



T&E: Where Science Meets Success

An Approach to Implement DODI 5000.02 and Shift Left

Terri Kocher



Bottom Line Up Front

- New DODI 5000.02 adds:
 - Earlier documents & decisions
 - Urgency of ongoing acquisition challenges
- DASD(DT&E) initiative to “Shift Left”:
 - Critical to success of new DODI 5000.02
 - Relies on early info, better synchronization

Analysis Science / T&E Principles can help



The Backdrop: Big Acquisition "Big A"

Joint Capabilities
Integration &
Development
System (JCIDS)

Defense
Acquisition
System

Planning,
Programming,
Budgeting &
Execution (PPBE)



Big A Challenges

- Technology Readiness Accuracy
- Test Scope
- Agreement on Data
- Partial Performance
- Relevance
- Requirements



Source: ITEA Nov 13 Tutorial, Brown, Bell



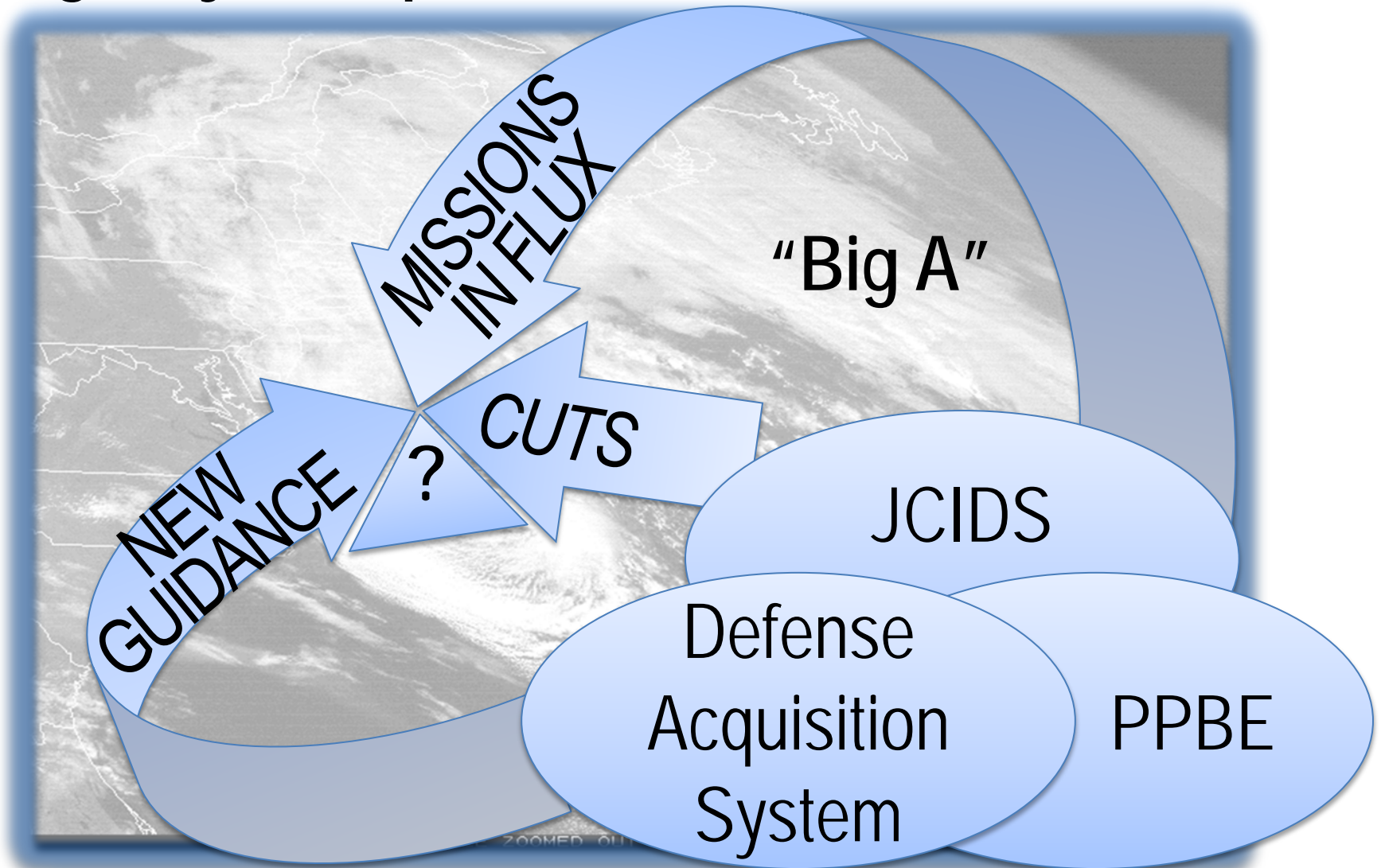
Big A Challenges and Their Sources

Historical Problems	Source of Challenges
<ul style="list-style-type: none">• Lack operationally relevant T&E and requirements• Cost/schedule overruns• Decision difficulty	<ul style="list-style-type: none">• Lack of supporting analyses, understanding of gaps, missions• No traceability across assumptions/parameters• Info disconnects

