TECHNOLOGY TRANSITION
IS THERE A WAY?

08/27/2014
Prof. Jeff Craver - DAU
Dave Hays - ASE

Aircraft Survivability Equipment (ASE) Project Office
Technology Transition in Practice

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OVERVIEW

- ***Describe the challenge*** of managing the maturation of technology for transition from the perspective of the Program Manager, User, and the Technologist
- Provide an ***overview of the*** Technology Program Management Model ***(TPMM) Methodology*** in terms of Processes, Systems Engineering, and Transition Management
- Describe the Systems Engineering Module (SEM) as ***a government-owned SharePoint@ application*** that provides online implementation
- Describe how the ***ASE*** TPMM Project has ***applied the model to improve current processes and add-value*** to the enterprise

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THE CHALLENGE

Fact: There are diminishing resources and belt tightening ongoing in DoD

Unfortunate Reality: Warfighter Needs are increasing at a significant rate in an attempt to outpace an Asymmetric Threat

Faced with this reality, what needs to be done?

If we can't get adequate funding,

- We need to ***make smarter choices in what to fund.***

If we can't build things faster,

- We need to ***build them more efficiently with less re-work.***

If we can't afford the full set of performance,

- We should ***focus on the highest priority needs.***

If we can't afford to fail,

- We must effectively ***identify and manage the risk.***

Does this require a Culture Change?

Do Perspectives Influence Decisions?

Hey Buddy - I OWN The Requirements!

Gotta be small, lightweight, and 99.99% reliable

I Want it All!!
I Want it Cheap!
I Want it Now!

I'm governed by the JCIDS

- Threat Driven
- Soldier-Proof
- Fieldable
- Meets Mission Needs
- **DOTMLPF**

USER

Your next chance for funding is 5 years down the road – stud!

I NEED a REQUIRMENT (CDD)!

My prime can do that!!

I am governed by DoD 5000.02

You forgot about the "ilities"!!!

- Value Added
- Capability
- Probability of Success
- Acquisition Strategy
- Budget (LLC/POM)
- Schedule - WBS
- The System " approach"

PM

If you "Push" long enough – they will come!

You don't understand - This project is different from everyone else

S&T does not require a process – I have been doing it for years

Customer role is to integrate

- Technical "break-through"
- Performance Goals
- Risk
- Cost Estimate.
- Program Plan
- Build a prototype

S&T

A Way

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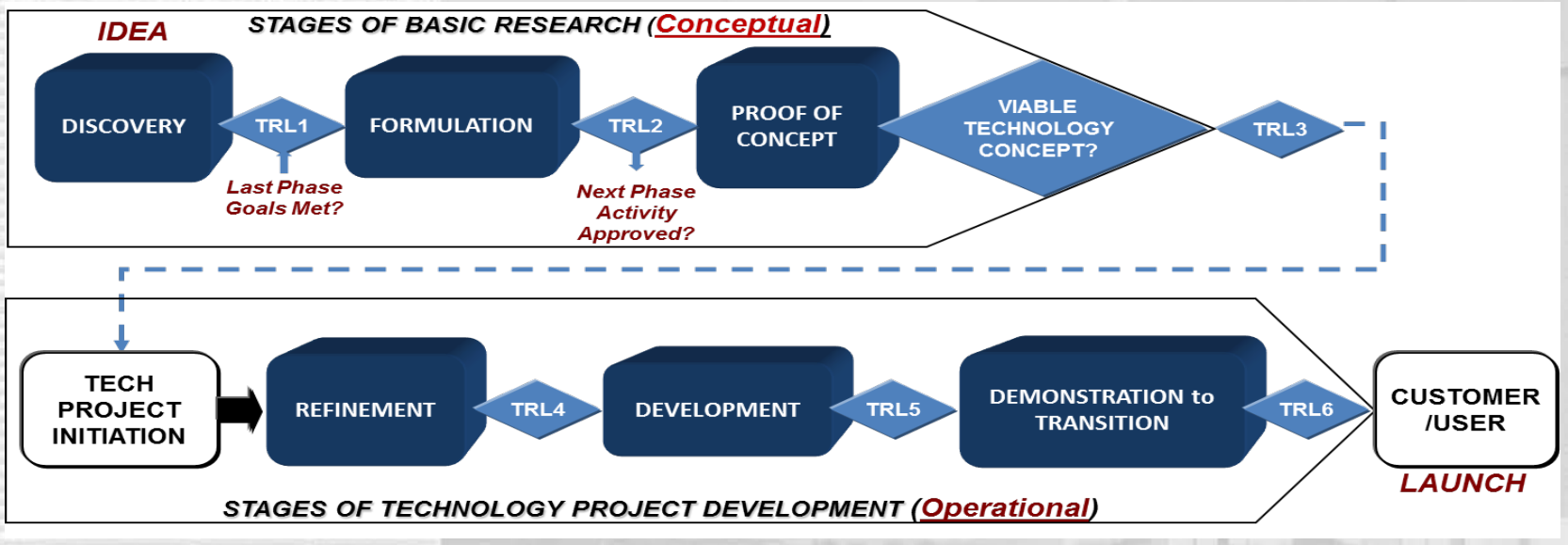
Technology Stage-gate Process



- Discrete stages of development or activity
- Evaluation Gate points (Go/No-go)
- Form a chain of steps leading from "idea" to "launch“ (transition)

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Gates with a rigorous criteria set facilitate effective Go/No-go decision points

Technology Program Management Model (TPMM) Overview

TPMM is a process model and supporting software toolset based on a set of industry and academia best practices and principles

a. Stage-Gate Process

b. Systems Engineering in DoD Technology Development

c. Incremental Transition Management

d. Standards

TPMM provides an framework that is designed to increase confidence in the decision making process.

Tech Program Events/Gates/TDP's

[With Sample Entry/Exit Criteria]

ESS Project Initiation

- Need Identified
- Market Analysis
- Cost Estimate
- Reqmts Trace
- AoA
- Risk ID'd
- Tech Approach
- Schedule

Proof of Technical Concept (3)

- Pgm Cost Estimate
- Pgm Schedule developed
- Contract strategy ID'd
- Perform Reqmts Drafted (*)
- Trade Study Analysis
- CPI/SCG Needs ID'd
- Proof of Concept Complete
- Tech Sponsor ID'd
- "Interest" Technology Transition Agreement (TTA) Drafted (*)

(SYS) Reqmts Review (Users)

- Perf Req & Thresholds Updated (*)
- Component Architecture Drafted
- Initial Req Allocation Drafted (*)
- M&S Gaps/Needs Understood
- Breadboard Lab Test Plan complete

Preliminary Design Review

- Design Doc Drafted
- Component Architecture Final w/ Req Allocated (*)
- Throughput Analysis Supported by M&S
- Algorithms Identified and Specified
- SW Components ID'd (*)
- Breadboard Lab Test Procedures complete
- Illities Addressed (*)

Bench (BreadBoard) Test (4)

- Integrated Breadboard Lab Test complete
- Cost Estimate Updated
- Program Plan Updated
- Form Fit Drafted
- System Requirements Validation complete (*)
- Design Issues ID'd
- CPI/SCG Needs Updated
- "Intent" TTA Initiated (*)
- Illities Drafted (*)

Out-of-Laboratory (Key Technology)

- Manufacturing/Production Plans initiated (*)
- Interface Specs Draft
- Design changes ID'd & Documented
- Relevant Envmt ID'd
- Brassboard Test Plan Complete (*)
- Phase Cost & Risk ID'd/Mitigated

Critical Design Review

- Requirements Updated and Traceable
- Component I/F Docs Final
- Brassboard Prototype Design is Final
- Brassboard Test Procedures Complete (*)
- Risk Plans Acceptable
- Manufacturing/Production Plans Drafted (*)

Prototype Demo in Relevant Environment (5)

- Brassboard Relevant Envmt Test Complete
- Test Report Validates Integrated System Performance
- System Req Final (*)
- CPI/SCG Needs Updated
- Supportability / Delivery Package Items ID'd (*)
- "Commitment" TTA Drafted (*)
- Cost and Risk Assessed

Final "Build-To" Specification Review

- "Build-To" specifications under CM control (*)
- Design Drawings/Codes Final
- Illities Final (*)
- Manufacturing/Production Documentation complete (*)
- Cost and Risk Final

Prototype Demo in Operational Environment (6)

- Prototype Performance Demonstrated to meet Capability Needs in Relevant or Simulated Operational Envmt
- Supportability/Delivery Package Complete (*)
- CPI/SCG Needs Final
- PPP Inputs Developed
- "Commitment" TTA Signed (*)

