PREFACE/CLASS OUTLINE
ACQUISITION AND LOGISTICS EXCELLENCE WEEK 2001

TOPIC: Overview of Interoperability in Requirements Generation

LENGTH/TYPE: 1 Period - Lecture

SCOPE: Interoperability is the ability of systems, units or forces to exchange data, information, materiel, and services to enable them to operate effectively together. Interoperability spans across all pillars of Joint Vision 2020 and is receiving renewed emphasis to advocate and enforce jointness. This lecture introduces interoperability as it relates to the requirements generation process. It overviews the requirements generation system, introducing basic concepts and establishing a foundation for further individual study of regulations in preparation for work developing operational requirements for systems.

OBJECTIVES: At the completion of this block of instruction, the participant will be able to:

1. Recognize basic requirements generation terminology and concepts, including interoperability, KPP, threshold, objective, and IER.

2. Be familiar with the general attributes of well-written requirements.

3. Be familiar with a process for developing an interoperability KPP.

MATERIALS:
Briefing Charts

Introduction to Interoperability

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September 10-15, 2001

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Agenda Topics

- **Interoperability: What is it and why should I care?**
- **How does it fit into the requirements and acquisition processes?**
- **How to develop the Interoperability KPP**

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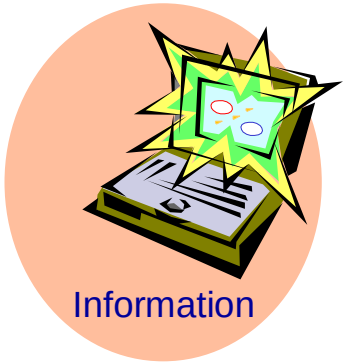
What is Interoperability?

"(1) The ability of systems, units, or forces to provide services to and accept services from other systems, units, or forces and to make use [of] the services…to operate effectively together."

"(2) The condition achieved among communications-electronics systems…when information can be exchanged…between them."

CJCSI 3170.01B



It's a consideration in most materiel & military operations

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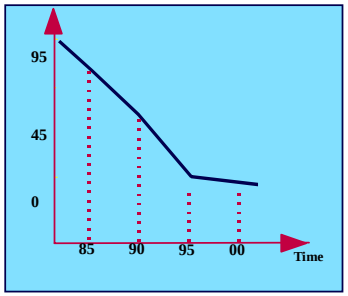
Why is it important?



Declining Resources

Wide Spectrum of Operational Commitments

Structural Change in DoD

Exploding Technology

Increasing Uncertainty in Requirements

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Need For Appropriate Interoperability

- ⇨ **Within Services**
- ⇨ **Within DoD**
- ⇨ **With Coalition Partners**
- ⇨ **With National and International Agencies**

Thru Open Systems Architectures

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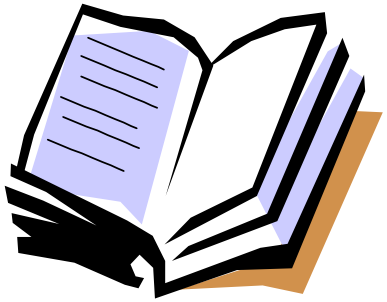
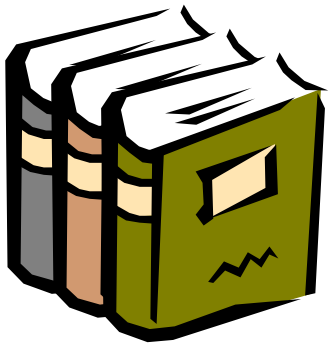
Key References

CJCSI 3170.01B (April, 2001) "Requirements Generation System"

CJCSI 6212.01B (May, 2000) "Interoperability and Supportability of National Security Systems and Information Technology Systems"





DOD Directive 5000.1 "The Defense Acquisition System"

DOD Instruction 5000.2 "Operation of the Defense Acquisition System"

