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D&SWS Technology Development Orientation Brief

**for
2008 Technology Maturity
Conference**

11 Sep 2008

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Overview

- **D&SWS – An Air Force Core Process**
- **Technology Development (TD) Core Sub-Process**
 - **The Problem – Our Solution**
 - **How We Birthed the Three Initiatives**



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



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The Status Quo is Out



AFSO21

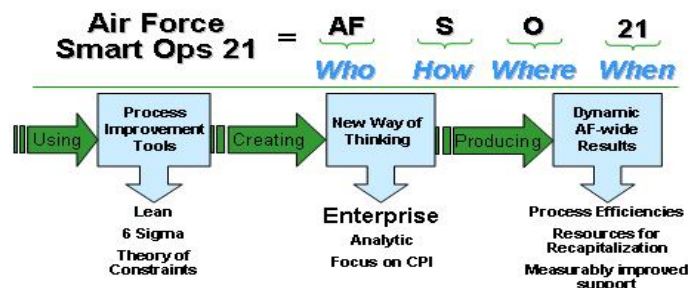
- The USAF will do less with less
- Do what is valued by our customers
- Employ tools and techniques smartly to reduce waste and non-value-added work, to maximize value to the warriors

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AF Smart Ops 21

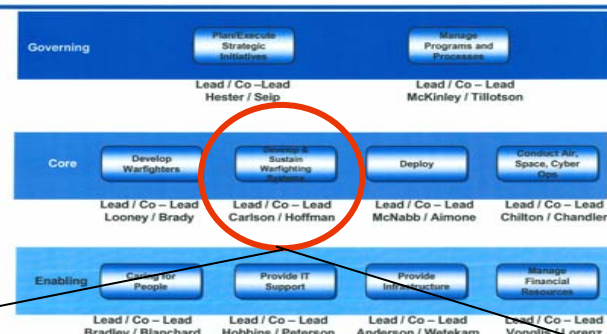


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CSAF Approved Process Owners

