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Air Force Enterprise Requirements Management Tool

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Agenda

- Requirements Management
- Problem
- Implementation
- Accomplishments to Date
- Summary

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Overall Approach

- **AF acquisition community is assessing COTS products with the flexibility to address military uniqueness of the requirements management process**
- **SAF/AQXI is sponsoring the acquisition and implementation of an AF Enterprise Requirements Management Tool (RMT) lead by HQ AFMC/EN**
- **View of the future: Sharing information between military domains, acquisition programs, sustainment activities, and contractors**
- **Needs to align with the AF Systems Engineering tools identification and selection effort**

Defining Requirements Management

- **Requirements Management is:**
  - **the identification, derivation, allocation, and**
  - **control in a consistent, traceable, correlatable, verifiable manner**
  - **of all the system functions, attributes, interfaces, and**
  - **verification methods that a system must meet including customer, derived (internal), and specialty engineering needs**

Stevens and Martine, 5th Annu. Int. Symp. Of INCOSE, P. 11

- **Requirements are more than just engineering including:**
  - **Technical**
  - **Process**
  - **Logistics**
  - **Test**
  - **Financial**
  - **Schedule**
  - **Operating environment**
  - **Environmental**
  - **Human factors**
  - **Human resources**

USAF Policy & Guidance

- **Air Force Instruction (AFI) 63-101 & AFI 63-1201**
  - **"Collaborative and continuous requirements management"**
    - **One of the six tenets of ILCM per AFI 63-101**
  - **"Requirements development and management"**
    - **One of five fundamental elements that make up systems engineering (AFI 63-101 & AFI 63-1201)**
  - **"All requirements, …, must be traceable and documented" (AFI 63-1201)**
- **The program manager should institute Requirements Management to (Defense Acquisition Guide)…**
  - **Maintain the traceability of all requirements from capability needs through design and test,**
  - **Document all changes to those requirements, and**
  - **Record the rationale for those changes.**

ILCM – Integrated Life Cycle Management
AFI 63-101 *Acquisition and Sustainment Life Cycle Management*
AFI 63-1201 *Life Cycle Systems Engineering*

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Requirements Management

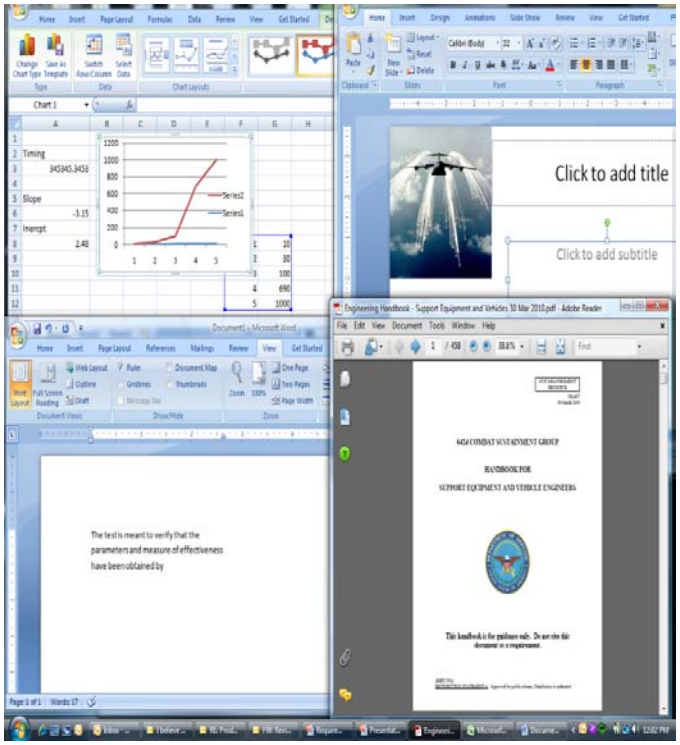
1. Identify source of requirements
2. Ensure completeness of requirements
3. Capture rationale for requirements
4. Ensure customer and user understanding
5. Explicitly ID interfaces
6. Ensure consistent data usage
7. Capture expectations interpretations/intent
8. Plan for changes, corrections, or clarification of requirements
9. Plan for new requirements
10. Maintain traceability

Pragmatic Principle 3 [DeFoe, INCOSE Report, Jan 1993]

