

Headquarters U.S. Air Force

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Air Force Technology Readiness Assessment (TRA) Process for Major Defense Acquisition Programs

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Purpose

**Provide Air Force perspective on MDAP
Technology Readiness Assessments**



Outline

- **What is a TRA?**
- **Statutory/Regulatory Requirement**
- **Why do a TRA?**
- **AF TRA Process**
- **What We've Learned**



What is a TRA?

(DoD TRA Deskbook, May 2005)

- A TRA is an *objective*, systematic, metrics-based *process and report* that *assesses the maturity of Critical Technology Elements (CTEs)*
- Not a risk assessment; not a design review
- Regulatory requirement for *all* acquisition programs; statutory for MDAPs



Technology Maturity Requirements

- **Statutory – USC Title 10 Section 2366a requires Milestone Decision Authority (MDA) Certification *prior to MS/KDP B* approval for Major Defense Acquisition Programs (MDAPs)**
 - ***“the technology in the program has been demonstrated in a relevant environment”***
 - **Equates to Technology Readiness Level (TRL) 6**
- **Regulatory – TRAs required for *all programs***
 - **DoDI 5000.2: Required at Milestones (MS) B & C**
 - **NSS Acquisition Policy 03-01: Required at Key Decision Points (KDP) A, B, & C**



JROC Technology Maturity Requirement

- JROC Memo (261-06, Dec 06) – Capability Development Document (CDD) and Capability Production Document (CPD) require discussion of critical technology elements (CTE), CTE linkage to Key Performance Parameters (KPP), and information on the Technology Readiness Assessment
 - Purpose: “to review a program’s essential performance elements in the context of cost, schedule and technical risks”

