Presented at the 2016 ICEAA Professional Development & Training Workshop - www.iceaaonline.com/atlanta2016

SURF Process Summary & Initial Findings: A Deeper Focus on Software Data Quality

Presented by:

Ranae Woods, AFCAA

Nicholas Lanham, NCCA

Corinne Wallshein, NCCA

This document was generated as a result of the AFCAA-led, Software Resource Data Report Working Group (SRDRWG). This working group represented a joint effort amongst all DoD service cost agencies. The following guidance describes SRDR data verification and validation best practices as documented by NCCA, NAVAIR 4.2, AFCAA, ODASA-CE, MDA, and many more.

Table of Contents

Presentation Purpose

Presented at the 2016 ICEAA Professional Development & Training Workshop - www.iceaaonline.com/atlanta2016

SRDR Working Group (WG) Vision

One OSD-hosted, central, user-friendly, authoritative, real-time software cost, technical, programmatic database and tool

- SRDR WG Charter: Identify status quo problems and **implement initiatives** to achieve vision

- SRDR WG Membership: Cross-Agency Team of Software Cost Estimating Experts
  - OSD (CAPE, R&E), Air Force (AFCAA, LCMC, SMC), Army (ODASA-CE, ARDEC, CECOM), Navy (NCCA, NAVAIR, SPAWAR), MDA, IC (NRO, DNI), etc.

Cost Leadership Forum (CLF) Approved SRDR WG Recommendations

(Dec 2014)

Recommendation		Benefit
1. Revised SRDR Development Data Item Description (DID)	⇨	1. Reduces inconsistency, lack of visibility, complexity, and subjectivity in reporting
2. New SRDR Maintenance Data Item Description (DID)	⇨	2. Aligned w/ dev. but w/ unique data/metrics available/desired for maintenance phase
3. Joint Validation & Verification (V&V) Guide, Team, and Process	⇨	3. Higher quality, less duplication - ONE central vs many distributed; 1 joint team & guide gives early, consistent feedback to ktrs
4. Software Database Initial Design and Implementation Process	⇨	4. Avoids duplication, variations - ONE central vs many distributed; Based on surveyed best practices and user expectations

Question: How was the SURF team created and is it linked to the SRDRWG?
Answer: Yes. The SRDR Unified Review Function (SURF) team was organized as part of the larger, SRDRWG initiative during 2015

