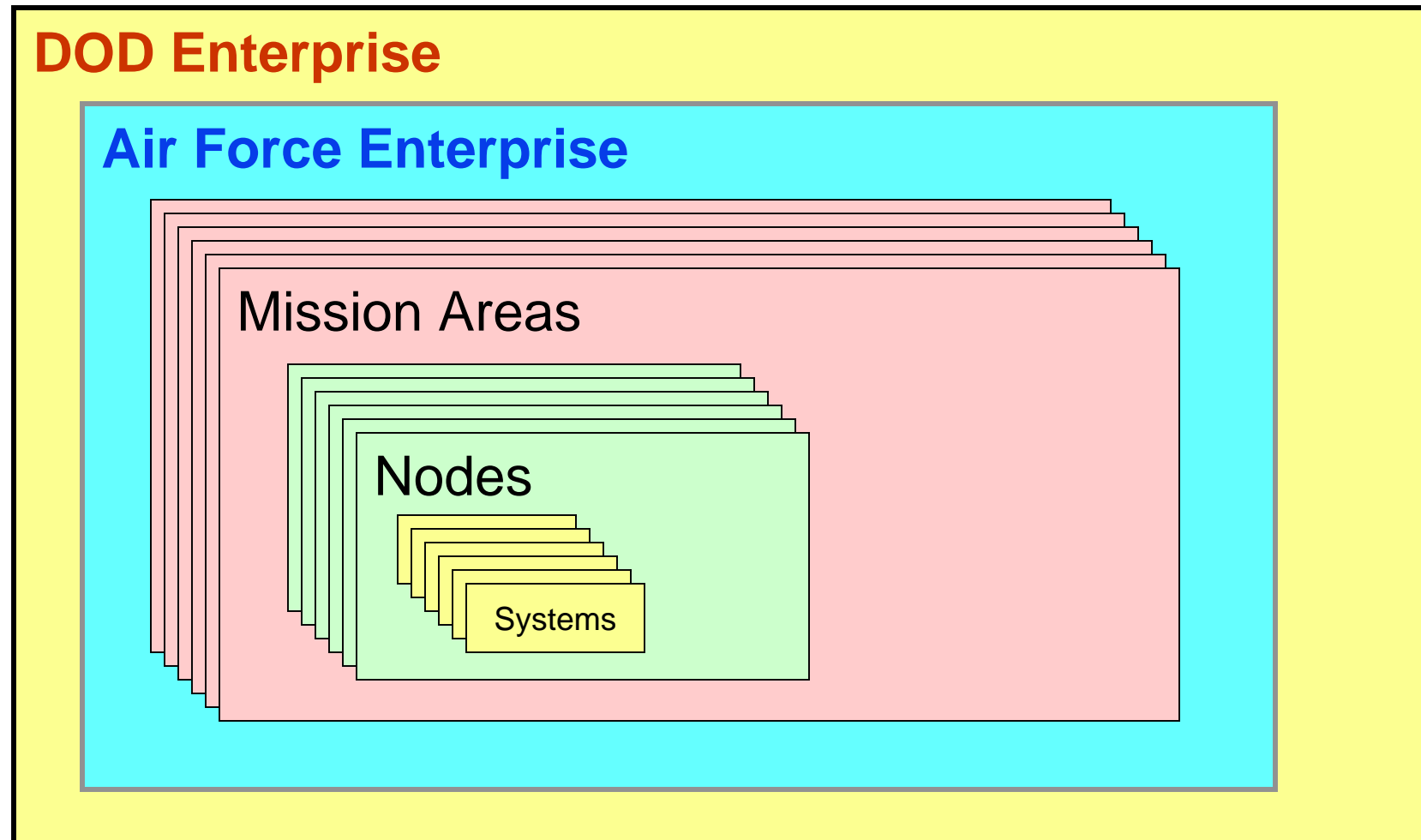
**Mission Area / X-MA Architectures**  
Space, Wx, Combat Ops, Mobility, ...

## TIER 4

**Program / Node Architectures**  
MILSTAR, AFSCN, AOC, ...



# Architectures are “Nested” into Higher Level Architectures



**WARNING:** Architecture at a higher level is the intersection  
of lower levels, NOT the union of lower levels.



# Discussion

- **What are the different objectives at the different “tiers” of architecture?**
  - Federal and Department
  - Service and Agency
  - Mission Area
  - Program and Node
- **What are the pros and cons of each architecture framework?**
  - Federal
  - DOD
  - Air Force
  - Home Grown ?