Defining the 21th Century Toolset

Was

Is



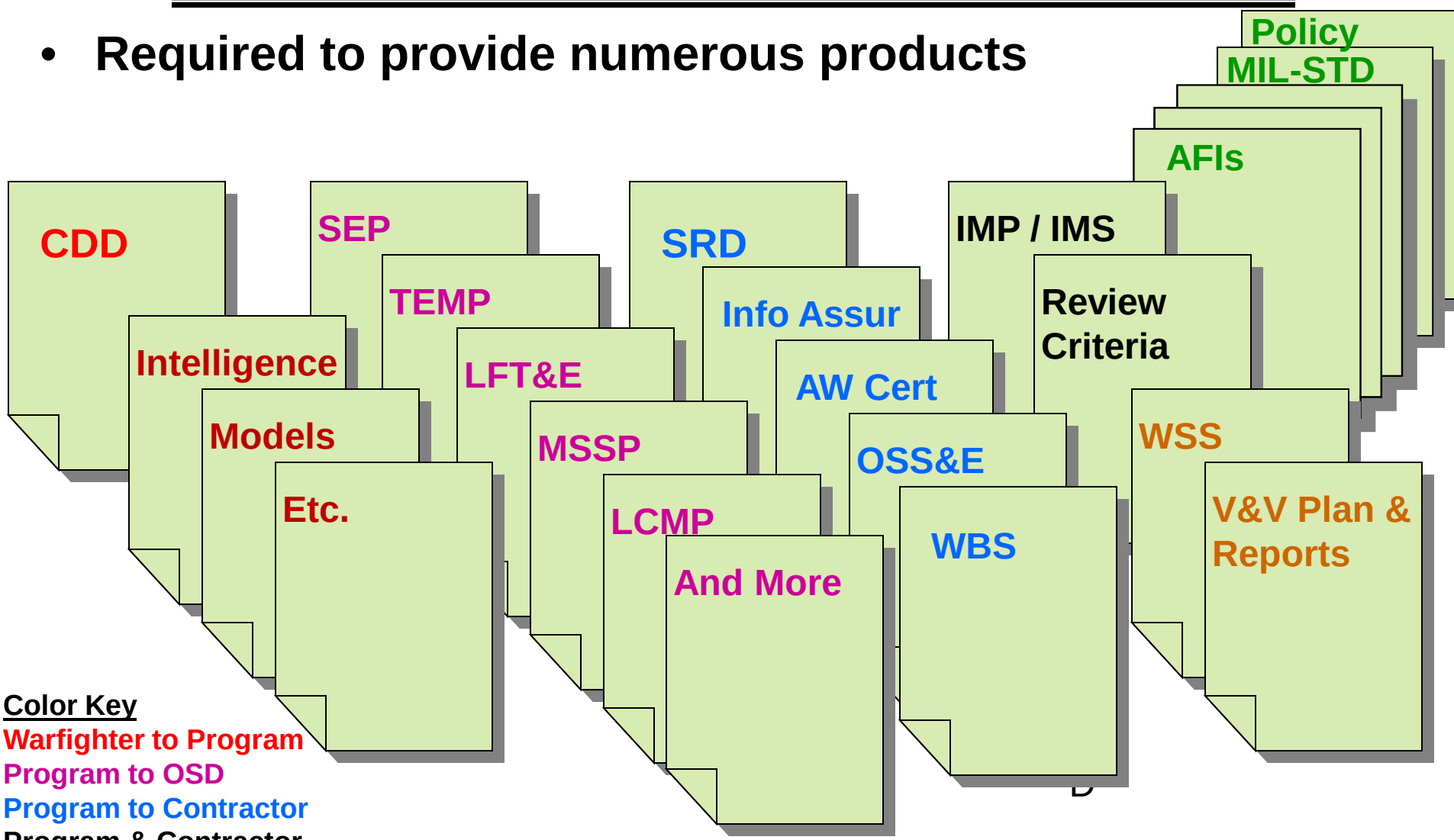
To

- Update content that requires immediate attention, then produce documents
  - ✓ Reduce cycle time
- When new information or changes are in-work people are notified
  - ✓ Push data to users
- Re-use data via relationships to avoid cut ‘n paste replicated
  - ✓ Configuration Control

AF Agile Combat Support CONOPS

Problem

- **Required to provide numerous products**

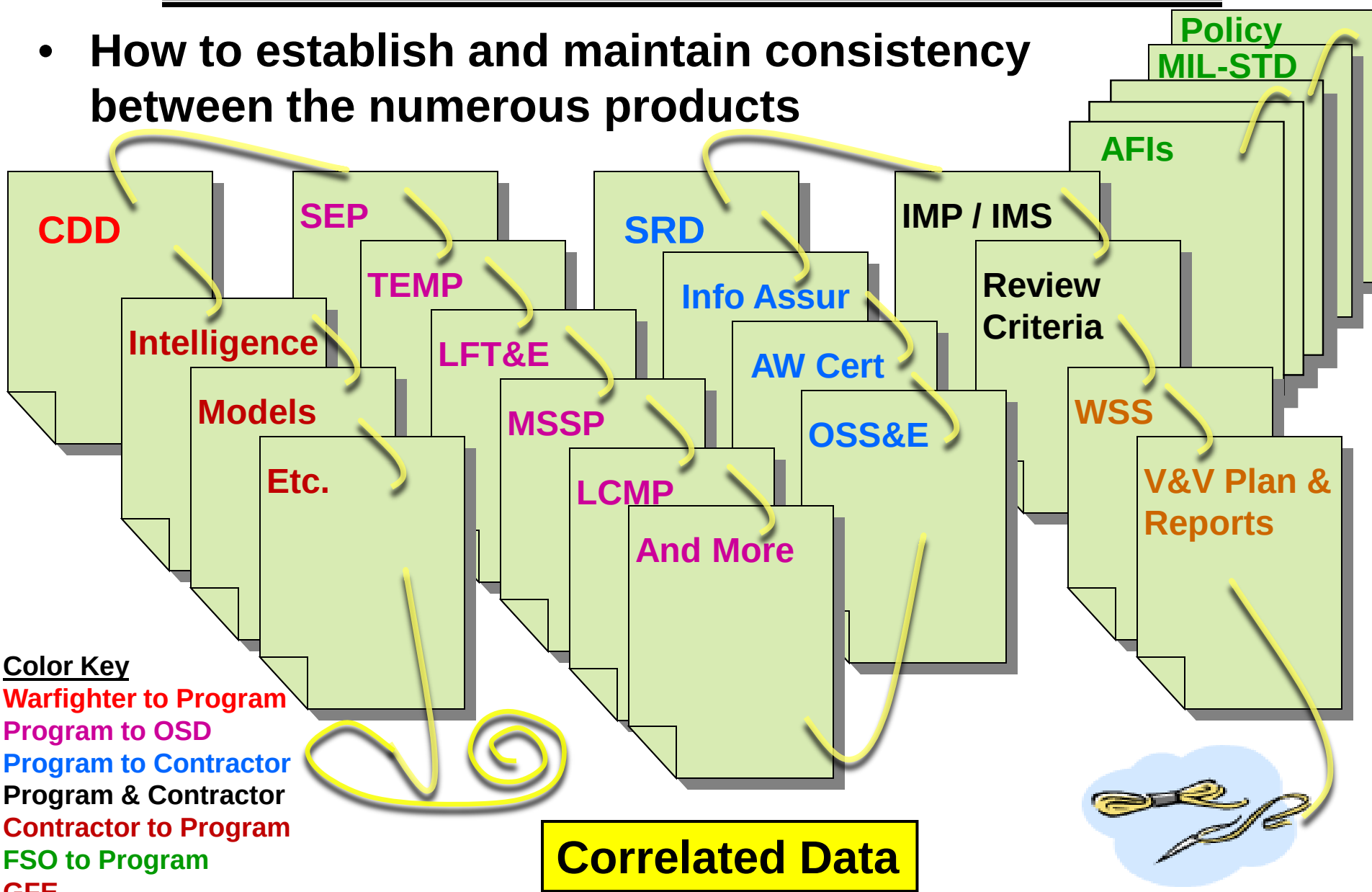


Color Key
Warfighter to Program
Program to OSD
Program to Contractor
Program & Contractor
Contractor to Program
FSO to Program
GFE

Voluminous Uncorrelated Data

Problem

- How to establish and maintain consistency between the numerous products



Request for Information Functionality Needs

- **Many System Engineering tools provide the necessary functionality to enable requirements management**
- **Key attributes to consider:**
  - **Collaborative Web Environment**
  - **Security and host on Government network**
  - **Decomposition of Requirements**
  - **Filtering of Requirements**
  - **Creation of Documents**
  - **Traceability of Requirements**
  - **Extensibility**
  - **Change Control of Requirements**
  - **Standard Reporting**
- **Tool Demonstrations**

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RFI – Technical Requirements

- Secure Web Based Access/Common Access Card
- Extensibility/Customizability
- Interfaces to Other Common Acquisition Tools
- Import/Export/Publishing Capability
- Traceability Management
- Change/Configuration Management Features
- User Schema Set-up
- Vendor Training
- Maintenance and Affordability
- Part of an Enterprise Tool Set
- Vendor Qualification
- Data Propagation/Metrics Generation & Collection
- Digital Signatures

Pathfinder Overview
Completed Jul 2010

- **Requirements Traceability Tool Pathfinder effort– demonstrate utility of a requirements traceability tool in an IT development environment**
  - **9 month pathfinder effort**
  - **Aeronautical Systems Center demonstrated one aspect of SRD generation based on CDD, Joint Service Specification Guide (JSSGs) , and Airworthiness**
    - **Deep dive into the Material Availability Key Performance Parameter**
  - **Space and Missile Systems demonstrated tracing/managing requirements between System, Subsystem, & Segment Specs**
    - **Populated tool with subset of authoritative technical data (MIL-STD/ HDBK/ Guides)**
    - **Imported and cross-referenced data**

