

Visual Information (VI) Process Improvement

Barbara Burfeind, Defense Imagery Management Operations Center (DIMOC), Defense Media Activity; Fort George G. Meade, MD, USA

Abstract

Defense Media Activity (DMA) is the Department of Defense's (DoD) direct line of communication for news and information to U.S. forces worldwide. The agency informs DoD audiences, entertains DoD audience overseas, trains Public Affairs and Visual Information professionals, and manages the DoD's visual information. Defense Imagery Management Operations Center (DIMOC) provides DoD enterprise-level visual information services including operational support, digitization, storage, access, records management of the Department's visual content, and accessions to the U.S. National Archives and Records Administration.

This paper presents an overview of the Defense Visual Information (DVI) component's Lean Six Sigma Green Belt Visual Information (VI) process improvement project. The goal of this lean initiative was to improve VI records management and caption editing. The purpose of the project was to provide an improved workflow that allows our customers to access DoD operational imagery more efficiently. A faster and less costly process for DoD imagery that is stored and preserved at DIMOC will also improve the copy editing process and ultimately, customer/user access.

Background

Sweeping changes have altered how the Department of Defense (DoD) receives, stores and makes its visual information (VI) holdings available, ranging from today's current imagery to historic U.S. military film footage, to the DoD and the American public.

The Defense Imagery Management Operations Center (DIMOC) manages the official VI records for the DoD. VI is defined as information in the form of visual or pictorial representation (still and motion photography) of person(s), place(s), or thing(s), either with or without sound. It is the single organization through which DoD imagery is transferred to the National Archives and Records Administration, an independent agency of the U.S. government charged with preserving and documenting government and historical records [1 & 2].

Within DIMOC is the VI Records Center, where an estimated 1.65 million of DoD's VI records (still, motion, audio and graphic formats of all kinds) reside in a physical storage area. Despite temperature controls and careful handling, these records are slowly deteriorating. To ensure this legacy imagery is accessible, the DIMOC VI Records Center is digitizing the physical media and making it accessible via the *DIMOC.mil* website.

On October 27, 2014, as part of a digitization initiative, the DIMOC activated *DIMOC.mil*. The website provides centralized access to new video and still content, imagery management, and ingest capability in conjunction with the Defense Video and Imagery Distribution System (DVIDS) [3]. At the time of writing, public access to these records is expected in April 2016. DVIDS connects the military with media outlets worldwide, and is the single ingest point for all DoD VI records. A regular feed between DVIDS and DIMOC ensures the migration of all DoD imagery

into the DIMOC archive, which today holds over 3 million assets or digital VI records. Through these combined initiatives, once inaccessible DoD imagery will be available to the DoD and the general public (figure 1) [4].

Problem Statement

DIMOC users and customers want quick, easy accessibility to their imagery, based on survey responses and direct feedback from the VI community collected during governance meetings and visits to combatant commands. Based on this customer feedback, the processing time for imagery is too slow. Depending on the situation, customers may need to access the imagery they submit in the span of hours, days, weeks or months. Therefore, improving the process with consistent rules, processes and procedures will provide greater efficiency.

As with all plans and implementation, new processes and tasks had to be developed and multiple systems consolidated. Matrices were built for the massive transfer of metadata that would be generated with the digitization of the physical media. During the second year of the contract, several challenges generated the need to reexamine the processes and tasks first implemented. A backlog of imagery was occurring within the workflow, and duplicate copies of imagery were being generated wasting precious time and energy in tracking and correcting. The existing VI ingest process was quickly overwhelming the workforce responsible for content management.

A new approach was needed. A study to explore process improvements, including an analysis of current processes that would cut costs and increase efficiency in accessing imagery was initiated.

The LSS VI Process Improvement Project: Approach & Study

Lean Six Sigma (LSS) is a disciplined problem-solving model and process improvement strategy for overall business improvement that uses data analysis to reduce cost, increase quality and reliability, and reduce cycle time. The Defense Visual Information (DVI) component conducted a Lean Six Sigma project with the goal of improving the overall VI records management and caption editing process. Part of VI management includes content management in which individuals (to include the actual photographer) follow standard guidelines for information that should be included in captions (who, what, when, where, and sometimes why and/or how) to describe the image. Since the images are official government records, this information adds valuable context and discoverability. The DVI project scope was narrowed from all caption editing in DIMOC to a more manageable portion of VI ingest—the part conducted by DIMOC's Joint Combat Camera Center (JCCC). The JCCC also edits and manages VI records for operational needs.

Purpose

The purpose of the project was to provide a more efficient workflow for DoD operational imagery from content creators and submitters back to consumers. An efficient (faster and less costly) ingest process of DoD imagery stored and preserved at DIMOC would also improve the content management workflow process. That process is illustrated in the attached workflow map. By identifying the detailed steps of the imagery workflow within the JCCC, a baseline or as-is view of the current workflow was captured in a process map, a standard within LSS and depicted in Figure 1, "VI Ingest & Triage (As Is)" [5 & 6].

