

# Policy Engineering

## *Applying SE to Develop Better Policies*

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STEVEN H. DAM, PH.D., ESEP  
CHRIS RITTER  
SPEC INNOVATIONS  
STEVEN.DAM@SPECINNOVATIONS.COM



# Outline

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1. What Is a Policy?
2. How Can We Apply SE to Improve Policies?
3. How Can We Implement this Approach without Scaring Policy Makers?



# 1. WHAT IS A POLICY?

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# What's a Policy

- Lot's of definitions, but the “Business Dictionary” shows the key elements highlighted
  - Guiding principles
  - Organizational governance
- But what is it in Systems Engineering terms?

policy

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Related Terms	Definitions (3)	See Examples	Cite Term	Add to Flashcards
conditional sal...	<p><b>1. Politics:</b> (1) The basic <u>principles</u> by which a <u>government</u> is guided. (2) The declared objectives that a government or <u>party</u> seeks to <u>achieve</u> and preserve in the <u>interest</u> of national <u>community</u>. See also <u>public policy</u>.</p> <p><b>2. Insurance:</b> The <u>formal contract</u> issued by an <u>insurer</u> that contains <u>terms and conditions</u> of the <u>insurance cover</u> and serves as its <u>legal evidence</u>.</p> <p><b>3. Management:</b> The set of basic <u>principles</u> and <u>associated guidelines</u>, formulated and enforced by the governing body of an <u>organization</u>, to direct and limit its actions in pursuit of long-term goals. See also <u>corporate policy</u>.</p>			
ordinary regist...				
consumerism				
full theft cove...				
policy reserve				

<http://www.businessdictionary.com/definition/policy.html> accessed 10/9/2017

## Policies in SE Terms

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- Policies contain *requirements and constraints* for the organization
- Those requirements and constraints are *allocated or traced* to different parts of the organization
- Policies also frequently contain processes or procedures which are essentially implementation *scenarios*

***Why not apply systems engineering techniques to analyze these policies to make sure they work prior to implementation?***

## 2. HOW CAN WE APPLY SE TO IMPROVE POLICIES?

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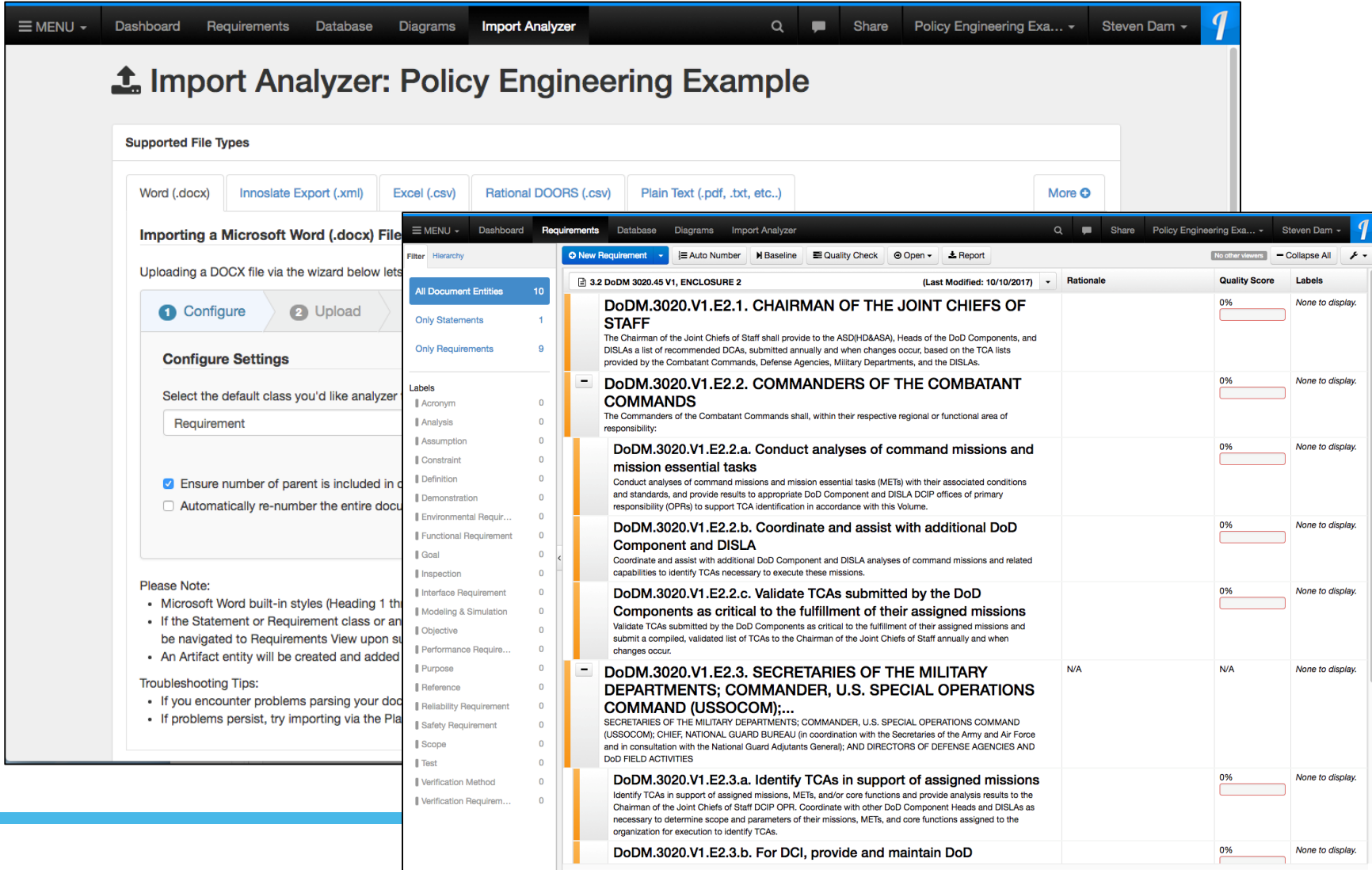
# Apply Requirements Analysis