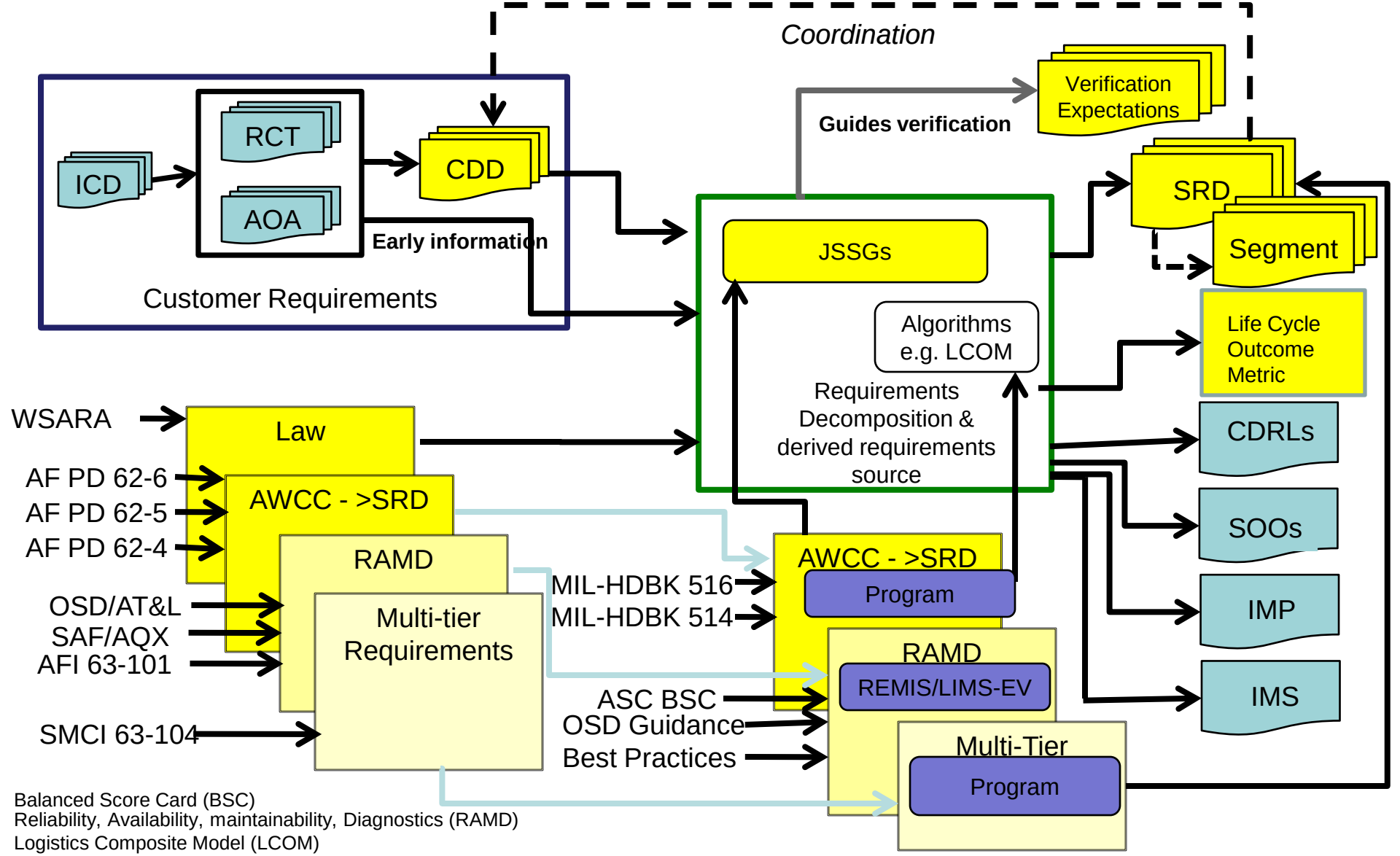
In a web-based environment

SRD Generation

- Authoritative Sources (Law, Air Force Policy Directives, AFIs, Policy)
- Guidance (MIL-STDs, JSSGs, Local Operating Instructions)
- Questions to refine SRD content
- Using MIL-HDBK-520 (draft) for SRD format
- Source data can be:
  - Linked directly to SRD format
  - Linked to Question Set that are tied to SRD format
  - Can be added, modified or deleted by users
- Subject Matter Experts assess information provided by RTT and creates the appropriate SRD requirements

Does not eliminate the need for an engineer in the loop

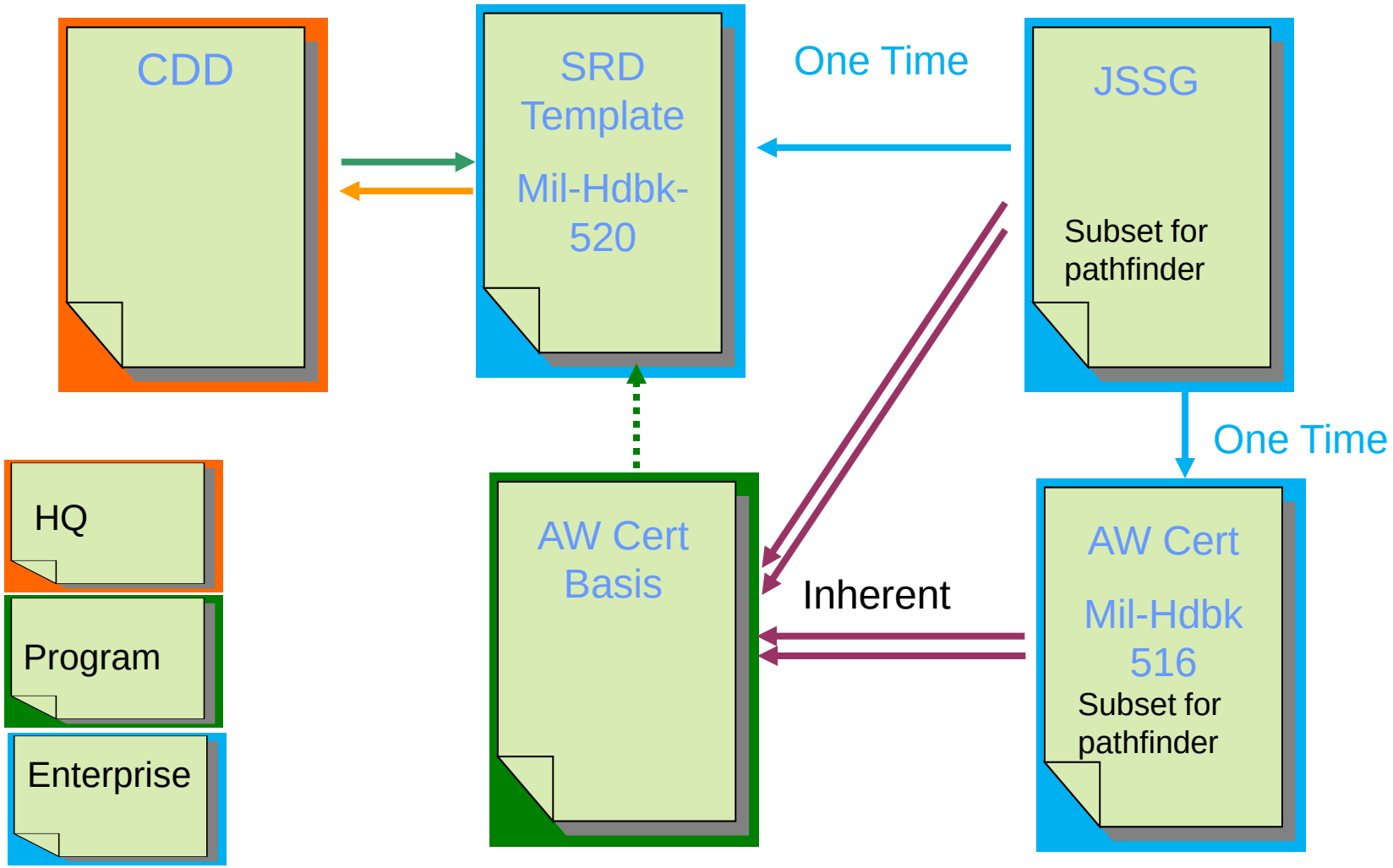
Pathfinder and Deep Dive:
Mechanization of Integrated Information



