AFSO21 / D&SWS / Tech Development:

High Confidence Technology Transition Planning Through the Use of Stage-Gates (TD-13)

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Overview

- D&SWS Background
  - An Air Force Core Process
- Technology Development (TD) Core Sub-Process
  - The Problems – Our Solution
- Introduction to TD-13
  - Focus, Goals and Tech Transition Best Practice
  - What is a stage-gate? What are we doing that is new?
- Products of the initiative
  - User Guide – today's process and the "to be" process
  - Automated Tool – TurboTPMM
- Schedule
- Summary/Way Ahead

D&SWS Background

AFSO21/D&SWS is Part of the Answer

Funding Our Priorities

"We will fund transformation through … organizational efficiencies, process efficiencies, reduction of legacy systems and manpower while sustaining GWOT and ongoing operations in support of the Joint Fight."

- Michael W. Wynne, SECAF

Integrity - Service - Excellence 1

The Status Quo is Out

AFSO21

- *The USAF will do less with less*
- *Do what is valued by our customers*
- *Employ tools and techniques smartly to reduce waste and non-value-added work, to maximize value to the warriors*

Integrity - Service - Excellence 1

AF Smart Ops 21

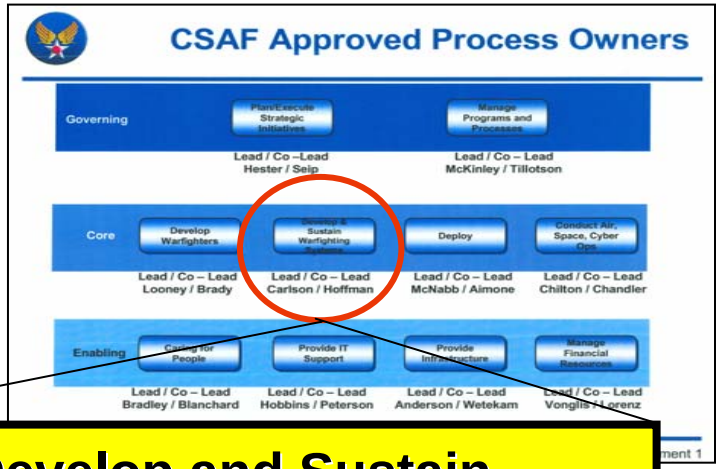
Air Force Smart Ops 21 = AF S O 21

Who How Where When

Using	Creating	Producing
Process Improvement Tools	New Way of Thinking	Dynamic AF-wide Results
Lean 6 Sigma Theory of Constraints	Enterprise Analytic Focus on CPI	Process Efficiencies Resources for Recapitalization Measurably improved support