Operational Qualification

LEGEND

GATE

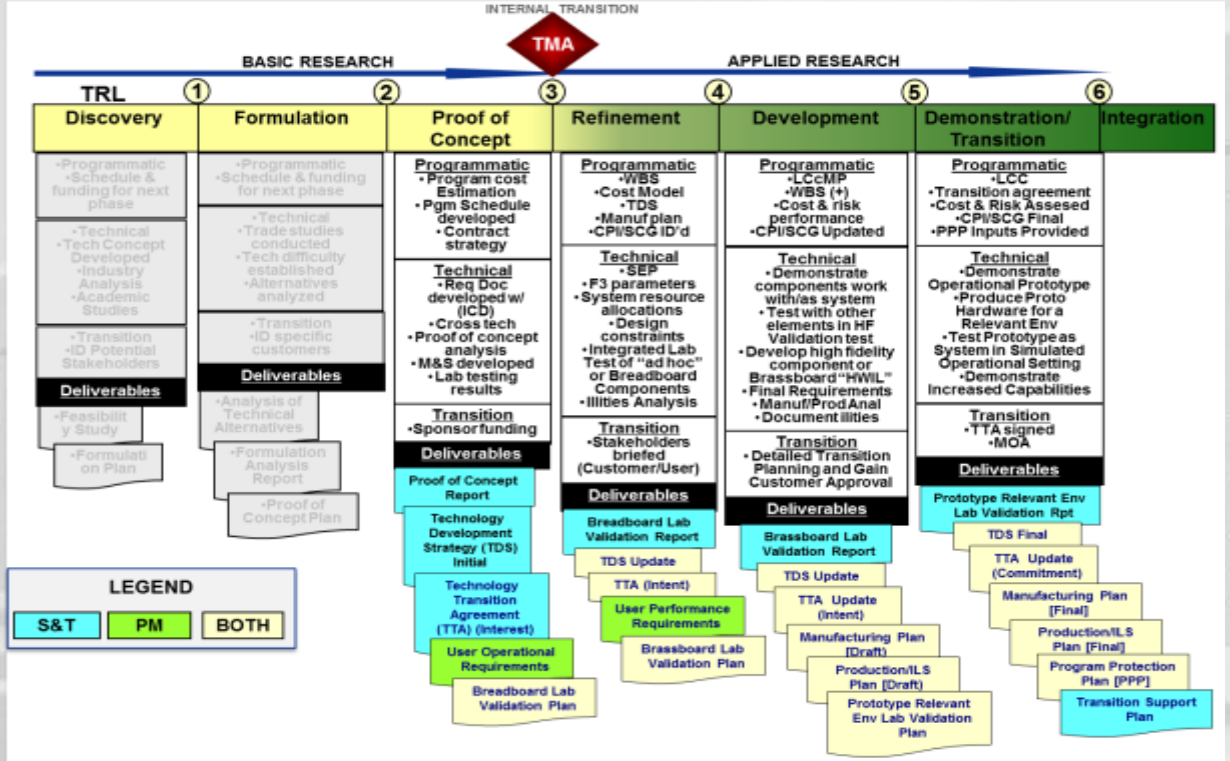
TECHNICAL DECISION POINT

(*) = Conditional Criteria Based on Push/Pull Status
Optional for Push Technologies/Mandatory if Pulled

TDP – Technical Decision Point

Functions of the TPMM

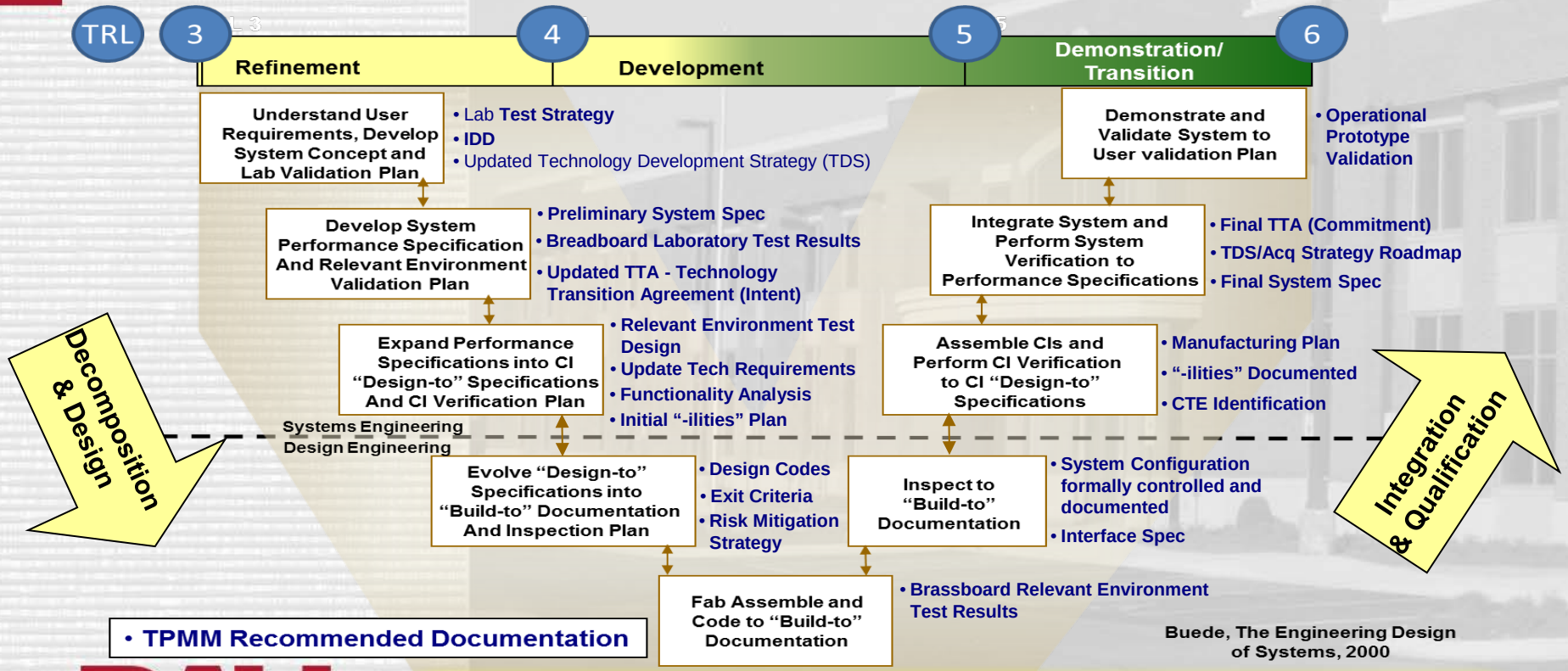
- Program Definition
  - ✓ Identify Activities to consider
  - ✓ Identify Deliverable Documents
  - ✓ Provide guidance for Tailoring
  - ✓ Employ "Best Practice" Tools
  - ✓ Identify and Mitigate Risk
- Transition Management
  - ✓ Technology Transition
  - ✓ Technology Transfer
  - ✓ Technology Marketing
- Maturity Assessments
  - ✓ Establishes Entry/Exit Criteria
  - ✓ Provides a Framework for Technology Maturity Assessments (TMA)



Legend:
TTA = Technology Transition Agreement TDS = Technology Development Strategy

A TRL-Based, Stage Gate Model Designed for Technology Development and Transition

Embedded Systems Engineering



• TPMM Recommended Documentation

Buede, The Engineering Design of Systems, 2000

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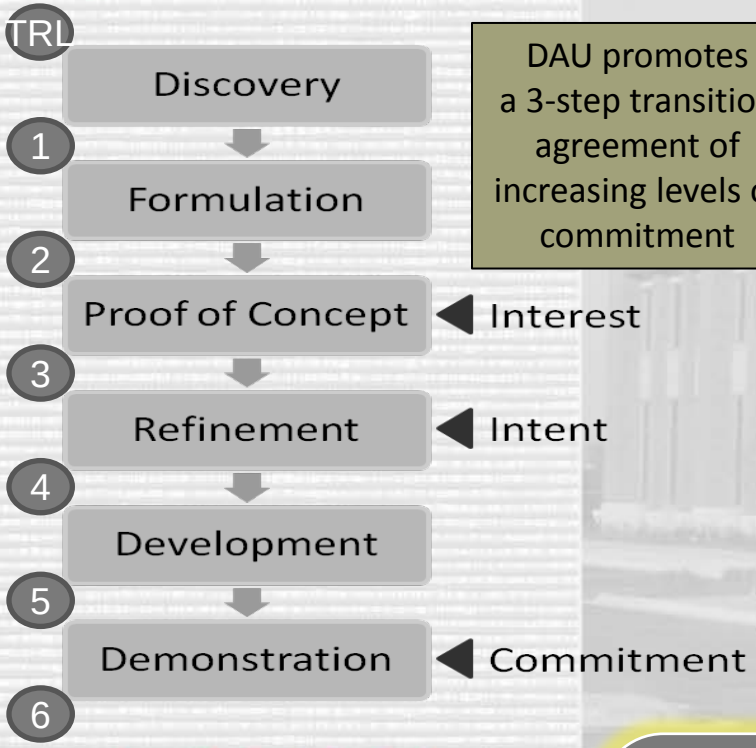
Systems Engineering principles are embodied in the activities and associated documentation in each stage of maturity development

Collaborative Transition Management



DAU promotes a 3-step transition agreement of increasing levels of commitment

Incremental levels of interest and investment promote an honest exchange and common understanding of the desired "Transition".