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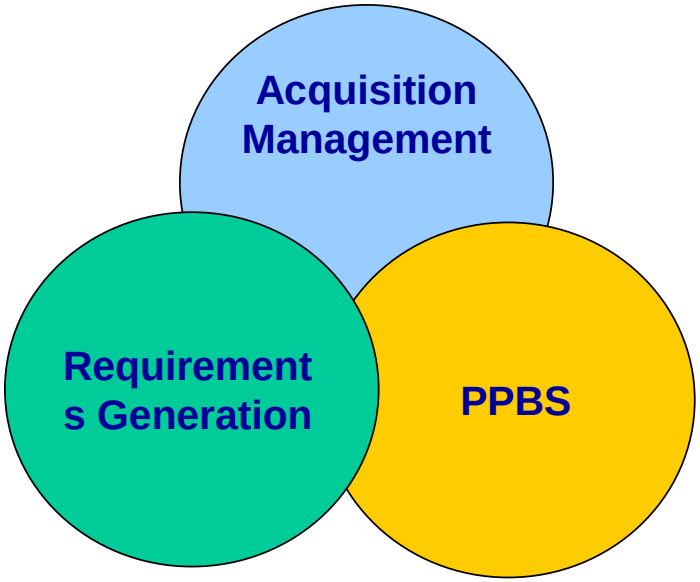
DoD Decision Support Systems



The three key DOD systems supporting acquisition are themselves interoperable

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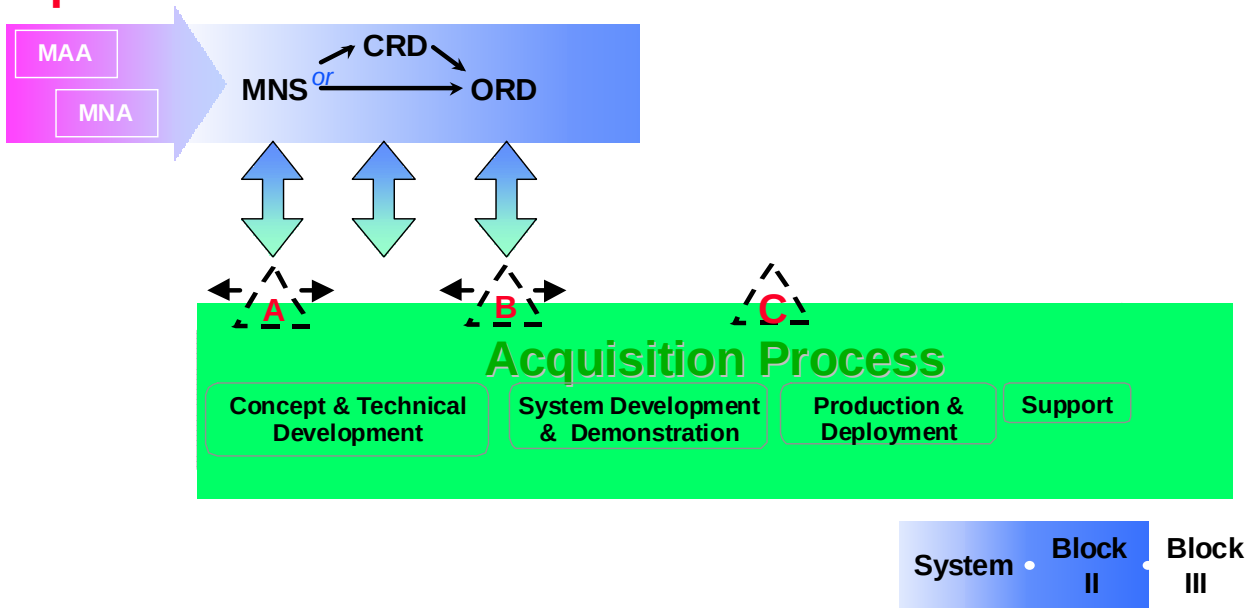
The 'Story of a System'