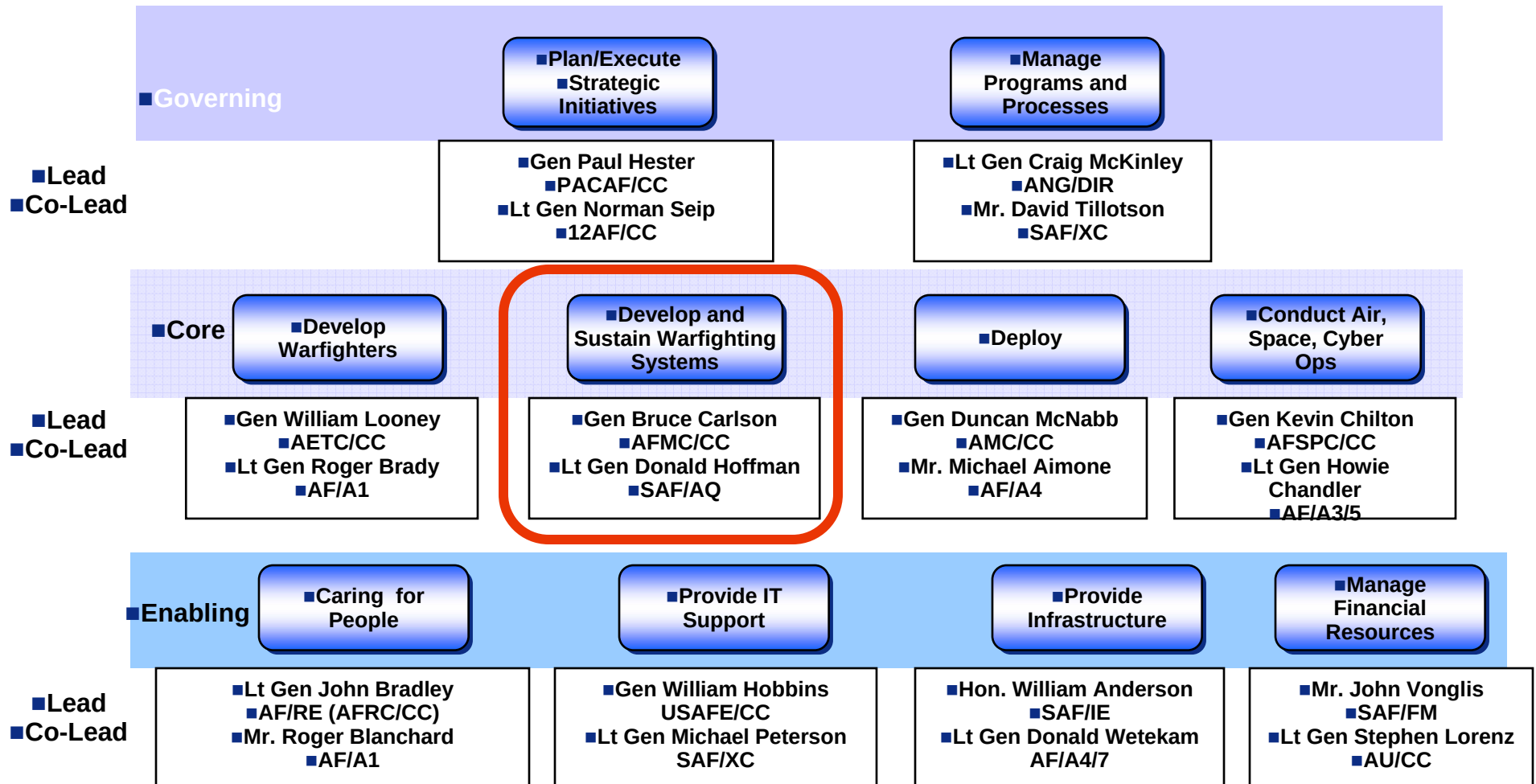


- Develop and Sustain
- Warfighting Systems (D&SWS)

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SECAF / CSAF Approved Air Force Process Owners



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D&SWS Sub-Process Teams

(Jun '08)

■ Process Owner
■ Co Lead

■ Gen Bruce Carlson
■ Lt Gen Don Hoffman

■ CPO: MG Marshall Sabol

Institutionalize Standard Work

*ESC/CA (Ms. Duntz)
SAF/ACE Dir (Mr. DiCicco)
AFMC/IG (Col Moran)

Oversight / Command & Control

*AFMC/A2/5 (BG Wolfenbarger)
AQX Deputy (Mr. Shelton)
SAF/IEL (Ms. Walker)

■ Advisors:
■ BG Smoot (AFMC/A1)

Technology Development

*AAC/CA (Ms. Stokley)
SAF/AQR (Mr. Jagers)
AFRL/CC (MG Bedke)

Continuous Capability Planning

*AFMC/A2/5 (Mr. Brown)
HAF/A5R (BG Mueller)
SMC/CV (BG Mashiko)

Lifecycle Management

*ESC/CC (LG Bowlds)
ASC/CA (Ms. Wright)
OC-ALC/CC (MG Reno)

Test and Evaluation

*AFFTC/CA (Mr. Bond)
AFOTEC/CC (MG Sergeant)
AFMC/A3 (BG Lanni)

Supply Chain Operations

*HAF/A4I (Mr. Dunn)
AFMC/A4 (BG Bruno)
AFSPC/A4/7 (Ms. Puckett)

Sourcing

*AFMC/PK (Mr. Gill)
SAF/AQC (Mr. Correll)

■ * Indicates Lead



TD Charter

- **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 Institutionalize 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 History

How We Birthed...and How We are Implementing Our Initiatives

- 6 Dec 06 Design Team Kickoff Meeting
- Large & Diverse Team
- Process-Reengineering Mandate
 - Lean Focus
 - EVSM, SIPOC
 - Diagnosis, Re-design, Transfer of Ownership
- Diagnosis:
 - TD is unwieldy AF process w/many stakeholders & confusion
 - Lean: Value-Added & Non-Value-Added Analysis ☹️
 - Root Cause Analysis (5 Whys) 😊
- Re-Design
- Transfer of Ownership to AF Functional Orgs