Alignment Mechanisms synchronize two communities which operate with different schedules and priorities.

Significant event milestones, or "**touch points**", are needed to maintain alignment along the way leading to transition at MS-B

Transition comes about through effective communication between the acquisition center and the technology base

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Collaborative Transition

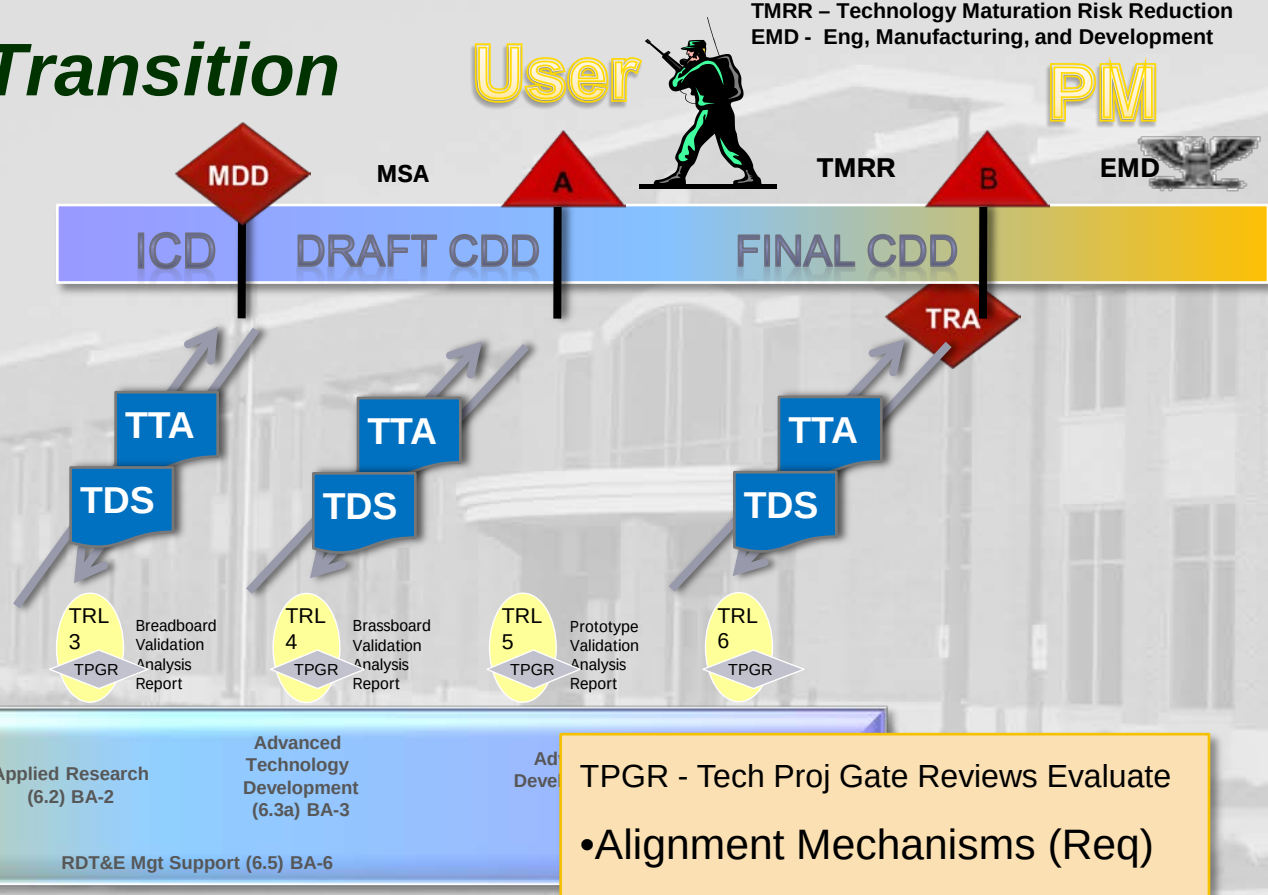
MSA - Material Solution Analysis
TMRR – Technology Maturation Risk Reduction
EMD - Eng, Manufacturing, and Development

TPMM defines the process and transition mechanisms to help tech programs align with Acquisition Milestones

Alignment Mechanisms

TTA Technology Transition Agreement

TDS Technology Development Strategy



Basic Research (6.1) BA-1

Applied Research (6.2) BA-2

Advanced Technology Development (6.3a) BA-3

RDT&E Mgt Support (6.5) BA-6

TPGR - Tech Proj Gate Reviews Evaluate

- Alignment Mechanisms (Req)
- Performance Objectives (TMA)
- Next Phase Plans (TAA)

TMA – Technology Maturity Assessment
TAA - Technology Advancement Assessment

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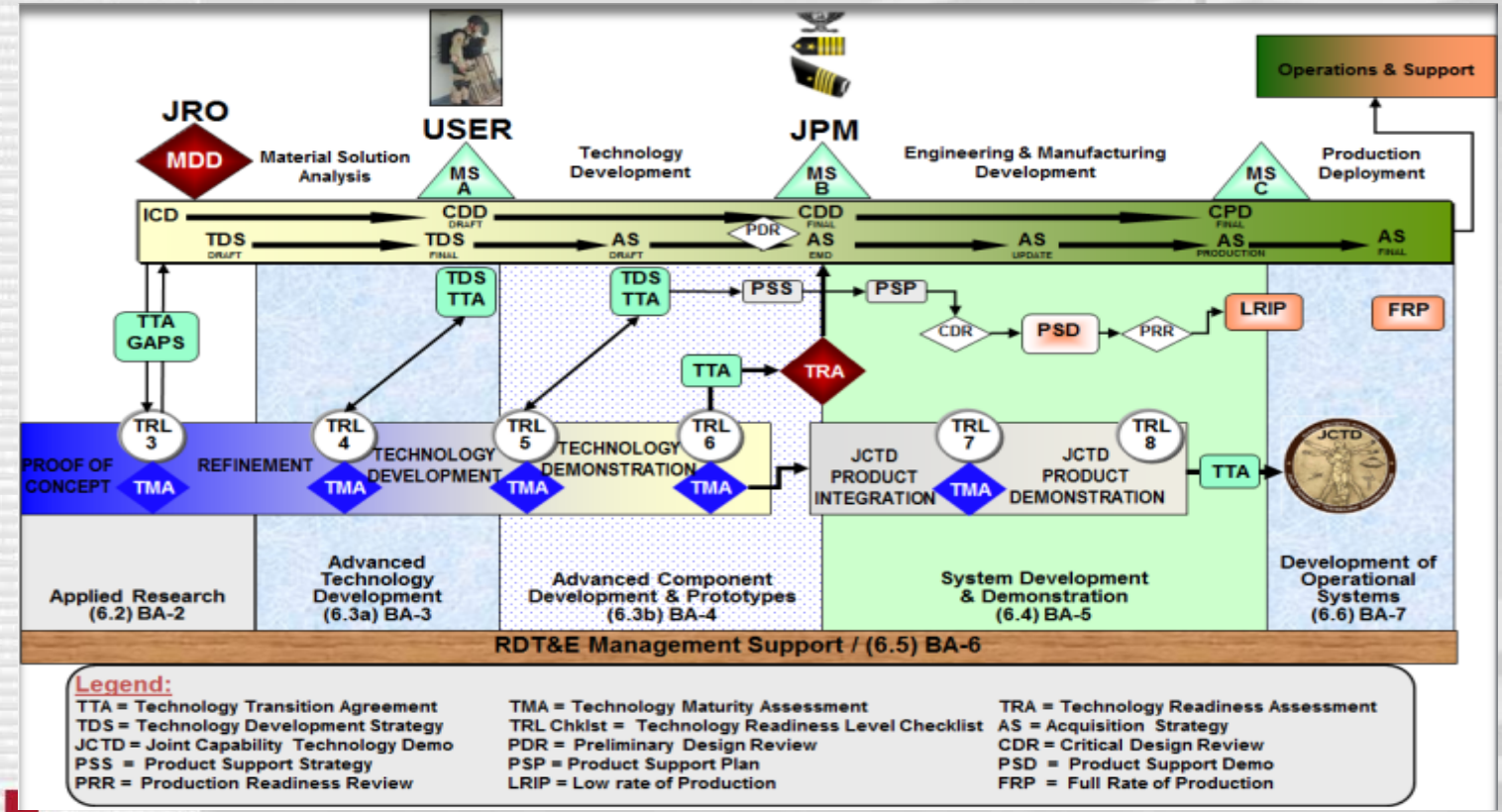
Example Collaborative Transition

Alignment Mechanisms

- **TTA** — Technology Transition Agreement
- **TDS** — Technology Development Strategy
- **TMA** — Technology Maturity Assessment



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Standards in TPMM

Activities

TPMM utilizes a standard set of activities for planning and evaluating your project as it progresses through the TRLs.