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- Treat the policy draft(s) as a requirements document
- Analyze for quality (clarity, completeness, etc.)
- Enhance the text using these quality criteria
- Use a “document view” for presentation to stakeholders
- Capture comments in tool and produce “comment matrix”

# RA: Treat the policy draft(s) as a requirements document

- Import documents into a requirements analysis tool
- Break paragraphs into individual requirements for analysis
- Note many statements may not be written like a requirements, but still are requirements



The screenshot displays the 'Import Analyzer: Policy Engineering Example' interface. It features a top navigation bar with 'MENU', 'Dashboard', 'Requirements', 'Database', 'Diagrams', and 'Import Analyzer'. Below the navigation, there's a 'Supported File Types' section with buttons for Word (.docx), Innosiate Export (.xml), Excel (.csv), Rational DOORS (.csv), and Plain Text (.pdf, .txt, etc.).

The main area is titled 'Importing a Microsoft Word (.docx) File' and shows a wizard with 'Configure' and 'Upload' steps. The 'Configure Settings' section allows selecting a default class (Requirement) and includes checkboxes for 'Ensure number of parent is included in class' and 'Automatically re-number the entire document'. A 'Please Note' section provides instructions on handling Microsoft Word built-in styles and navigating to Requirements View upon successful import. Troubleshooting tips are also provided.

The right side of the interface shows a table of requirements. The table has columns for 'Filter Hierarchy', 'ID', 'Description', 'Rationale', 'Quality Score', and 'Labels'. The requirements listed include:

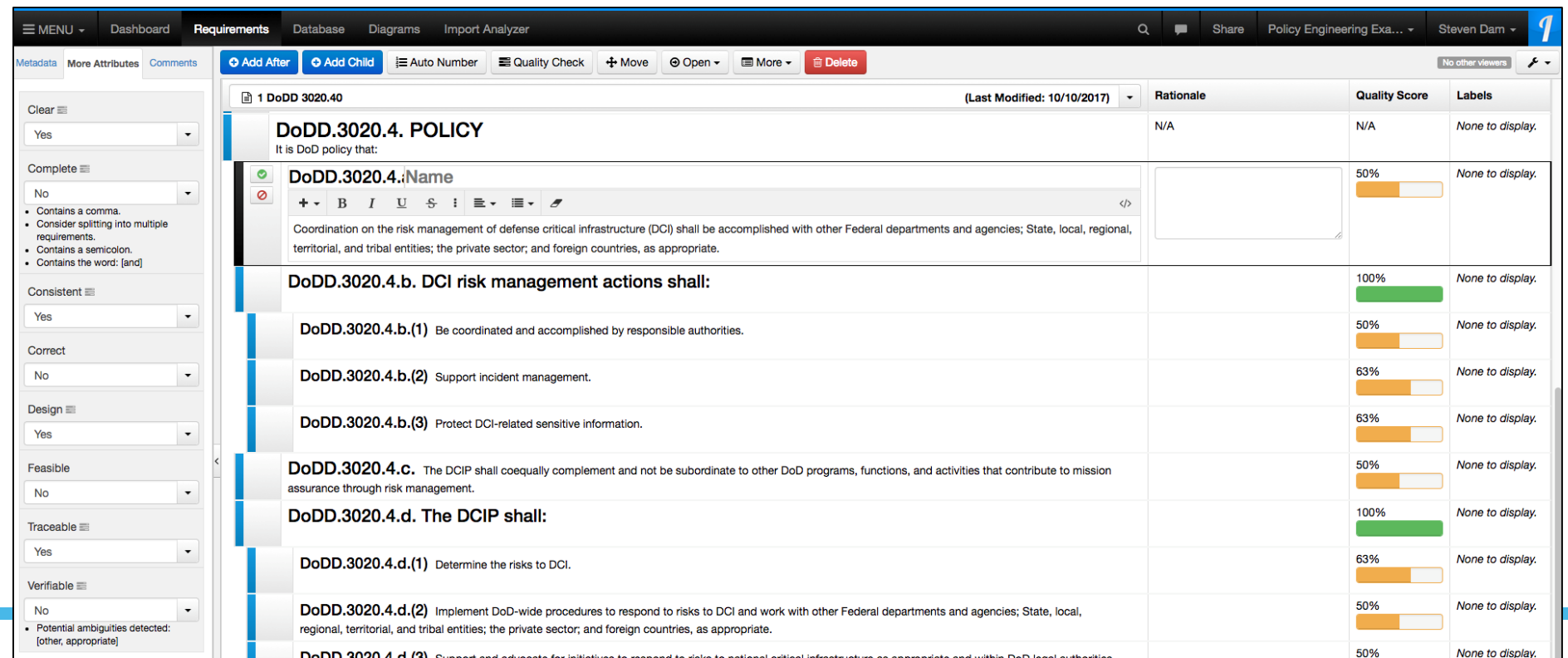
- DoDM.3020.V1.E2.1. CHAIRMAN OF THE JOINT CHIEFS OF STAFF**: The Chairman of the Joint Chiefs of Staff shall provide to the ASD(HD&ASA), Heads of the DoD Components, and DISLAs a list of recommended DCAs, submitted annually and when changes occur, based on the TGA lists provided by the Combatant Commands, Defense Agencies, Military Departments, and the DISLAs.
- DoDM.3020.V1.E2.2. COMMANDERS OF THE COMBATANT COMMANDS**: The Commanders of the Combatant Commands shall, within their respective regional or functional area of responsibility:
- DoDM.3020.V1.E2.2.a. Conduct analyses of command missions and mission essential tasks**: Conduct analyses of command missions and mission essential tasks (METs) with their associated conditions and standards, and provide results to appropriate DoD Component and DISLA DCIP offices of primary responsibility (OPRs) to support TGA identification in accordance with this Volume.
- DoDM.3020.V1.E2.2.b. Coordinate and assist with additional DoD Component and DISLA**: Coordinate and assist with additional DoD Component and DISLA analyses of command missions and related capabilities to identify TCAs necessary to execute these missions.
- DoDM.3020.V1.E2.2.c. Validate TCAs submitted by the DoD Components as critical to the fulfillment of their assigned missions**: Validate TCAs submitted by the DoD Components as critical to the fulfillment of their assigned missions and submit a compiled, validated list of TCAs to the Chairman of the Joint Chiefs of Staff annually and when changes occur.
- DoDM.3020.V1.E2.3. SECRETARIES OF THE MILITARY DEPARTMENTS; COMMANDER, U.S. SPECIAL OPERATIONS COMMAND (USSOCOM);...**: SECRETARIES OF THE MILITARY DEPARTMENTS; COMMANDER, U.S. SPECIAL OPERATIONS COMMAND (USSOCOM); CHIEF, NATIONAL GUARD BUREAU (in coordination with the Secretaries of the Army and Air Force and in consultation with the National Guard Adjutants General); AND DIRECTORS OF DEFENSE AGENCIES AND DoD FIELD ACTIVITIES
- DoDM.3020.V1.E2.3.a. Identify TCAs in support of assigned missions**: Identify TCAs in support of assigned missions, METs, and/or core functions and provide analysis results to the Chairman of the Joint Chiefs of Staff DCIP OPR. Coordinate with other DoD Component Heads and DISLAs as necessary to determine scope and parameters of their missions, METs, and core functions assigned to the organization for execution to identify TCAs.
- DoDM.3020.V1.E2.3.b. For DCI, provide and maintain DoD**