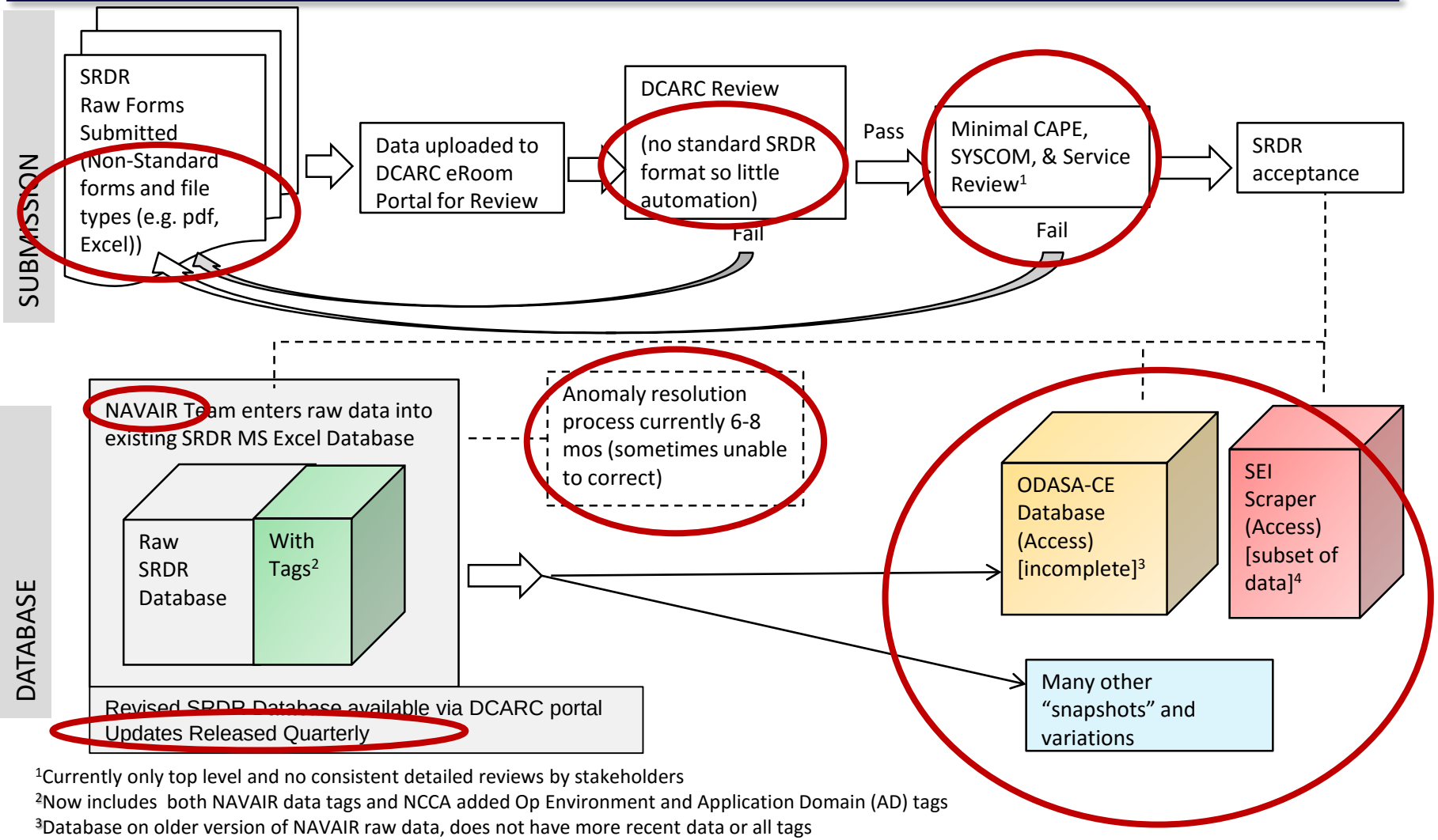
SRDR User Review Function (SURF) Purpose

Question: What services helped develop the questions included within the latest SRDR V&V guide?
Answer: All services participating in the SRDR WG provided feedback, comments, and reviews over a year long SRDRWG effort focused on establishing higher quality review efforts coupled with an ongoing SRDR DID update

Presented at the 2016 ICEAA Professional Development & Training Workshop - www.iceaaonline.com/atlanta2016

Current Software Cost Data Process

Using Existing SRDR Submission Format and NAVAIR upload



[1]Currently only top level and no consistent detailed reviews by stakeholders
[2]Now includes both NAVAIR data tags and NCCA added Op Environment and Application Domain (AD) tags
[3]Database on older version of NAVAIR raw data, does not have more recent data or all tags
[4]Scraper tool currently not able to scrape all formats of SRDR submissions

Presented at the 2016 ICEAA Professional Development & Training Workshop - www.iceaaonline.com/atlanta2016

Proposed Future Process - Phase 1&2

Phase 1: Using Existing SRDR Submission Format, new V&V process, NAVAIR Excel approach upload
Phase 2: New SRDR DID, XML, new V&V process, CADE database

SUBMISSION

SRDR Raw Forms Submitted (Phase 1 is non-standard; Phase 2 - XML)

Data uploaded to DCARC CADE Portal for Review

V&V Guide (VVG)

