Suitability Impacts on Rapid Development

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Roadmap

- Review of Quick Response Program Compared With A Program Of Record
- Characterizing System Requirements Through System Level Attributes
- Prioritizing System Attributes To Support Rapid Deployment
- Identifying Rapid Development Streamlining Of System Attributes
- System Architecting To Minimize Suitability Attributes Impact On Development Timelines
- Summary

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Rapid Development v. Rapid Deployment

The DOD 5000 series of instructions regulate government acquisition for ACAT I programs in a ***very deliberate*** and ***programmed manner. ..*** The rapid validation and resourcing of JUONs is a time sensitive process in support of a combatant commander involved in a combat-related ongoing operation. .. ***They should not involve the development of a new technology or capability***; however, the acceleration of an Advanced Concept Technology Demonstration (ACTD) or ***minor modification of an existing system*** to adapt to a new or similar mission is within the scope of the JUON validation and resourcing process.

-CJCSI 3470.01

- **Program Of Record-Long Term DOD Requirements**
  - CDD Requirements Originating Through JCIDS And Are Validated By JROC
  - Requirements Have Strategic View Of Capabilities
    - Stressing KPPs & Threshold Requirements Reflect Large Acquisition Efforts
    - Stressing Performance Thresholds Requires Additional Development Time
  - Time To IOC Is Dependent On Balancing Requirements
    - Total Ownership Costs (TOC) Are Minimized By Policy Direction
    - Longer Service Life Requires System Suitability
- **Direct Warfighter Response-Immediate Needs**
  - Supporting Tactical “Immediate Needs” Should Not Evolve Into Long Term Capability
  - Suitability Shortfalls Have A Short Lived Impact On System
  - Schedule Is KING
    - Performance Levels Constrained To Existing Technology
    - Existing Design Defines Suitability
    - Training Real Time And Hands-On

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Tasking

- **Compare Two Programs; Tiger Shark, A Rapid Deployment Program And STUAS, A CDD Tasked Program of Record (POR).**

Question 1: Tiger Shark Required Less Time And Staffing Resources To Field Than A POR. Why Did This Occur?

Question 2: Can Techniques Used In The Rapid Deployment World Be Adapted To Streamline POR Acquisition Efforts?

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Program Environments

Tiger Shark-

“USSOCOM Needed A Short Term, Stop Gap, ISR System For Approximately One Year.”

STUAS-

“Marine Corps Was Looking To Field A System That Operators Liked And Was Supportable It For 20 Years.”

Tiger Shark vs STUAS Attributes Affecting Staffing

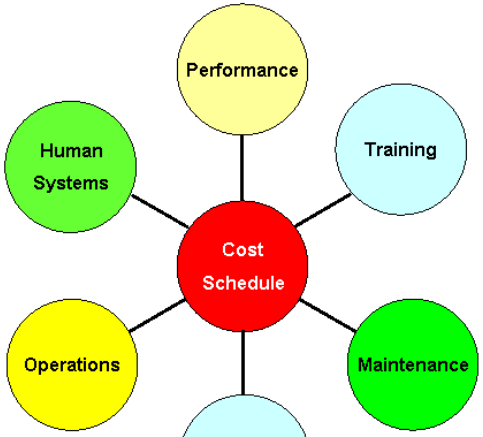
Factor	Tiger Shark	STUAS
Supportability	3-5 Yr Service Life, Contractor	20 Yr Service Life, Organic
Maturity of Technology	Non-Developmental	Sensor Development
Breadth of Design	Immediate Needs Focused	Multi-Service, Ground Segment
Complexity of Design	Sensor/Vehicle Integration	Stressing CDD
External Interfaces		
Interoperability	None	NET READY KPP
National Air Space	Combat or Range (CAT 3)	Sparsely Populated (CAT 2)
Ship Board Integration	NO	YES
ACAT Designation	None	YES
Competition/Sole Source	Pre-Negotiated Competitive	Source Selection Competition
Risk Tolerance	High	Medium To Low