The table also shows 'Quality Score' (0%) and 'Labels' (None to display) for each requirement.



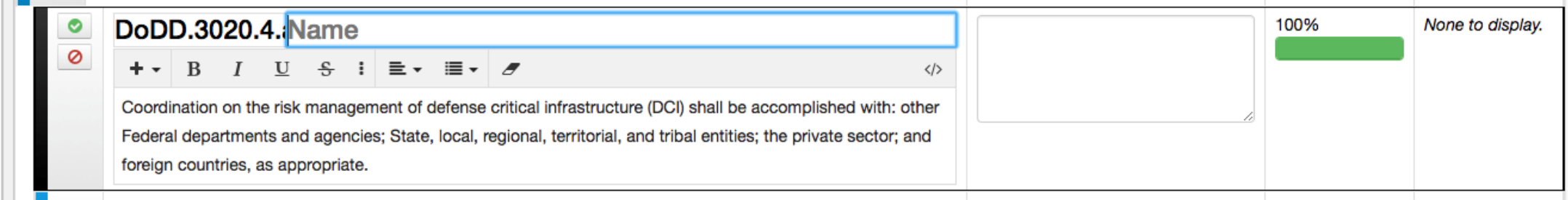
# RA: Analyze for quality (clarity, completeness, etc.)

- A number of the standard quality factors apply directly to policies (clear, complete, consistent, and correct)
- Other may apply, depending on the specific policy (Design, Feasible, Traceable, Verifiable)



Quality Factor	Value	Rationale	Quality Score	Labels
Clear	Yes	N/A	N/A	None to display.
Complete	No		50%	None to display.
Consistent	Yes		100%	None to display.
Correct	No		50%	None to display.
Design	Yes		63%	None to display.
Feasible	No		63%	None to display.
Traceable	Yes		50%	None to display.
Verifiable	No		100%	None to display.
			63%	None to display.
			50%	None to display.
			63%	None to display.
			50%	None to display.