DCARC review via CADE

Fail

SURF Pre-Accept Review via CADE

Fail

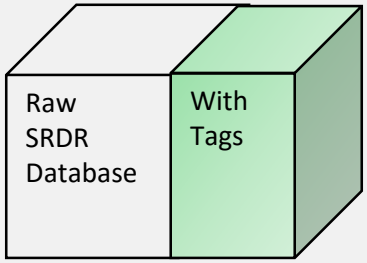
Pass

SRDR acceptance

DATABASE

-Phase 1- SURF manually enters raw data into existing SRDR MS Excel DB

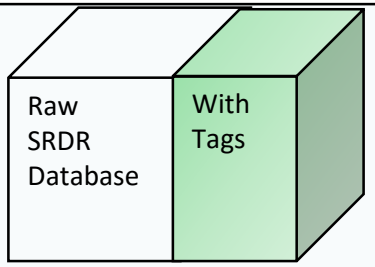
- Phase 2 - Automated XML, manual entry for some SURF Tags



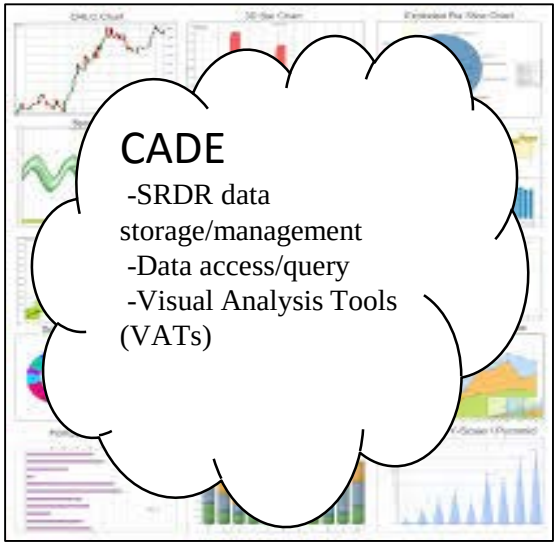
SURF SRDR Database for V&V purposes; USERS do not see

SURF Final Review & Documentation in Database

Secondary Anomaly resolution through DCARC



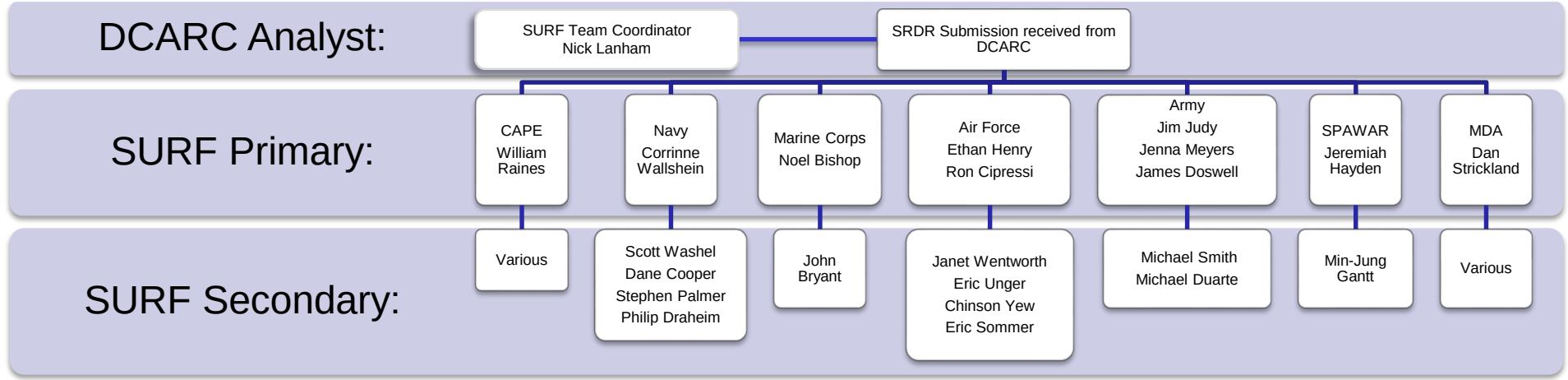
Revised SRDR Database available via DCARC portal