Balanced Score Card (BSC)
Reliability, Availability, maintainability, Diagnostics (RAMD)
Logistics Composite Model (LCOM)
Airworthiness Cert Criteria (AWCC)

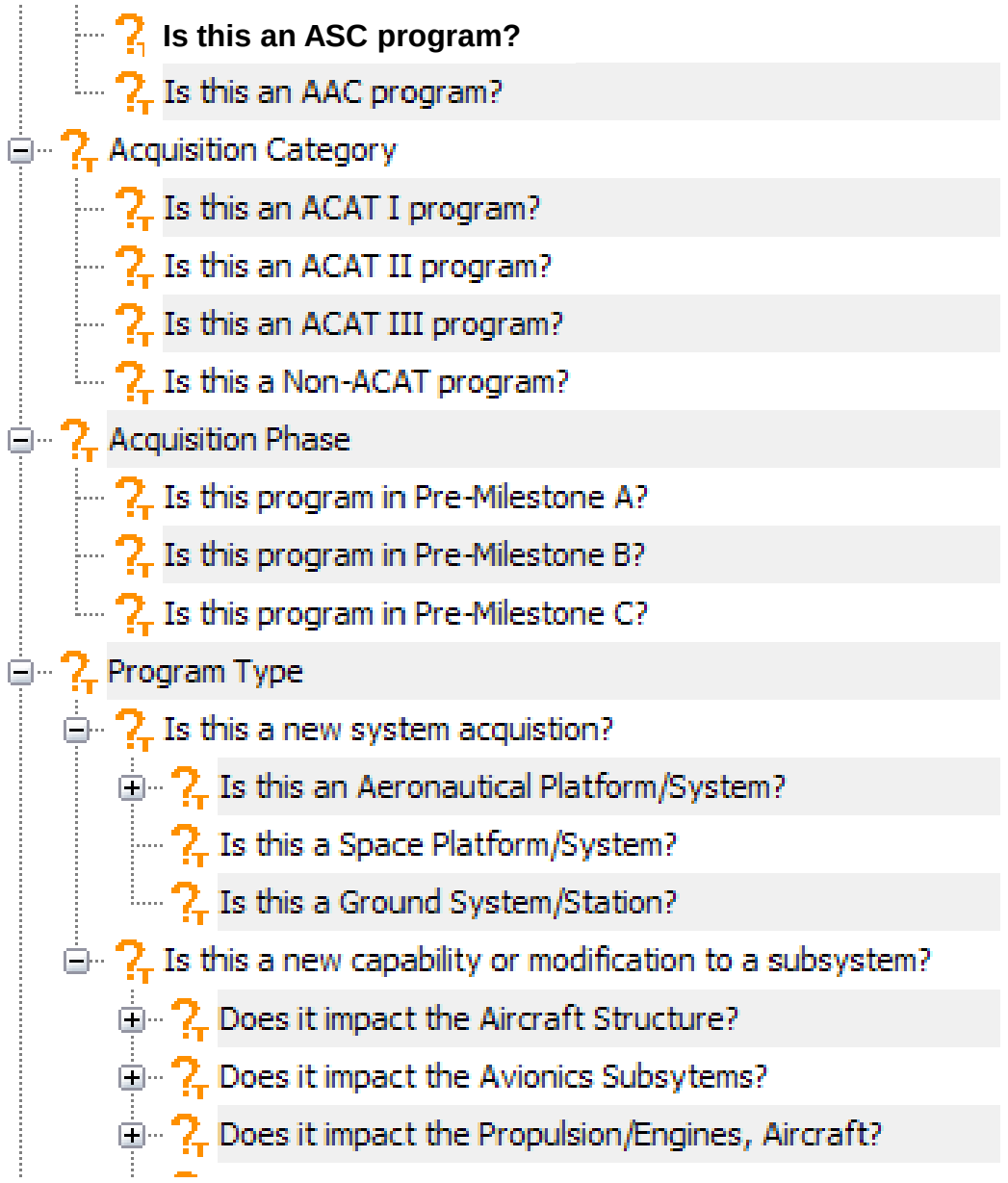
Not inclusive of all policy/guidance

ASC Functional Links Governance

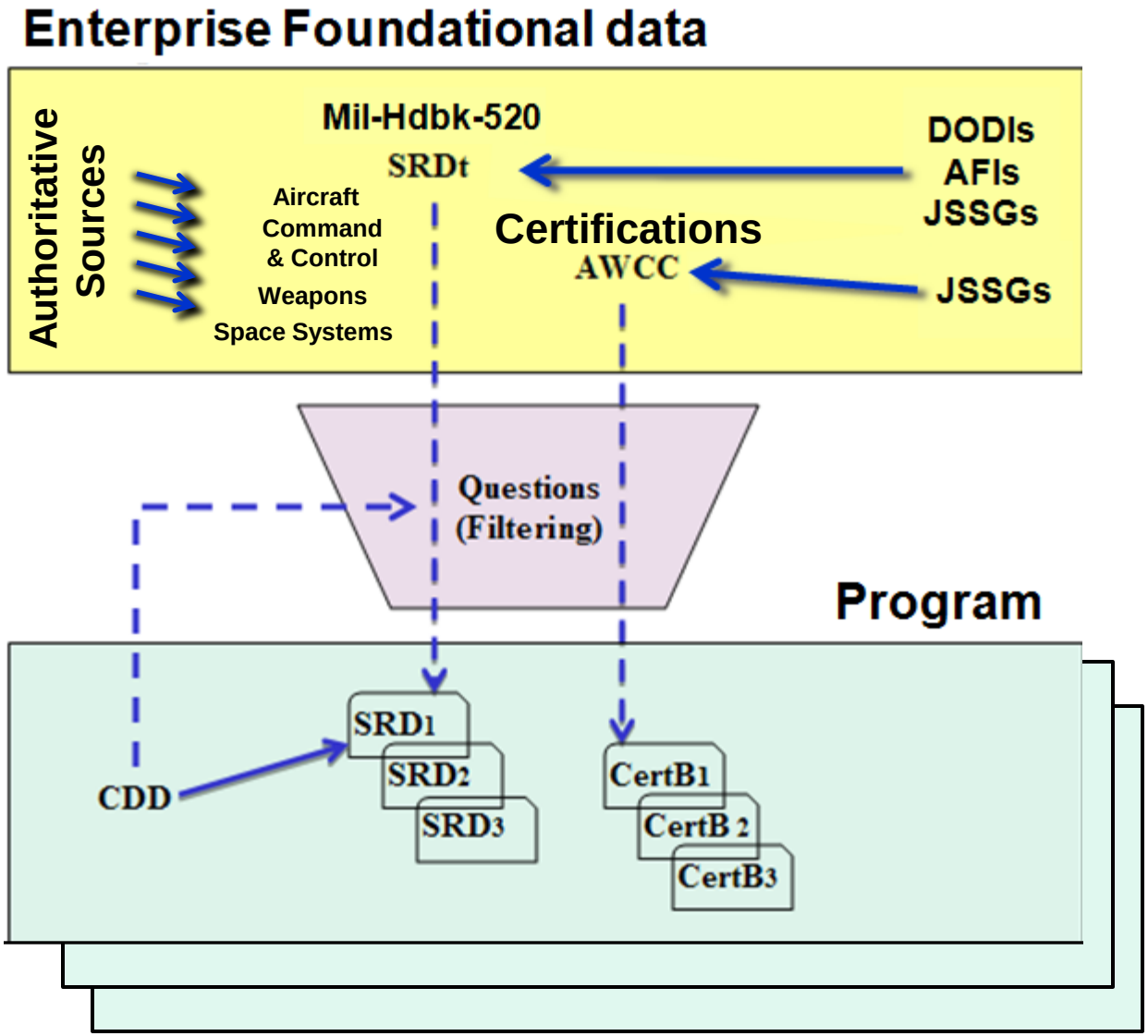


Question Samples

- **Enterprise Documents**