Categories:

- Program Management
- Technical Management
- Algorithms
- Models and Simulation
- Manufacturing Readiness
- Transition Management
- Validation

2 - Formulation

Program Management			
PLANNING		EXECUTION	OMISSION JUSTIFICATION
Will you produce a Formulation Analysis Report?	☐	The significance of having the capability afforded by this technology is understood and explained.	
	☐	Recommendation and rationale to continue or desist in developing this technology was provided.	
Will you produce a Plan for the Proof of Concept phase?	☐	The plan for managing Project Risk is established and sufficient	
	☐	Next Phase Cost estimate was sufficient	
	☐	Next Phase Funding estimate was sufficient	
Technical Management			
PLANNING		EXECUTION	OMISSION JUSTIFICATION
Will you produce a Formulation Analysis Report?	☐	The Formulation Analysis Report developed was sufficient for down selecting a Technology Concept	
Will you produce a Plan for the Proof of Concept phase?	☐	The Operational Requirements and Constraints the technology	

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TPMM Metrics Support Decision Making

TPMM Output	Priority	1	2	3	4	5
Technology Advancement Degree of Difficulty (TAD[2])	1	Well Within	Within	Pushing the Science	Hard Push on Science	Breakthrough Required
Risk	1	100% Mitigated	< 100% > 75% Mitigated	< 75% > 50% Mitigated	< 50% > 25% Mitigated	< 25% Mitigated
Next TRL Achievement	1	Imminent (0-6 months)	Soon (6-12 months)	Ranged (12-18 months)	Far (18-24 months)	Horizon (>24 months)
TRL Roadmap to Transition	1	1 Year	2 Years	3 Years	4 Years	>4 Years
Technology Transition Agreement (TTA) Initiated	1	Commitment	Intent	Interest	Under Development	None
Phase Cost (Funding Objectives and Threshold Minimum)	1	< $500K	>$500K <$1M	>$1M <$2M	>$2M <$3M	>$3M
Measure of Effectiveness as a % improvement over existing capability/performance	1	>100%	< 100% > 75%	< 75% > 50%	< 50% > 25%	< 25%
Requirements Trace	1	Traceable to DTRA Mission	Traceable to RD-NT	Traceable to RD-NT-NTD	Level DoD Source	Not Traceable

A priority can be set for any given factor when one has more influence with the decision than another (i.e., where MoE is more important than cost but equal in relevance to TAD2)

TPMM outputs can be used to support investment decisions applied as follows(*):

- A Project that totals [> 33] is in need of review for continuation
- A Project that ranks [> 21 but < 32] needs Management Oversight
- A Project that totals [> 11 but < 20] has moderate risk
- A Project that totals [<10] should be considered as well targeted and relatively Low Risk

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[*Criteria Should be Tailored to the Technology Enterprise]

TPMM Investment Decision Guide

Project Initiation/Investment Decision Checklist					
Branch = AAAA				Project = Name	Date = YYYYMMDD
Description	Yes	No	N/A	Comments	Actions
Value to the Warfighter - why are we doing it? - Should answer the "So, what?" - What are the products to be delivered?	√			Identify the Impact to the Warfighter/Military Significance of pursuing this technology	Operational Prototypes are frequently builts and delivered for characterization and to cultivate User/POR interest
Who are we doing it for?		√		Which Portfolio is it in and how aligned to the Strategic Mission and/or ICD Capability Gaps	Interactive SEM Example
What are the technical challenges?			√	Describe the complexity involved (Breakthrough Req - to Well Within the Science)	Interactive SEM Example
How mature is the technology?	√			The technology maturity stated as TRL last achieved	Interactive SEM Example
What technology readiness level (TRL) is it?		√		The technology development phase that will begin the cycle	Execute TRL X Planning Checklist
What are the metrics?			√	Evaluate Metrics and calculate Risk Summary Score	[> 33] (High Risk) [> 21 but < 32] (Moderate Risk) [> 11 but < 20] (Low Risk) [<10] is considered "On Rails"
What have we accomplished - current and future?	√			Is the technology out of a Vendor IRAD or University R&D	Provide TRL Roadmap Example
When will it be delivered?		√		Identify year that a Capability Demonstration is estimated for	Provide TRL Roadmap Example
What is the transition plan?			√	Transition planning should start with the development of a TTA	Provide TRL Roadmap Example

Benefits from using TPMM

- Standardize planning, documenting, assessing, and reporting
- Ensures each program considers best practice activities
- Assists in assessing and communicating technical maturity through TRL gate reviews
- Assist Portfolio managers in balancing and aligning to gaps
- Higher confidence transitions to Program Offices
- Software Application implementation
  - Staff level project portfolio dashboard
  - Guides tailoring TPMM to each project
  - Guides gate reviews
  - Helps PMs manage projects
  - Provides gap analysis for investment decisions

TPMM helps:
- Reduce risk
- Improve transitions
- Standardize across projects

TPMM SharePoint Application Systems Engineering Module (SEM)

System Engineering Module

TPMM Systems Engineering Module

TPMM Systems Engineering Module

SE Module Center
- Portfolio Overview
- I Need To...
- Portfolio Matrix
- Staff Meeting Review
- Project Attributes Report
- Attributes Matrix Report
- Gate Review
- View Quad
- View Profile
- Desk View
- Administration

Resource Center
- Aids & Lessons Learned
- Policies & Procedures
- Reference
- Templates

SEM Change Requests
- Report a bug
- Request a new feature

Welcome to the System Engineering Module

The System Engineering Module has been implemented to assist Program and Project Managers in the monitoring and management of current, active technology development projects.

Create Project | I Need To...

Project Dashboard for: Ellis, Michael S. CONTRACTOR

Upcoming Events — Next 7 Days

Search all columns:

Date	Description	Type	Point of Contact	Project
Date	Description	Type	Point of Contact	Project

SEM Demonstrator

Project Tools

Current TRL: 5

Current Phase: 5-Demonstration/Transition -6

Next Review Date

Risks — Show Closed:

Tools	Risk	Current Impact	Current Probability	Status	Point of Contact
	Publish TPMM V3 Reference Manual on .MIL Website	4-Serious	4-Highly Likely	Open	TBD

Milestones — Show Completed:

Tools	Milestone	Commitment Date
	Version 1.4 Hotfix	2013-10-21
	Version 1.5	2013-11-15
	Version 1.6	2013-12-30

Project Manager Dashboard

System Engineering Module

TPMM Systems Engineering Module

SE Module Center
- Portfolio Overview
- I Need To...
- Portfolio Matrix
- Staff Meeting Review
- Project Attributes Report
- Attributes Matrix Report
- Gate Review
- View Quad
- View Profile
- Desk View
- Administration

Resource Center
- Aids & Lessons Learned
- Policies & Procedures
- Reference
- Templates

SEM Change Requests
- Report a bug
- Request a new feature

Go to Profile Page

87%

Properties Editor
- Issues
- Risks
- Milestones
- Accomplishments
- PM Scorecard
- Optional Attributes
- Metrics
- Funding Profiles
- Phase Cost Estimate
- TRL Roadmap
- Project Images
- Team Members (Not Visited)
- KPP's (Not Visited)

Project: SEM Demonstrator

Click a Project Property name on the left side of the screen to open a dialog that will allow yo