Scope and Objectives

The primary focus of the project was on VI from the time submitted to the time it is accessible to the customer. A review of each phase of that process, to include assessment, triage, prioritization, assignment, editing of images' metadata within the workflow was also part of the scope. The breakthrough objectives spell out the improvements planned above the baseline performance that was indicated in the problem statement:

- Establish a consistent process map for the Ingest and Triage (prioritizing the assignment) of VI for DIMOC JCCC
- Increase VI availability and ease of access for the customer
- Increase the accuracy and quality of VI captions and metadata in the DoD VI Archive
- Place job responsibilities and duties under the position (i.e. check duplicates, run spreadsheet, etc.)

The process improvement development was conducted through five key phases: Define, Measure, Analyze, Improve and Control, or DMAIC [7].

Define (DMAIC process within LSS) – This phase is focused on both strategic and process views. The project purpose and team were developed using a newly developed Strategic Plan from Defense Visual Information. This is also where an initial analysis was completed to include defining the Voice of the Customer, along with the process scope and the project team composition. This is a critical step because the organization defines who the customer is, why DIMOC provides the services or products to them, what DIMOC does to provide those services or products and how they measure success – such as meeting the customer's requirements.

Measure – This plan documents the current state of the process and includes building a process model and map, determining the inputs and outputs, and collecting the baseline data to populate the process map with "what we do" and "how we do it."

Analyze – During this phase, the team conducts a process analysis with the information gathered, reviews the process map, compares the data, and determines areas for process improvement.

Improve – In this phase, the team identifies and proposes process improvements based on the "To-Be" or future process. Solutions may be tested, and alternatives considered during this phase. Some solutions could

require development of a business case and an implementation plan.

Control – During this phase, process owners create a system of monitoring and maintaining project performance gains. Lessons learned should be shared, to include recommendations for future opportunities.

Part of the project included researching why imagery duplication occurred. Duplicates included: Copies of imagery already in the system, different images with the same metadata, and the same images with different captions. Some of these were generated when editors and content managers made changes to the photo captions. Those changes caused the system to create another copy of the image. Imagery searches resulted in inconsistent results and did not meet customer needs.

Interviews were conducted with each JCCC content manager, the individuals reviewing the caption and metadata for accuracy and quality. As an outcome, a survey was developed and completed by the Air Force, Army, Marine Corps, Navy, and the JCCC, on the management of their imagery. The interviews captured each step of the JCCC ingest process that are depicted in the swim lane for the JCCC in figure 1.

Surveying the Services was the quickest and simplest means to gather the data needed for analysis. The Service photographers generate official VI while documenting military events, operations and exercises. The information gathered was compared with the JCCC VI ingest processes. From this data, DVI identified and recommended process improvements for DIMOC and JCCC ingest, editing and managing VI records.

Data Analysis

The following conclusions and recommendations were made after reviewing and comparing the data from the survey completed by all the Services. All the military Services, except for the Air Force, use a Component Coordination Point (CCP) to review and edit captions of their Service's imagery. CCP editing includes correcting misspellings, punctuation, and styleguide errors, as well as adding missing metadata. Individuals manually review the information that accompanies every image.

Below is a narrative of the survey results and analysis [8].

- Because the Services triage much of their own VI, DIMOC determined their resources would only edit VI specifically designated as their responsibility: Joint interest. This change reduced duplication of effort, provided a more efficient workload, and increased the accessibility and discoverability of DoD VI records.
- All Services, except the Air Force, noted that their CCP routinely reviews and edits ALL of the critical VI metadata fields: Caption, Visual Information Reference Identification Number (VIRIN), Photographer's name and rank, date shot, and release status.
- For those critical fields, the Service CCPs perform the following editing tasks:
 - Army: Grammar, spelling and punctuation corrections, Associated Press (AP) and DoD captioning styles, validate VIRIN/VISION IDs [9], and accuracy of caption information.
 - Marine Corps: Spelling/grammar corrections, ensure date shot and VIRIN correspond, verify VISION IDs, verify that no unreleased or For Official Use Only (FOUO) assets are published,

- ensure the release status contains appropriate and full information (Point of Contact, contact number)
 - o Navy: Accuracy and completeness
 - o Air Force CCP: No imagery or metadata editing.
- The average number of VI records reviewed/processed by the Service CCP, per week was:
 - o Army: 600
 - o Marine Corps: 300
 - o Navy: 450
 - o Air Force: N/A
- The average amount of time (in minutes) spent processing a single VI still record?
 - o Army: 12 min
 - o Marine Corps: 1.5 min
 - o Navy: 4 min
 - o Air Force: N/A
- What was the average percentage of VI records Service CCPs processed and made required changes?
 - o Army: 100%
 - o Marine Corps: 100%
 - o Navy: 20%
 - o Air Force: N/A
- The average age of the VI records your CCP reviews/edits?
 - o Army: 3-5 days
 - o Marine Corps: 1day
 - o Navy: 2-5 days
 - o Air Force: N/A

Results and Recommendations

The team made the following recommendations and conclusions after reviewing the Service CCP VI Ingest survey data. Process improvement can be an effective way to refine established procedures. An added benefit was that individuals often shared additional suggestions for possible improvements, which were captured and set aside for future consideration [10].