- **Acquisition Questions**
- **Program specific**

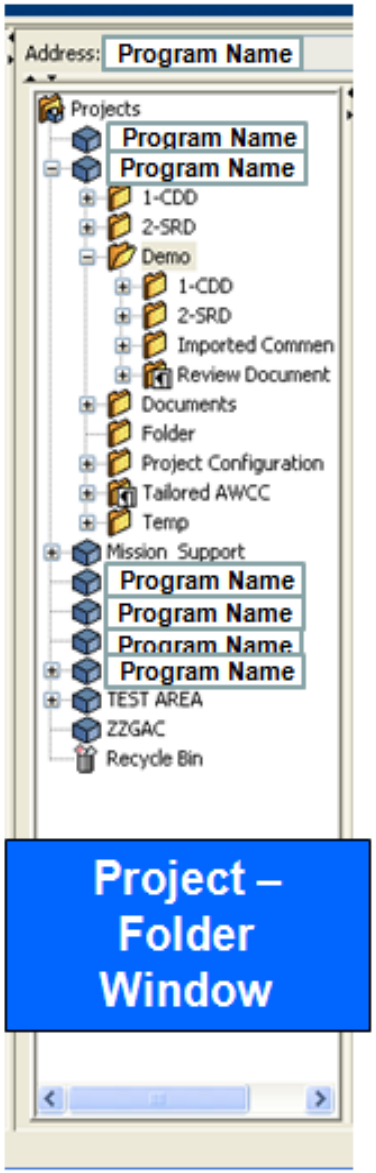


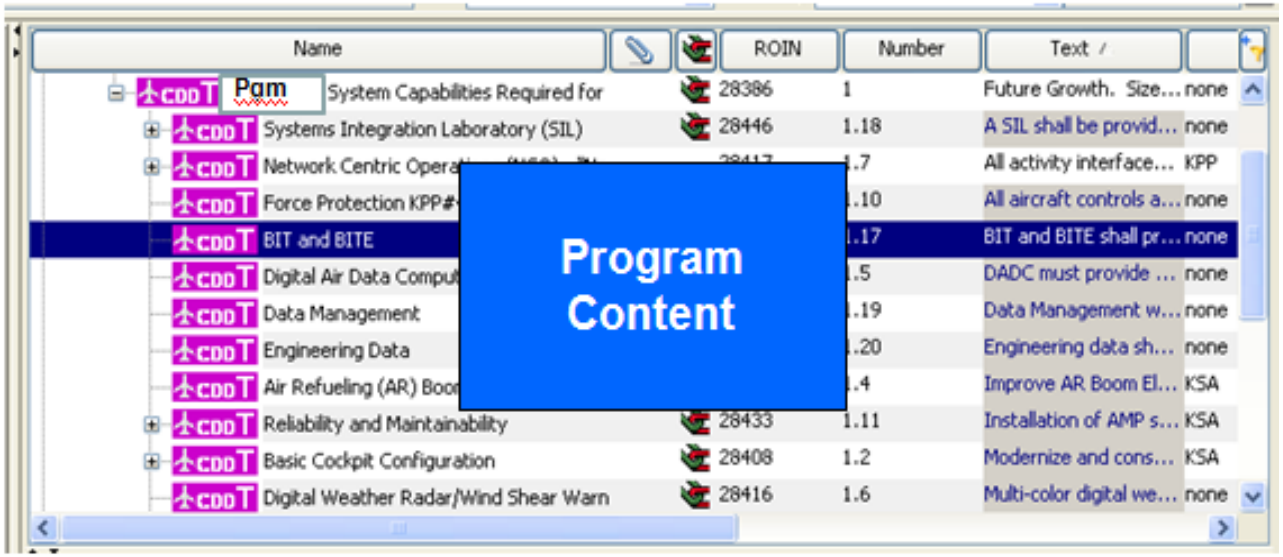
Structure & Organization

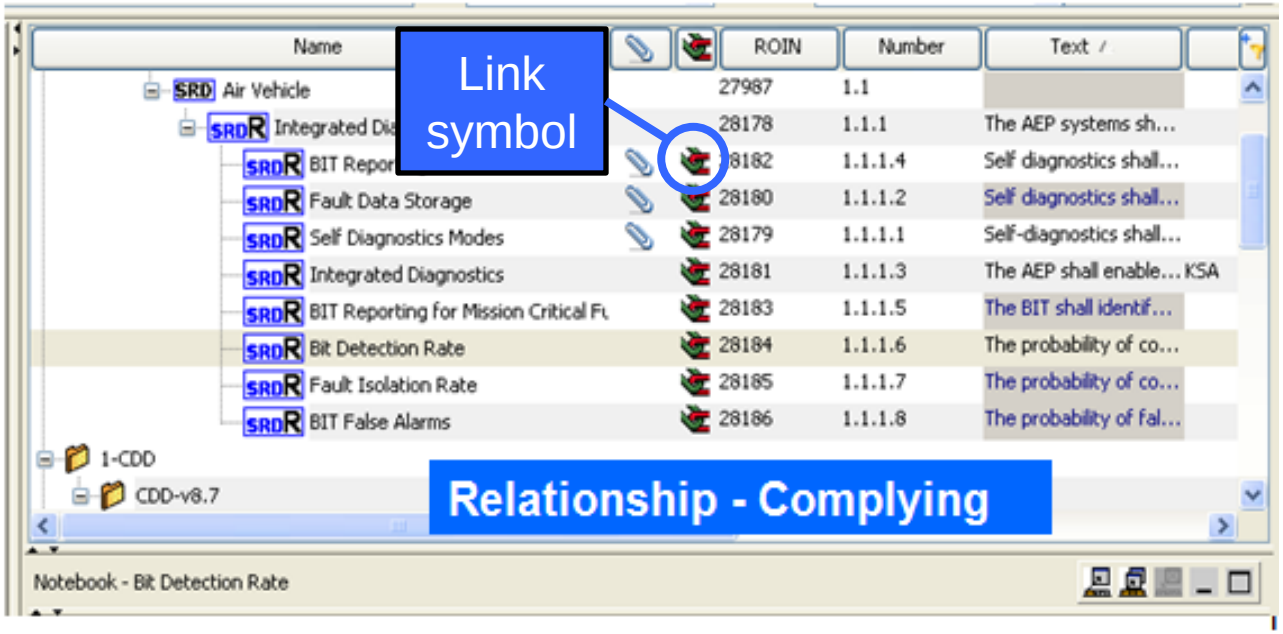


- Foundational data that users have access
- Selection of program specific content and information
- Program data with limited users and access