Integrity - Service - Excellence 47

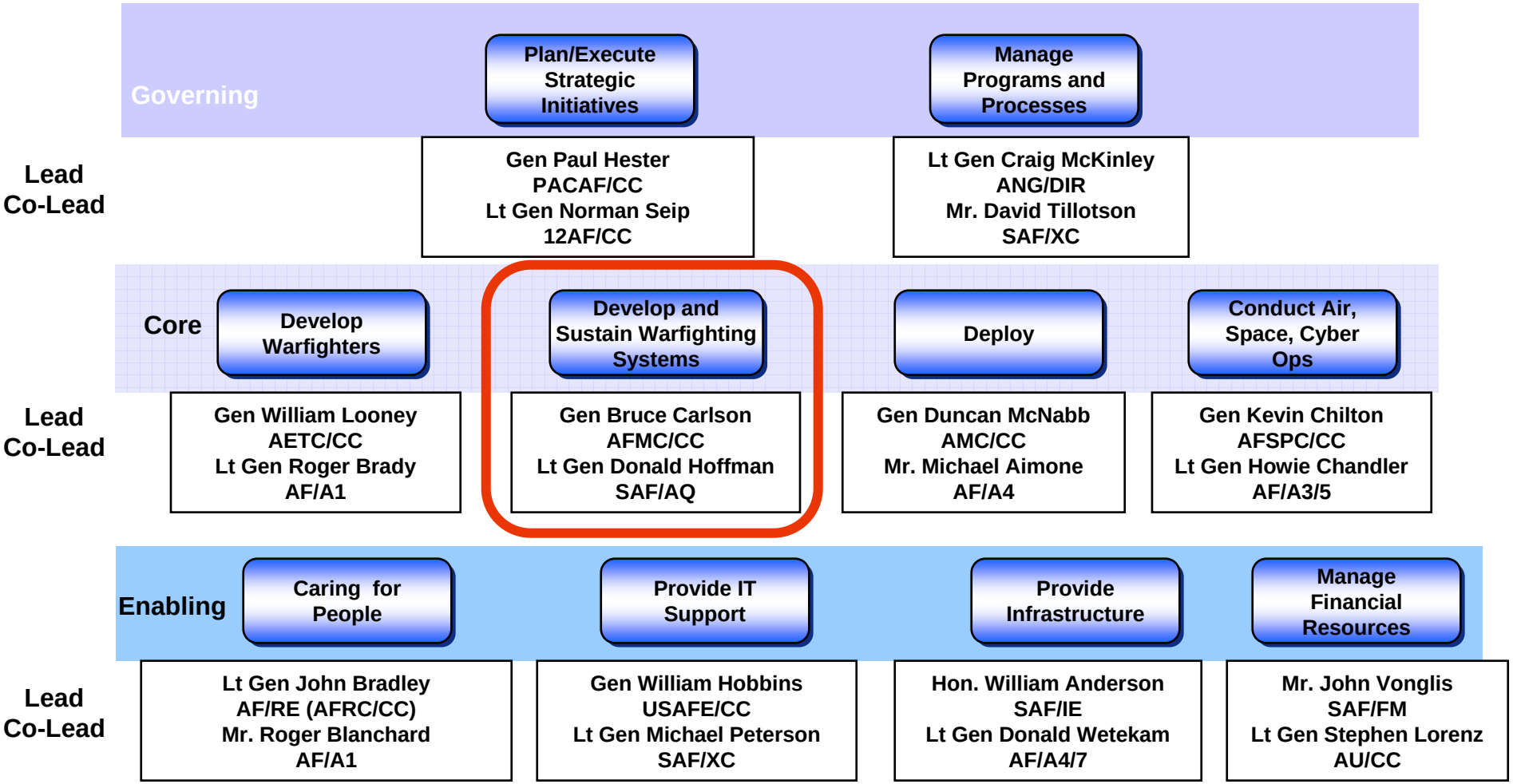
CSAF Approved Process Owners



Develop and Sustain Warfighting Systems (D&SWS)