Need to tackle Big A challenges at their roots

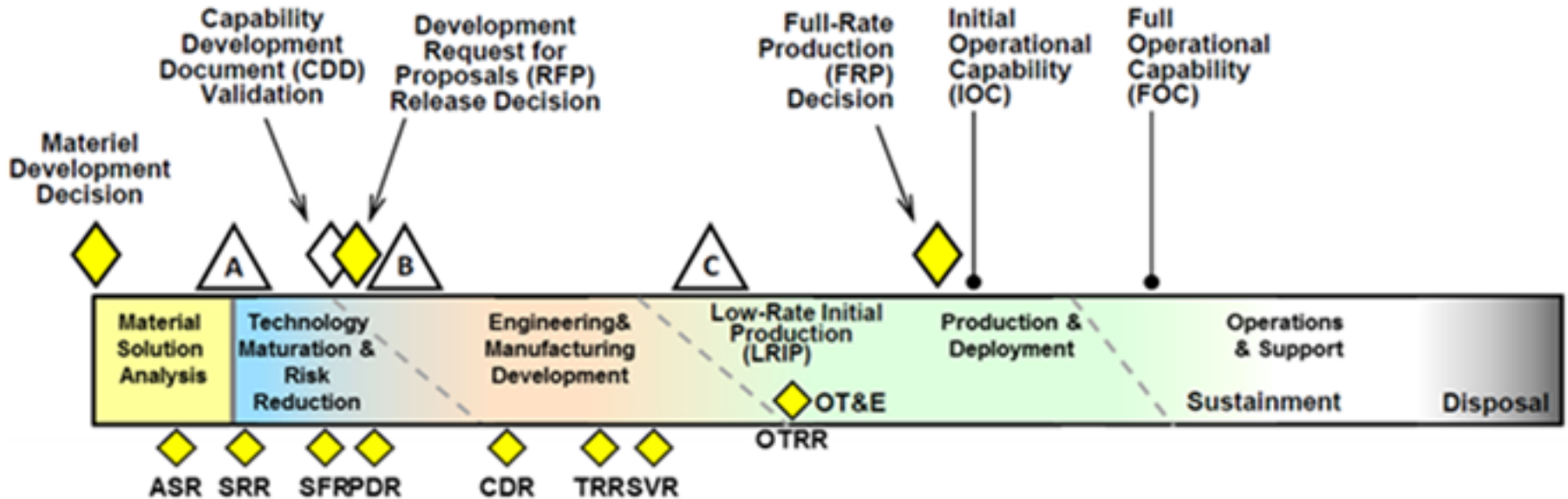


Urgency of Improvement: The Perfect Storm





Interim DODI 5000.02 Challenges: Increased focus to pre Milestone A, B



Users, S&T, T&E advise PM at Milestones
but the horizontal blocks are still stove pipes!