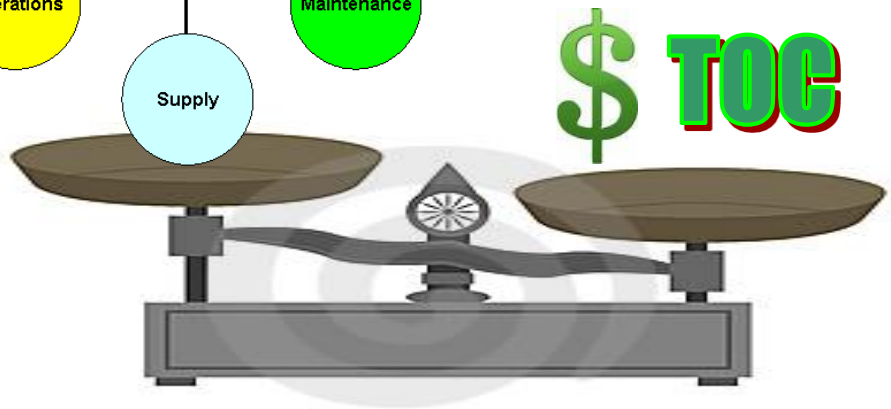
Requirements Trade Space

Tiger Shark Guidance

STUAS JCIDS Guidance

300+ Requirements





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Passing Grade

- **Operationally Effective**
  - User Performance Requirements and Capabilities
  - Evaluated In User Defined CONOPS Environments
  - Defined In System Key Performance Parameters (KPPs)
- **Operationally Suitable**
  - Compatibility With User Environment And Support Systems
  - Reliability and Maintainability Characteristics
  - Interoperability With Other Systems
  - Utilizes Establish Supply Chain
  - Reduces Total Ownership Cost (TOC)
  - Defined In System Key System Attributes (KSAs)

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Developing Attributes

- **Attributes Should Represent Product Characteristics**
- **Traceable To OT&E Criteria**
  - **Operationally Effective: Does The Product Provide A Capability That Meets Performance Requirements?**
  - **Operationally Suitable: Is The Performance Available, Reliable, Supportable, Modifiable, and Cost Effective?**
- **Should Span Multiple Functional Engineering Disciplines**
- **Should Require Analysis And Final Verification By Technical Authorities**

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Varied Guidance On SE

DODI 5000.02 Enclosure 8 & 12	DAG Chapter 4.4	SECNAVINST 5000.02	NAVAIRINST 5000.24 SETR Handbook
Systems Engineering Across Life Cycle	System Engineering Design Consideration	CH 7 System Engineering and Human Systems Integration	Functional Areas
	Accessibility		
	Commercial Off-the-Shelf (COTS)		
Corrosion Prevention and Control	Corrosion Prevention and Control		
	Critical Safety Items (CSIs)	Aviation Critical Safety Items (CSIs) (7.3.7)	
	Disposal and Demilitarization		
	Diminishing Manufacturing Sources and Material Shortages (DMSMS)		
Environment, Safety, and Occupational Health (ESOH)	Environment, Safety, and Occupational Health (ESOH)	Environmental, Safety, and Occupational Health (ESOH) (7.3)	Safety
Programmatic Environmental, Safety and Occupational Health (ESOH) Evaluation (PESHE)	Programmatic Environmental, Safety and Occupational Health (ESOH) Evaluation (PESHE)	Safety and Health (7.3.3)	
	National Environmental Policy Act (NEPA)/Executive Order (EO) 12114 Compliance Schedule	National Environmental Policy Act (NEPA) and Executive Order (EO) 12114 Environmental Effect Abroad (7.3.2)	
	Networks and Automated Information Systems (AIS)		
	Environment, Safety, and Occupational Health (ESOH) Management Evaluation Criteria		
Mishap Investigation	Environment, Safety, and Occupational Health (ESOH) Risk Management		
	Environmental, Safety and Occupational Health (ESOH) Risk Reporting	ESOH Compliance (7.3.1)	
	Environmental, Safety and Occupational Health (ESOH) Risk Acceptance		
National Environmental Policy Act (NEPA)/ Executive Order (EO) 12114 Compliance Schedule Analysis	National Environmental Policy Act (NEPA)/ Executive Order (EO) 12114 Compliance Schedule Analysis		
	Unmanned Systems (UMS)		
	Green Procurement	Pollution Prevention (7.3.5)	
		Hazardous Materials Management (7.3.4)	
		Pollution Prevention (7.3.5)	
Mishap Investigation Support			
Human Systems Integration (Enclosure 8)	Human Systems Integration (HSI)	Human Systems Integration (HSI) (7.2)	Human Systems Integration
Human Factors Engineering		Human Factors Engineering (HFE) (7.2.3)	
Manpower		Manpower, Personnel, and Training (MPT) (7.2.2)	
Personnel			
Training			
Habitability		Habitability (7.2.5)	
Survivability		Personnel Survivability (7.2.4)	
Safety & Occupational Health			
		HSI in Acquisition (7.2.1)	

