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# **AFSO21 / D&SWS / Tech Development:**

## **Air Force Initiative – High Confidence Technology Transition Planning Through the Use of Stage-Gates (TD-13)**

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# Agenda

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- Introduction to Air Force Initiative
- Outputs of Initiative
  - Guidebook
  - Automated Tool – *Turbo* Technology Program Management Model (*Turbo*TPMM)
  - OSD/AF Policy Changes
  - MAJCOM Policy Changes
- Next Steps
- Summary



# Scope the Initiative

**September 2006 GAO report: GAO recommends that DOD strengthen its technology transition processes by developing a gated process with criteria to support funding decisions; expanding the use of transition agreements, ...**

GAO Report to Congressional Committees, "BEST PRACTICES Stronger Practices Needed to Improve DOD Technology Transition Processes", September 2006. GAO-06-883

- **Initiative focuses on Technology Transition process**
  - **Ensure early and complete life-cycle transition planning**
  - **Create a common understanding of the technology transition processes to be applied at all life cycle stages**
- **Initiative goal is improved transition success**
  - **Improved planning using exit criteria enhances probability and speed of the transition, increasing confidence of acquisition programs – *REDUCE PROGRAMMING RISK!***
  - **Key aspect is ensuring the right people are involved earlier for increased collaboration between researcher, acquisition organization, and stakeholders**



# Why this is important to the Enterprise

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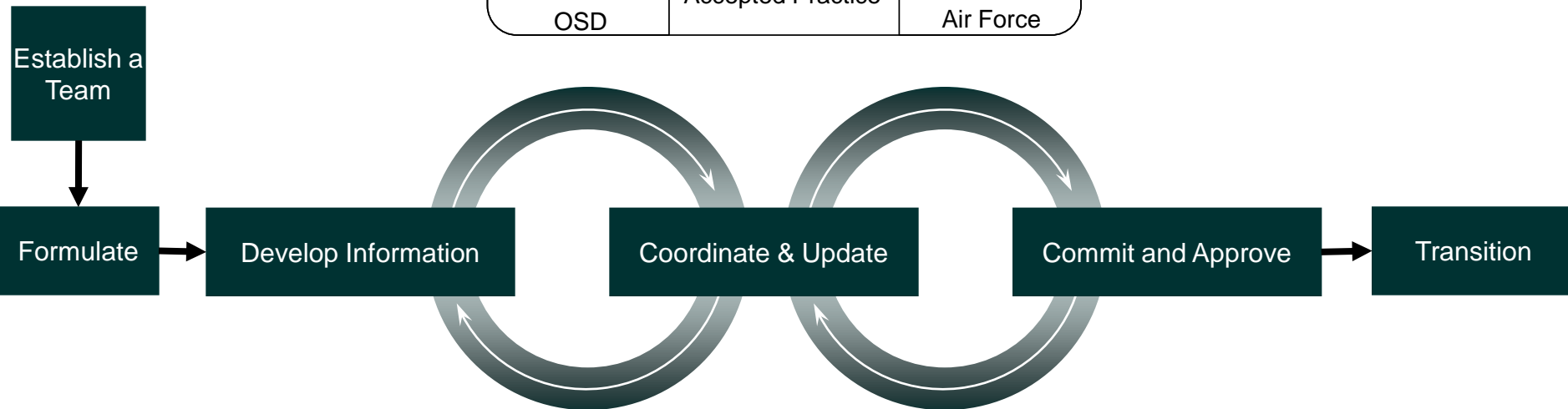
- **We know the best practices (OSD<sup>1</sup>/AF):**
  - **Establish a team / Formulate a strategy / Execute to the strategy (iterating over time) / Begin planning for transition *EARLY***
- **We have a Problem acting on them!**
  - **Stage gate process during technology maturation = facilitate improved planning = increased confidence of transition**
  - **Get the right people involved earlier = better communication and increased collaboration between researcher, acquisition organization, and stakeholders**

<sup>1</sup> OSD Transition Practical Operating Guidelines (TPOG), Version 1.0.  
DUSD (AS&C) in accordance with Under Secretary of Defense (Acquisition, Technology and Logistics) (USD(AT&L)) and Director, Defense Research and Engineering (DDR&E).