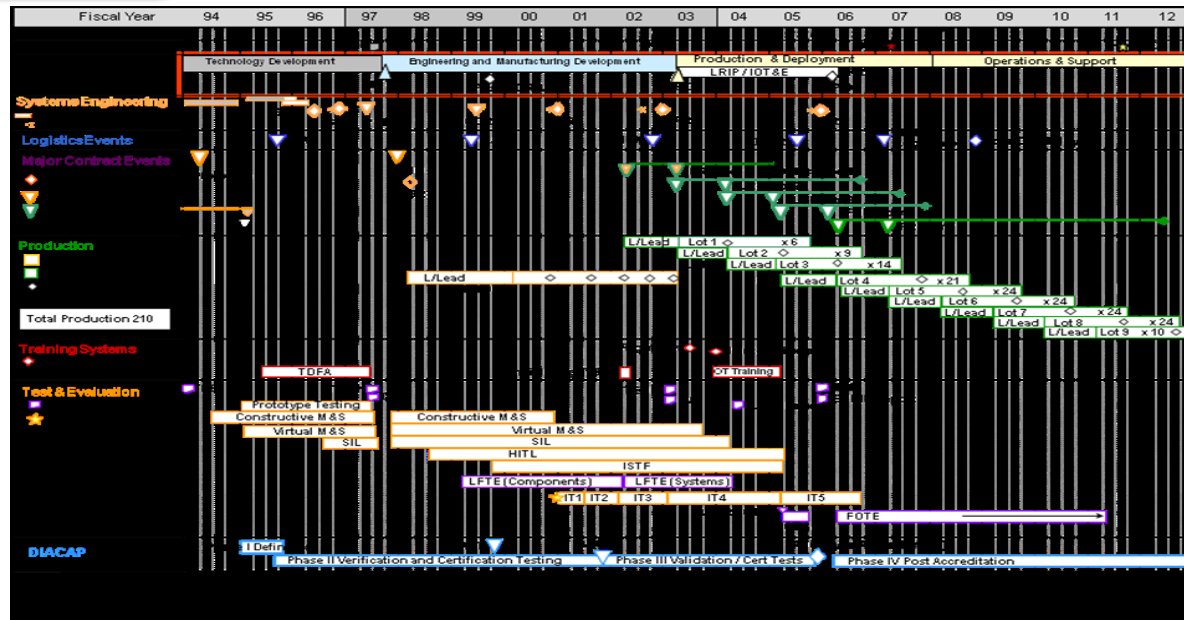


The Problem With Flow Charts and Big A

Requirement

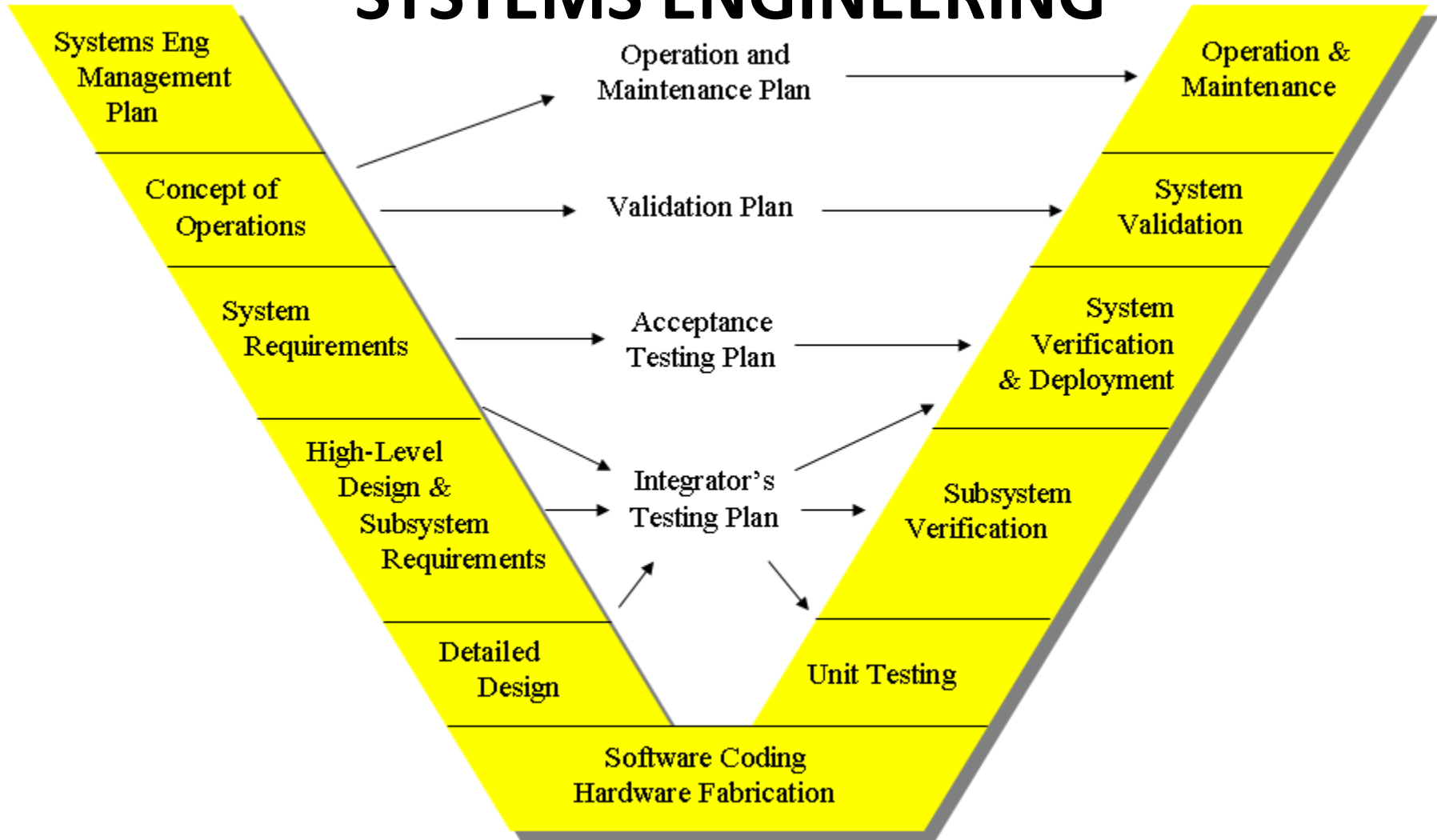
Miracle!