Question: What is the primary benefit from adjusting the existing SRDR review and acceptance process?
Answer 1: SRDRWG discovered existing processes did not include standardized quality reviews prior to DCARC acceptance letter release
Answer 2: The revised process introduces standardized V&V reviews prior to the report being accepted and increases software data quality

Presented at the 2016 ICEAA Professional Development & Training Workshop - www.iceaaonline.com/atlanta2016

SURF Team Structure



Question: How do members get involved with SURF? Why are there “primary” and “secondary” members?
Answer 1: The SURF team was established by Government SRDRWG members who were recommended/volunteered by each DoD service
Answer 2: Primary members are included on CSDR S-R IPT email notifications for their specific service. Secondary members are contacted during periods of increased review demands, if necessary.

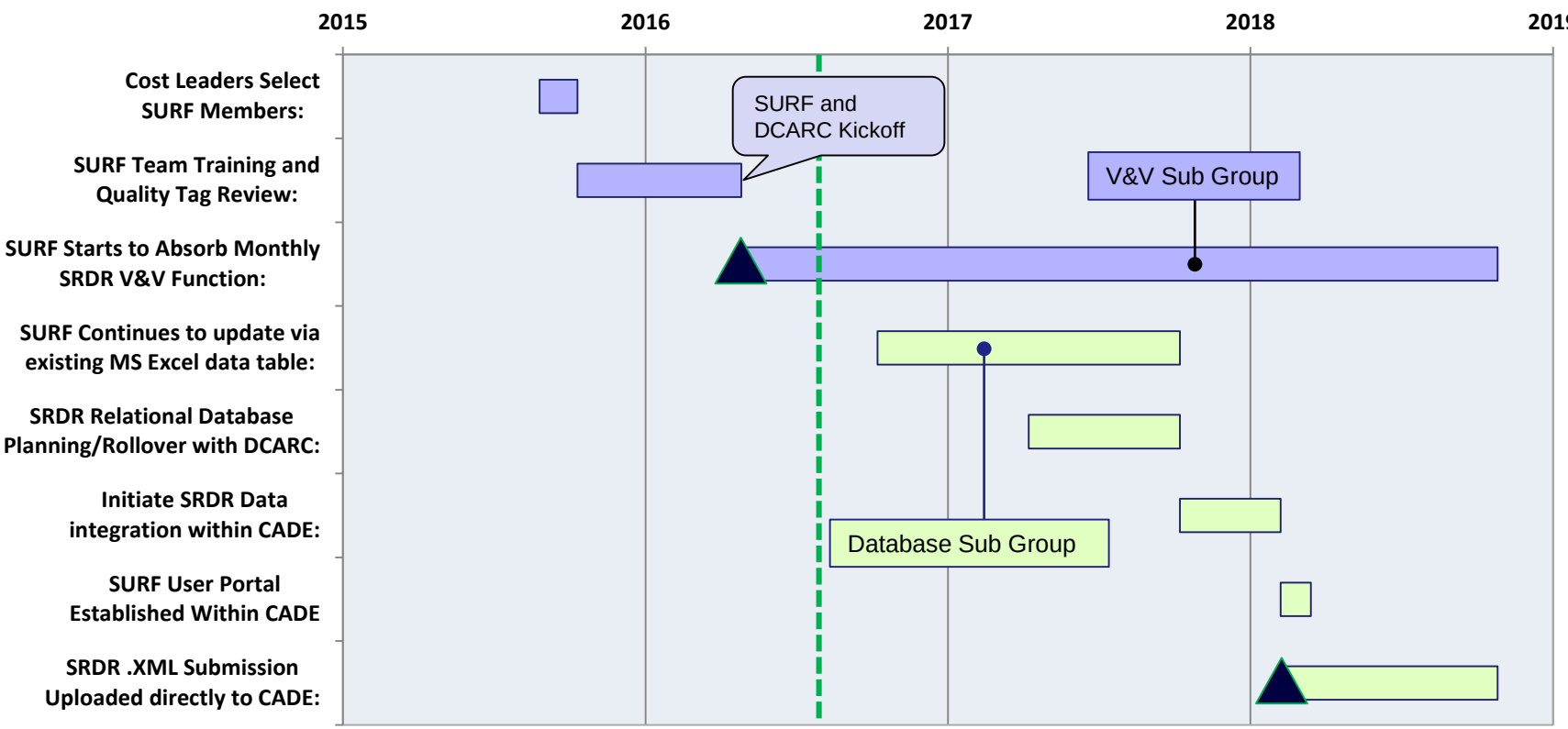
Presented at the 2016 ICEAA Professional Development & Training Workshop - www.iceaaonline.com/atlanta2016