# Current Best Practice

- Transition process Iterative w/in technology readiness phases:
  - Establish a team, formulate a strategy
    - Iterate: develop/gather information, document and coordinate agreement, and commitment / approval





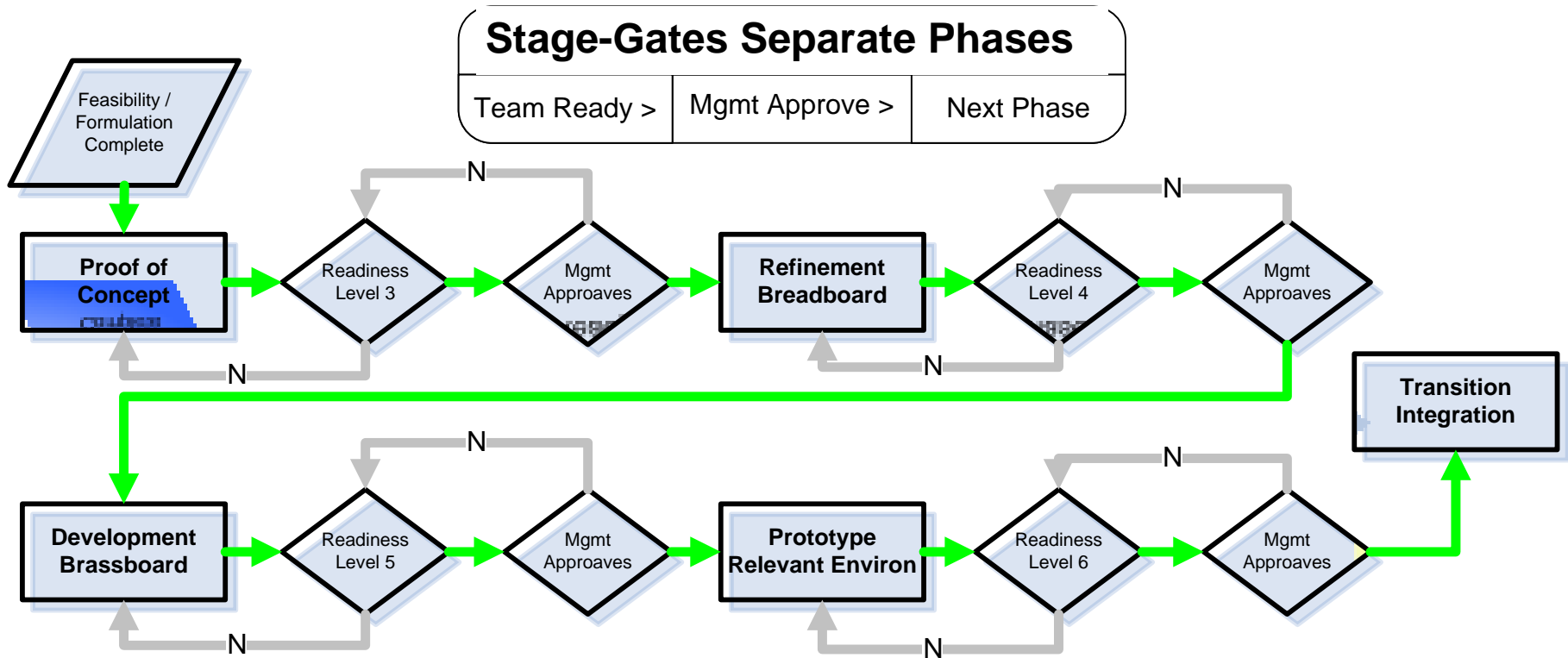
# What is “New”?

- Formalized process to develop the strategy to mature and transition a new technology
- List of detailed activities needed for technology maturation
- Mechanism to ensure a robust execution of the strategy: Stage-Gate process
  - A Stage is where the activities occurs – the team completes key activities (technology and programmatic) to advance the project to the next gate and focuses on the changing roles and responsibilities
  - A Gate is a decision point – on whether a project is a go, no-go, re-directed or put on hold (TRL based / driven)
  - The decision is based on EXIT CRITERIA for each gate



# What is “New”?

- A formalized process, the mechanism (stage-gate criteria) and detailed activities and milestones necessary to transition from phase to phase





# What is “New”?

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- **Develop a stage-gate process (TRL based/driven)**
  - A decision point on whether a project is proceeding as planned and a go, no-go or hold decision is made
  - Phases are: Feasibility, Formulation, **Proof of Concept, Breadboard (Lab Env), Brassboard (Relevant Env) and Prototype (Relevant Env) (TRL3-6)**
- **Entry/Exit Criteria (tech & programmatic) shall be used prior to advancing to the next stage in the transition process. Highlights change in team roles and responsibilities over time.**
  - Use existing readiness levels (TRLs and MRLs), cost, schedule, performance, early “-ilities” considerations (RI3 Guidebook)





# TDTS Guidebook

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- **Instructional document**
- **“How-to” guide for:**
  - **Assembling the proper team for each stage**
  - **Building the strategy to mature and transition a technology**
  - **Constructing the exit criteria for the gates**
  - **Executing the stage-gate process**
  - **Developing and staffing the required documentation**
- **TDTS documentation:**
  - **Replaces TTP / leverages other “early” documentation**
  - **TDS is subset of TDTS required at Milestone A**
  - **TDTS document “morphs” to LCMP at Milestone B**