System





SYSTEMS ENGINEERING





Basic Analysis Process

Formulate Problem

Develop Model

Define Alternatives

Select Inputs/Parameters

Characterize Alternatives

Implement

Reassess



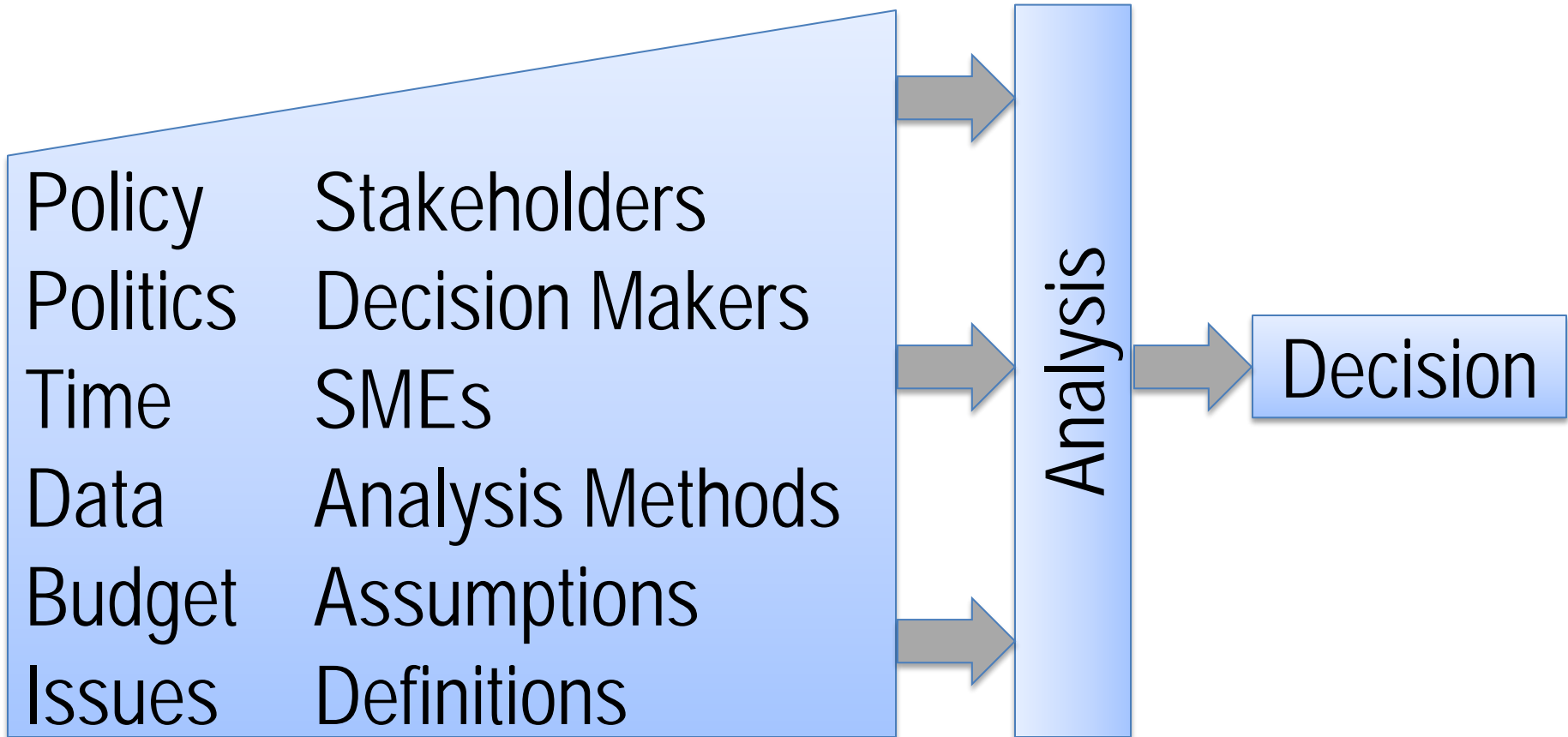
Analysis Processes in Big A

- Mission Decomposition
- Analysis of Alternatives
- Systems Engineering
- Project Management
- Modeling & Simulation
- Test and Evaluation (T&E)