NMS

DPG

Requirements Generation



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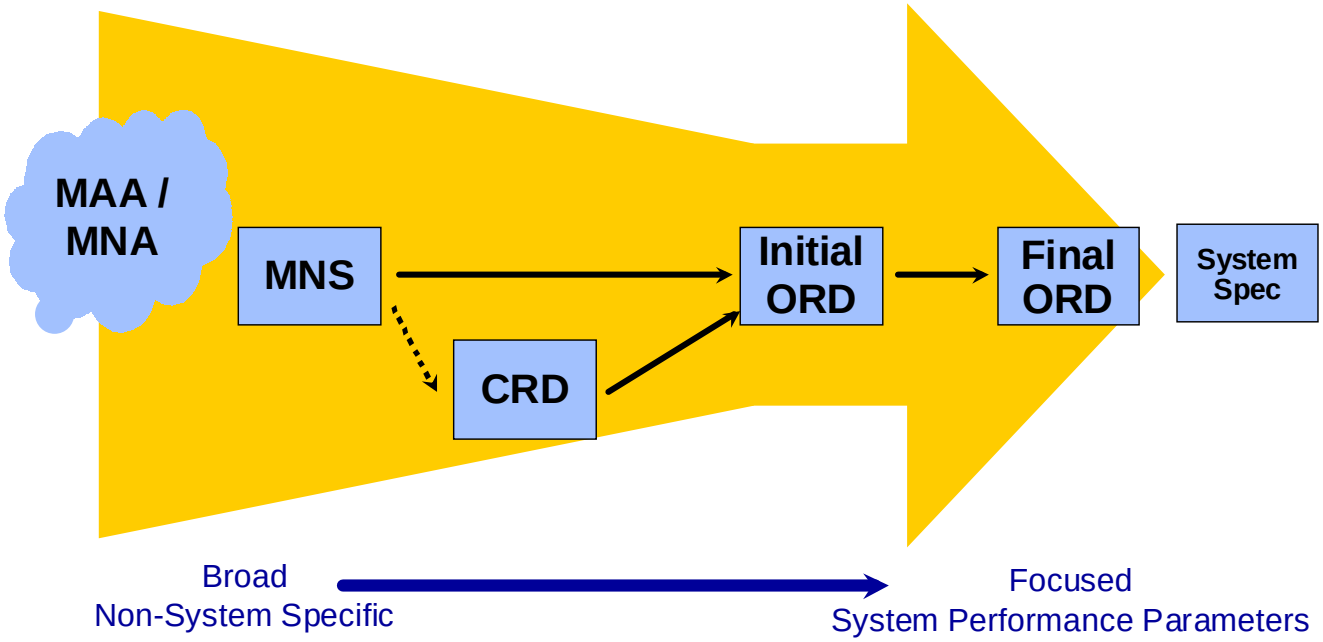
Requirements Evolve...

They get more specific with time



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Anatomy of a Requirement

"The x-ray device shall be transportable in a standard ISO container. The objective x-ray device shall be transportable in a HMMWV."

Threshold: The minimum acceptable parameter value for a given requirement

Tradespace: Value between the Threshold and Objective for any given requirement

Objective: The parameter value desired by the user to meet the requirement

Max size: 2M x 2.5M x 5M

TradeSpace

Desired size: 0.9M x 0.9M x 1.1M

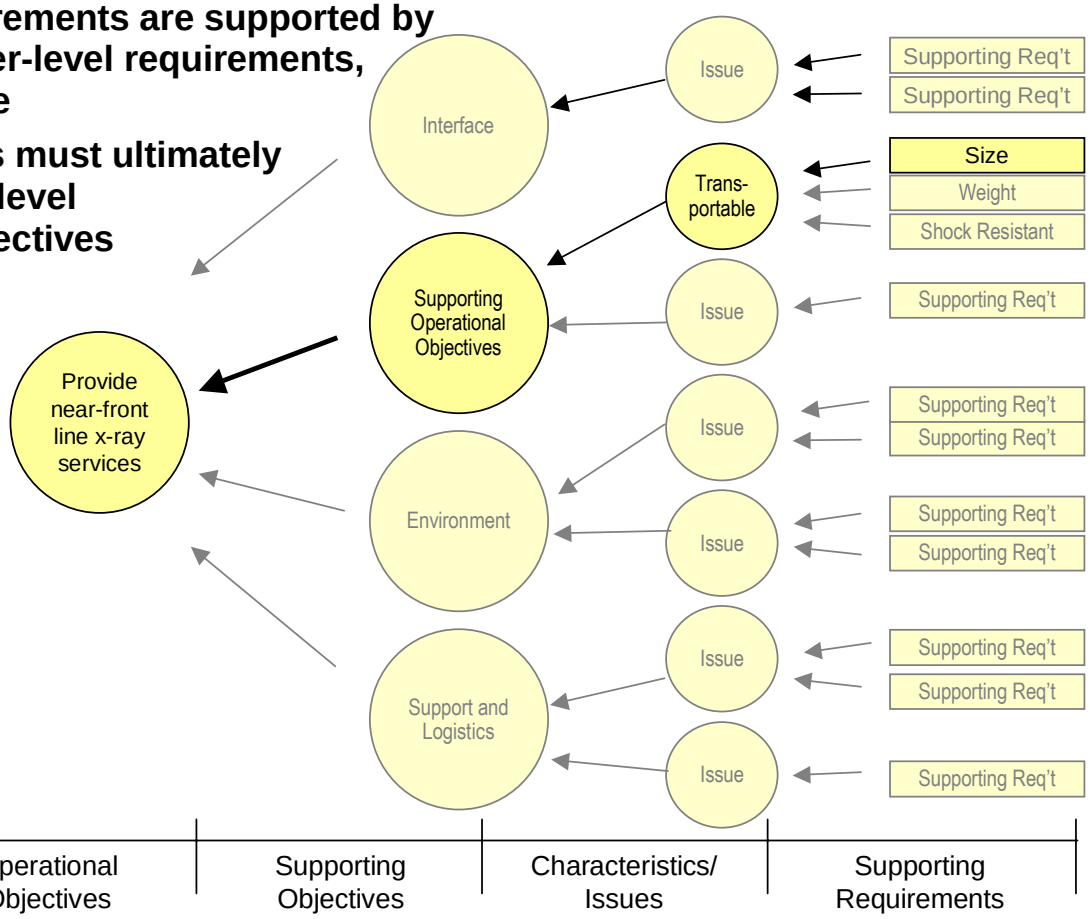
08/13/01 Introduction to Interoperability 10