Risks

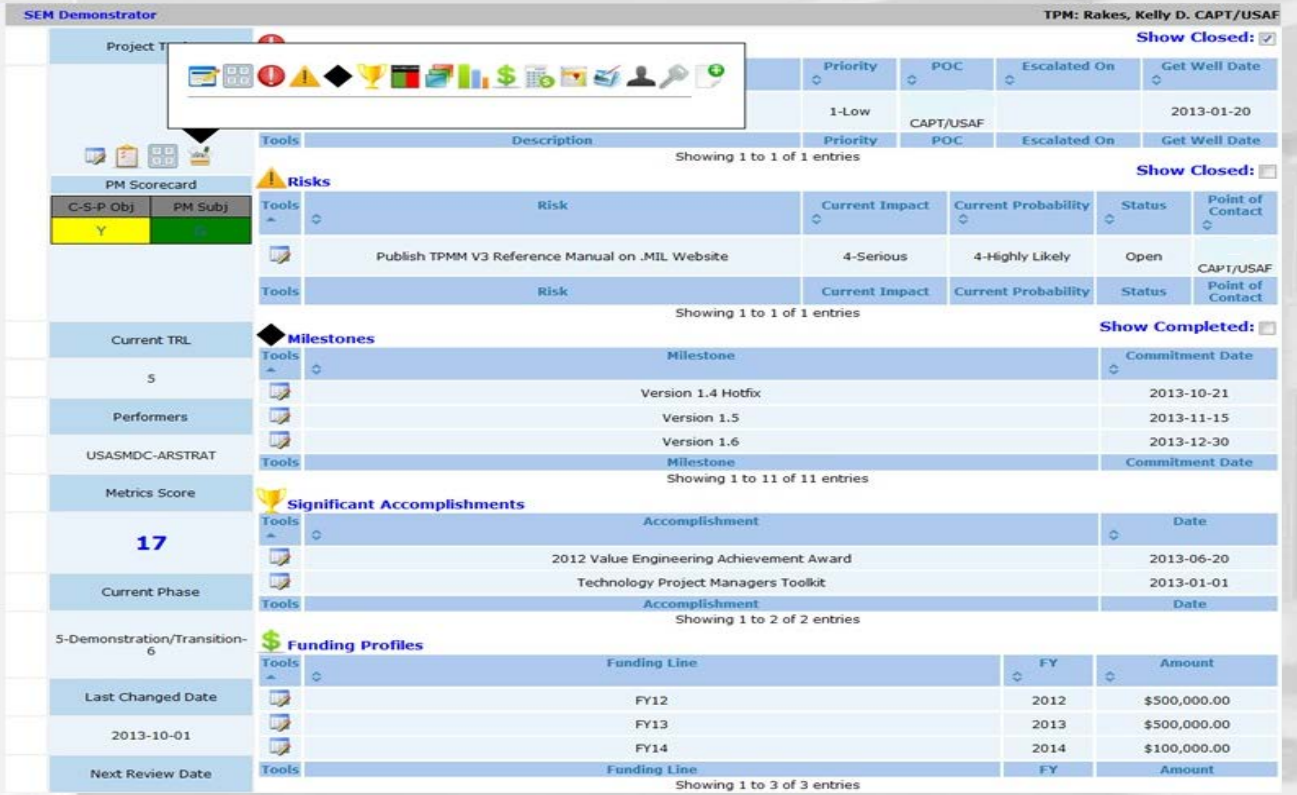
Risks

Risk	RiskImpact	MitigationPlan	IdentifiedDate	ContingencyDate	ClosedDate	RiskDetails
Publish TPMM V3 Reference Manual on .MIL Website	Unable to effectively promulgate knowledge and awareness of TPMM V3 to the potential USG User community	Publish TPMM V3 web pages on the SMDC .MIL site to be accessable to all DoD users as a online reference manual. Once installed, provide a notification email to all previous inquiries	9/17/2013	12/18/2013		Difficulty resides in getting permission from IT to install the site on a page that is accessable from the intranet but restricted to the .MIL domain.

Add new item

Project Properties Editor

System Engineering Module



Project Summary (staff meeting review)

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System Engineering Module

Gate Review

% Completes

Go	No Go	Go with conditions	Incomplete
0%	0%	0%	100%

TMA Checklist — Enabled Only

	Exit Criteria	Reference	Comments	Omission Justification	Determination	Reviewer Comments
Program Management						
	Technology has been assessed at TRL 6.				Go No Go CONDITIONS	
	The technology program development strategy has been Finalized				Go No Go CONDITIONS	
	A realistic estimate of the costs for Transition and Technology Integration into Acquisition Program was provided				Go No Go CONDITIONS	
	Hardware, Software and Algorithm Development Cost projections for the Transition phase are updated in the TDS				Go No Go CONDITIONS	
	A realistic estimate total life-cycle costs have been documented				Go No Go CONDITIONS	
	A Risk Management Plan has been documented and reviewed for Programmatic Mitigation				Go No Go CONDITIONS	
	The Technology Advancement Degree of Difficulty has been revised based on the validation process.				Go No Go CONDITIONS	

Project TRL Assessment Gate Review

System Engineering Module

TAA Checklist

	Exit Criteria	Enabled	Omission Justification	Determination	Reviewer Comments
Program Management ✓✗					
Will the Technology Project conduct a formal assessment at TRL5? ✓✗					
	Technology has been assessed at TRL 5.	✓			
Will the Program development strategy be updated? ✓✗					
	The technology program development strategy has been updated	✓			
Will an estimate of the Demonstration Phase cost be developed? ✓✗					
	Provide an estimate of the Demonstration phase cost	✓			
Will the Technology Life Cycle Cost estimate be revised? ✓✗					
	A realistic estimate total life-cycle costs have been documented	✓			
Will the TPMM Metrics be updated and maintained? ✓✗					
	A Risk Management Plan has been documented and reviewed for Programmatic Mitigation	✓			
	The Technology Advancement Degree of Difficulty has been updated	✓			
Will a plan for Configuration Management of Project work products be maintained? ✓✗					
	Software is under Formal Configuration Control under a published CM Process	✓			
	Software defects and changes follow an established Corrective Action Process	✓			
Will an estimate of the Demonstration Phase cost be devloped? ✓✗					
	Hardware, Software and Algorithm Development Cost projections for the Transition phase are updated in the TDS	✓			
Technical Management ✓✗					
Will the Operational and Mission Requirements/Objectives be finalized? ✓✗					
	Refined Operational and Mission Requirements/Objectives were finalized	✓			
Will the TPMM Metrics be updated and maintained? ✓✗					
	Measures Of Effectiveness are adequate to allow qualitative assessment of the technology	✓			
Will the System Functional Requirements be finalized? ✓✗					
	System Functional Requirements were finalized	✓			
Will a Systems Engineering Review be conducted to support the effectiveness of the developed technology? ✓✗					
	The interfaces for the system and subsystems have been adequately identified for each technology spiral	✓			
	Finalize the Key Technology Component Architecture to be used during this				

Developing the Project Plan

System Engineering Module

⊞ Program Management						Complete:0%
⊟ Technical Management						Complete:28%
	Activity	Completed	Reference	Comments	Reviewed	Reviewer Comments
[+]	Refined Operational and Mission Requirements/Objectives were finalized	✗				
[+]	System Functional Requirements were finalized	✓	Project Management Development Plan.DOC			
	Specific performance goals and exit criteria that must be met before exceeding number of prototypes were met	✗	DTRA Systems Engineering Toolbook Design.doc	Page 8		
	Planned Start Date: 2012-10-01 (yyyy-mm-dd) **% Complete:** 85 % **Planned Completion Date:** 2013-12-20 (yyyy-mm-dd) **Completed:** **Enabled:** ☑ **Example Template :** Proof of Concept Plan			**External Reference:** **Waiting on:** **Reference:** DTRA Systems Engineering Toolbook Design.doc DTRA Systems Engineering Toolbook Design.doc **Comments:** Page 8		
[+]	The Physical Requirements to be used during this spiral or increment of development are complete	✗				

Updating the status of an activity

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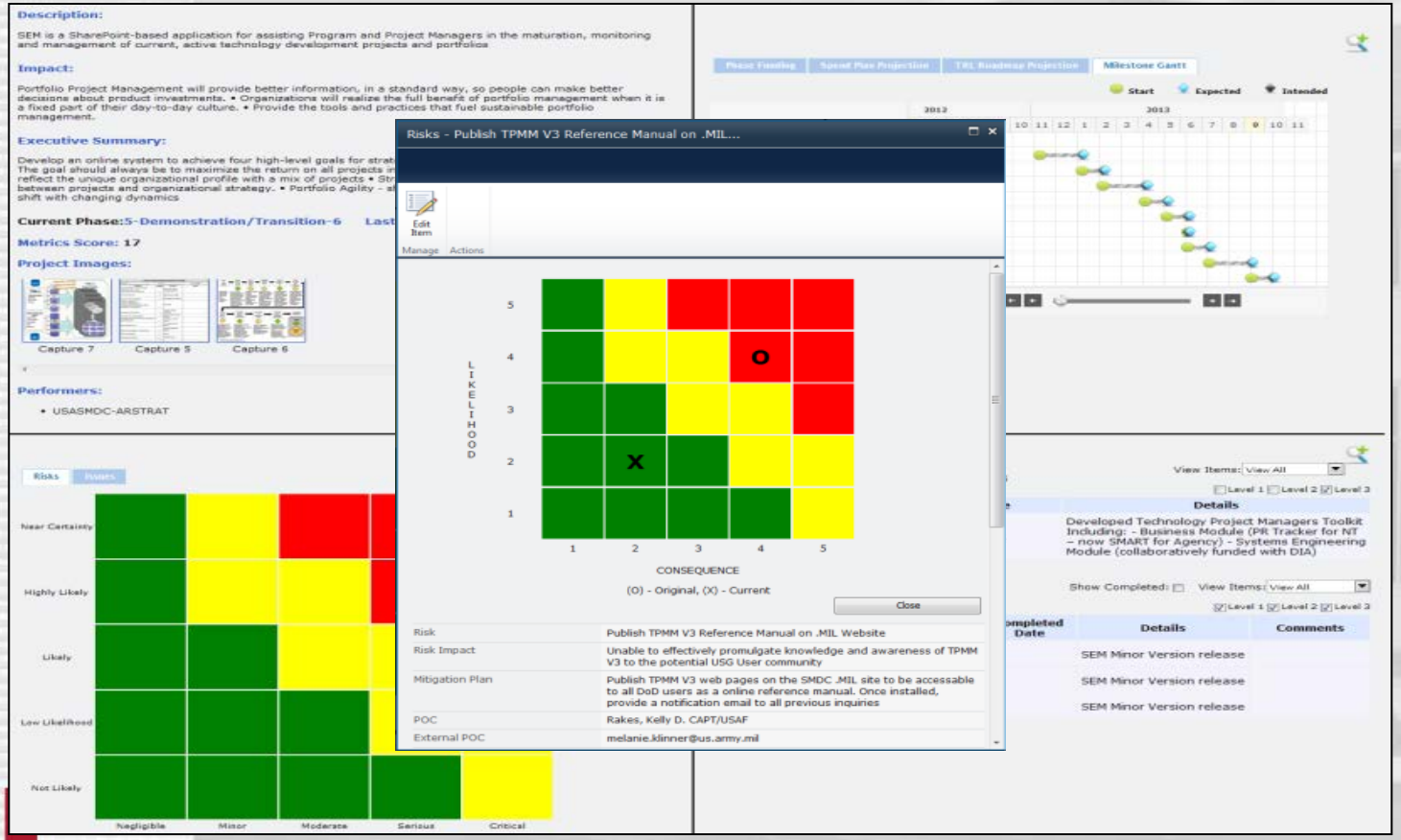
System Engineering Module