Varied Guidance On SE

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Systems Engineering Across Life Cycle	System Engineering Design Consideration	CH 7 System Engineering and Human Systems Integration	Functional Areas
	Insensitive Munitions (IM)	Explosives Safety (7.3.6)	
	Interoperability	Interoperability and Integration (7.1.6)	Standardization and Interoperability
	Open Systems De	Open Architecture (7.1.4)	
Modular Open Systems Approach (MOSA)			
		(SOS & FOS) Standardization and Commonality (7.1.9.2)	
		T Design Considerations (7.1.6.1)	
		D Architecture Framework (DoDAF)/Global Information rid Technical Guidance (GTG) (7.1.6.2)	
		tem of Systems (SoS) or Family of Systems Integration eroperability Validation (7.1.6.3)	
		eroperability and Integration Support (7.1.6.4)	
		tem Performance for SoS and FoS Programs (7.1.9.1)	
	Parts Ma		
	Program Pr		
	Program		
	Critical Program I		
	Threats, Vulnerabi s, Risk sment		
			Information Assurance
	Quality and Producibility		
	Quality in Design	Quality (7.1.2)	
	Manufacturing Readiness	Manufacturing and Production (7.1.1)	
	Reliability, Availability, and Maintainability	Reliability, Availability, and Maintainability (RAM	intainability
	Software		e
Spectrum Supportability	Spectrum Management	Electromagnetic Environmental Effects (E3) an Supportability (7.1.13)	l Effects and Spectrum
	Standardization		
	Supportability	Acquisition Logistics and Sustainment (7.1	
	Supportability Analyses		
	Support Concept		
Data Management & Technical Rights	Support Data		
	Support Resources		
	Survivability and Susceptibility	Survivability (7.1.7)	
Unique Identification of Items (UID)	Unique Identification of Items (UID)		
Systems Engineer Plan (SEP)		System Engineering (7.1)	Sy g and Program Management Tasks
		Shipboard System Integration (7.1.8)	
		Performance Specifications (7.1.9)	
		Precise Time and Time Interval (PTTI) Support (7.1.10)	
		Geospatial Information and Services (GI&S) (7.1.11)	
		Natural Environmental Support (7.1.12)	
Systems Engineering Leadership			
Techncial Reviews			
Configuration Management			