Stratifying Requirements

Requirements exist on several levels

- **Some requirements are supported by several lower-level requirements, as seen here**

All requirements must ultimately support the top-level Operational Objectives



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Key Performance Parameters

Some capabilities or characteristics are so important...

Failure to achieve their threshold is not acceptable!

Designate these as KPP:

- Limited in number
- Minimize thresholds
- Include in Acquisition Program Baseline
  - Performance
  - Schedule
  - Cost

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Characteristics of Good KPPs

Output oriented / performance-based

- Describes 'what' and 'how well,' but not 'how to'

Described in Threshold - Objective format

- Lists minimum acceptable as well as desired performance

Measurable

- Defined in terms that can serve as a means of measuring success or comparing alternatives

Examine KPPs closely

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Characteristics of Good KPPs

Unambiguous

Clearly written in plain English, leaving no room for doubt or misinterpretation

Justifiable through objective analysis

Numeric parameters can be objectively explained and supported to disinterested seniors

Achievable

Thresholds should be within the bounds of technical feasibility within the time required

Examine KPPs closely

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One Mandatory KPP

Interoperability is a *mandatory* KPP in both CRDs and ORDs

In this context, interoperability relates solely to information exchange

Expressed in terms of Information Exchange Requirements or "IERs"

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The Interoperability KPP

KPP	Threshold	Objective
All top-level IERs will be satisfied to the standards specified in the Threshold (T) and Objective (O) values.	100% of ***critical*** IERs will be satisfied	100% of IERs will be satisfied

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IERs

are
Information Exchange Requirements

In a CRD: IERs are top-level information exchanges between both systems *of* the family and those *external* to the family of systems

In an ORD: IERs are top-level information exchanges that are *external* to the system

An information exchange so significant that, if it does *not* occur, the mission area will be adversely impacted is called a 'Critical IER'

?

Who to talk to?

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Format for CRD IERs

Top-level IERs to be provided in matrix format

Mandatory Fields for CRDs

1 Rationale/UJTL Number	2 Event/Action	3 Information Characterization .	4 Sending Node	5 Receiving Node	6 Critical
Set of joint mission tasks from the UJTL (CJCM 3500.04B) for each mission area identified in the CRD/ORD.	***Free Text:*** Event or action that triggers the need for the information exchange.	***Pick List and Free Text:*** The critical information characteristics that describe what information is being exchanged and how it is to be used	***Free Text:*** Sending Node	***Free Text:*** Receiving Node	***Logical Field:*** Yes/No The criticality assessment of the information being exchanged in relationship to the mission being performed.

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Developing IERs

Determine the intended use of the systems

- **Operational Concept**

Operational View (High level operational concept graphic OV-1)

- **Drive by doctrine**
- **Generally independent of organization & force structure**

"a description of the tasks and activities, operational elements and information flows required to support a military operation"