D&SWS Background

Air Force Process Owners – SECAF/CSAF Approved



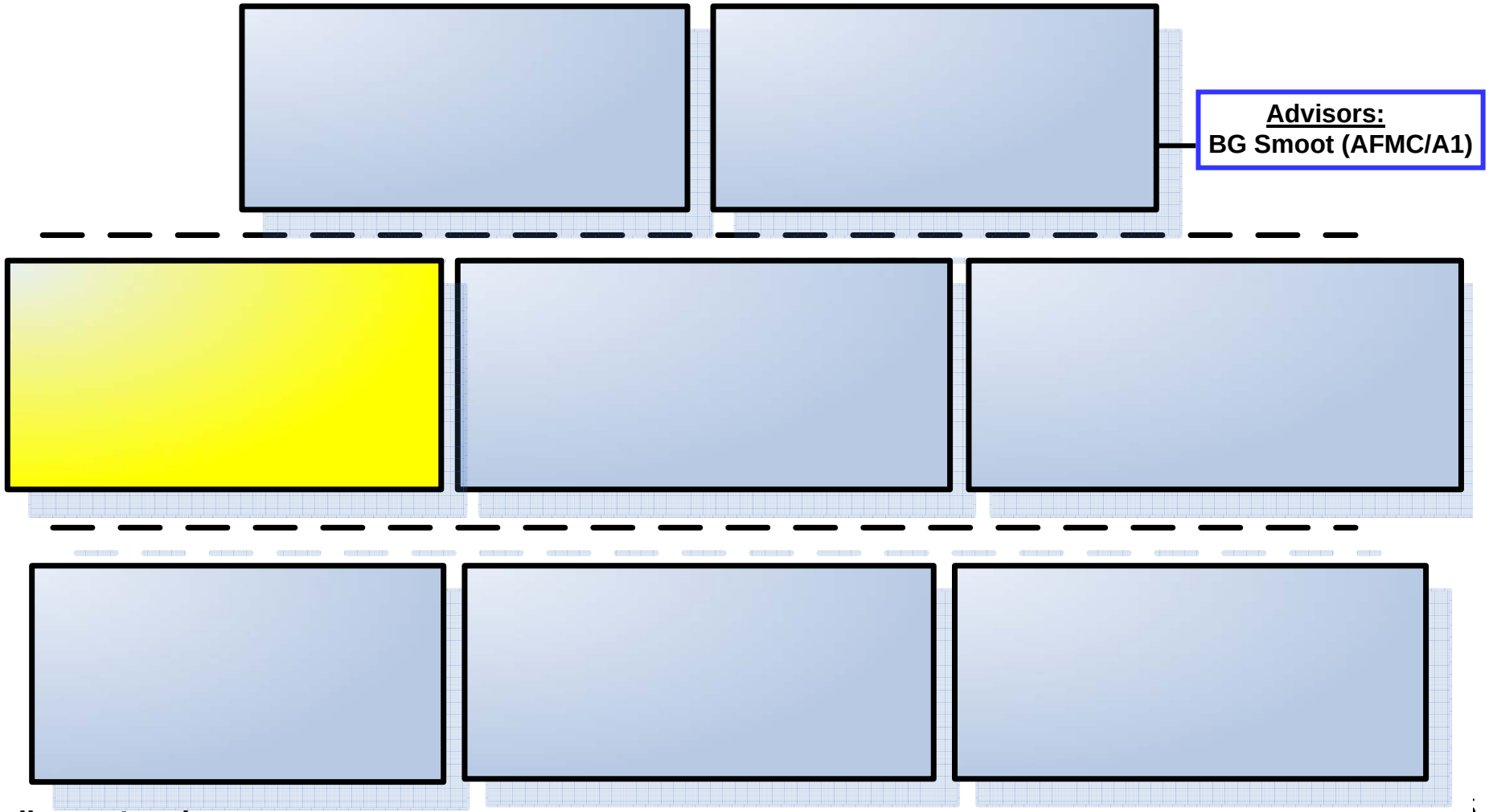
D&SWS Background

D&SWS Sub-Process Teams (Jun '08)

Process Owner
Co Lead

Gen Bruce Carlson
Lt Gen Don Hoffman

CPO: MG Marshall Sabol



Advisors:
BG Smoot (AFMC/A1)

*** Indicates Lead**

Institutiona

TD Core Sub-Process
The Problems

- **TD Initiatives Target 2 Key Problems:**
  - **Immature Technology in Acquisition Programs Leads to Cost Growth and Schedule Slip**
  - **Many Unprioritized Needs Lead to Sub-optimized Investments**

Approach

- **Implement 3 TD Initiatives to <u>Institutionalize</u> One AF Level Process to Manage Investments in Technologies to Ensure They are Mature for AF Systems**
- **Provide "Standard Work" In the Technology Development Arena Where It Makes Sense**

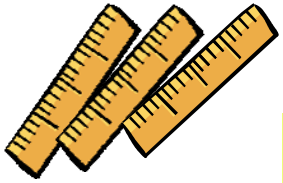
TD Core Sub-Process

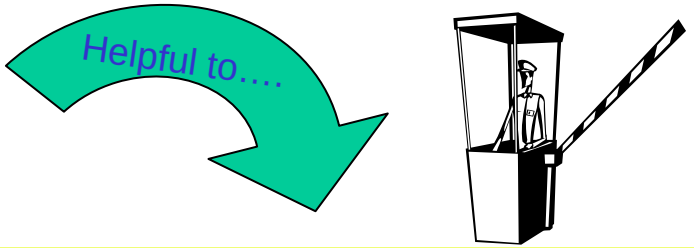
Our Solution - Three TD Initiatives

3 Initiatives with the goal of institutionalizing one AF level process to manage investments in technologies to ensure they are mature for AF systems

TD-1-12 Improved Technology Maturity Assessments

- **Improved, but Separate, Qualitative Maturity Assessments**
  - **TRA Training**
  - **MRA Training**
-
- **Improved Software TRL descriptions**
- **A methodology to help identify Technical Risks related to Integration & 'ilities**