# RA: Enhance the text using these quality criteria

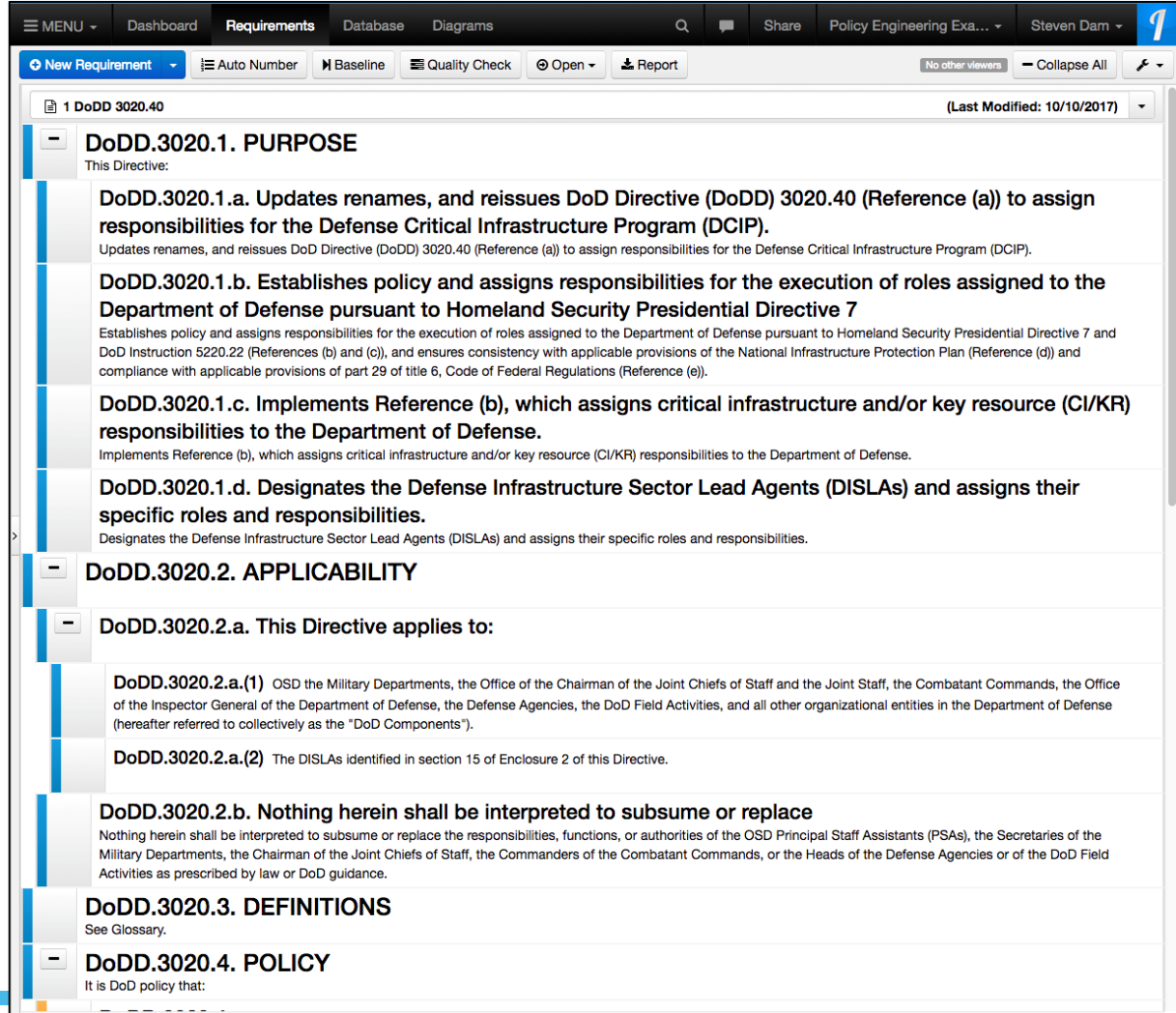


The screenshot shows a software interface with a text editor on the left and a progress indicator on the right. The text editor has a title bar that says "DoDD.3020.4.:Name" and a toolbar with icons for bold, italic, underline, strikethrough, bulleted list, numbered list, and code. The text in the editor reads: "Coordination on the risk management of defense critical infrastructure (DCI) shall be accomplished with: other Federal departments and agencies; State, local, regional, territorial, and tribal entities; the private sector; and foreign countries, as appropriate." To the right of the text editor, there is a progress bar that is 100% full, and the text "None to display." is shown.

- Enhance the grammar
- Simplify, where possible
- Break into separate requirements, if desirable

# RA: Use a “document view” for presentation to stakeholders

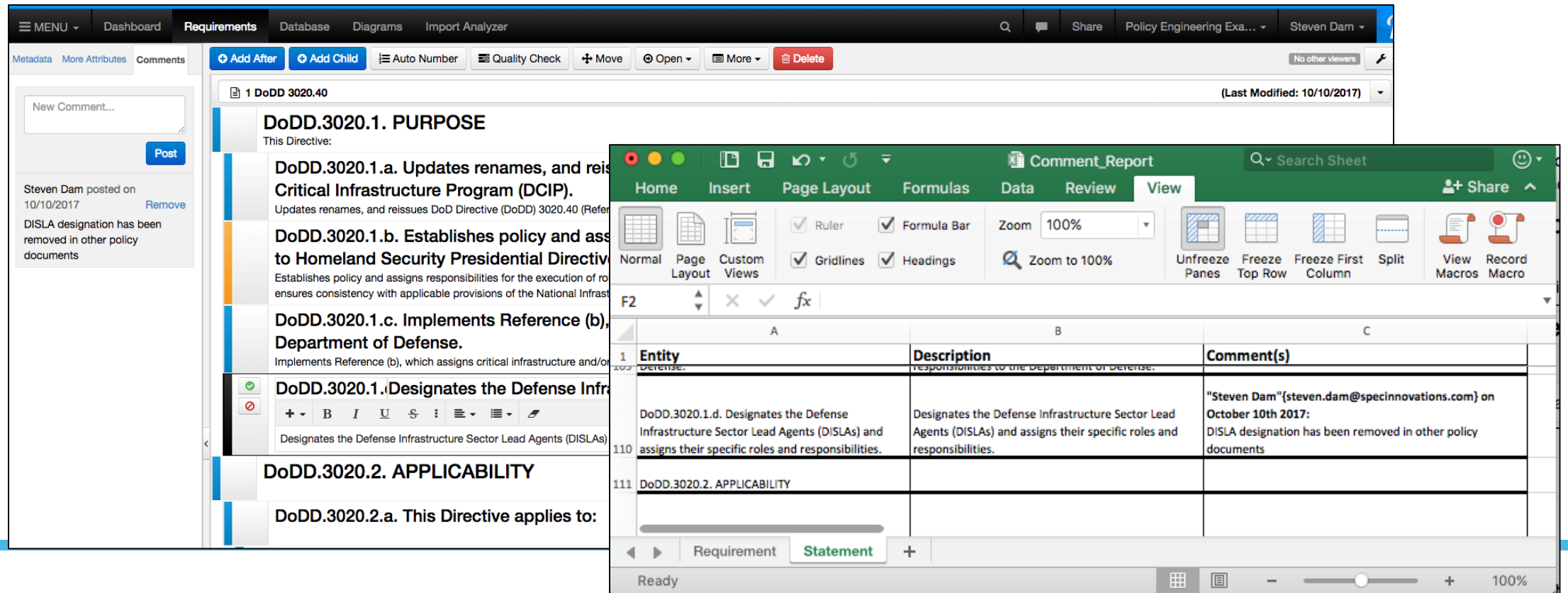
- Hide information that may confuse a reader/viewer
  - e.g., columns with quality score, labels, other attributes
- Readers can then view it as they would a document in MS Word, but any comments and other information would be accessible at the paragraph level
- Hyperlinks can be provided to guide them to other documents