No Mention Of Performance Parameters KPPs

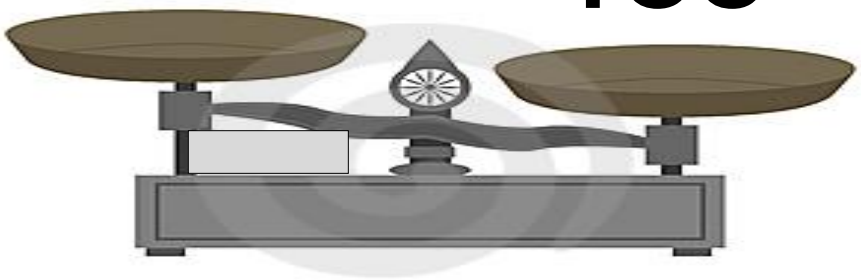
No Mention Of Total Ownership Cost TOC

System Attributes

Operationally Effective	Operationally Suitable
Performance (KPPs, KSAs)	**System Safety**
Human Systems Integration	**Environmental Impact**
Habitability	**Human System Integration (7 Domains)**
Survivability	Human Factors Engineering
Interoperability	Manpower
Air-Ship Integration	Personnel
Electromagnetic Environmental Effects (E3)	Training
Spectrum Supportability	Safety & Occupational Health
Netcentric Interoperability	**Interoperability & Standardization**
	OA
	Modularity
	Commonality
	Program Protection
	Critical Program Information (CPI)
	Critical Safety Items (CSI)
	Threats, Vulnerabilities, Risk Assessment
	Technology Protection
	Information Assurance
	OPSEC
	Producibility
	Ten Logistics Elements
	Maintenance Planning
	Supply Support
	Support & Test Equipment
	Manpower & Personnel
	Training & Training Devices
	Technical Data
	Computer Resource Support
	Packaging, Handling, Storage, and Transportation (PHS&T)
	Facilities
	Design Interface
	Facilities and Infrastructure
	Total Ownership Cost

KPPs/KSAs

TOC



Rapid Deployment System Attributes

Operationally Effective	Operationally Suitable
Performance (KPPs, KSAs)	**System Safety**
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Habitability	**Human System Integration (7 Domains)**
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	Total Ownership Cost

Reduced Attribute Set Based On Minimum Set of Flexible Requirements For Short Lived Tactical Systems

No Threshold

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Critical Rapid Deployment Attributes

Operationally Effective	Operationally Suitable
Performance (KPPs, KSAs)	**System Safety**
Human Systems Integration	**Environmental Impact**
Habitability	**Human System Integration (7 Domains)**
Survivability	Human Factors Engineering
Interoperability	Manpower
Air-Ship Integration	Personnel
Electromagnetic Environmental Effects (E3)	Training
Spectrum Supportability	Safety & Occupational Health
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	Design Interface
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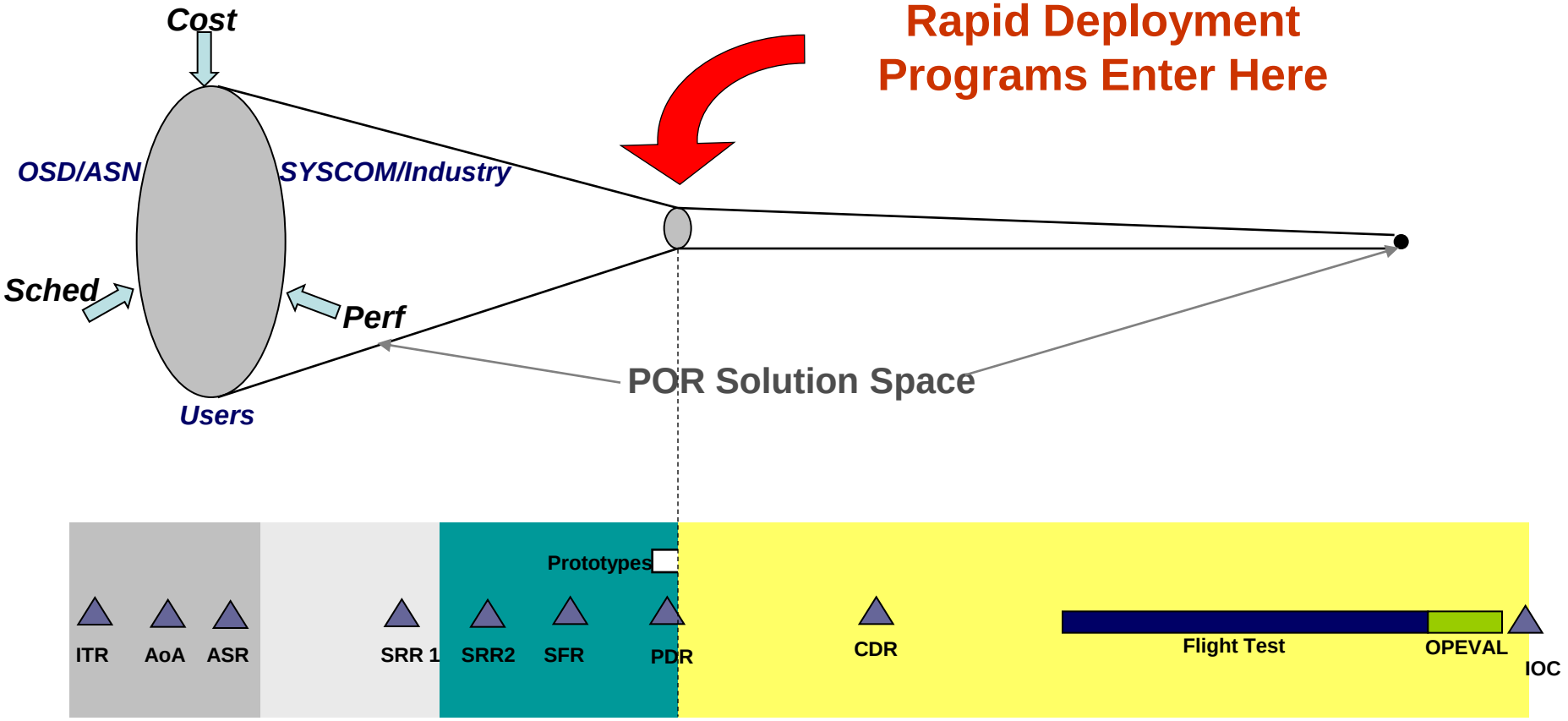
Rapid Deployment Attributes