SURF Team Status As of February 2016

- Group includes ~19 Government team members from across the DoD
- Has received very positive feed back from DoD cost estimation community, DCARC analyst(s), and even program office communities since inception
- Over the past 6-7 months, the SURF team has been focused on training members on “how to” conduct SRDR Verification and Validation (V&V) review efforts, updating the latest SRDR V&V guide, and finalizing our team charter

- Completed initial version of SRDR V&V guide March 2015
- Completed development of SURF team charter July 2015
- Conducted actual SRDR reviews in support of several programs (i.e. SM-3, V-22, CH-53K, AIM-9X, DDG-1000, LCS, AMDR, SSC, UCAS-D, GPS, F-22, Global Hawk, etc.)
- SURF kickoff with DCARC completed 2nd QTR FY16
- During training period, SURF generated **483** V&V comments provided to DCARC (June 2015 to March 2016)
- Majority of comments thus far have focused on sections 1.5 Sizing and Language and 1.1-1.3 Data Characterization

SURF kickoff with DCARC personnel completed 2nd QTR FY16



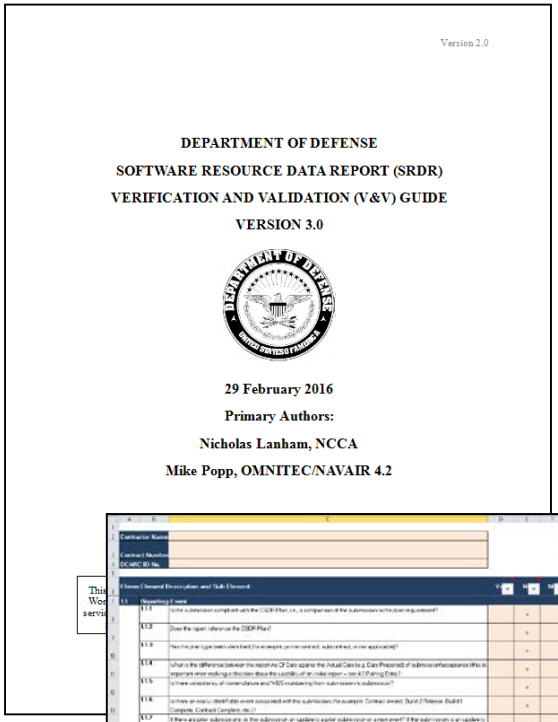
– Simple process that leverages planning between two, critical SRDRWG sub teams (i.e. V&V and Database Planning)

Initial SURF and CSDR S-R Integration Meeting Completed February 2016

SRDR V&V Guide

Initial Draft Complete in Mar 2015/Update Completed Feb 2016

- OSD public release approved 5 April 2016
- Now includes quick-reference MS excel question checklist by SRDR DID section
- SRDR V&V training guide (V&V questions)
- Focus areas used to determine SRDR quality tags



Version 2.0

DEPARTMENT OF DEFENSE

SOFTWARE RESOURCE DATA REPORT (SRDR)

VERIFICATION AND VALIDATION (V&V) GUIDE

VERSION 3.0

29 February 2016

Primary Authors:

