

# Air Force Lifecycle Management Center



**U.S. AIR FORCE**

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

Abstract: 14876

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# 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**

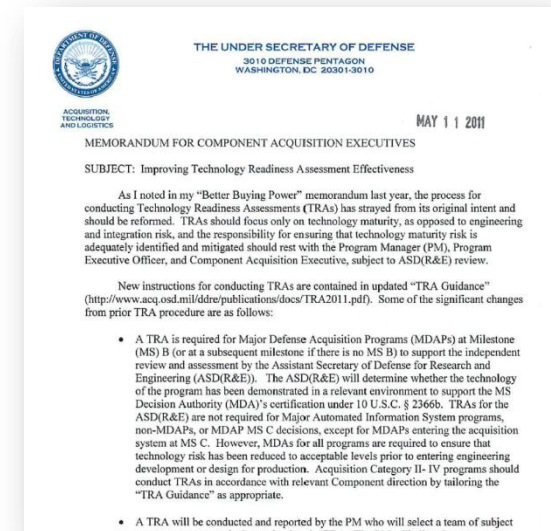




# Background



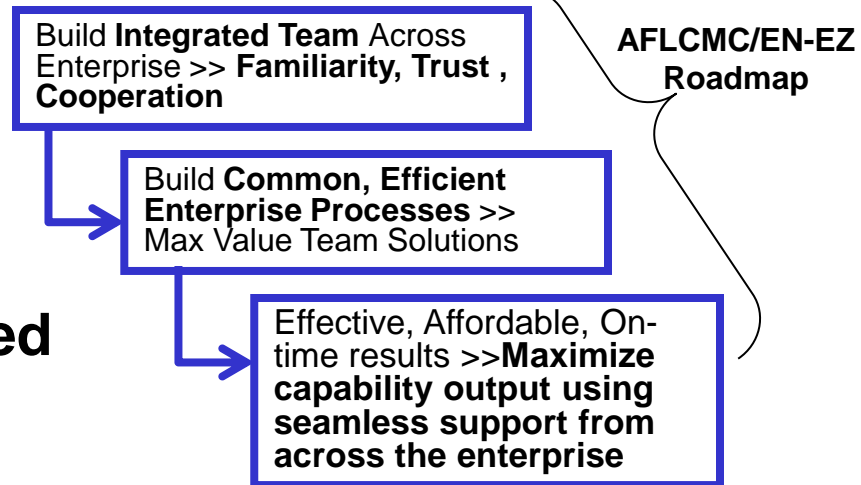
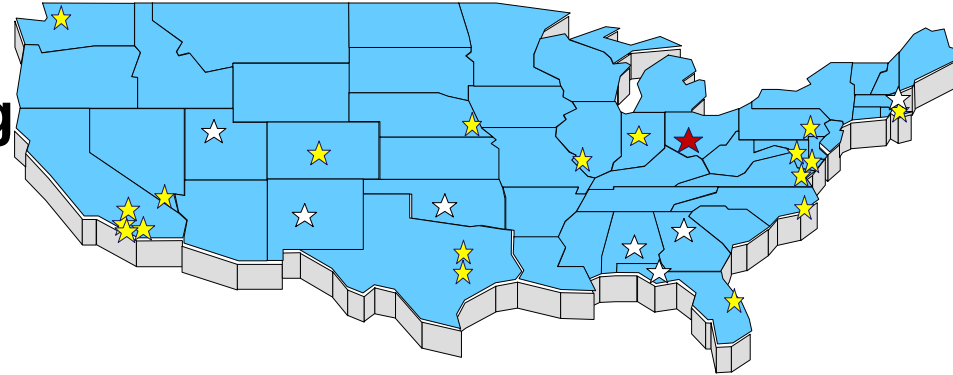
- **AF PSR - 2010**
  - Lead by SAF/AQRE, designed to integrate AF reviews with OSD reviews for MDAPs
  - Established leadership, timelines, decision points and process for AF TRAs
  - Eliminated in Dec 2011
- **OSD Streamlining - May 2011**
  - Eliminated mandatory TRA at MS C
  - Eliminated independent 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