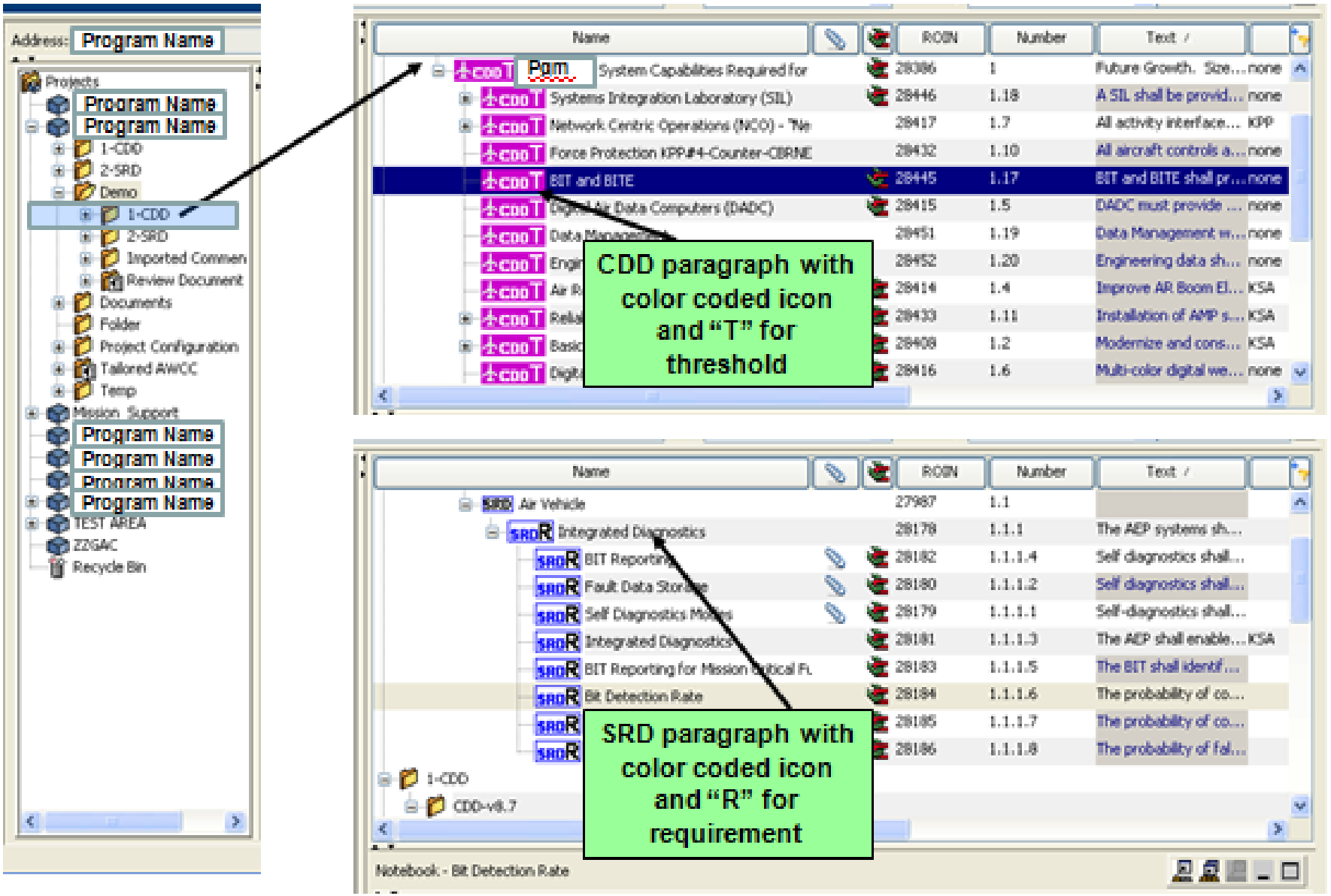
Pathfinder Implementation



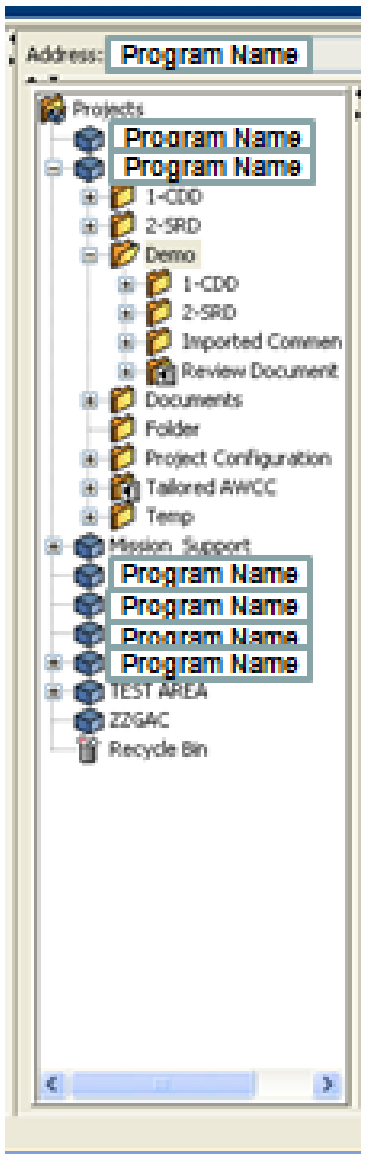


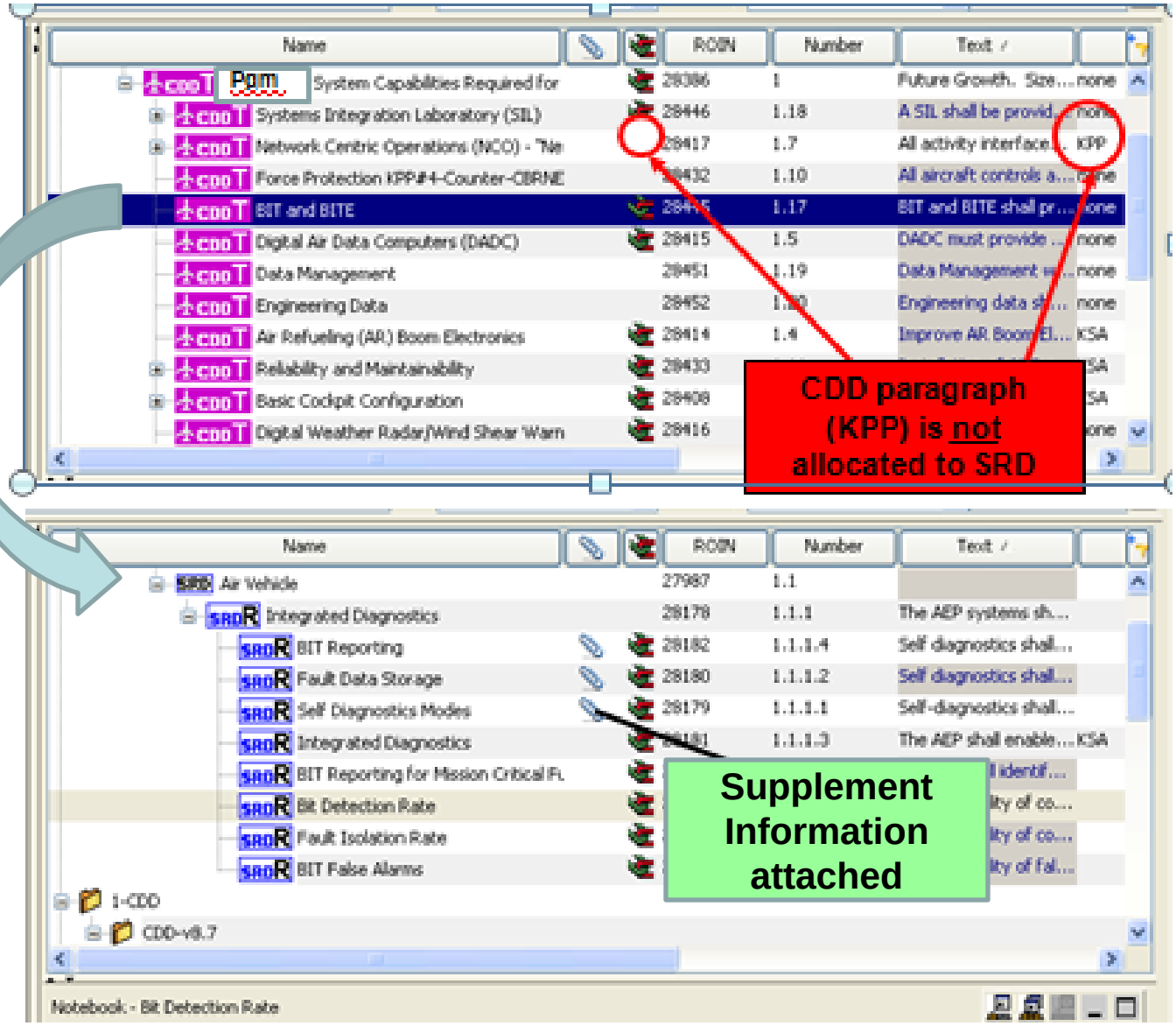


Pathfinder Implementation

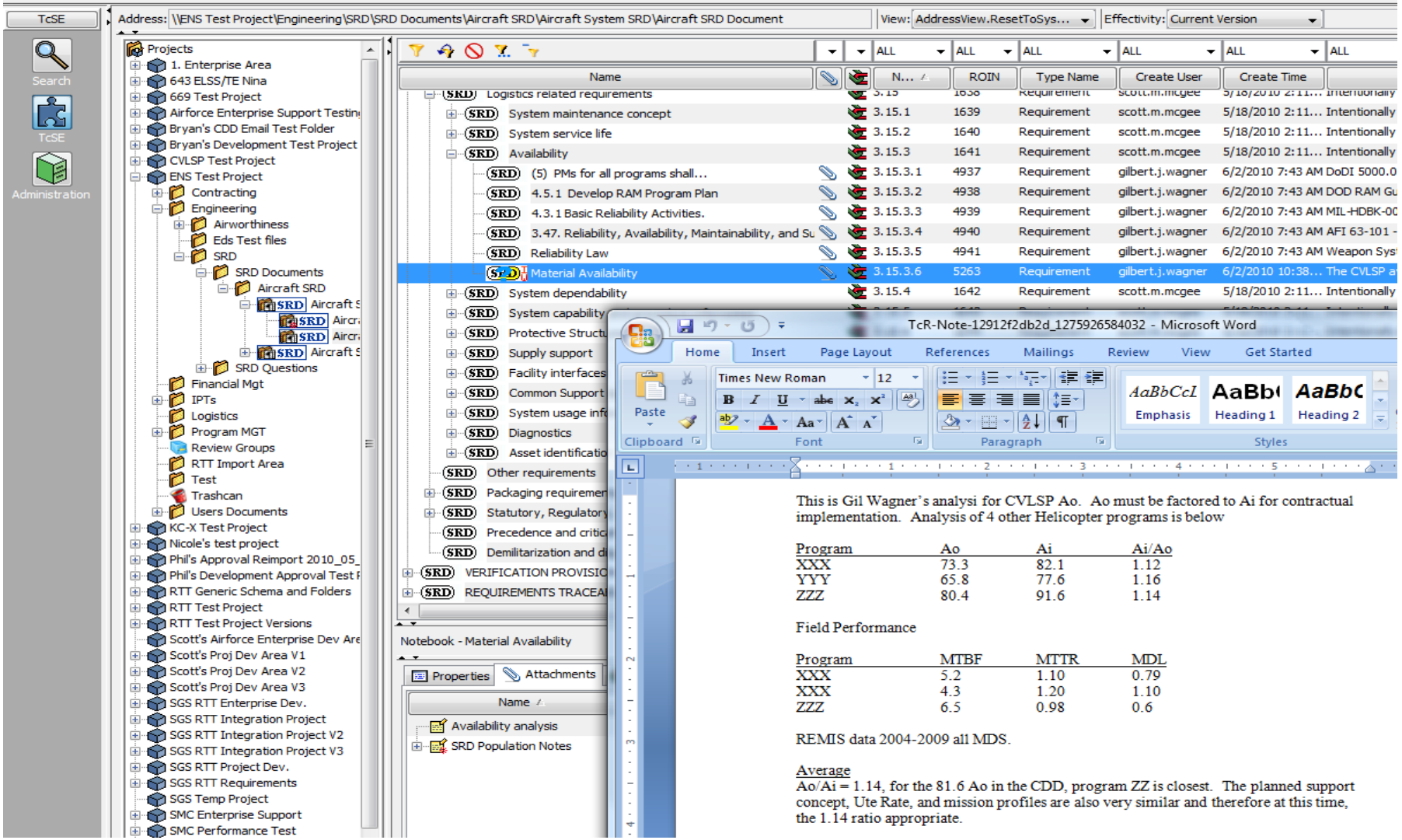


Pathfinder Implementation



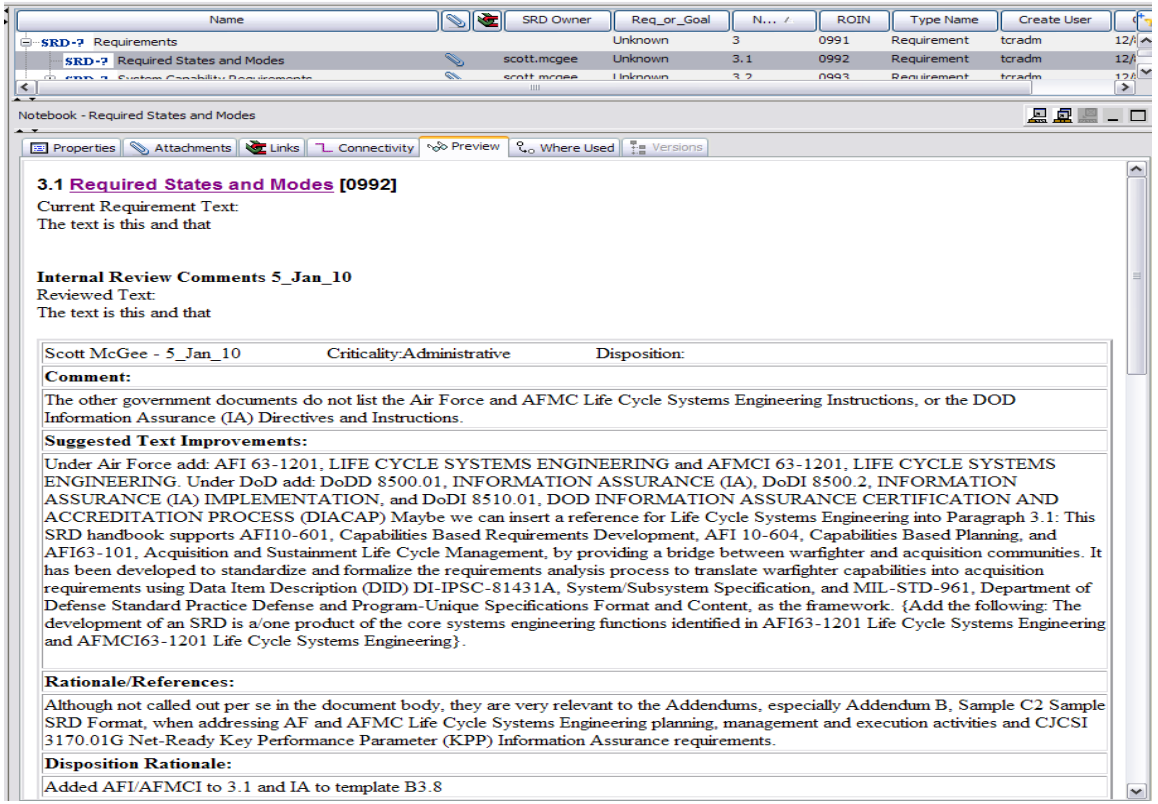


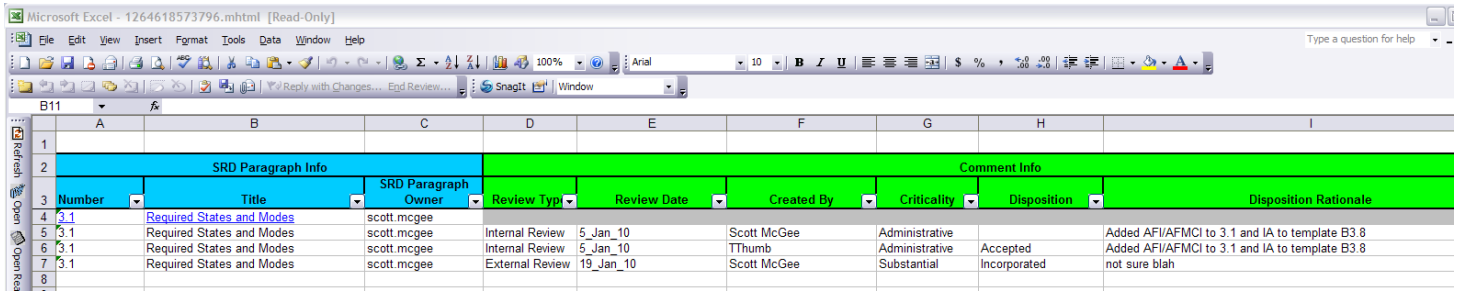
Retain Substantiation of Requirements



Owner reviews all comments

- All comments grouped
- E-mail/notification to users
- Hyperlinks into tool
- Can review in
  - Word
  - Excel
  - Tool native environment
- Live updates from review
- Feedback to commenter





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Accomplishments to Date

- **RTT pathfinder completed**
  - **Briefed final results Jul 2010**
  - **Performed on GCSS-AF development server**
  - **Learned more about tool requirements and implementing an Enterprise solution**

- **RMT funded by Tools, Training & Reengineering Council (T2RC)**
  - **Market Research Request for Information (Oct/Nov 2010)**
  - **Requirements Working Group established across Enterprise**
    - **Creating FRD, SRD, process/architecture**
  - **Request for Proposal (Spring 2011)**
    - **Acquisition process initiated—AFPEO EIS portfolio**

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Summary

- Planning a COTS requirements tool to mechanize consistent development of Acquisition information
- Conducted a 9 month pathfinder - learned more about implementing an Enterprise solution
- Identified gaps and attributes of good requirements management to enable:
  - Technical functionality
  - Standup of an Enterprise solution
- Informed industry of AF need and desire to be able to share information between domains
- RFI released

Interested in industry use of RM tools and lessons learned