Nicholas Lanham, NCCA

Mike Popp, OMNITEC/NAVAIR 4.2

Question: Did a standardized-joint service, software-specific quality review guide exist prior to the SURF V&V guide? Who contributed to the development of this document?
Answer 1: No. Services implemented very inconsistent SRDR review methodologies (if conducted at all) prior to DCARC acceptance
Answer 2: The SRDR V&V guide was developed by the SURF team and has been reviewed by numerous SRDRWG, OSD CAPE, and other cost community team members. Feedback from other services has generated significant improvements from initial draft

SRDR V&V Guide
Table of Contents (TOC)

1.0 Review of an SRDR submitted to DCARC
1.1 Reporting Event
1.2 Demographic Information
1.3 Software Char. and Dev. Process
1.3.1 Super Domain and Application Domains
1.3.2 Operating Environment (OE) Designation
1.3.3 Development Process
1.4 Personnel
1.5 Sizing and Language
1.5.1 Requirements
1.5.2 Source Lines of Code (SLOC)
1.5.3 Non-SLOC Based Software Sizing
1.5.4 Product Quality Reporting
1.6 Effort
1.7 Schedule
1.8 Estimate at Completion (EAC) Values
2.0 Quality Tagging
3.0 Solutions for Common Findings
3.1 Allocation
3.2 Combining
3.3 Early Acquisition Phase Combining
4.0 Pairing Data
5.0 Possible Automation
Appendix A – SD and AD Categories
Appendix B – Productivity Quality Tags
Appendix C – Schedule Quality Tags
Appendix D – SRDR Scorecard Process

V&V Questions and Examples Developed and Organized by Individual SRDR reporting Variable

SRDR V&V Guide Example Question
Section 1.6: Effort

- Was effort data reported for each CSCI or WBS?
- Was effort data reported as estimated or actual results? If the submission includes estimated values and actual results, does the report include a clear and documented split between actual results and estimated values?
- Is the effort data reported in hours?
- Is effort data broken out by activity?
- What activities are covered in the effort data? Is there an explanation of missing activities included within the supporting SRDR data dictionary? ….

The V&V Guide Includes Specific Lists Of Questions, By SRDR Variable, For Analysts To Confirm Prior To Accepting The Report

SURF Initial Findings

Generated From June to Dec 2015 = 319 V&V Comments

- **Each individual's comments were discussed as a group to promote cross learning and efficiencies**
- **Group reviews led to the SURF "Quick-reference Excel Checklist"**
- **V&V comments were tracked, tagged, and analyzed for trends**

Portion of SURF V&V Trends Summarized in the Following "Word Clouds"

SURF Initial Findings
1.0, 1.1, 1.2, 1.3 Word Cloud

- Missing contract type, funding appropriation, Period of Performance (PoP), and program phase
- Reporting elements frequently not broken out by Computer Software Configuration Item (CSCI)

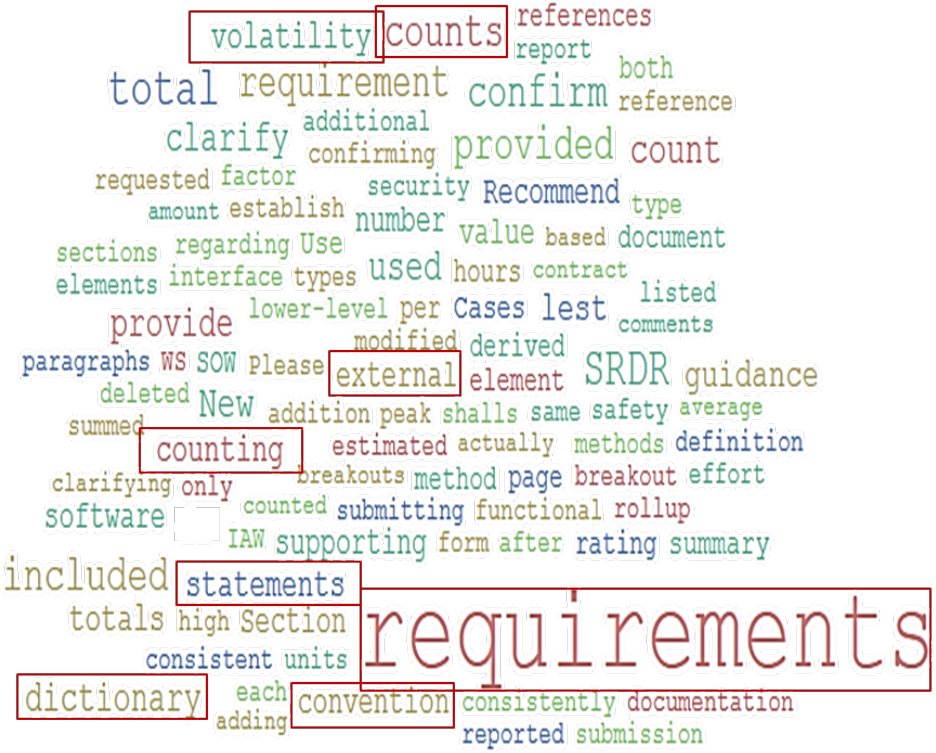
Critical Required Metadata Items Were Not Always Included