Developing CRD IERs

ID info exchanges using hi-level operational concept graphic

1 Rationale/UJTL Number	2 Event/Action	3 Information Characterization	4 Sending Node	5 Receiving Node
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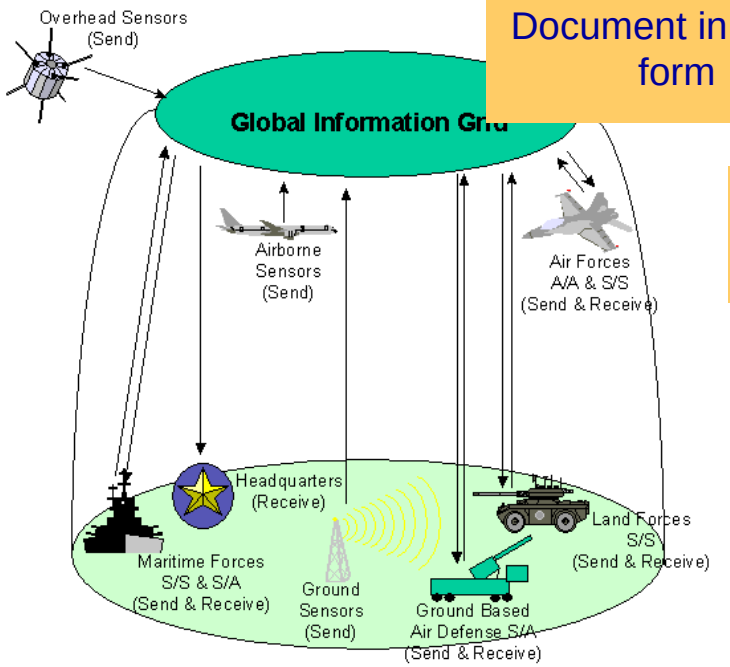
Document in matrix form



ID and label critical IERs

Establish KPP thresholds and objectives

KPP	Threshold	Objective
All top-level IERs will be satisfied to the standards specified in the Threshold (T) and Objective (O) values.	100% of ***critical*** IERs will be satisfied	100% of IERs will be satisfied

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Format for ORD IERs

Top-level IERs to be provided in matrix format

Mandatory Fields for ORDs

1 Rationale / UJTL Number	2 Event/ Action	3 Information Characterization	4 Sending Node	5 Receiving Node	6 Critical	7 Format	8 Timeliness	9 Class	10 Optional
Set of joint mission tasks from the UJTL (CJCM 3500.04B) for each mission area identified in the CRD/ORD.	***Free Text:*** Event or action that triggers the need for the information exchange.	***Pick List and Free Text:*** The critical information characteristics that describe what information is being exchanged and how it is to be used	***Free Text:*** Sending Node	***Free Text:*** Receiving Node	***Logical Field:*** Yes/No Assessment of the criticality of the information being exchanged in relationship to mission being performed	***List and Free Text:*** Description of data type.	***Numerical Field:*** Required maximum time from node to node expressed in seconds.	***Pick List Field:*** Classification of the information.	***Free Text:*** As desired by the originator

Developing ORD IERs

ID info exchanges using hi-level operational concept graphic

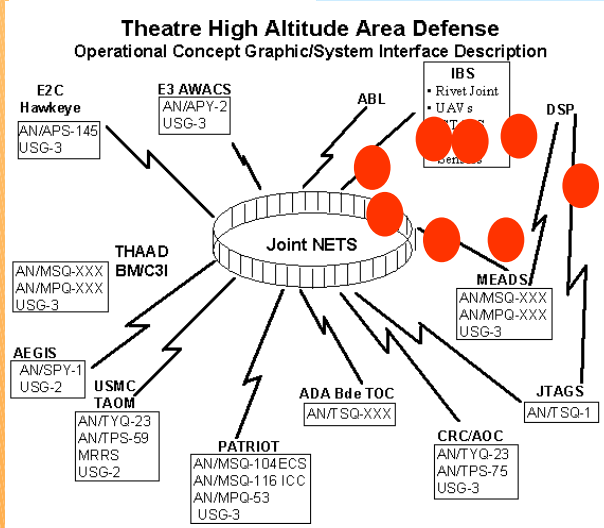
ID legacy and future external interfaces

Document top-level external IERs in matrix format

ID and label critical IERs

Derive interoperability KPP from the IER matrix

1 Rationale/UJTL Number	2 Event/Action	3 Information Characterization	4 Sending Node	5 Receiving Node	6 Critical
Set of joint mission tasks from the UJTL (CJCM 3500.04B) for each mission area identified in the CRD/ORD.	***Free Text:*** Event or action that triggers the need for the information exchange.	***Pick List and Free Text:*** The critical information characteristics that describe what information is being exchanged and how it is to be used	***Free Text:*** Sending Node	***Free Text:*** Receiving Node	***Logical Field:*** Yes/No The criticality assessment of the information being exchanged in relationship to the mission being performed.