Operations Research Analysis/T&E Science
can inform all Big A Analyses



Integrated Analysis



Info, parameters, & constraints affect all analyses

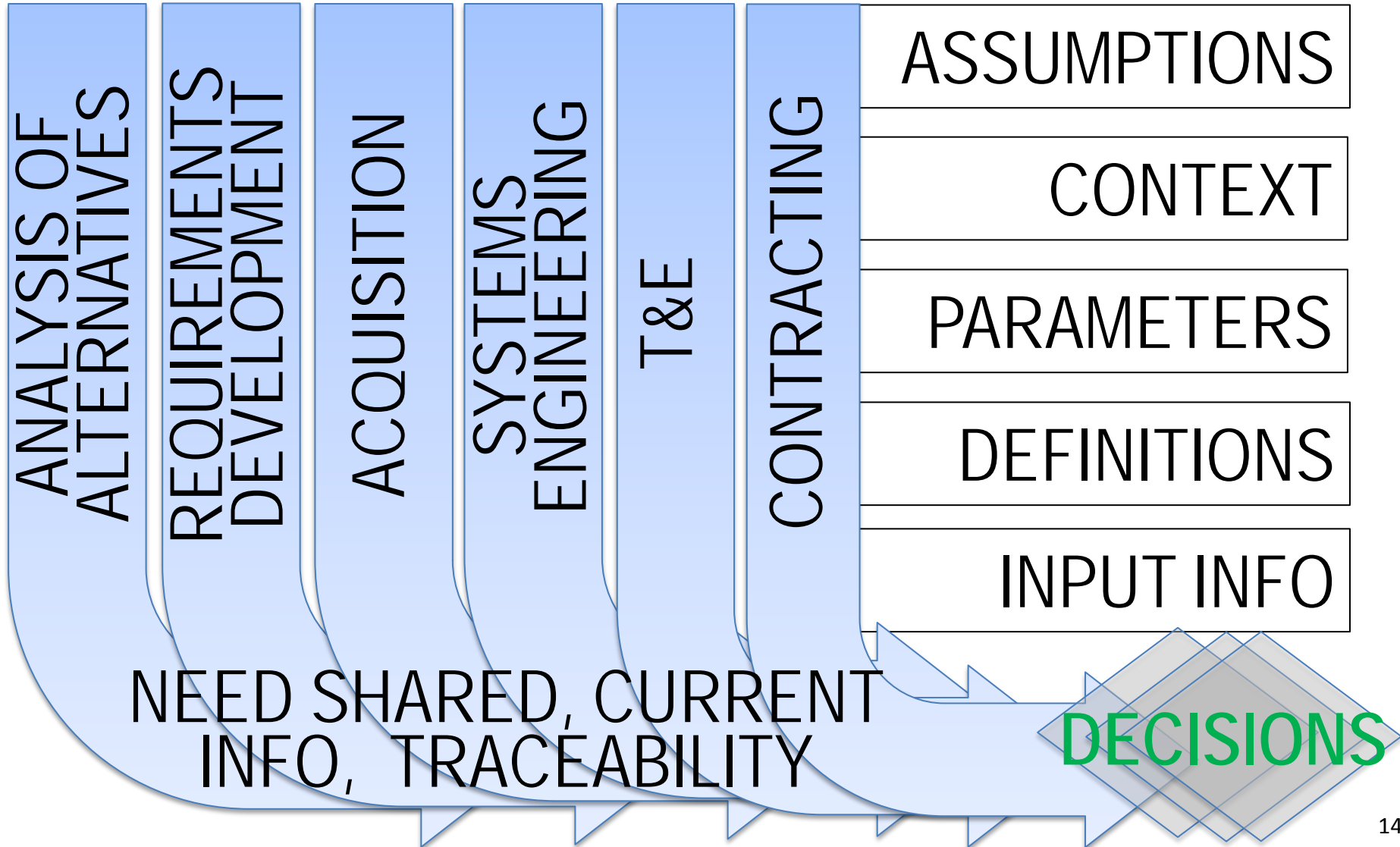


The “A-ha” Moment

- Each Big A component does analyses
 - Mission Planners and Combat Developers
 - Project Management, Contracting
 - Systems Engineering
 - T&E: Developmental Evaluation Framework (DEF)
- BUT LACK COMMONALITY, INTEGRATION