SURF Initial Findings Cont…
1.4, 1.6, 1.7 Word Cloud

Agile Development Process Sometimes Drives Reporting Inconsistency When Submitting Organizations Breakdown Scope At “Scrum” Or “Sprint” Level

SURF Initial Findings Cont…

1.5.1 Word Cloud



Submissions Frequently Did Not Breakout “New” and ”Existing” Requirement Counts

SURF Initial Findings Cont…
1.5.2 and 1.5.4 Word Cloud

Submissions Frequently Did Not Include Firmware, COTS/GOTS Integration, or Software Defect Counts

- **Reduces inaccurate use of historical software data**
  - Aligns with OSD CAPE initiative(s) to improve data quality
- **Helps correct quality concerns prior to final SRDR acceptance**
- **Allows a central group of SMEs to tag SRDR data**
- **SRDR submissions are used by all DoD cost agencies when developing or assessing cost estimates**
- **Quality data underpins quality cost and schedule estimates**

BBP Principle 2: Data should drive policy. Outside my door a sign is posted that reads, "In God We Trust; All Others Must Bring Data." The quote is attributed to W. Edwards Deming

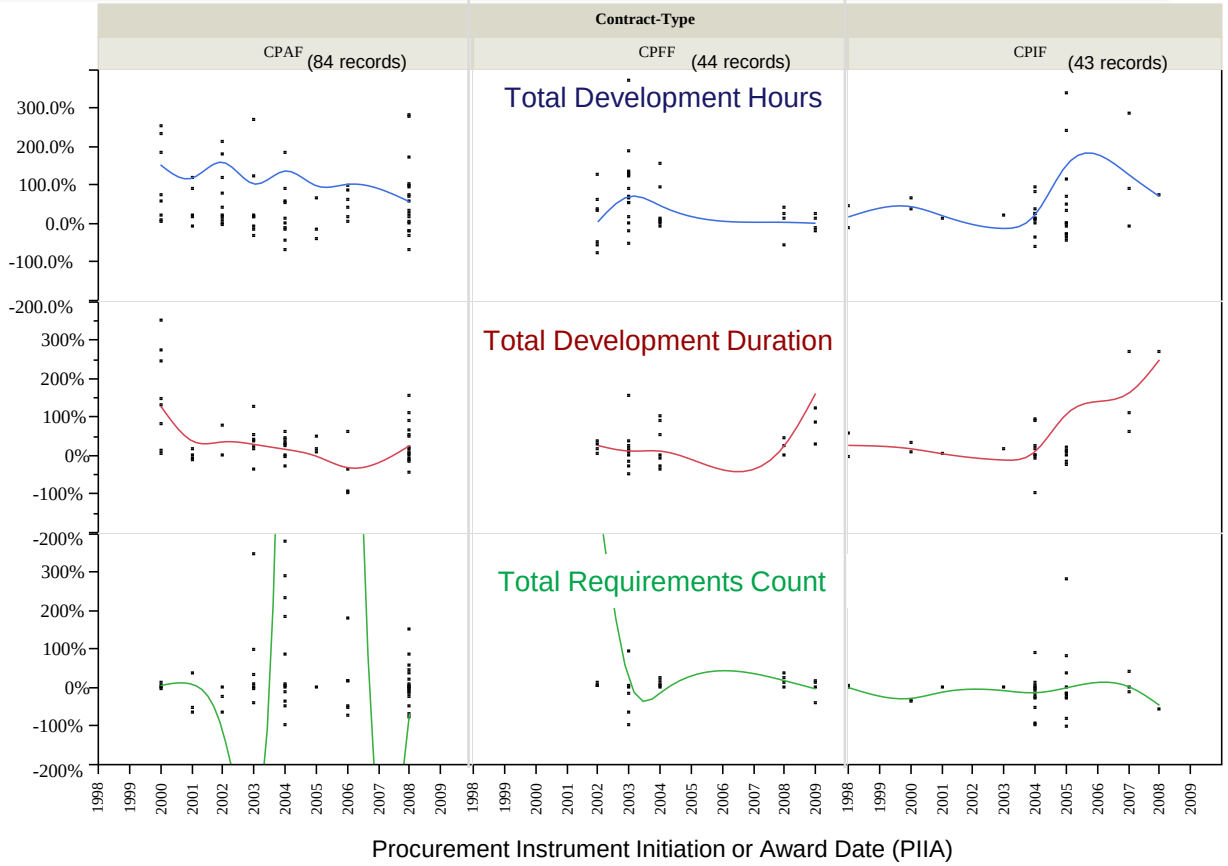
- Mr. Frank Kendall, AT&L Magazine Article, January-February 2016

