Air Force Lifecycle Management Center



Air Force Life Cycle Management Center (AFLCMC) Process for Technology Readiness Assessments (TRA)

Abstract: 14876

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Contents



- Purpose
- Background
- Challenges
- AFLCMC TRA Process
 - Roles and Responsibilities
 - MDAP SME Selection
 - MDAP Process and Timeline
 - Non-MDAP Tailoring
 - Recommended TRAs
- Tools and References
- Lessons learned



Purpose



 Raise awareness of the Air Force Life Cycle Management Center newly established TRA process

Promulgate the standardized TRA process across AFLCMC portfolios and

industry





Background



- AF PSR 2010
 - Lead by SAF/AQRE, designed to integrate AF reviews with OSD reviews for MDAPs
 - Established leadership, timelines, decision points and process for AF TRAs
 - Eliminated in Dec 2011
- OSD Streamlining May 2011
 - Eliminated mandatory TRA at MS C
 - Eliminated independent team lead
 - Established Program Manager as TRA lead
- AFMC 5 Center Construct Jul 2012
 - Reduced number of centers in AFMC to five
 - Eliminated and consolidated engineering staff functions

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MEMORANDUM FOR COMPONENT ACQUISITION EXECUTIVES

SUBJECT: Improving Technology Readiness Assessment Effectiveness

As I noted in my "Better Buying Power" memorandum last year, the process for conducting Technology Readiness Assessments (TRAs) has strayed from its original intent and should be reformed. TRAs should focus only on technology maturity, as opposed to engineering and integration risk, and the responsibility for ensuring that technology maturity risk is adequately identified and mitigated should rest with the Program Manager (PM), Program Executive Officer, and Component Acquisition Executive, subject to ASD(R&E) review.

MAY 1 1 2011

New instructions for conducting TRAs are contained in updated "TRA Guidance" (http://www.acq.osd.mil/ddre/publications/docs/TRA2011.pdf). Some of the significant changes from prior TRA procedure are as follows:

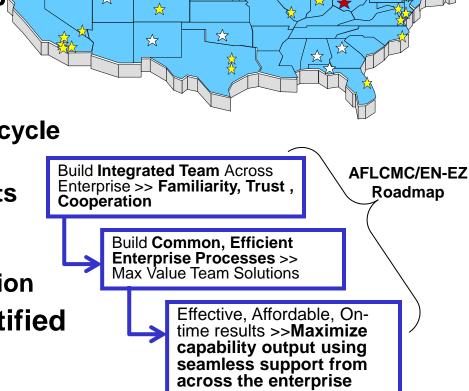
- A TRA is required for Major Defense Acquisition Programs (MDAPs) at Milestone (MS) B for at a subsequent milestone if there is not MS B) to support the independent review and assessment by the Assistant Secretary of Defense for Research and Engineering (ASD(R&E)). The ASD(R&E) will determine whether the technology of the program has been demonstrated in a relevant environment to support the MS Decision Authority (MDA)'s certification under 10 U.S.C. 3266b. TRAs for the ASD(R&E) are not required for Migor Automated information System programs, non-MDAPs, or MDAP MS C decisions, except for MDAPs entering the acquisition system at MS C. However, MDAs for all programs are required to ensure that technology risk has been reduced to acceptable levels prior to entering engineering development or design for production. Acquisition Category II- IV programs should conduct TRAs in accordance with relevant Component direction by tailoring the "TRA Guidance" as appropriate.
- A TRA will be conducted and reported by the PM who will select a team of subject



Challenges Acquisition Landscape Changed



- Lots of moving parts
- Limited AF role in supporting TRA
- Organizational landscape changed
 - Single EZ organization for lifecycle management
 - Geographically separated units with no dedicated local SMEs available
 - Different culture at each location
- Technical risk often not identified
- COTS solution maturity presumed, not assessed





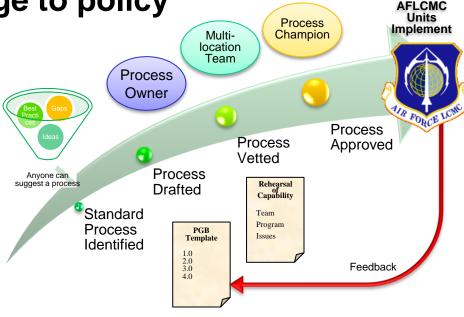
AFLCMC TRA Process



- TRA Process developed jointly with SMEs from 6 main locations
 - Followed rigorous development process
 - Became chapter of AFLCMC Process Guide Book

 Adds implementation details to existing OSD and AF instructions - no change to policy

- Process covers:
 - Overview of existing policy
 - Roles and responsibilities
 - MDAP §2366b TRA process
 - Requesting SMEs
 - Guidance for non-MDAPs, including MAIS programs





Roles and Responsibilities



Process Owner: AFLCMC/EZID

- Maintain process, provide training and TRA SMEs responds to programs
- Facilitate identifying SMEs

Program Manager or Chief Engineer

- Lead the team to conduct and report TRAs
- Determine if and when to conduct a tailored TRA to identify technical risk at other milestones and key decision points
- Establish technology maturation and mitigation plans
- Provide program technical information to independent SME teams

Independent SME team

- Review the performance, technical requirements, and design of the system
- Review critical technologies and recommend additions or deletions
- Provide findings and conclusions for the TRA report