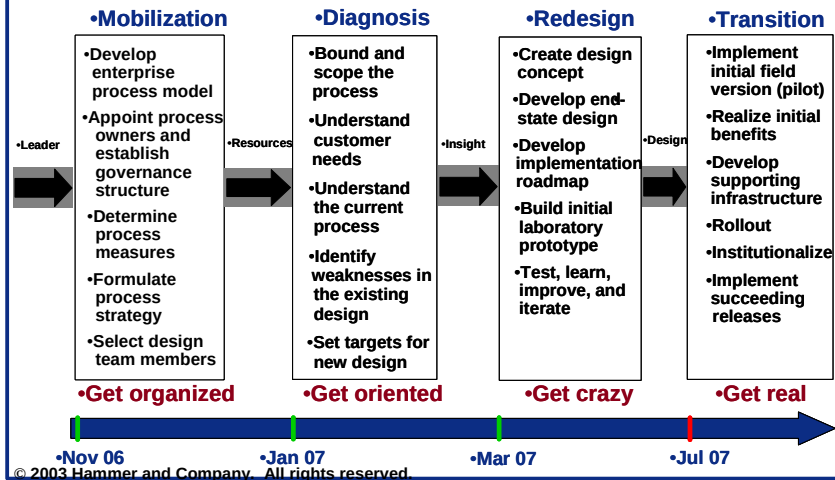


Process-Reengineering Summary

Issues and Opportunities	On time / On cost	Improve Availability at reduced cost	Reduce Cycle Time
Institutionalize Standard Work			✓
Lack of integrated policy deployment & interpretation process			✓
Lack of consistent policy & process compliance			✓
Inconsistent process execution			✓
Oversight / Command and Control			✓
Policy process takes too long and content unclear			✓
Decision authority often unclear			✓
Gap - No existing LCM enterprise	✓	✓	✓
LCM Program Decision	✓	✓	✓
LCM Performance	✓	✓	✓
Technical			
and tech needs	✓	✓	✓
Planning	✓	✓	✓
Advisor and Honest Broker (TD13)	✓	✓	✓
Capability Planning			
Linkability to program linkage			✓
Lack of disciplined requirements process	✓		
Lack of requirements / budgeting stability	✓		
Lifecycle Management			
Low confidence SDD proposals	✓	✓	
Low confidence AF Program Baseline	✓	✓	
Insufficient Execution & Technical Leverage	✓	✓	
Test & Evaluation			
Need for qualified T&E personnel	✓		
Need for consistent T&E processes	✓		
Supply Chain Operations			
Absence of an Enterprise View		✓	
Fragmented Planning Processes		✓	
Lack of Integration		✓	
No Enterprise System Strategy		✓	
Sourcing			
Ineffective & inefficient acquisition of services	✓	✓	✓
Ineffective & inefficient J&A review and approval process	✓	✓	✓
Supplier relationship Mgt (Strategic view)	✓	✓	✓
Issues/Opportunities Total	12	11	14

"GO Fix" List

•A Process for Process Redesign



End-to-end Assessment Complete:

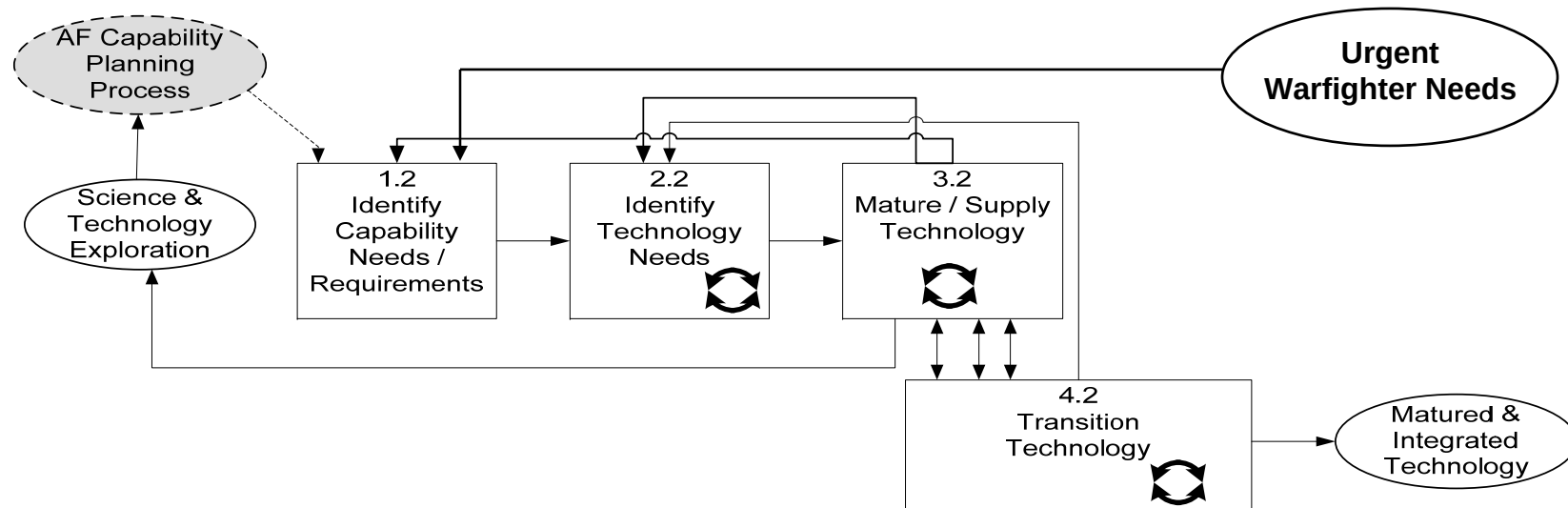
- Significant value-stream analyses and process mapping conducted
- Identified 27 issues / opportunities
- Created "To-Be" state for process redesign
- Multiple process improvement initiatives aligned under 4 Focus Areas
- Measure success against 3 customer-oriented objectives