Project Quad Chart Generator with *Risk Drill- down*

Portfolio Reports/Views

Collaboration: Type

Attribute Type 1: Technology Area | Attribute Type 2: Collaboration Type | Go

Show/Hide Filters

☑ Highlight Project Gaps ☑ Highlight Collaboration Type Gaps ☐ Show Grid Lines ☐ Show Duplicates

		Interdependence	Shared_Responsibility	Information_Sharing	Awareness	
Training-Demo Portfolio	SEM Demonstrator	X				(1), 25%
	Training_B[illegible]		X			(1), 25%
	Training_[illegible]is	X				(1), 25%
	Training_F[illegible]	X				(1), 25%
		(3), 75%	(1), 25%	(0), 0%	(0), 0%	

Innovation: Type

Attribute Type 1: Technology Area | Attribute Type 2: Innovation | Go

Show/Hide Filters

☑ Highlight Project Gaps ☑ Highlight Innovation Gaps ☐ Show Grid Lines ☐ Show Duplicates

		Architectural	Disruptive	Incremental	
Training-Demo Portfolio	SEM Demonstrator		X		(1), 33%
	Training_B[illegible]y			X	(1), 33%
	Training_E[illegible]s	X			(1), 33%
	Training_F[illegible]n	X			(1), 33%
		(2), 50%	(1), 25%	(1), 25%	

Performer:

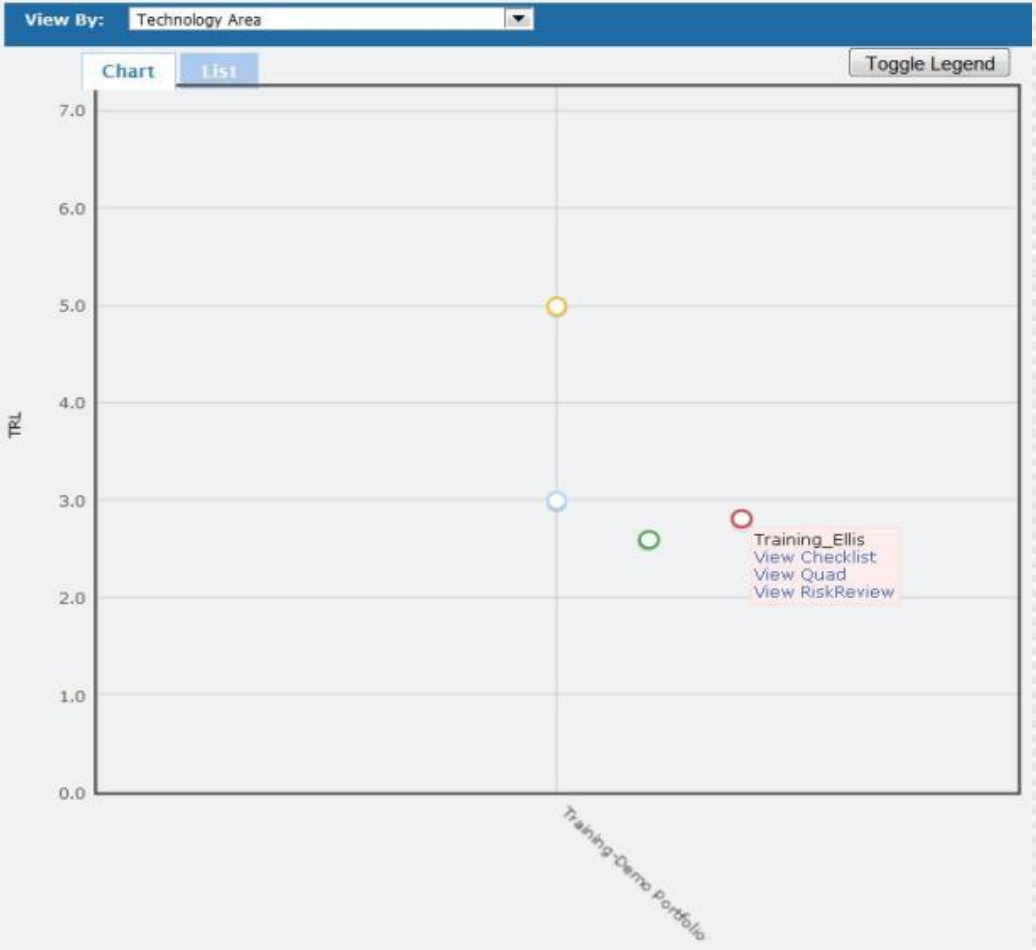
Attribute Type 1: Technology Area | Attribute Type 2: Performer | Go

Show/Hide Filters

☑ Highlight Project Gaps ☑ Highlight Performer Gaps ☐ Show Grid Lines ☐ Show Duplicates

		USASMDC-ARSTRAT	Nuclear Science and Engineering Research Center	Missile Defense Agency	Defense Intelligence Agency	Defense MicroElectronics Activity	
Training-Demo Portfolio	SEM Demonstrator	X					(1), 20%
	Training_B[illegible]y	X					(1), 20%
	Training_E[illegible]s	X					(1), 20%
	Training_F[illegible]n	X					(1), 20%
		(4), 100%	(0), 0%	(0), 0%	(0), 0%	(0), 0%	

Portfolio Matrix Analysis



Capability Needs Coverage Matrix

Attribute Type 1: Technology Area Attribute Type 2: Requirement Go

Show/Hide Filters

☑ Highlight Project Gaps ☑ Highlight Requirement Gaps ☑ Show Grid Lines ☐ Show Duplicates

		CNT Capability Gap 5	CNT Capability Gap 10	CNT Capability Gap 2	CNT Capability Gap 1	CNT Capability Gap 15	CNT Capability Gap 19	
Training-Demo Portfolio	SEM Demonstrator				X	X		(2), 33%
	Training_E[illegible]rc[illegible]y	X			X		X	(3), 50%
	Training_E[illegible]is	X			X			(2), 33%
	Training_Fi[illegible]n		X		X			(2), 33%
		(2), 50%	(1), 25%	(0), 0%	(4), 100%	(1), 25%	(1), 25%	

Gaps NOT Covered

Gaps Potentially Duplicated

Gaps Partially Covered

RECIPIENT OF A USD(AT&L) 2012 VALUE ENGINEERING ACHIEVEMENT AWARD

THE UNDER SECRETARY OF DEFENSE
3010 DEFENSE PENTAGON
WASHINGTON, DC 20301-3010

ACQUISITION, TECHNOLOGY AND LOGISTICS

MEMORANDUM FOR: SEE DISTRIB

SUBJECT: Fiscal Year 2012 Value Engineering Awards

It gives me great pleasure to announce the FY 2012 Value Engineering (VE) Achievement Award winners. Attached is a list of 32 programs, individuals, teams, and organizations who have made significant contributions to the Department of Defense (DoD) through VE-related efforts resulting in cost savings, cost avoidances, quality improvements, or efficiencies. In particular, we commend Mr. David Love for his 44 years of unwavering commitment to building the VE Program and his cycle of U.S. defense systems.

In lieu of an awards ceremony this year, certificates to component VE offices so that they me in congratulating these recipients and recogn critical component of our Better Buying Power cycle cost of defense systems.

My points of contact (POCs) for this matter are Mr. Darren Dusza, at 571-372-6157; and Ms. Mary Hart, DoD VE Awards POC, at 703-767-1 your support as we work to improve and expand the use of VE.

Frank Kendall

TPMM-based SharePoint Solution Application: Systems Engineering Module (SEM)

Defense Threat Reduction Agency (DTRA)

Special — Implementation of the Technology Program Management Model to Nuclear Detection Technologies
DTRA
Fort Belvoir, VA 22060

NTD's use of TPMM and the tenets of BBP have both potential and direct savings implications. Specifically, *over $30 million has been saved both directly (~$8M) and through cost avoidance (~$22M)* by the implementation of this best practice systems engineering method to develop and assess a technology's maturity.