TD-1-13 High Confidence Tech Transitions

- **Early & complete lifecycle transition planning**
  - **Formal documentation of IPT's plan – TDTS**
  - **"Plan the Flight"**
- **"Stage-gated" transition of technology**
  - **Clearly defined entrance/exit Criteria**
  - **"Fly the Plan"**

D-1-14 Identify and Prioritize Tech Needs

-

ocus S&T on highest priority needs

- **Integrate/align existing processes to identify tech needs**
- **Develop new process to prioritize short, mid, and far-term needs vice a single "1-n" list**

-

ame-changing "Tech Push" influencing capability planning

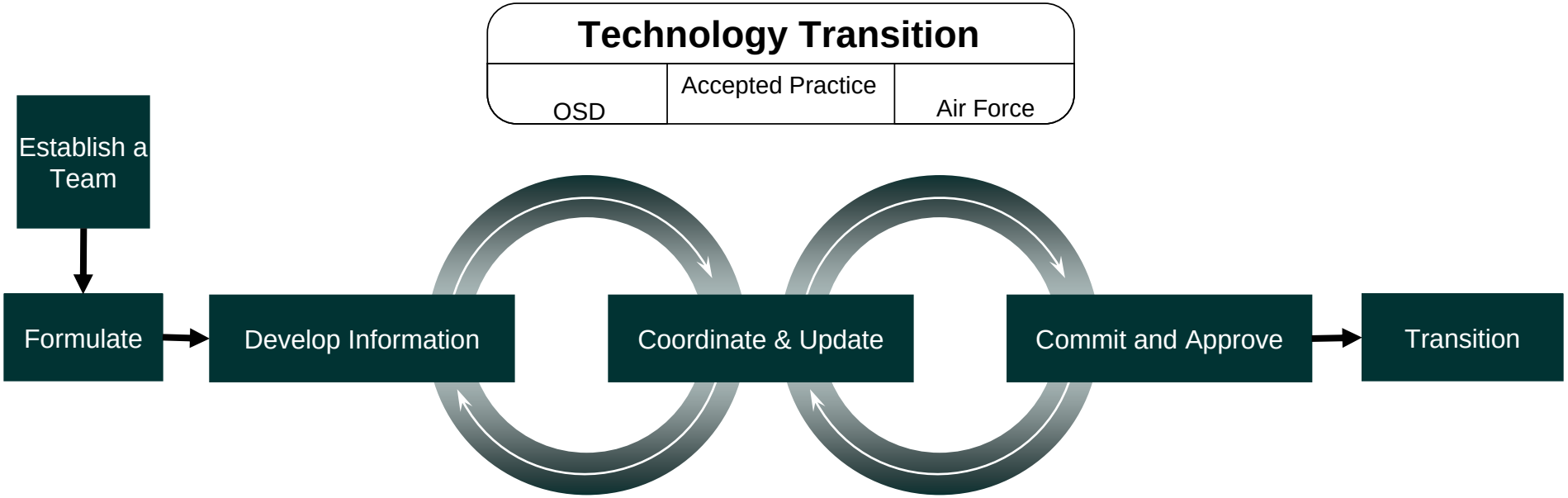
Introduction to TD-13
Focus/Goals

- **Initiative focus on Technology Transition**
  - **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 – Improve transition success**
  - **Improved planning will lead to increased probability and speed of the transition and increase confidence of acquisition programs.**
  - **Key aspect of this process will be making sure the right people are involved earlier in the process for increased collaboration between researcher, acquisition and stakeholders**