Tech Development

As-Is Process: Issues & Opportunities

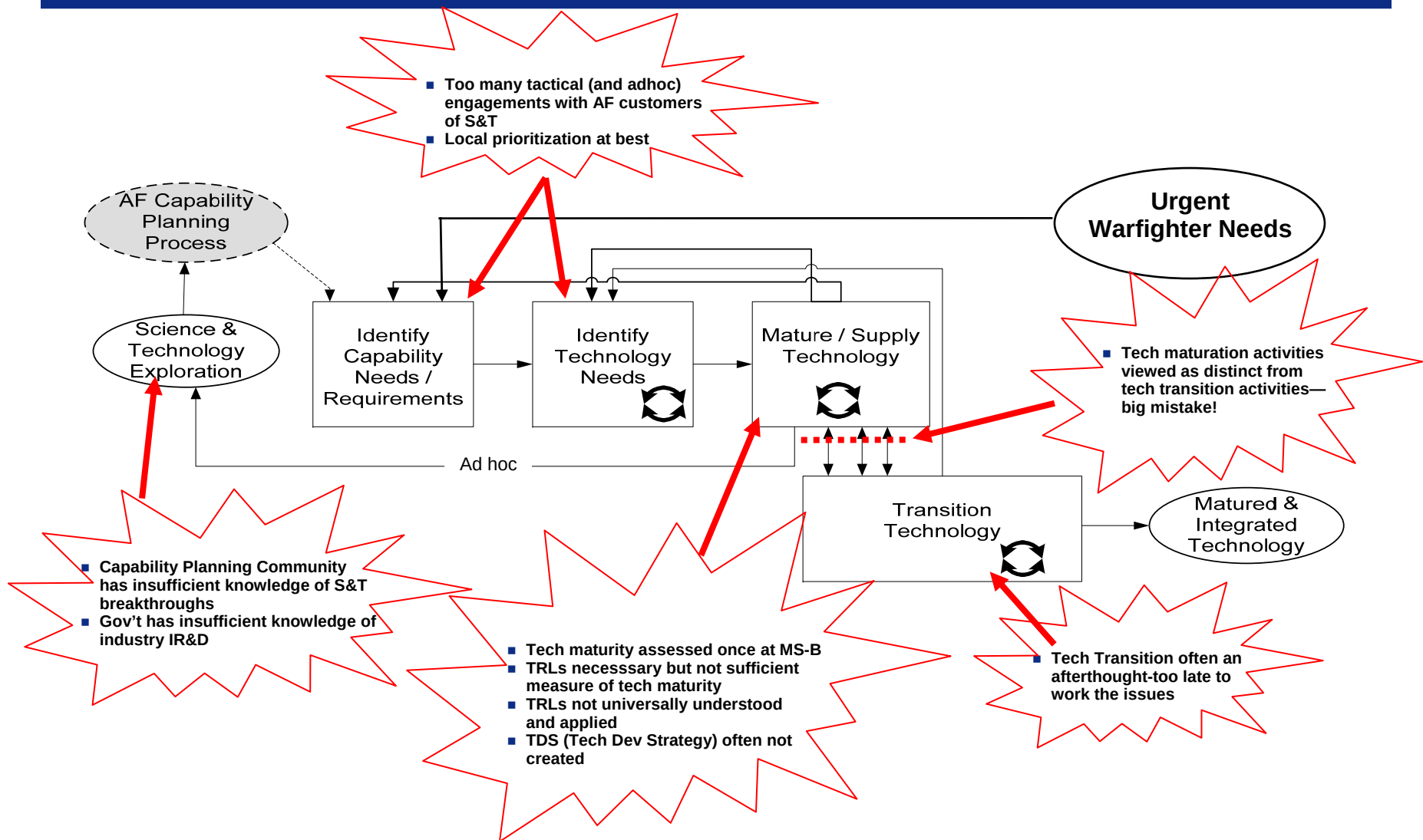
Briefed to D&SWS Process Council Spring 07