KPP	Threshold	Objective
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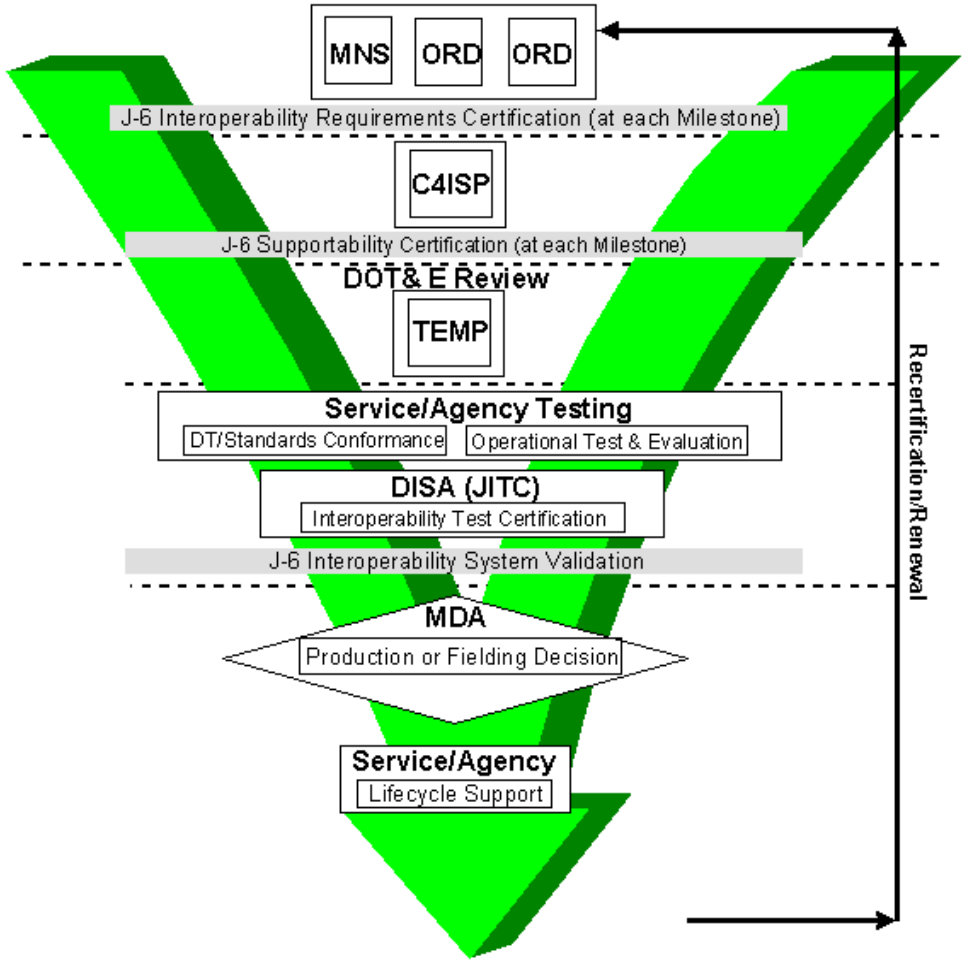
Staffing & Approval Process



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Views

Operational View
Warfighter Relationships And Info Needs

ORD/CRD IERs

System View
Relates capabilities and Characteristics to Operation Requirements

Technical View
Standards and contentions

C4ISP

DII COE JTA

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Points of Contact

- Joint Forces Command
- Joint Staff
- Services

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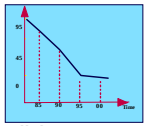
Wrap Up: Key Points

Why is interoperability important?

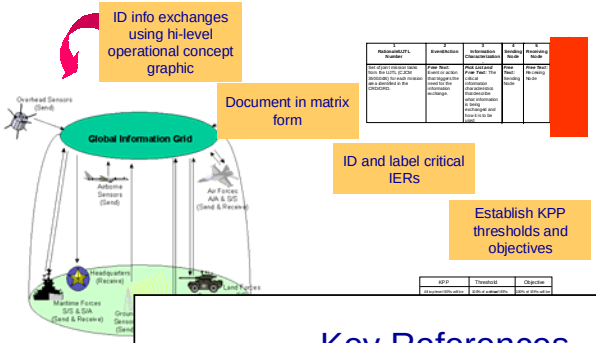


Declining Resources

Expand operatio commitm

Exploding Technology

Developing CRD IERs



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- ✓ **DoD's and the world's situation makes interoperability critical**
- ✓ **There is a process to develop IERs and KPPs, and it must start early**
- ✓ **There are key references and offices to go for help**

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