The screenshot displays a web application interface for managing requirements. The top navigation bar includes 'MENU', 'Dashboard', 'Requirements', 'Database', and 'Diagrams'. A toolbar below the navigation bar offers actions such as 'New Requirement', 'Auto Number', 'Baseline', 'Quality Check', 'Open', and 'Report'. The main content area shows a document titled '1 DoDD.3020.40' with a 'Last Modified' date of 10/10/2017. The document is structured into sections: 'DoDD.3020.1. PURPOSE', 'DoDD.3020.2. APPLICABILITY', and 'DoDD.3020.3. DEFINITIONS'. The 'PURPOSE' section is expanded, revealing sub-sections 1.a through 1.d, each with a bold title and a descriptive paragraph. For example, 1.a states: 'DoDD.3020.1.a. Updates renames, and reissues DoD Directive (DoDD) 3020.40 (Reference (a)) to assign responsibilities for the Defense Critical Infrastructure Program (DCIP)'. The 'APPLICABILITY' section includes sub-sections 2.a and 2.b, detailing the scope and interpretation of the directive. The 'DEFINITIONS' section refers to a glossary.

# RA: Capture comments in tool and produce “comment matrix”

- Use commenting features where available
- Special reports may be desired



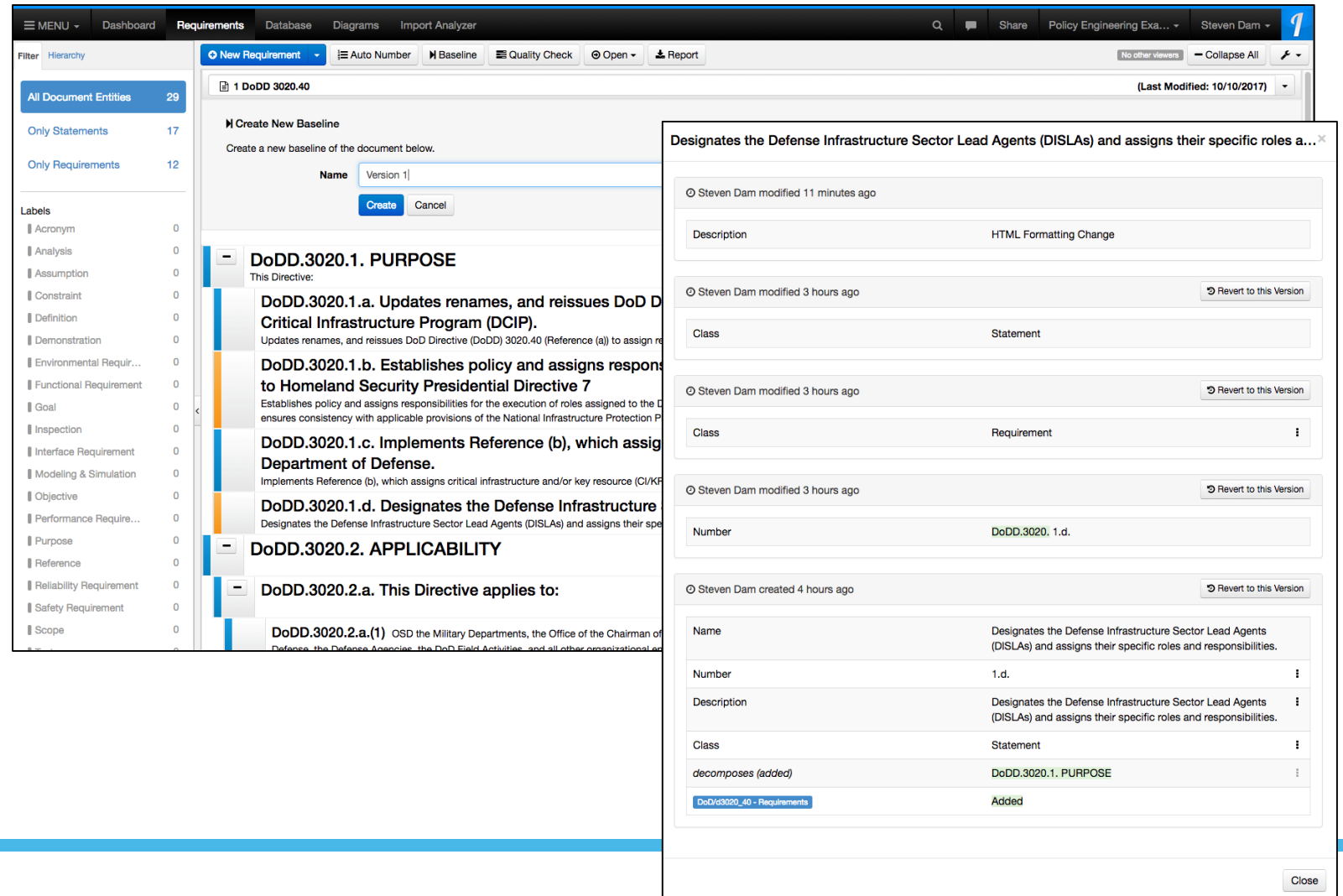
The screenshot displays a requirements management tool interface. The main window shows a requirement titled "1 DoDD 3020.40" with a sub-section "DoDD.3020.1. PURPOSE". Under this purpose, there are four sub-sections (a, b, c, d) describing updates and designations. A comment by Steven Dam is visible on the left side of the tool, dated 10/10/2017, stating that a DISLA designation has been removed in other policy documents.