# Today's Process

## ■ Stovepipe Document Generation: TTP : TDS : LCMP

Owner:

AFRL Technology Developer, pre MS-A

### Tech Transition Plan (TTP)

- Signature Page
- Development Strategy
  - Participants
  - Tech Availability
  - Program Objectives
  - Target Acq Programs
  - Approach
  - Products / Payoff
  - Risk Analysis
  - Exit Criteria / RL
- Acquisition Strategy
  - Identify Stakeholders
  - Capability / Rqmts
  - Bus/Contract/Fin
  - Logistics / Mfg
  - Intelligence
- Transition Strategy
  - Integration Plan

Owner:

Acquisition PM @ MS-A

### Tech Development Strategy (TDS)

(Public Law 107-314, Sec 803)

- Acquisition Approach
  - Supporting Rationale
- R&D Strategy
  - Performance Goals
  - CSP and Spirals
- Describe Tech Demo
  - CSP and Exit Criteria
- Develop Test Plan
  - Goal / Exit Criteria
  - Ensure Maturity Level

Note: Multiple Spirals may be necessary before user & developer agree the solution is: Affordable, Military Useful and based on mature technology

Owner:

Acquisition PM @ MS-B

### LCMP

- Exec Summary
- Mission/Rqmts
- Program Summary
- Program Mgmt
- Business Strategy
- Risk Mgmt
- Cost and Performance Mgmt
- Test Approach
- Product Support Concept

Note: TDS required at MS-A, but often Milestone not held



# To Be Process

## ■ Tech Development & Transition Strategy (TDTS)

- Replaces the TTP
- TDS is subset of TDTS required at Milestone A
- As program progresses – TDTS “Morphs” to LCMP

Owner: Acquisition PM

### Tech Development & Transition Strategy (TDTS)

- **Replaces** TTP, *but a gated approach defining depth required at each phase.*
- Integrated Strategy (Technology Development and Acquisition)
- Example: As team approaches:
  - MS-A (TRL-4) – Gates/checklist ensures TDS is complete
  - MS-B (TRL-6) – Gates/checklist ensures LCMP is complete

Subset

### Tech Development Strategy (TDS) (Public Law 107-314, Sec 803)

- Acquisition Approach
  - Supporting Rationale
- R&D Strategy
  - Performance Goals
  - CSP and Spirals
- Describe Tech Demo
  - CSP and Exit Criteria
- Develop Test Plan
  - Goal / Exit Criteria
  - Ensure Maturity Level

Becomes

### LCMP

- Exec Summary
- Mission/Rqmts
- Program Summary
- Program Mgmt
- Business Strategy
- Risk Mgmt
- Cost and Performance Mgmt
- Test Approach
- Product Support Concept



# TDTS Development Process

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- **Power of the Process is in Teamwork**
  - **Having the right people on the team at the right time –  
Chaired by Program Manger and Co-Chaired by  
Technology Manager**
- **Process will apply to all programs with technology  
maturation**
  - **Team planning for the life-cycle of the new technology**
  - **Stage-gate process to evaluate programs during the  
tech maturation**
    - **Provides comprehensive decision support for  
management!**



# Tool Description - *TurboTPMM*

- Facilitates development of the “Transition Strategy” for Tech Maturation and Transition
- USAF added graphic user interface to model
- The *TurboTPMM* S/W tool features:
  - Automates the stage-gate process
  - Easy to use, walks user through the process
  - Turbo-tax<sup>©</sup> like graphic user interface
  - Questions aligned with acquisition framework
  - Ensures application of Systems Engineering
  - Follows Project Management fundamentals
- DAU also Collaborating with TurboTPMM

*Designed to Ask the “Right” Question at the “Right” Time*



# TurboTPMM – Baseline Planning

## TurboTPMM

Technology Program Management Model

ALPHA TEST VERSION

PROFILE

**BASELINE**

STATUS

REPORT



### MY PROJECTS

AFMC demonstration

[AF SAA Prototype  
Demonstration](#)

NDQ Technology

DQR Sensor  
Technology

+ START NEW  
EDIT PROJECT

LIST ALL

### HELP

View Lifecycle  
Feedback

### SELECT PHASE

TRL 5 - 6

### METRICS

TRL  
5

STATUS

40%

### ARTIFACT GATHERING

### PLANNING

### GAP RESOLUTION

#### ✖ Planning

Start

*During this next exercise, we will be collecting information on your planning activities for executing the Development Phase to achieve TRL/MRL 4. The primary activities in this phase are: Establishing the relationship with the Transition partner; Development of the Key Technology Performance; Fabrication and development of the Technology Brassboard; Continuing to assess critical Manufacturing needs; and Relevant Environment Validation Testing.*