AIRCRAFT SURVIVABILITY EQUIPMENT (ASE) PROJECT OFFICE OVERVIEW

ASE TPMM SEM Adoption

Defense Acquisition University

Perspective on the imperative of technology transition

27 August 2014

Presented by

Dave Hays
S&T Coordinator
Technical Division
PMO Aircraft Survivability Equipment (ASE)

Disclaimer

- Multiple organizations mentioned in this presentation do not necessarily represent any organization's final effort; but this presentation will provide an overview of similar efforts in process paralleled by multiple DoD organizations
- As a Science and Technology (S&T) Coordinator, my duties and responsibilities involve the monitoring and “shepherding” of S&T initiatives by external organizations for a potential transition to an acquisition program

Overview

- **Questions / Observations**
- **Relationship with S&T Community**
  - TINs vs. CINs
  - Requirements
- **S&T Management Tools – TPMM**
- **Recent Collaboration**
- **Summary**

Questions / Observations

- **"Is S&T Broken?"**
- **From the perspective of:**
  - Combat Developers (the User)
  - RDECOM (the Labs)
  - Acquisition PEOs and PMs
- **How do we measure success?**
- **How does a PM align itself with the Labs?**
- **What is the process a PM must follow?**

Relationship with S&T Community

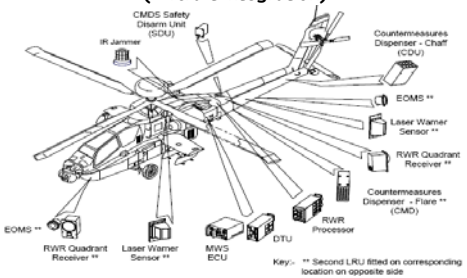
"B-Kits" are easily installed and removed from the aircraft

"A-Kits" are permanently installed on the aircraft

Technology Foundation in "B-Kits"
(EW Systems)

Air-Worthiness Release (AWR)
(Software Integration)

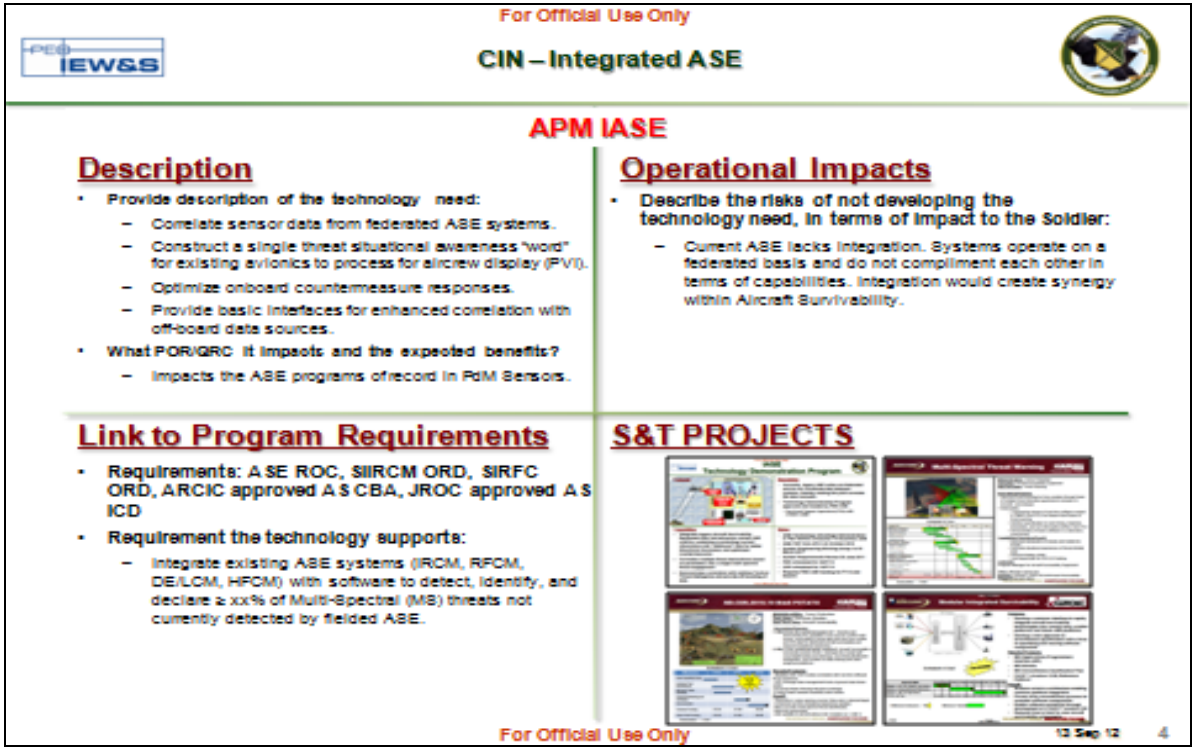
Technology Foundation in "A-Kits"
(Aircraft Integration)



TINs vs. CINs

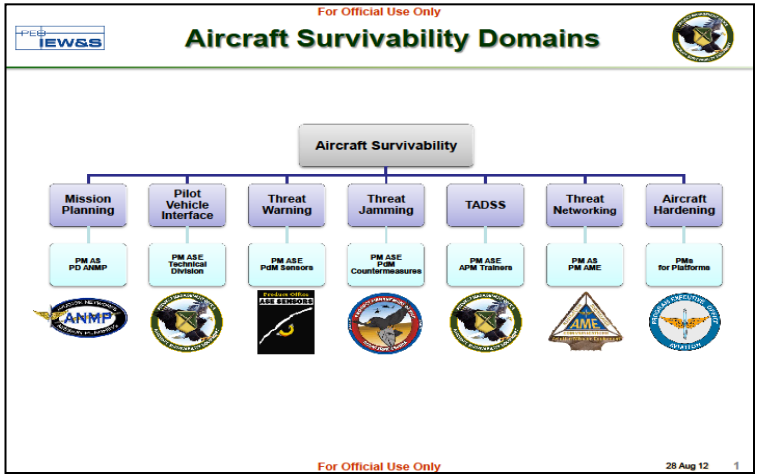
<u>Technology Investment Needs (TINs)</u> come from JCIDS documents (e.g. – CIRCM CDD KPPs, KSAs, AAs) or Directed Requirements, and map to current acquisition programs.

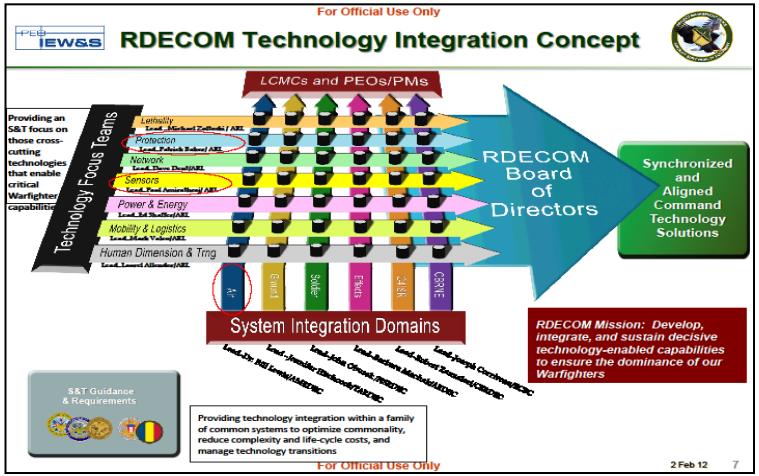
<u>Capability Investment Needs (CINs)</u> represent high level needs that have not been decomposed into specific technology areas, but trace to an approved strategic vision.