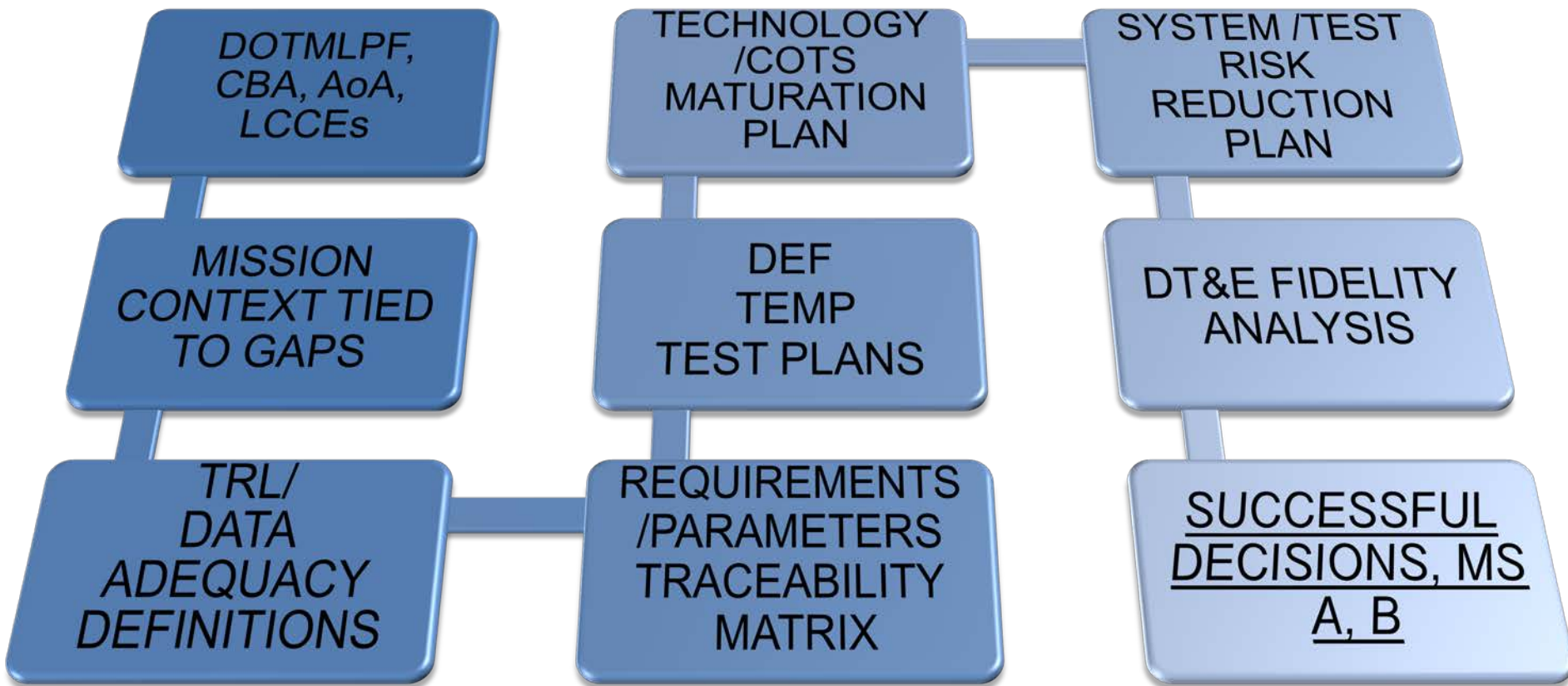


The Answer: Cross pollinate, trace throughout





What's lacking in the current process.... And critical to implement the new process?



Linkages and tools are critical

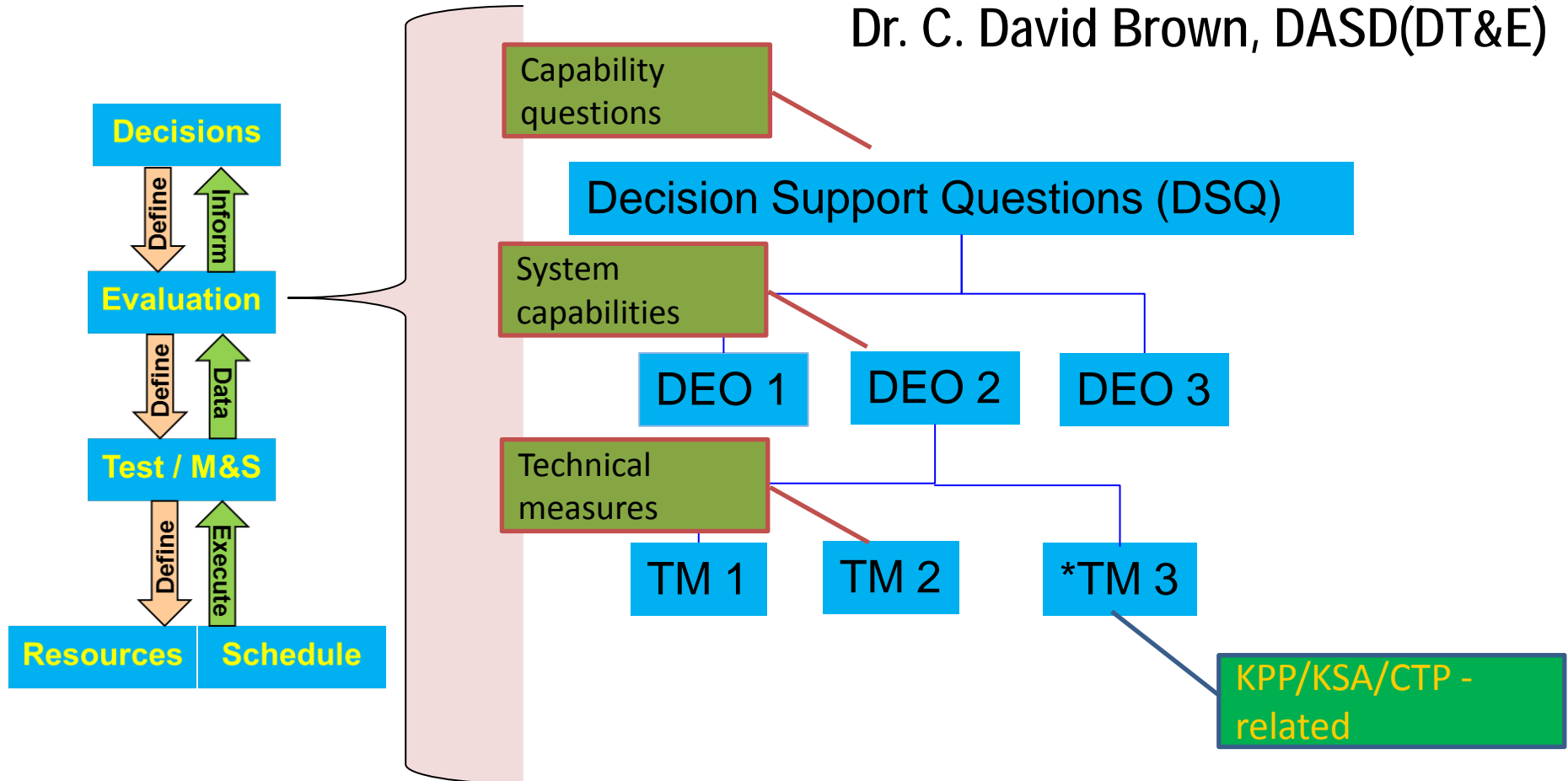


Need Better Linkages across the Big A

- Developmental Evaluation Framework (DEF) provides DT&E story thread:
decision – evaluation – test & resources
- Story thread is needed into and out of DEF, and throughout Big A
- Traceability from Analysis of Alternatives and Mission Decomposition and throughout will inform DEF and increase its utility