Prime Contractor

- Provide system briefings to independent team (MDAPs)
- Provide artifacts documenting relevant tests of critical technologies



MDAP SME Selection



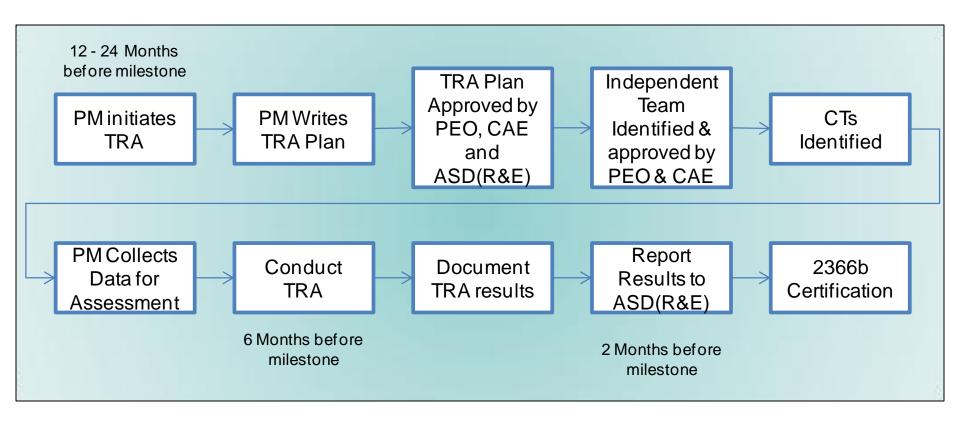
- Program Manager responsible for identifying independent SMEs IAW OSD policy memo
- "Independent" defined as outside program manager chain of command
- SME can be obtained from multiple sources:
 - Within PEO directorate
 - Other PEO directorate
 - AFLCMC/EZ technical experts
 - AFRL or other AF units
 - Other services, academia, etc.





MDAP Process and Timeline





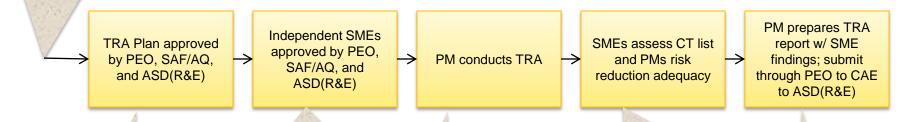
Schedule dependent on program complexity and contract strategy



Non-MDAP Tailoring



 PM and CE determine when TRA needed



 PM may acquire SMEs as needed, independence not required • PM (or CE) directs
SME review to
provide needed
information

- Begin ~ 6 months prior need date
- Plan accomplished solely at the PM level or between the PM and PEO

 The PM is responsible for the TRA, but will normally assign actual conduct to the CE PM determines capture and documentation format and content



Recommended TRAs and TRLs



			A					F	P
Material Solution Analysis				Technology Development		Engineering & Manufacturing Development		Production & Deployment	
MRL 1 Basic Mfg Implications Identified	MRL 2 Mfg Concepts Identified	MRL 3 Mfg Proof of Concept Developed	MRL 4 Manufacturing Processes In Lab Environment	MRL 5 Components In Production Relevant Environment	MRL 6 System or Subsystem In Production Relevant Environment	MRL 7 System or Subsystem In Production Representative Environment	MRL 8 Pilot Line Demonstrated Ready for LRIP	MRL 9 LRIP Demonstrated Ready for FRP	MRL 10 FRP Demonstrated Lean Production Practices in place
TRL 1	TRL 2	TRL 3	TRL 4	TRL 5	TRL 6	TRL 7		TRL 8	TRL 9
Basic	Concept	Proof	Breadboard	Breadboard	Prototype	Prototype		System	Mission
Principles	Devised	of	in	in Rep	in Rep	in Operational		Qualified	Proven
Observed		Concept	Lab	Environ	Environ	Environment			

Recommended times to consider tailored TRAs:

- Before MS A, B, & C
- Prior to EMD RFP release to help determine development strategy
- Prior to final CDD approval

Tailored TRA Approach Identifies Risks



Tools & References



- DoD TRA Deskbook, July 2009
 - The 2011 DoD TRA Guidance supersedes the TRA Deskbook, but the Deskbook contains additional details useful for identifying and assessing critical technologies
- AFMC/A2/5 Memorandum on AFMC Technology Readiness Assessment Independent Review Panel Staffing Process, 19 January 2011
 - This optional process is for requesting SME support outside of AFLCMC
- DAG section 4.3.2.4.2.4 (TRA)(as of 3 September 2011)
- DAU Module CLE 021 Technology Readiness Assessment
- AFRL Technology Maturity Calculator, version 3.6.0
- Risk Identification: Integration and –ilities (RI3) tool version 3.0.1



Lessons Learned



- Source Selection
 - Evaluation factor for award
 - Evaluate all proposed systems
- COTS products adapted to military environment need maturity assessed
- Integrate MRA, TRA, and RI3 results for a complete picture
- Technology maturity should feed into risk management process
- Geographic separation drives need for some independence from home office
- TRAs apply to more than just MDAPs and MS B
- A tailored TRA approach is more manageable





Summary



- AFLCMC TRA Process established
 - Process shaped by changes to the TRA process and organization
 - Standardized process improves execution and efficiency for geographically separated units
- TRA is essential to making informed program decisions as well as early identification of technology mature risks