Defined Thresholds Exist


Thresholds Flexible


No Threshold

Rapid Deployment Against SETR Timeline



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Role of Engineering & Logistics Personnel

- **Engineering & Logistics Review Predictive Analysis To Evaluate Maturing Design**
  - Stressing Requirements Requires More Analysis
  - Suitability Requirements Are Balanced Across Breadth Of Design
- **Service Life (20-25 Year) Invokes JCIDS Sustainability Emphasis**
  - High Levels Of Reliability Over Service Life
  - Design Is Optimized To Reduce Total Ownership Cost (TOC)
  - Large Infrastructure Investments Are Evaluated
    - Fully Integrated, Multi-Service, Joint Infrastructure
    - Establishing Permanent Ground Control Segments
    - Multiple Operating Locations
    - Large Number Of Systems
    - Organic MX, Training, and Supply Support

Plan & Analyze

Short Lived Systems Reduce Planning and Analysis

Rapid Development Effectiveness Attributes

- **Performance Thresholds (Pre-MS B)**
  - Achievable With Existing Technology (Limited TD Phase)
  - Allow Performance Threshold To Adjust To Technology
  - Incremental Increases Through P3I
- **Open Architecture-Modular Or Federated Approach**
  - Integration Drives Complexity
  - Integration Works Against P3I
- **Avoid Desire To Control Everything**
  - Allow CDD To Spawn Multiple Programs
    - UAS Control Segments
    - UAS Air Vehicles
  - Manage Program Beyond System Boundaries

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Rapid Development Sustainment Philosophy

- **Identify Non-TOC Elements**
  - Balance Logistics Savings Against Development Cost
- **Avoid One Size Fits All Support Structure**
  - Current Support Of Sub-System May Be Good Enough
- **Define A Standardized Technology Insertion Cycle**
  - Manage Life Cycle Logistics Incrementally
  - Reduce Support Requirements By Life Limiting Components
  - Accept Technology Refresh As A Supportability Approach Along With Performance Improvements Benefits
  - Performance Improvements Have Value That Offset Cost
- **Assume Supportability Infrastructure Is Not Inflexible And Will Adapt To System Shortfalls**

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Summary

- "Timing Is King" In Rapid Deployment
- DODI 5000.02 and JCIDS 3470.01 Identify Program Of Record Timelines As 'Deliberate"
- System Development Timelines Driven By
  - State Of Technology
  - Suitability Requirements
- Architect System To Reduce Development Time
  - Open Architecture
  - Incremental Development or Technology Insertion
  - Modularize System To Reduce Supportability Impacts
- Support System Is Not Static

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BACKUP

Rapid Deployment System Attributes

Operationally Effective	Suitable
Performance (KPPs, KSAs)	System Safety
Human Systems Integration	Environmental Impact
Habitability	Human System Integration (7 Domains)
Survivability	Human Factors Engineering
Interoperability	Manpower
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Rapid Warfighter Attributes

Defined Thresholds Exist

Thresholds Flexible

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