Overlaid on the right is an Excel spreadsheet titled "Comment\_Report". The spreadsheet has three columns: "Entity", "Description", and "Comment(s)". The data in the spreadsheet is as follows:

Entity	Description	Comment(s)
DoDD.3020.1.d. Designates the Defense Infrastructure Sector Lead Agents (DISLAs) and assigns their specific roles and responsibilities.	Designates the Defense Infrastructure Sector Lead Agents (DISLAs) and assigns their specific roles and responsibilities.	"Steven Dam" (steven.dam@specinnovations.com) on October 10th 2017: DISLA designation has been removed in other policy documents
DoDD.3020.2. APPLICABILITY		
DoDD.3020.2.a. This Directive applies to:		

# Configuration Manage Policy Documents

- Baseline
- Track change history
- Branch/fork for excursions
- Store files in database



The screenshot displays the 'Requirements' section of the SPEC INNOVATIONS software. The main window shows a document titled '1 DoDD.3020.40' with a 'Create New Baseline' dialog box open. The document content includes several sections:

- DoDD.3020.1. PURPOSE**
  - DoDD.3020.1.a. Updates renames, and reissues DoD Critical Infrastructure Program (DCIP).** Updates renames, and reissues DoD Directive (DoDD) 3020.40 (Reference (a)) to assign re...
  - DoDD.3020.1.b. Establishes policy and assigns responsibility to Homeland Security Presidential Directive 7** Establishes policy and assigns responsibilities for the execution of roles assigned to the D... ensures consistency with applicable provisions of the National Infrastructure Protection P...
  - DoDD.3020.1.c. Implements Reference (b), which assigns Department of Defense.** Implements Reference (b), which assigns critical infrastructure and/or key resource (CI/KF...
  - DoDD.3020.1.d. Designates the Defense Infrastructure...** Designates the Defense Infrastructure Sector Lead Agents (DISLAs) and assigns their spe...
- DoDD.3020.2. APPLICABILITY**
  - DoDD.3020.2.a. This Directive applies to:**
    - DoDD.3020.2.a.(1)** OSD the Military Departments, the Office of the Chairman of Defense, the Defense Agencies, the DoD Field Activities, and all other organizational Le...

A change history window is overlaid on the right, showing a list of changes:

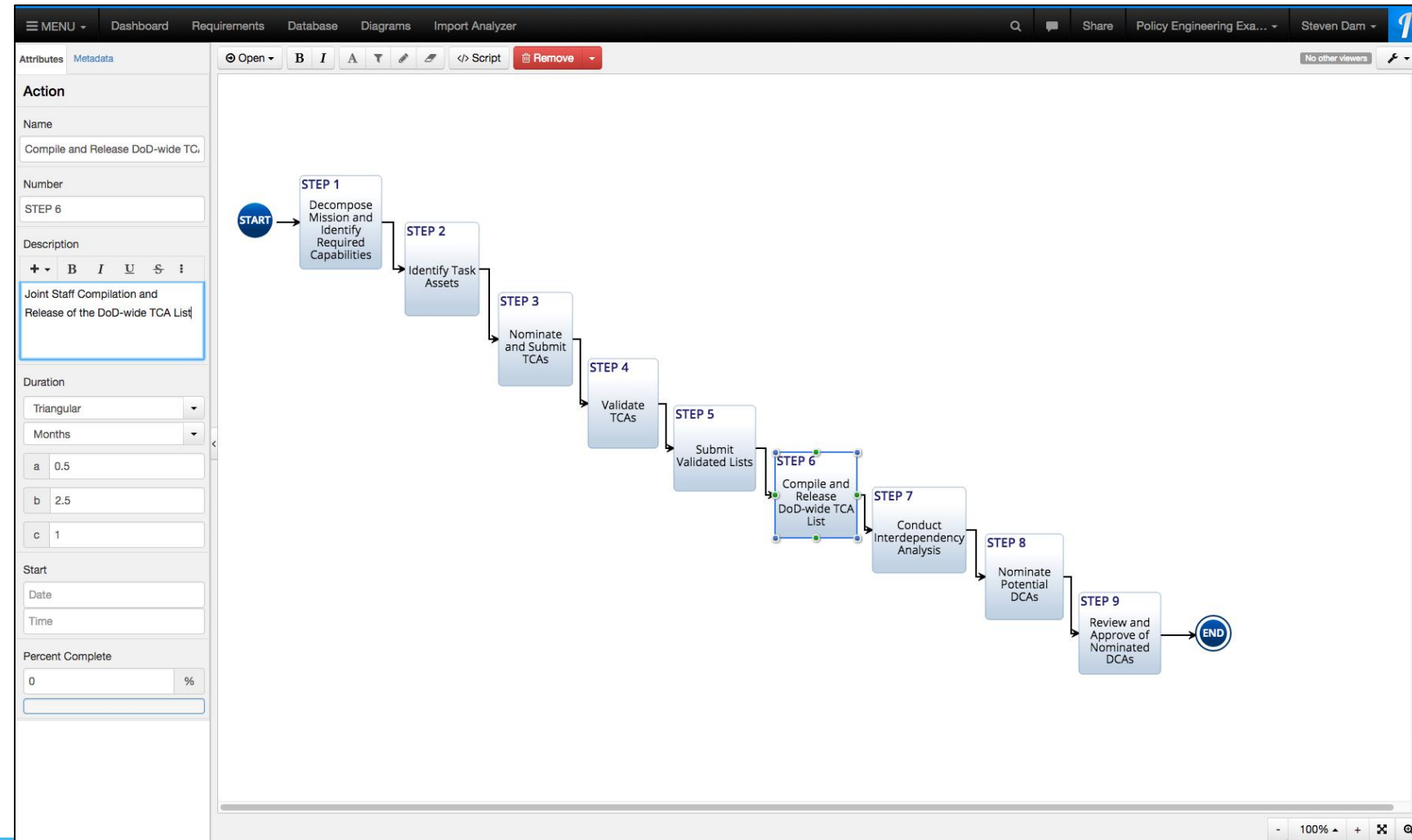
- Steven Dam modified 11 minutes ago: HTML Formatting Change
- Steven Dam modified 3 hours ago: Statement
- Steven Dam modified 3 hours ago: Requirement
- Steven Dam modified 3 hours ago: DoDD.3020. 1.d.
- Steven Dam created 4 hours ago: Designates the Defense Infrastructure Sector Lead Agents (DISLAs) and assigns their specific roles and responsibilities.