Introduction to TD-13
Tech Transition Best Practice

- **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



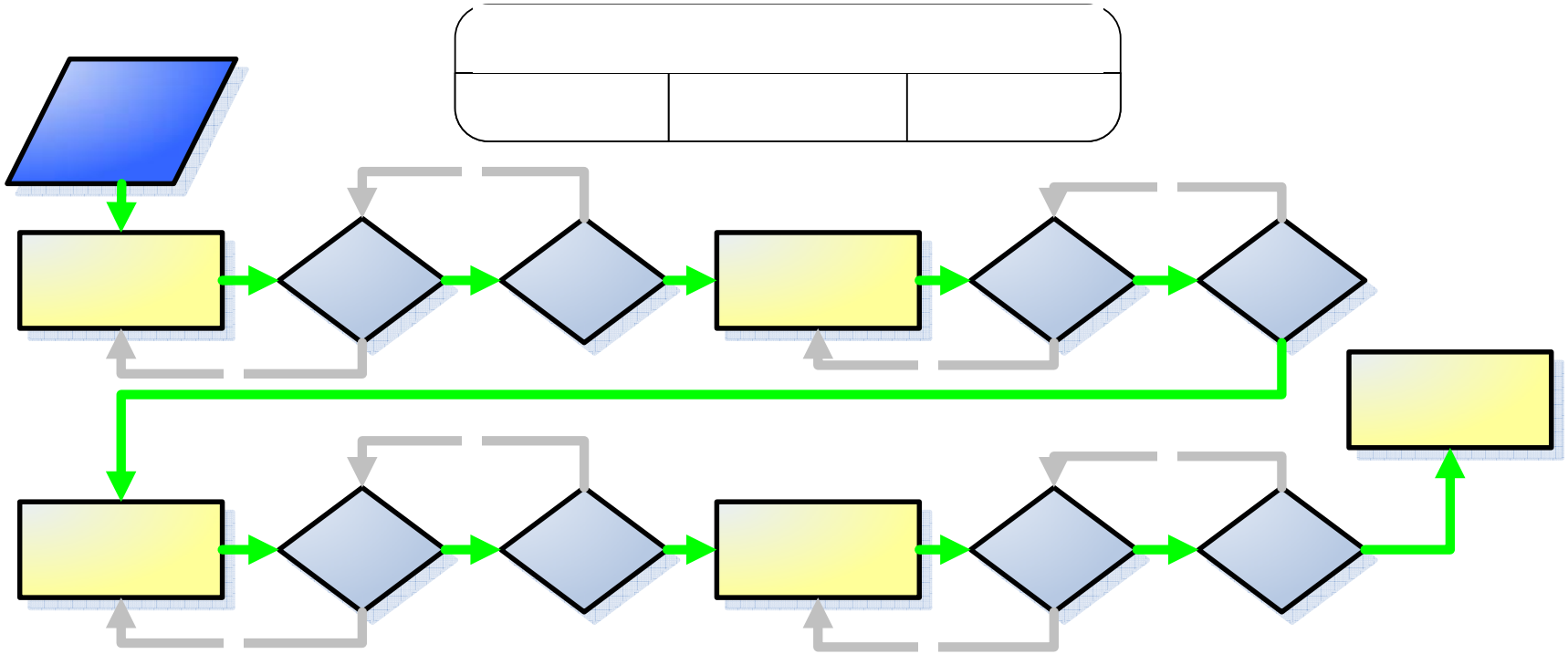
Introduction to TD-13
What is a Stage-Gate Process?

- **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.**
    - **Spiral 1: existing readiness levels (TRLs and MRLs), cost, schedule, performance, early "-ilities" considerations;**
    - **Spiral 2: additional "-ilities" identified in TD-1-12**