*Many of the questions posed will be activities that you will plan to do in this phase, but have not yet accomplished. In those cases, simply select "Future Planned Activity" in the justification section for your answer.*

✖ Program Management Planning

Start

✖ Systems Engineering Planning

Start

✖ Requirements Update Planning

Start

✖ Design Update Planning

Start

✖ Manufacturing Planning

Start

✖ Relevant Environment Validation Planning

Start

✔ Technology Transition Planning

Start



# Enterprise Interface Opportunities

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## ■ ADDM

- ADDM Focused on Acquisition
- *Turbo*TPMM focused on technology maturation
- Software efforts are good fit
- Interface opportunities with ADDM include:
  - Providing technology maturation templates
  - Sharing reference models for key milestones

## ■ SMART

- Possibly include tech maturation status in MAR
- Next step is to interface w/ PMO

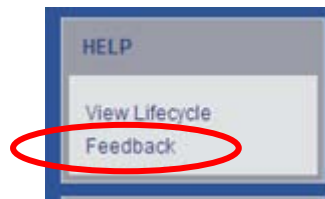
## ■ Clarity

- AFRL program management trusted source for data



# TurboTPMM

- Gunter AFB is hosting “alpha” version of **TurboTPMM**
  - URL: <https://www.tdr.gunter.af.mil/GCSS-SBX031>
    - UserName: TPMM.testuser
    - Password: P@\$\$word1234!@#&
  - IMI: model training
- **Turbo** welcomes feedback
  - Alpha version w/ no real data
  - Feedback allowed via button



Type	Comments
Activity	When selecting "Other" as a Center, the application should provide a text field to record what "Other" means
	This section should be bypassed for SW unless we want to construe it as the Build





# Policy Changes

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- **DoDI 5000.02, published December 8, 2008**
  - **Interim Defense Acquisition Guidebook (DAG), June 2009 – includes exit criteria requirement**
  
- **SAF/AQR Guidance Memorandum, May 12, 2009**
  - **Tech maturation and transition strategy requirement**
  - **Exit criteria for each phase requirement**



# Policy Plans for Institutionalization

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- **TDTS (described in Guidebook) = framework for standard work process**
- **Implementation of TDTS process through policy: AFIs and MAJCOM Instructions**
  - **SAF/AQR/AQX to identify AFIs for updates**
  - **AFMCI identified for update**
    - *AFMCI 61-102 Advanced Technology Demonstrations Technology Transition Planning*
    - *(New) AFMCI 61-103 Management of Science and Technology*
    - *AFMCI 63-1201 Implementing Operational Safety Suitability And Effectiveness (OSS&E) And Life Cycle Systems Engineering*
- **Relevant AFSPCIs**
  - **Weekly telecoms with AFSPC/A5**



# Policy Changes

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- **If team follows stage-gate process, they will always be able to answer where they are today and how long to agreed to transition point**
  - **Supports MS-briefings and PDR shift to Tech Development**
  - **Provides information for Sufficiency Reviews**
  - **Make Milestone B TRA easier - less obtrusive**



# Next Steps

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- **Perform “pilots” of the TDTS development**
  - **To facilitate understanding the TDTS process with specific program teams**
  - **At completion of pilots – finalize the TDTS Guidebook**
  
- **Initiate AF/AFMC/AFSPC policy updates Feb 2010**



# Feedback Welcome on all Products

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## **TDTS Guidebook:**

Available on DAU Acquisition Community Connection (ACC)

<https://acc.dau.mil/CommunityBrowser.aspx?id=314696&lang=en-US>

## ***Turbo*TPMM:**

Gunter AFB is hosting “alpha” version of *Turbo*TPMM

URL: <https://www.tdr.gunter.af.mil/GCSS-SBX031>

UserName: TPMM.testuser

Password: P@\$\$word1234!@#&

## **RI3 Guidebook:**

Risk Identification: Integration & Ilities (RI3) Guidebook

Version 1.2, 15 December 2008.

Available by request from SAF/AQRE:

[safaqre.workflow@pentagon.af.mil](mailto:safaqre.workflow@pentagon.af.mil) .



# TDTS Guidebook

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- **Easy to read and understand strategy development for technology transition using stage-gates**
  - **Description of stage-gate process**
    - **Describes the phases for technology maturation (TRL/MRL based)**
    - **Highlights the transition process and iterative nature within each phase**
    - **Explains how the stage-gate criteria (for Team and Mgmt) helps to move from phase to phase using latest assessment criteria**
  - **Description of what people have to do to navigate the process – roles and responsibilities**