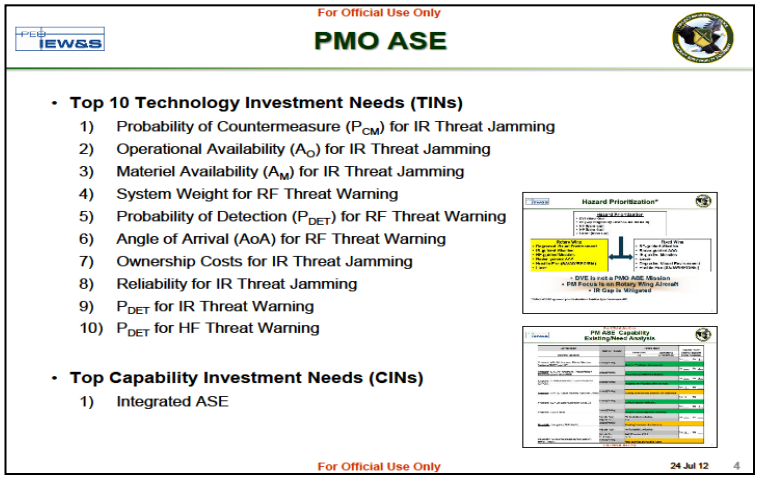


Requirements→TINs/CINs→SIDs/TFTs

Portfolios

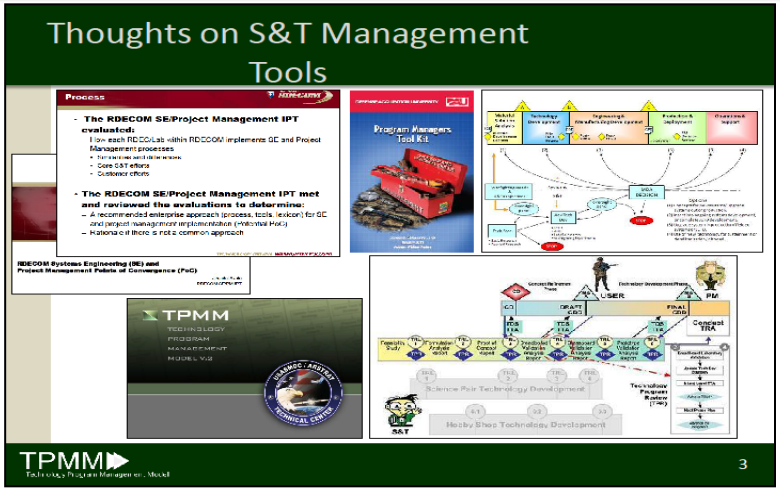


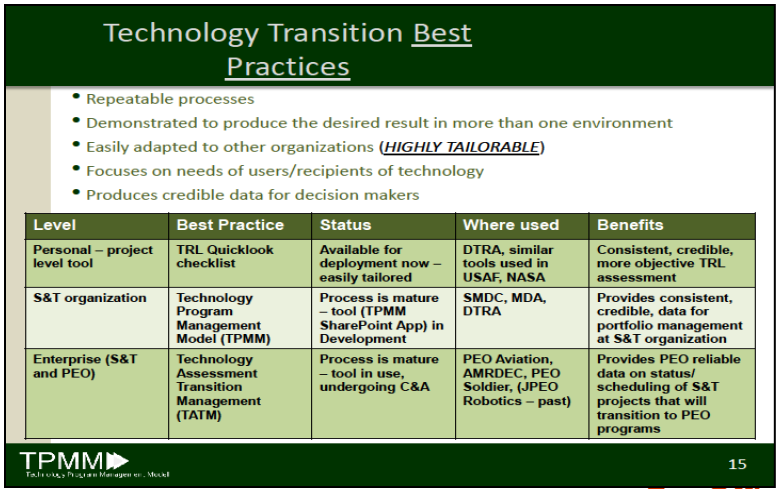




S&T Management Tools – TPMM

- Both Materiel Developers and Technology Managers need a logical methodology and standardized approach to technology development
- Since 2007, PM ASE had used the Technology Transition (T2) Matrix for PEO IEW&S, and Technology Assessment Transition Management (TATM) for PEO Aviation
- PM ASE sought out best practices from the Defense Acquisition University (DAU), the Army Logistics University (ALU), and the Center for Army Acquisition & Materiel Lessons Learned (CAAMLL); subsequently identifying the Technology Program Management Model (TPMM) methodology
- On 20 Dec 12, PM ASE completed a 6-month pilot program that culminated with a Technology Program Gate Review (TPGR) for TRL 5 on an S&T effort



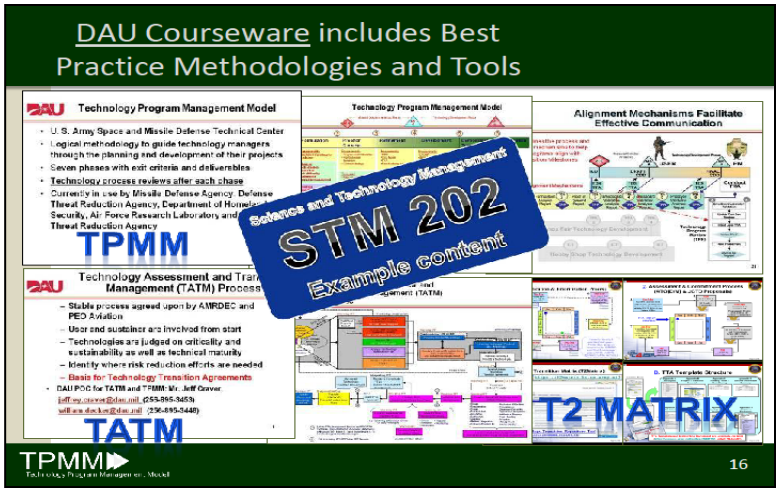


Technology Transition Best Practices

- Repeatable processes
- Demonstrated to produce the desired result in more than one environment
- Easily adapted to other organizations (*HIGHLY TAILORABLE*)
- Focuses on needs of users/recipients of technology
- Produces credible data for decision makers

Level	Best Practice	Status	Where used	Benefits
Personal – project level tool	TRL Quicklook checklist	Available for deployment now – easily tailored	DTRA, similar tools used in USAF, NASA	Consistent, credible, more objective TRL assessment
S&T organization	Technology Program Management Model (TPMM)	Process is mature – tool (TPMM SharePoint App) in Development	SMDC, MDA, DTRA	Provides consistent, credible, data for portfolio management at S&T organization
Enterprise (S&T and PEO)	Technology Assessment Transition Management (TATM)	Process is mature – tool in use, undergoing C&A	PEO Aviation, AMRDEC, PEO Soldier, (JPEO Robotics – past)	Provides PEO reliable data on status/ scheduling of S&T projects that will transition to PEO programs

TPMM
Technology Program Management Model
15



Recent Collaboration

- **Sensor Upgrade Technology Assessment**
  - This assessment will inform the development of a Capabilities Development Document (CDD) by our User, and provide PM leadership an assessment of the technologies under consideration
  - Technology Readiness Assessment (TRA) vs. Technology Maturity Assessment (TMA)
- **Implementation of TPMM / SEM allows the PM to conduct TMAs to determine an actual TRL with the Technology Manager**
- **This environment bridges the "Valley of Death"**

ASE Technology Program Gate Review

Threat Detection System (TDS)

Project Manager: [redacted]

Phase 6: 5-Demonstration and Transition-6

TRL: 1 — 2 — 3 — 4 — 5 — 6 — 7

Current: 5 At Completion: 6

Tools

Promote to Next Phase

Submit Final Recommendation:

- Recommend Go
- Recommend No Go
- Recommend Go with Conditions
- Partially Complete

Project Details | Gate Review Info

Date Scheduled: 2014-06-11

Gate Review Panel:

Member Name	Role
[redacted]@us.army.mil	Panel Member
[redacted] Timothy T	Panel Member

Gate Review

% Completes

Technology Maturity Assessment

Go	No Go	Go with conditions	Incomplete
44%	0%	8%	48%

53 items have received a unanimous PGR consensus

Integration Strategy has been developed and is published		Integration Strategy is part of CDR package		Go / No Go / Conditions	Go		(0)
Required contractor-to-contractor agreements are in place for technology insertion	[redacted] TDS PWS, Clean, 20120625.docx	Required Contractor to Contractor agreements are defined in the Performance Work Statement		Go / No Go / Conditions	Go		(1)

Manufacturing

Exit Criteria	Reference	Comments	Omission Justification	Panel Determination	PGR Consensus	Reviewer Comments	
Industrial Capability Assessment (ICA) for MS B completed. Capability is in place to support mfg of development articles. Plans to minimize sole/foreign sources complete. Need for sole/foreign sources justified. Potential alternative sources identified.				Go	Discuss	Significant investment made by UTAS in SSSC for camera production.	(1)
Manufacturing technology efforts continuing. Required manufacturing		Completed and					

Summary

- **"Perspective on the imperative of technology transition"**
- **It is about building strong organizational and professional relationships with solid communication**
  - Drive the technology being developed
  - Communicate technical needs / capability gaps
- **S&T program management by milestones and metrics**
  - Find a tool / process that works for you = TPMM / SEM
  - Control your Technology Maturity Assessments (TMAs)
- **The path from S&T to Acquisition Program**
  - Provide formal, written endorsement letters (Technology Transition Agreements) laying out what we need, when we need it, exit criteria, etc.
  - POM for the tech transition

CONTACTS

Mr. Jeffrey Craver
Professor, Engineering Management
Defense Acquisition University
South Region
Huntsville, AL
E-mail: Jeffrey.Craver@dau.mil

Dave Hays
S&T Coordinator
Technical Division
PMO Aircraft Survivability Equipment (ASE)
Huntsville, AL
E-mail: david.h.hays.ctr@mail.mil

Ms. Melanie Klinner
TPMM Project Manager
USASMDC/ARSTRAT
Technical Center/Cyberspace Technology Division
Redstone Arsenal, Huntsville, AL
E-Mail: melanie.g.klinner.civ@mail.mil

US GOVERNMENT PERSONNEL CAN REQUEST A COPY OF TPMM V2.PDF FILE AT:

HTTP://WWW.TPMM.INFO

QUESTIONS