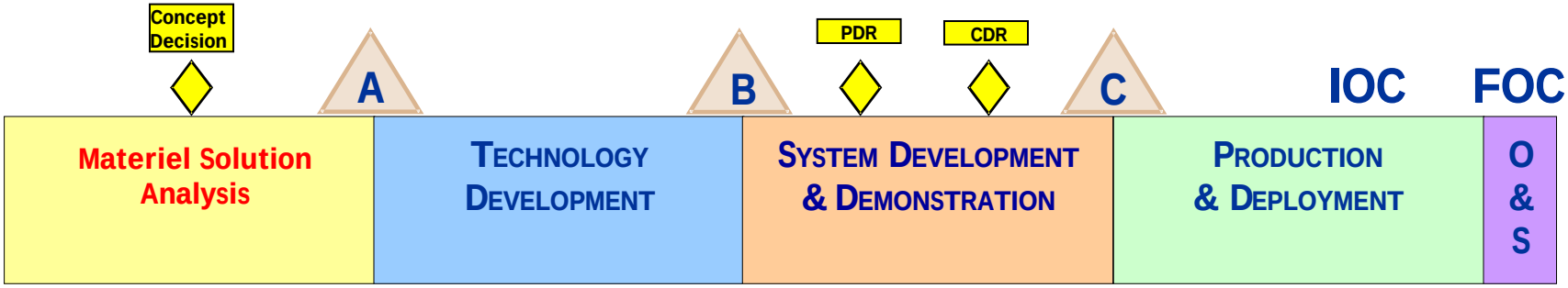
Introduction to TD-13

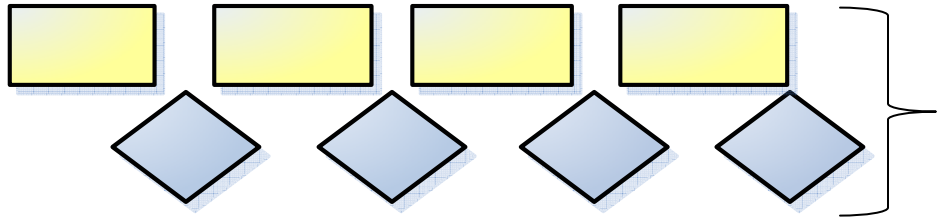
What are we doing that is new?

- **NEW: TD-1-13 provides a formalized process, the mechanism (stage-gate criteria) and detailed activities and milestones necessary to transition from phase to phase**



Introduction to TD-13
Alignment with DoD Acquisition





- Stage-Gate Process does not change
- Follow process to always know maturity
- Guide to be shared with Industry (RFP)

TRL 1-3 Proof Of Concept	**TRL 4** Validation in Laboratory Environment	**TRL 5** Validation in Relevant Environment	**TRL 6** Demo in Relevant Environment	**TRL 7** Prototype In Ops Environment	**TRL 8** System Qualification	**TRL 9** Mission Proven	

MRL 1-3 Mfg Concepts Identified	**MRL 4** Mfg Processes Identified	**MRL 5** Mfg Processes Developed	**MRL 6** Critical Mfg Processes Demo'd	**MRL 7** Prototype Mfg System	**MRL 8** Process Maturity Demo	**MRL 9** Mfg Processes Proven	**MRL 10** Lean System Production

Products of the Initiative
Users Guide and Automated Tool

- **Users Guide – for developing the strategy for technology development and transition**
  - **How to build Technology Development and Transition Strategy (TDTS) and required documentation**
    - **How to execute the stage-gating**
    - **How to build the entrance/exit criteria**

- **Automated Tool to facilitate the implementation of the User Guide**

Products of the Initiative
User Guide

- Easy to read and understand documentation on the Technology Transition Process Using Stage-Gates
  - Part 1 – Description of Stage-Gate Process for Technology Development
  - Part 2 – Explains “How to” Navigate the Process
- Power of the Process is in Teamwork
  - Having the right people on the team at the right time – Chaired by Program Manager and Co-Chaired by Technology Manager
- Process will apply to all key advanced programs
  - Top 50% of all AFRL 6.3 programs
  - High Visibility Programs
  - Industry-developed technology programs

Products of the Initiative
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

Products of the Initiative
"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