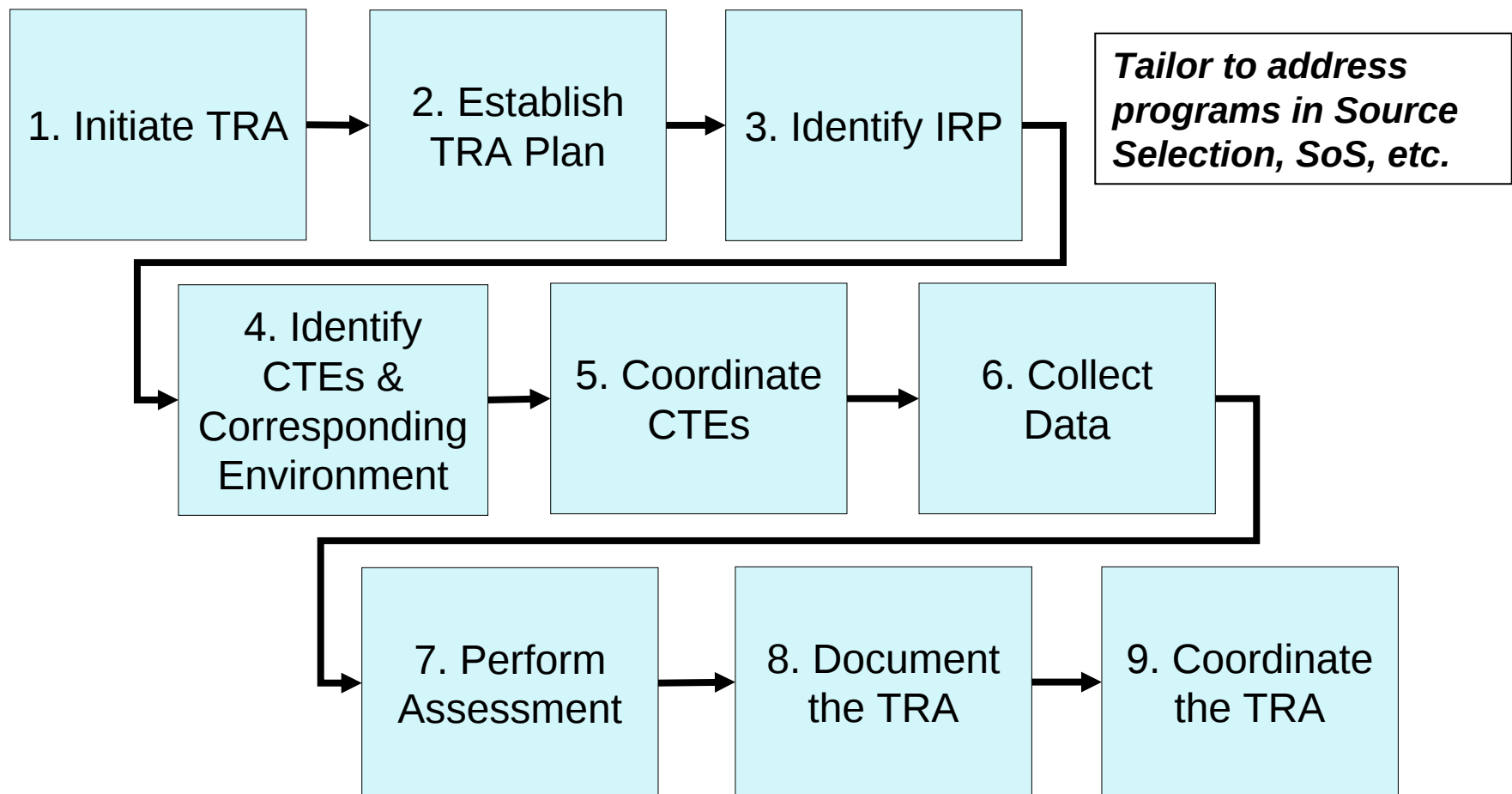


Why do a TRA?

- **GAO assessments have correlated low technology maturity with program problems**
 - **Programs that began development with immature technologies averaged**
 - **32% cost growth**
 - **20 months schedule growth**
- **Help acquisition programs be timely, on cost, meeting the user requirements**
 - **Help acquisition programs better understand their technology status & technical planning**
 - **Provide senior leaders with current, accurate technical information to make better decisions**



AF TRA Process



CTE – Critical Technology Element

IRP – Independent Review Panel

TRA – Technology Readiness Assessment



AF TRA Process Variations

- **Follows guidance in DoD TRA Deskbook, May 2005**
 - Tailored for each MDAP in compliance with DoD and National Space Security policy and guidance
 - Three touch points to ensure objective TRA
 - Independent of the program office
- **CTEs assessed by an Independent Review Panel (IRP) with two basic variations**
 1. Program office builds initial TRA and briefs IRP on proposed CTEs and artifacts on CTE maturity at formal IRP meetings
 2. IRP conducts entire TRA (with program office support)
- **Other variations**
 - Component S&T Executive provides the results of the IRP to the Independent Program Assessment (IPA) Team for space systems per NSS Acquisition Policy 03-01
 - Technology readiness must be addressed during source selections conducted in conjunction with Milestone B (or KDP B)



What We've Learned

The Process

- TRA is a process, not a “just in time” milestone document
 - Start early, integrate with overall technical and acquisition planning
 - Title 10 MDA certification requirement raises the bar on TRAs
- Need to dive deeper than the component level to identify the technology
 - A thorough & disciplined technical scrub of the program is needed identify all technologies (from which CTEs are determined)



What We've Learned

IRP Membership

■ IRP membership needs

- 1) Domain experienced experts who understand the context of the technology environment & use,
- 2) who can connect the dots and ask good questions in a peer review setting, and
- 3) are independent of the program office and the technologies being developed (sister service participation adds bonus points...)



What We've Learned

The Power of Change

- Programs will change their approach if the TRA shows maturity levels lower than expected
 - However, they need this information early enough to make changes...



What We've Learned

Technology vs. Design

- There is a misconception between the technology and design implementation
 - TRL scale blurs pure technology with program design implementation as maturity increases
 - Can just a technology be proven mature (TRL 7, 8, 9) without system integration?
 - When does design or technology change cross the line to become a Critical Technology Element?



What We've Learned Education

- Education of people new to the process needs to start early
 - Most people have never been hands-on with a TRA leading to misconceptions
 - Better understanding of the TRA process and methodology leads to efficient work
 - Recognize that the broader workforce is still climbing the learning curve



What We've Learned

What it is and is not

- TRLs are becoming very popular, but remember
 - TRLs are only a current snapshot in time – not an indicator of future success
 - the TRA is only an input to program risk
 - the learning curve can be very steep for those not familiar – education can make or break a good assessment
- Great tool for systems engineers, but most not familiar



What We've Learned

What needs attention

- Methodology lacking in some areas
 - TRLs at the Systems-of-Systems (SoS) level
 - Defining environments for Space Systems
 - Technology vs Design (e.g., new or novel)
- Integrating technology maturity demonstrations into T&E planning
 - Demonstrations are not always part of programs' "integrated" V&V process, which is based on requirements verification



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