Developmental Evaluation Framework (DEF)

Dr. Suzanne Beers, Session G
Dr. Mosser-Kerner, DASD(DT&E)
Dr. C. David Brown, DASD(DT&E)



System Engineering decomposition:
Evaluate system capability - Inform decisions

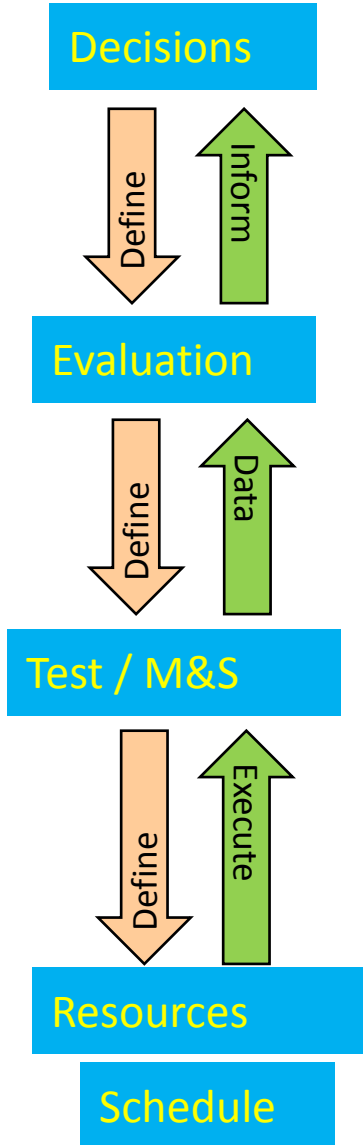
DEO = DE Objective

KPP = Key Performance Parameter KSA = Key System Attribute CTP = Critical Technical Parameter

Developmental Evaluation Framework (DEF)

Dr. Suzanne Beers, Session G

Drs. Mosser-Kerner, Brown DASD(DT&E)



Developmental Evaluation Objectives			Decisions Supported								
			System Requirements and T&E Measures		Decision #1		Decision #2		Decision #3	Decision #4	
			DSQ #1	DSQ #2	DSQ #3	DSQ #4	DSQ #5	DSQ #6	DSQ #7	DSQ #8	
Functional evaluation areas	Technical Reqmts	Description	Identify major decision points for which testing and evaluation phases, activity and events will provide decision supporting information. Cells contain description of data source to be used for evaluation information, for example: 1) Test event or phase (e.g. CDT1....) 2) M&S event or scenario 3) Description of data needed to support decision 4) Other logical data source description								
System capability categories	Document Reference										
Performance											
Performance Capability #1	3.x.x.5	Technical Measure #1	DT#1		M&S#2				DT#4	M&S#2	
	3.x.x.6	Technical Measure #2	M&S#1		DT#3				DT#4	M&S#2	
Performance Capability #2	3.x.x.7	Technical Measure #3				DT#3			IT#1		
	3.x.x.8	Technical Measure #4				M&S#4			IT#1		
Interoperability											
Interoperability Capability #3	3.x.x.1	Technical Measure #1				DT#3			DT#4		
	3.x.x.2	Technical Measure #2		IT#2		M&S#4			DT#4		
Interoperability Capability #4	3.x.x.3	Technical Measure #3		IT#2					IT#1	M&S#2	
	3.x.x.4	Technical Measure #4							IT#1	DT#3	
Cybersecurity											
SW/System Assurance	PPP 3.x.x	SW Assurance Measure #1				SW Dev Assess		SW Dev Assess	SW Dev Assess		
RMF		RMF Contol Measure #1	Cont Assess			Cont Assess	Cont Assess	Cont Assess			
Vulnerability Assess		Vul Assess Measure #1					Blue Team			Blue Team	
Interop/Exploitable Vuln.		Vul Assess Measure #2					Red Team			Red Team	
Reliability											
Reliability Cap #1	4.x.x.1	Technical Measure #11		M-demo#1						IT#5	
	4.x.x.2	Technical Measure #12		M-demo#1					IT#2	IT#5	
	4.x.x.3	Technical Measure #13					M-demo#2		IT#2		
Reliability Cap #2	4.x.x.4	Technical Measure #14					M-demo#2		IT#2		