Products of the Initiative
Automated Tool - TurboTPMM

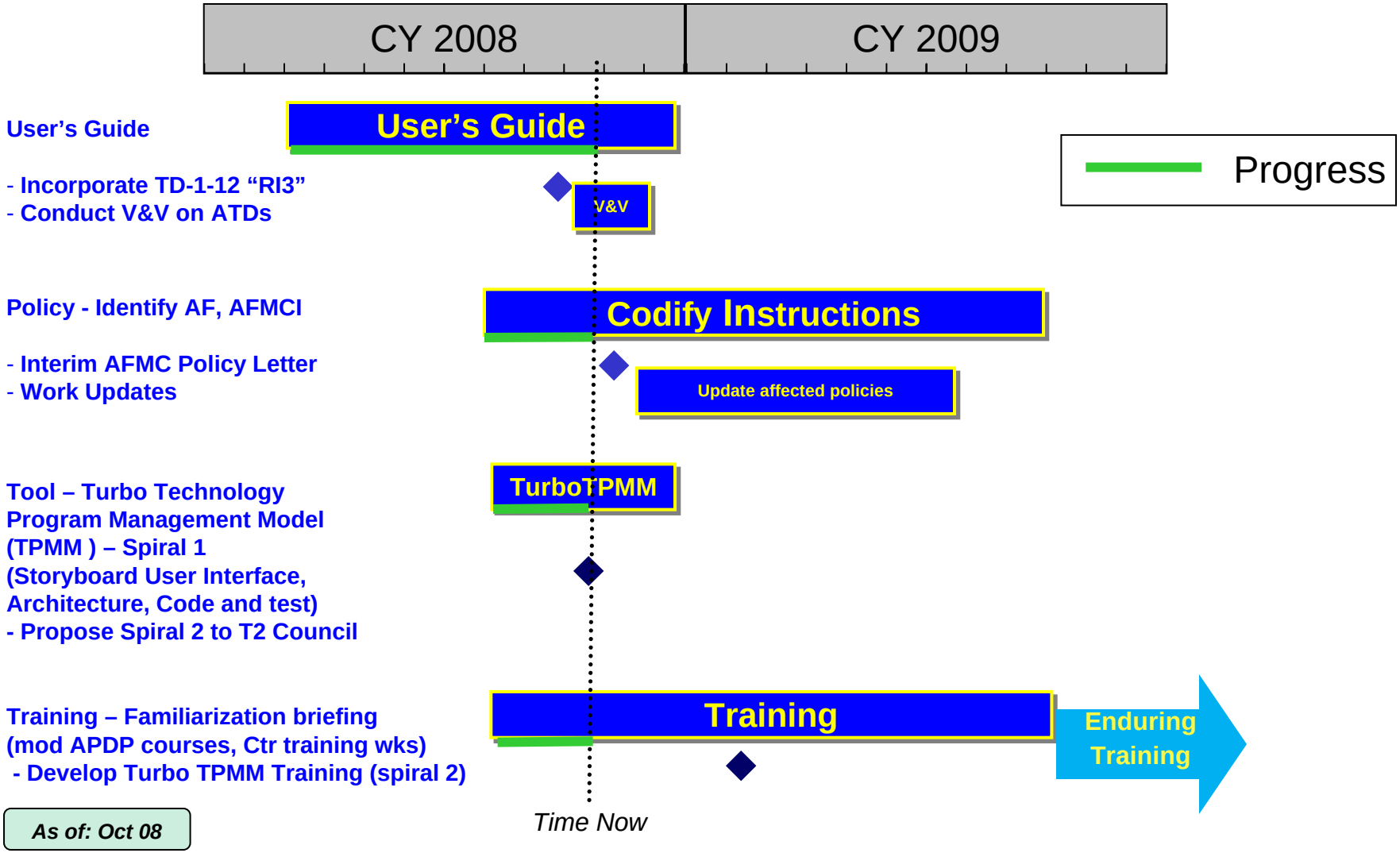
- **TurboTPMM Tool – An application to navigate a database tool that will be the repository of the stage-gates (i.e. checklists) and the documentation required for each TDTS**
  - **TPMM database developed by Army SMDC**
  - **TurboTPMM automates the Stage-gate process**
  - **Easy to use, walks user through the process**
  - **Turbo-Tax© like software that asks the right questions**
  - **Ensures application of Systems Engineering principles**
  - **Contract to Dynetics through Army SMDC**

- **DAU to join in on Collaboration with TurboTPMM**

Products of the Initiative
TurboTPMM – Scope and Requirements

- **Ease of Use**
  - **Develop a Graphical User Interface**
  - **Prove feasibility of automating the process**
- **Portfolio Management**
  - **Develop capability to output Readiness data**
- **Reporting**
  - **Develop a Reporting Capability**
- **Common Language**
  - **Adapt Army to USAF lexicon, templates, events**

Schedule


CY 2008
CY 2009
User's Guide
User's Guide
- Incorporate TD-1-12 "RI3"
- Conduct V&V on ATDs
V&V
Progress
Policy - Identify AF, AFMCI
Codify Instructions
- Interim AFMC Policy Letter
- Work Updates
Update affected policies
Tool – Turbo Technology Program Management Model (TPMM) – Spiral 1 (Storyboard User Interface, Architecture, Code and test)
- Propose Spiral 2 to T2 Council
TurboTPMM
Training – Familiarization briefing (mod APDP courses, Ctr training wks)
- Develop Turbo TPMM Training (spiral 2)
Training
Enduring Training
Time Now
As of: Oct 08

Summary / Way Ahead

- Modify Stage-Gating tool for AF application
- Verify and Validate User Guide and Gates
- Finalize Communication Plan
- Initiate Workforce Development (Training) Plan

For More Information, Questions or Comments:
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Questions?