- **As-is Process is not well understood; involves many stakeholders; is not conducive to strong and consistent collaboration**
- **16 Issues/Opportunities Identified and Prioritized**
 - **Four principal areas to focus:**
 - Identifying and prioritizing technology investment needs and communicating what we are doing
 - More comprehensive and effective technology maturity assessment
 - Earlier and more responsive Technology Transition Planning
 - Establishing AFRL as the AF's Trusted Advisor and Honest Broker

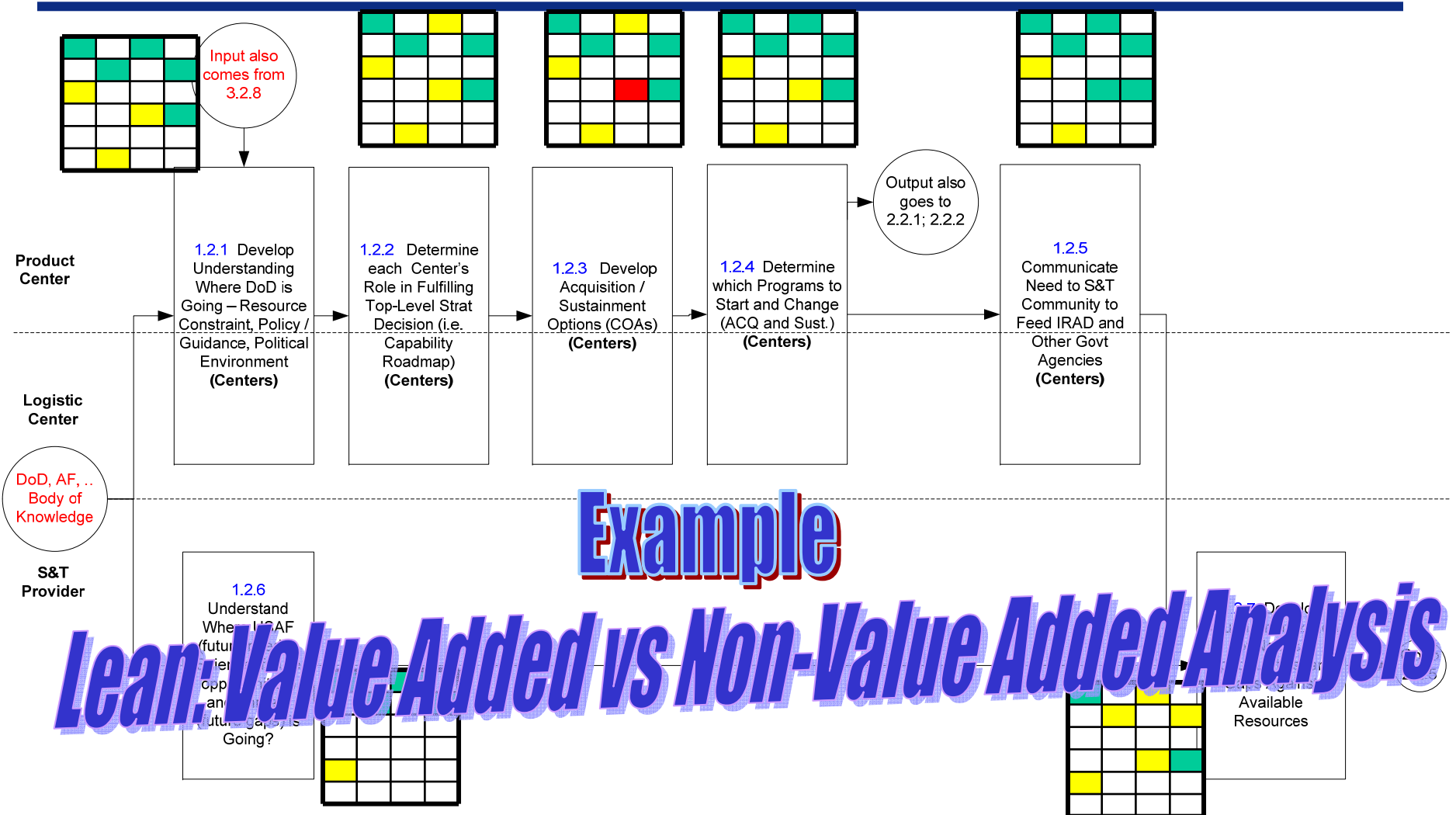


Tech Development As-Is Process: Many Issues





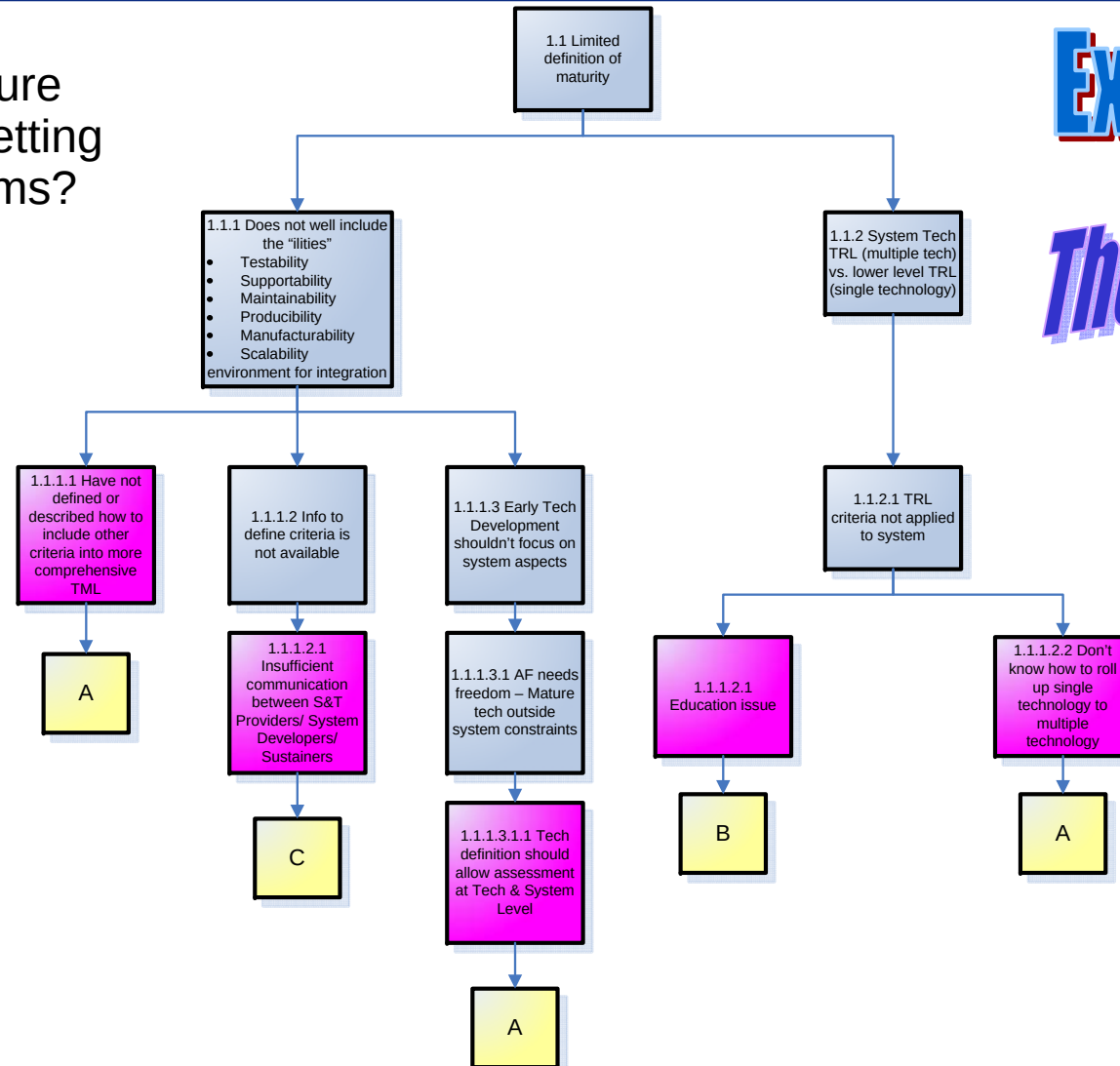
"Lean" Was of Limited Value in Identifying the Problems