SURF Need Statement Cont…

Why do these reports need to be reviewed?

- Percent change from Initial (2630-2) to Final (2630-3) reports for 171 "Paired" records

- Only 24% of historical SRDR data tagged as "Good" for future analysis*



Note 1: Graph excludes FFP, FPIF, IDIQ, and unknown contract types (48 records)
Note 2: Dates generated using Contract Number PIIA date vice contract completion or latest contract modification date
Note 3: Graph view is zoomed to show a consistent scale from -100% to 300%
* Referencing April 2014 SRDR dataset posted to DACIMS by dividing records tagged as "Good" by the total number of records

SURF Way-Ahead

Next Steps

- ✓ **Publish/Implement V&V guide in accordance with revised DIDs**
  - ✓ Develop quick reference question list for all services and DCARC analyst use
- ✓ **Stand-up Initial Ops for Joint V&V Process**
  - ✓ Develop SURF team charter and organizational structure
  - ✓ Identify SURF members from each service and OSD CAPE
- ✓ **Conduct SURF V&V comment training on actual DCARC submissions**
  - ✓ Review initial finds and ensure V&V guide adequately captures all software report variables
- ✓ **Coordinate CSDR S-R SURF portal access and V&V comment flow (In process)**
- ✓ **Initiate SURF team member access onto existing automated CSDR S-R review portal**
  - ✓ DCARC analysts add SURF member(s) to CSDR S-R IPT list and automated emails are sent
  - – V&V comments will be generated and stored within the portal for future access/review

- **SURF is focused on improving data quality and helping support robust Government review process**
- **We would like to thank all of the DoD and Non-DoD individuals who have commented, participated, and provided feedback throughout the past few years**
- **Please feel free to use the contact information below if you would like more information regarding SURF, the SRDR V&V Guide, or checklist**

Ms. Ranae Woods
Air Force Cost Analysis Agency
NIPR: Ranae.p.woods.civ@mail.mil

Nicholas Lanham
Naval Center for Cost Analysis (NCCA)
NIPR: Nicholas.lanham@navy.mil

Dr. Corinne Wallshein
Naval Center for Cost Analysis (NCCA)
NIPR: Corinne.wallshein@navy.mil

Dan Strickland
Missile Defense Agency (MDA)
NIPR: Daniel.strickland@mda.mil