Membership

- **Membership**
  - **Consists of representatives from across the Air Force**
  - **Chartered by Senior Leaders SAF/AQ, AFRL/CC, AFMC/CC**
    - **Broad experience base for this approach**
  - **Culture Change**

Stage-Gate Example

STAGE GATE #3

DESCRIPTION: This is the first stage-gate in the Technology Development and Transition Strategy process.

EXIT CRITERIA:

1.TRL == 3 MRL == 3

2.The Technology Concept has been proven sufficient to meet the User Need in a Laboratory environment and a Proof of Concept is documented

3.The Technology Development and Transition Strategy (TDTS) is drafted.

4.ENTRANCE CRITERIA FOR NEXT PHASE: A Breadboard Laboratory Validation Plan has been developed whose purpose, objectives and scope are adequately described

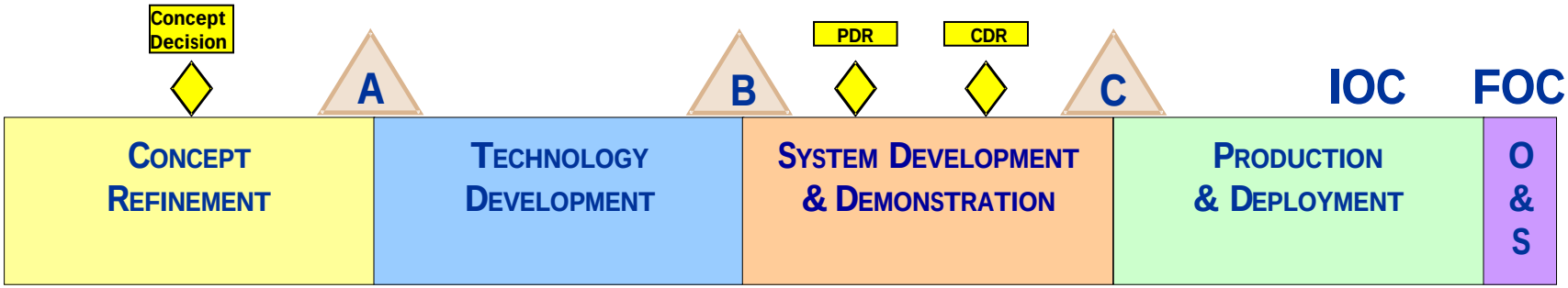
Tool focuses the team on the tasks necessary to meet these exit criteria. Provides a repository for the information created during technology development.

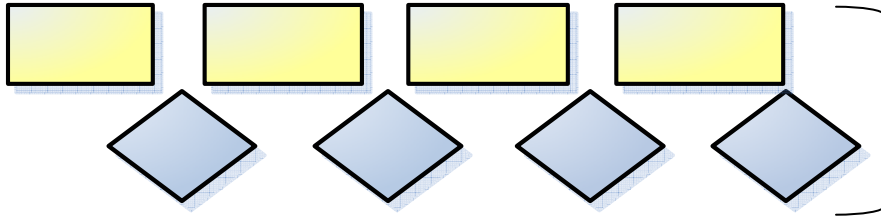
TurboTPMM – FY08
Development & Deployment

- Development environment
  - Microsoft® Visual Studio® 2008
  - ASP.NET 3.5 application framework
  - C# programming language
  - Relational Database using MS SQL Server® 2005
  - UML 2.0 Object Modeling using Altova® Umodel®
  - Microsoft® Team Foundation Server (Configuration Mgmt)

- Deployment – FY08
  - Laptop
  - Microsoft ® Windows XP Pro or Server 2003
  - Microsoft® IIS Web Server
  - SQL Server Express
  - IE6 Web browser client
  - Microsoft® Office

Stage-Gates Process Alignment with Acquisition





Stage-Gate Technology Maturity Process

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