Root Cause Analysis Helped Us Zero-In on the Real Issues

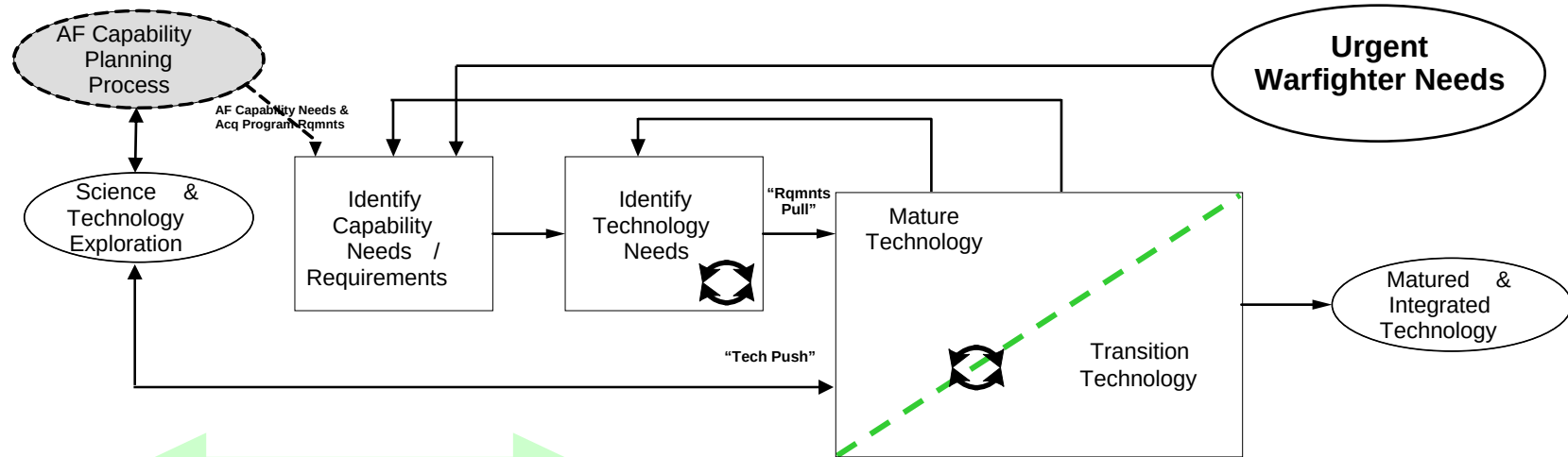
Why Is Immature
Technology getting
Into our systems?



Example
The 5 Whys



Tech Development “To-Be” Process Opportunities for Improvement



TD-1-14

- Comprehensive ID & prioritization of tech needs
 - Solves the problem of understanding/interpreting AF's Capability Needs and Program Rqmnts
- Game-changing “tech push” influencing capability planning (and vice versa)

AF-Wide Requirements Database

TD-1-12

- More frequent maturity assessments
- More robust maturity assessments
- Common process/tool for Gov't & Industry

Tech Maturity Assessment “Calculator”

TD-1-13

- Earlier transition planning
 - Combined with tech maturation planning
- Gated reviews to ensure timely and robust tech development
 - Also enables tech off-ramps to support Acq “Time Certain Capability”

Transition Planning & Stage-Gating Tool

Tools

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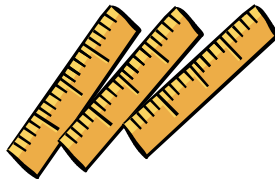
Three TD Initiatives

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

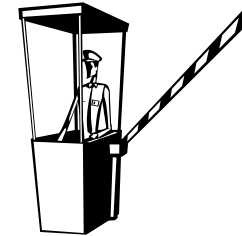
- Improved, but Separate, Qualitative Maturity Assessments

- TRA Training
- MRA Training



- Improved Software TRL descriptions
- A methodology to help identify Technical Risks related to Integration & 'ilities

■ Helpful to....



■ 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”

■ TD-1-14 Identify and Prioritize Tech Needs

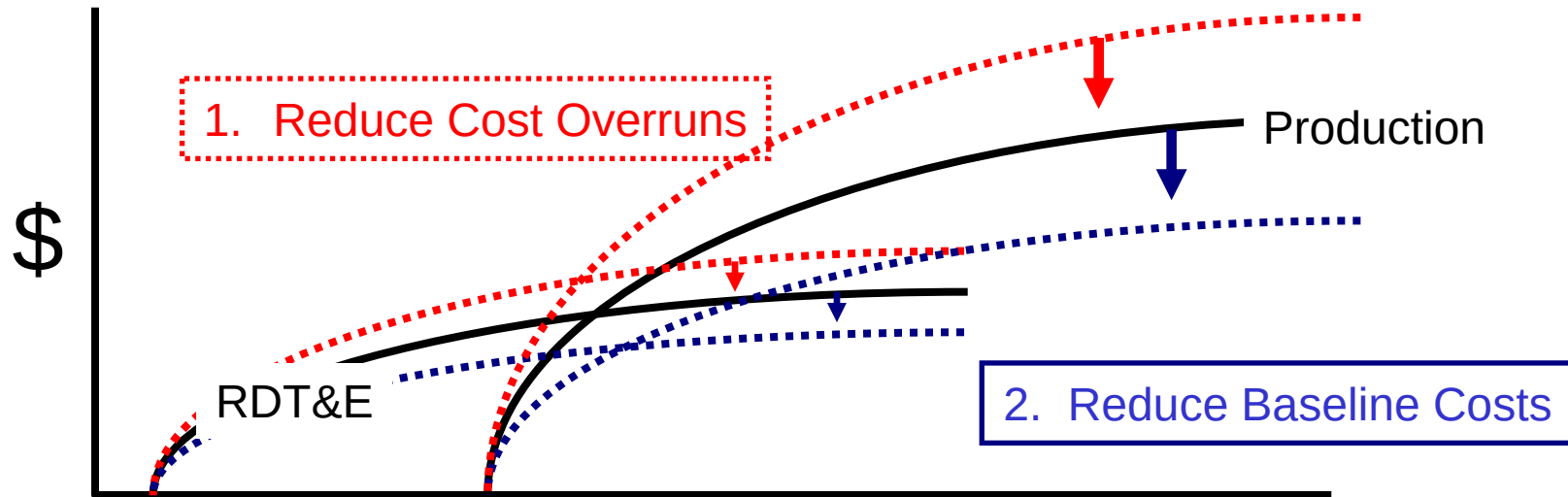
- Focus S&T on highest priority needs
 - Integrate/align existing processes to identify tech needs
 - Develop new process to prioritize short, mid, and far-term needs vice a single “1-n” list
- Game-changing “Tech Push” influencing capability planning