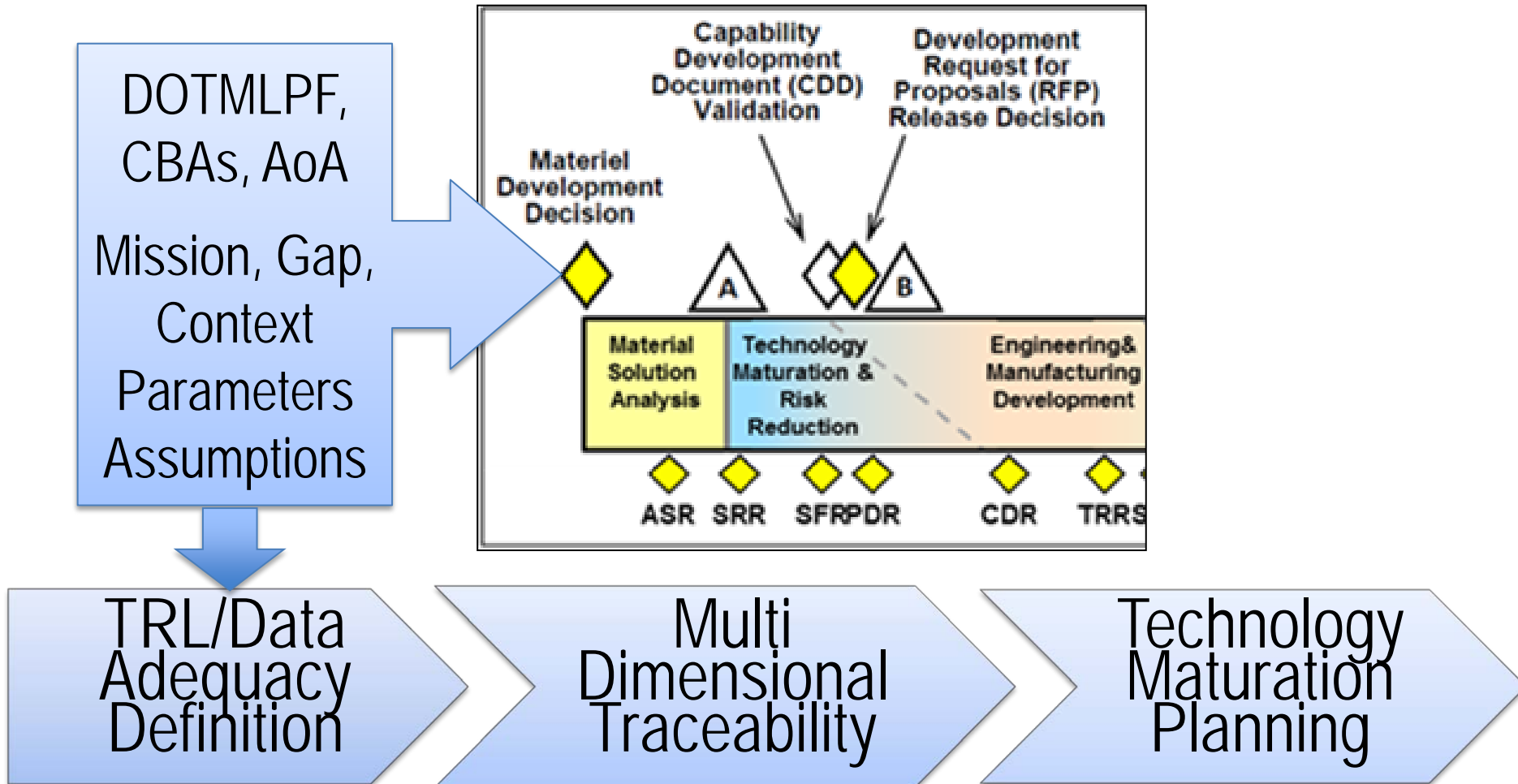


Build on DEF concept and links

- DEF is a spreadsheet tool
 - References requirements paragraphs
 - Ties from decision to evaluation strategy to tests and resources
- Need to add tools to complement DEF across Big A
 - Start with AoA Study Guidance, Gap Definition, and Mission Decomposition
 - Inform DEF, link to SE and contract language
 - Provide traceability, ease of update throughout



Notional Solution: Cross-Track Integrated Product Tools





Shift Left Implementation Tool Set

- Cross-track functional analysis tool(s)
- Mechanisms to integrate, track and update:
 - Context, assumptions and other parameters
 - Outputs from DOTMLPF, AoA, CONOPs, etc.
- Fulfills intent of the new Technology Maturation and Risk Reduction Phase
- Facilitates analysis across communities

Shift Left requires integrated linked analyses



Summary

- Need coordinated Big A “story thread” and tools
 - Make decisions earlier, BETTER
 - Inform and use DEF, and reduce risk
- DODI 5000.02 Compliance and Shift Left will be enhanced by expanding DEF-type approach across Big A

User friendly tools needed to implement Shift Left



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POC Information

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Acronyms

- AoA: Analysis of Alternatives
- CBA: Capabilities Baseline Assessment or Cost Benefit Analysis
- CONOPs: Concept of Operations
- COTS: Commercial Off the Shelf System
- DASD(DT&E): Deputy Assistant Secretary of Defense (Developmental Test & Evaluation)
- DEF: Developmental Evaluation Framework
- DODI: Department of Defense Instruction
- DOTmLPF: Doctrine, Operations, Training, materiel, Leadership and Education, Personnel, and Facilities
- IDEF0: Integrated Definition Framework
- SE: Systems Engineering
- TRL: Technology Readiness Level