The change history window also shows a table of decomposed requirements:

Decomposes (added)	Added
DoDD/3020_40 - Requirements	Added

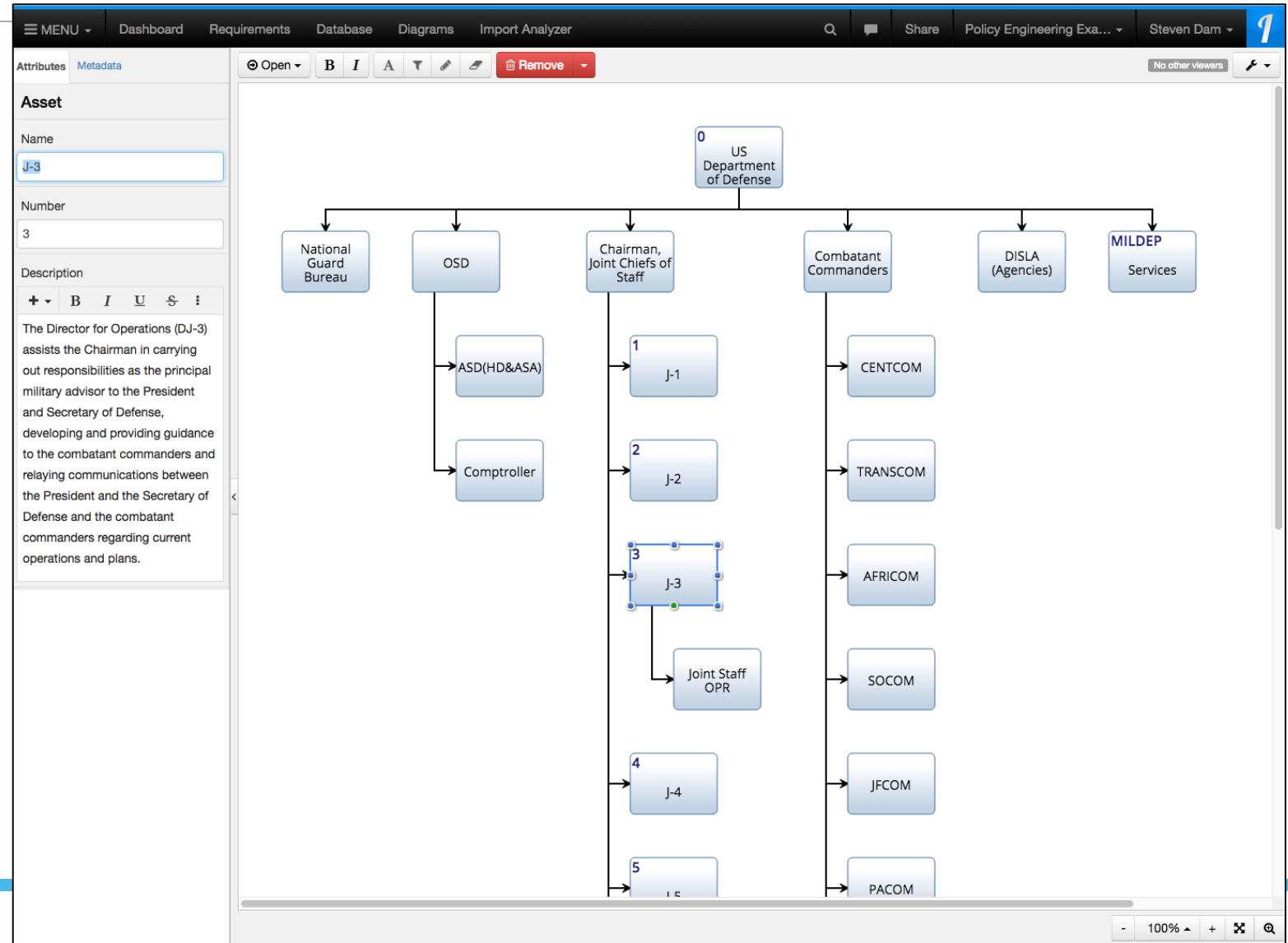
# Model Processes and Procedures

- Review policies for processes and procedures
- Create a functional model
- Trace back to requirements
- Enter time distributions
- Associate costs
- Allocate to performing elements



# Capture Organization Information in Database

- Create hierarchy
- Allocate actions and requirements as appropriate





# Allocate Tasks to Organizational Elements

- Create relationships between tasks and organizations, according to policies
- Use this information to determine if the correct organizations are being correctly tasked
- Suggest changes, as appropriate, and/or identify risks to the organization and mitigation strategies

MENU Dashboard Requirements Database Diagrams Import Analyzer

Matrix Comments

Save Open Report Add Column

Target Entity: CAIP Process

Target Relationship: performs

Generate

US De... performs CAIP ...