■ **THE LIST**





Two Benefits to Solving the “Immature Technology” Problem



The ability to more accurately assess the maturity of technology, across dimensions more meaningful to acquisition & sustainment programs promises 2 benefits:

1. Pre-MS-B: More accurate assessment of tech maturity guides more complete tech development and enables more accurate program estimates (RDT&E and Production)
Result: Reduction in Cost Overruns (cost avoidance)
 - \$1B-\$3.5B per year with an ROI of 2.6-4.2 (GAO report)
2. Post-MS-B: Targeted tech assessments within on-going programs may offer timely (and previously unknown) tech alternatives
Result: Reductions in projected [budgeted] costs (cost avoidance)
 - Specific examples available (F-22 AESA with ROI of 76:1, etc.)



Pay Me Now (\$) or Pay Me Later (\$\$)

- It costs money to save money
- It also costs money today to avoid future cost overruns
- TD (and other D&SWS initiatives) are proposing initiatives that will drive additional costs earlier in the development cycle
 - For TD-1-12 & 13, this means additional RDT&E funding to mature technologies more robustly...earlier...so they are MATURE when they get into acquisition programs



Want to Change Behavior? Train the Workforce!

- All three TD initiatives propose new processes/tools that will require workforce training
- Both DAU and AFIT have a critical roles
- TD initiatives will develop required workforce training:
 - **Advanced training** for personnel working, or about to work, the new processes/tools (TD-1-12 Only for TRAs and MRAs)
 - **General Awareness training** appropriately tailored to fit into the many existing DAU and AFIT S&T/ Acquisition/ Sustainment “Familiarization” courses

	Advanced Training	General Awareness Training
Computer-Based	AFIT	DAU & AFIT
Classroom	AFIT	DAU & AFIT



Are We Sure Our Process-Improvement Initiatives Will Achieve Desired Affect?

- TD-1-12 and TD-1-13 will participate in D&SWS pathfinders
 - Five Pre-MS B AF Acquisition Programs Designated as Pathfinders

Seven D&SWS Initiatives to be “Tested”

- LCM-1-7: Time Certain Capability
- LCM-1-8: High Conf Baselines
- LCM-1-9: Life Cycle Affordability Planning
- CCP-1-10: Time-Phased Requirements Development
- TD-1-12: Improved Technology Maturity Assessments
- TD-1-13: High Confidence Technology Transitions
- TE-1-16: T&E Milestone B Support

- New TD processes will be integrated into an existing schedule as expediently and cost-effectively as possible
- However...D&SWS pathfinders will provide limited verification and validation of TD initiatives
 - Will not sufficiently exercise TD's process improvements
- Additional pilots will be required (Some of AFRL's 6.3 portfolio)



Summary

- We diagnosed the problem
 - Why/How is Immature Technology Getting into Weapon Systems?
- We proposed solutions - Process-Improvement Initiatives Designed to:
 - More robustly Assess Technology Maturity (TD-1-12)
 - Plan Transition Earlier & Be More Disciplined in Implementing Those Plans (TD-1-13)
 - “Plan the Flight...Fly the Plan!”
- Tools, Training, Policy Will Facilitate Implementation
- Getting Ready to “Test our Products”