# 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



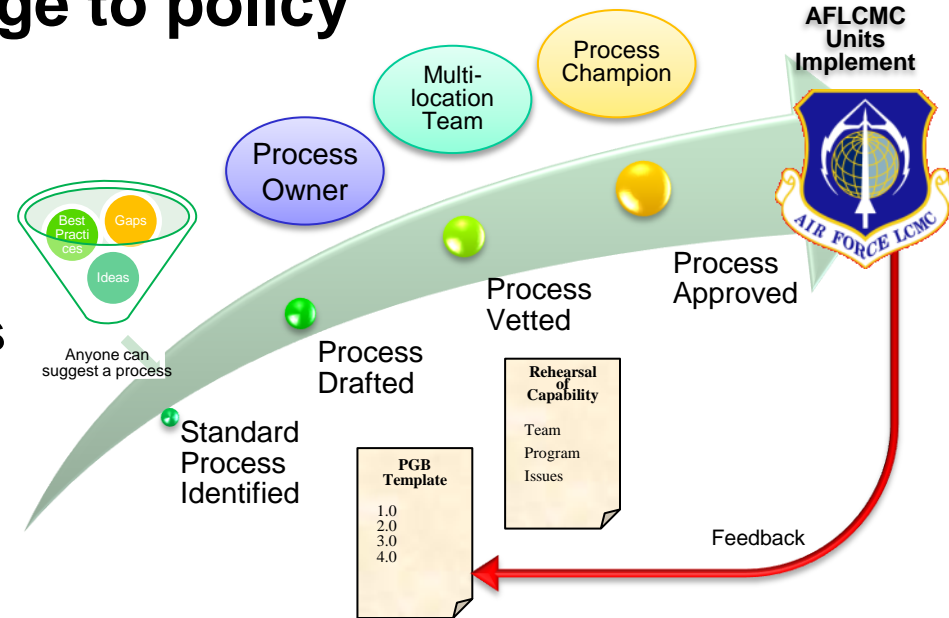
**Imperative to Standardize TRA Process and Expectations**



# 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



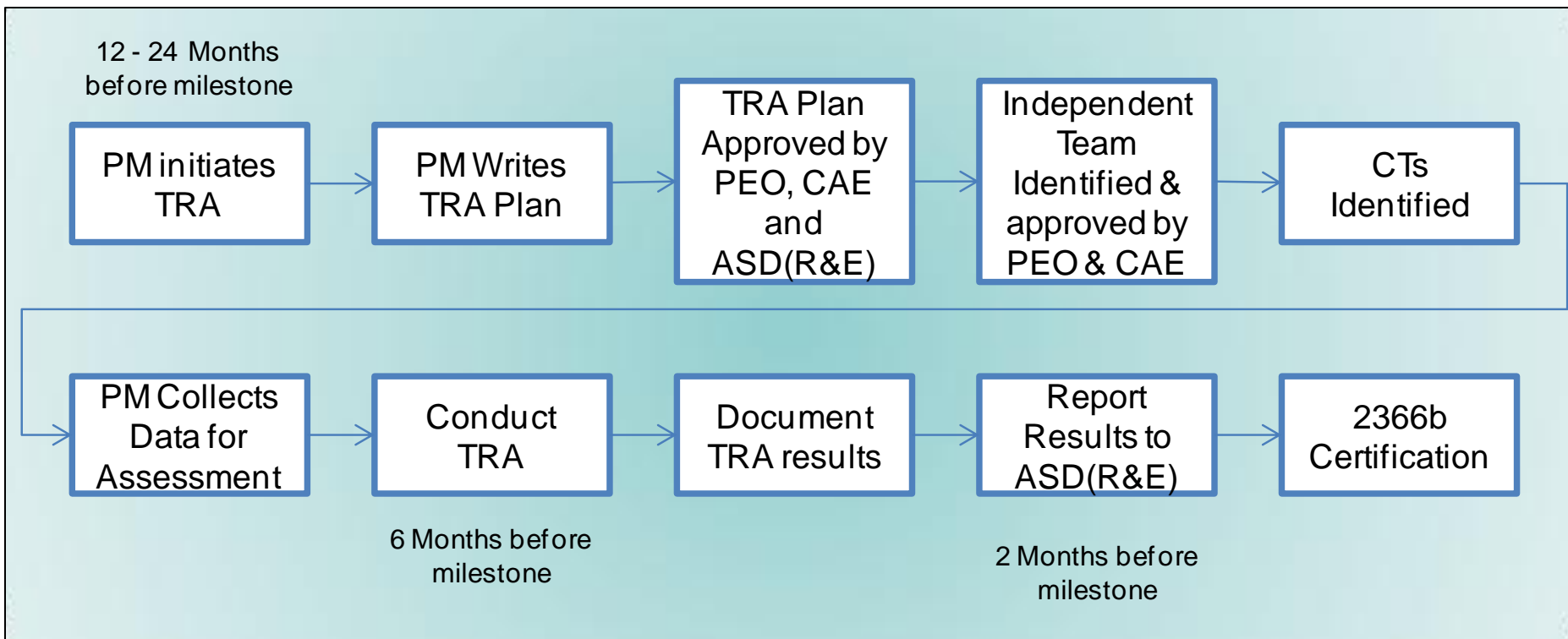
- **Program Manager responsible for identifying independent SMEs IAW OSD policy memo**
- **"Independent" defined as outside program manager chain of command**
- **SME can be obtained from multiple sources:**
  - **Within PEO directorate**
  - **Other PEO directorate**
  - **AFLCMC/EZ technical experts**
  - **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

TRA Plan approved by PEO, SAF/AQ, and ASD(R&E)

Independent SMEs approved by PEO, SAF/AQ, and ASD(R&E)

PM conducts TRA

SMEs assess CT list and PMs risk reduction adequacy

PM prepares TRA report w/ SME findings; submit through PEO to CAE to ASD(R&E)

- 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



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

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**



**TRAs Provide Valuable Information For Program Decisions**

- **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**