Hierarchical Comparison Matrix

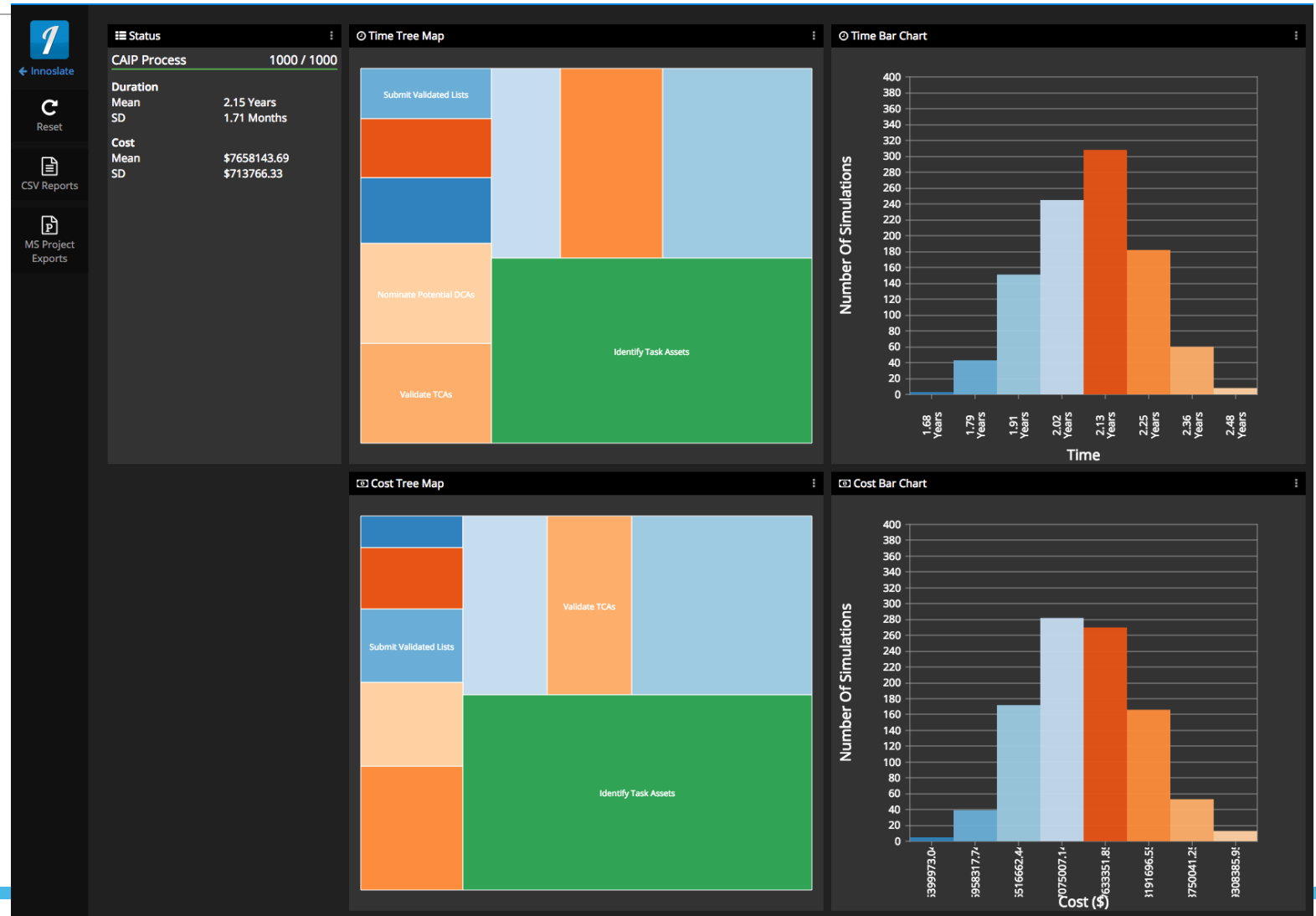
	CAIP Process	STEP 1 Decompose Mission and I...	STEP 2 Identify Task Assgts	STEP 3 Nominate and Submit TCAs	STEP 4 Validate TCAs	STEP 5 Submit Validated Lists	STEP 6 Complete and Release Do...	STEP 7 Conduct Interdependency...	STEP 8 Nominate Potential DCAs	STEP 9 Review and Approve of N...
0 US Department of Defense										
1 Services	X	X	X	X	X					
2 National Guard Bureau	X	X	X	X	X					
3 OSD										X
3.1 ASD(HD&ASA)										X
3.2 Comptroller										X
4 Chairman, Joint Chiefs of Staff									X	
4.1 J-1							X			
4.2 J-2							X			
4.3 J-3							X			
4.3.1 Joint Staff OPR	X	X	X	X	X	X	X	X		
4.4 J-4							X			
4.5 J-5							X			
4.6 J-6							X			
4.7 J-7							X			
4.8 J-8							X			
5 Combatant Commanders	X	X	X	X	X					
5.1 CENTCOM	X	X	X	X	X					
5.2 TRANSCOM	X	X	X	X	X					
5.3 AFRICOM	X	X	X	X	X					
5.4 SOCOM	X	X	X	X	X					
5.5 JFCOM	X	X	X	X	X					
5.6 PACOM	X	X	X	X	X					
5.7 STRATCOM	X	X	X	X	X					
5.8 SOUTHCOM	X	X	X	X	X					
5.9 NORTHCOM	X	X	X	X	X					
5.10 EUCOM	X	X	X	X	X					
6 DISLA (Agencies)				X	X		X			

30 per page



# Verify Processes Work through Simulation

- Uses timing and cost information for each step
- Distributions in time and cost provide a more realistic range of the process
- These distributions also provide a measure of cost and schedule risk



### 3. HOW CAN WE IMPLEMENT THIS APPROACH WITHOUT SCARING POLICY MAKERS?

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# Implementation Strategy

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- Don't tell them you are doing systems engineering
  - Most people think systems engineering only applies to hardware and software
- Perform the analysis, but only show results in a form that they will easily accept
  - No UML, SysML, IDEF0, etc. drawings
  - Simple summaries of changes (i.e., document markups and text summaries)
  - No engineering jargon!
- Wait for them to ask how you got the results
  - Then just show them the bare minimum of SE information
  - Once they buy into these, you can start show them more

# Summary

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- Systems engineering can dramatically improve policy development and implementation
- You must work fast in doing your analysis – use multi-purpose tools with analytics to speed up your analysis and delivery
- Only show results, not how you got there ... until necessary