1. DIMOC stops processing of captions already processed by the Service CCPs. DIMOC resources can then focus on VI metadata accuracy and increasing discoverability via keywording. The change would also eliminate redundancy in editing.
2. Establish and clarify the Release Status as a Service-level responsibility. (This can help address the issue of Release Status often being an unfilled metadata field for VI received, which forces DIMOC to expend time to provide a review on behalf of the originator.) Three of the four Services (Army, Navy and Marine Corps) state they work 100 percent of their VI, so the Release Status could easily be addressed at the source.
3. Establish a division of platforms: An operational system (DVIDS) for current VI records (and in which Service CCPs are already working), and an archive system (DIMOC contractor developed) for non-current VI records, where DIMOC content managers ensure the preservation and long-term discoverability of these records. The change can reduce overlapping functionality in both systems.

4. Address the cause of duplicate VI records. The Service and JCCC surveys noted a low percentage (3%) of duplicates early in the lifecycle. Therefore, duplication can probably be addressed in DVIDS and with the submitters themselves. The Services can address some of the errors made by photographers in the field, which in turn prevents some of the duplicates from moving to the archive.
5. Develop automated reports based on set data points and requirements. Establish a quarterly report or dashboard of the VI process. Track recurring problems to provide a resolution status.
6. Establish a Service CCP Working Group to socialize future DoD VI records management and increase Service-level understanding of the connection between accurate, efficient VI records management and quick, easy accessibility for both the short- and the long-term.
7. Establish a capability for federated search of DoD imagery. Develop a Joint Media Environment (JME) continuing the effort to provide DoD VI quickly and easily. Develop and explain how the JME will evolve with a timeline for completion and establish milestones within that process.

Conclusion & Future Predictions

The VI Process Improvement project concluded with the sharing of recommendations within the agreed scope. The improvements are being considered and some are being tested for future implementation.

Project outcomes: The improved VI processes have already resulted in some cost savings.

Breakthrough areas: The survey revealed that while duplicates were a nuisance and a time waster, they were not as prominent as first thought. Actions were taken to reduce their occurrence at the point of ingest [11].

Having content managers focus on metadata and only editing those captions that are joint interest can reduce the duplication of effort on caption content. This achieves considerable savings in time and effort for DIMOC and decreases the process time for our customers.

Implementation: JCCC content managers received additional training to learn the DVIDS processes for VI management and workflow.

VI record access and discoverability is directly linked to future DoD VI records management. While customers want quick and easy access to VI records, the ongoing challenges in managing these past and future records must be addressed, from the photographer, to DVIDS, to the DIMOC archive, to the record transfer to NARA.

The DoD visual history is critical to shaping future leadership decisions and U.S. military operations, as well as informing the public. Great gains are possible when processes are broken down into minute details and analyzed for possible improvements, efficiencies, and elimination of waste. However, implementing the changes takes considerable time, commitment and effort by every member of the organization. The project recommendations, once implemented, will result in a more efficient overall workload and increased record accessibility and discoverability. These changes are key factors in not only preserving DoD's visual history, but in making that imagery accessible to the broader public.

References

- [1] Department of Defense Instruction 5040.02, Visual Information, October 27, 2011, <http://www.dtic.mil/whs/directives/corres/pdf/504002p.pdf>
- [2] National Archives and Records Administration, Records Schedule: DAA-0330-2013-0014, "DoD Visual Information Schedule," February 2015, <http://www.dimoc.mil/documents/DoD/DoD-VI-Records-Schedule.pdf>
- [3] HQ0516-13-C-0007, Digitization and Storage, Defense Media Activity, Defense Imagery Management Operations Center contract, Awarded 26 August 2013.
- [4] Defense Visual Information Lean Six Sigma Greenbelt Project: VI Process Improvement Project, July 2015.
- [5] Ibid, VI Ingest & Triage As Is Process Map.
- [6] Lean Six Sigma Green Belt Certification Course, MHC-2002, Volumes I & II (2013) www.mhc-net.com
- [7] Ibid.
- [8] Defense Visual Information Lean Six Sigma Greenbelt Project: VI Process Improvement Project, VI Ingest Survey Analysis (survey data spreadsheet with results), July 2015.
- [9] Note: VISION ID is an identification number assigned to all DoD personnel who create Visual Information (VI) records. The VISION ID is entered in "field 3" of the Visual Information Records Identification Number (VIRIN).
- [10] Defense Visual Information Lean Six Sigma Greenbelt Project: VI Process Improvement Project, Executive Summary & Recommendations, July 2015.
- [11] Ibid.
- [12] Defense Visual Information Lean Six Sigma Greenbelt Project: VI Process Improvement Project, VI Ingest Survey Analysis (survey data spreadsheet with results), July 2015.

Author Biography

Barbara Burfeind, a retired Navy Public Affairs Officer and current director of the Defense Imagery Management Operations Center (DIMOC), is a certified Lean Six Sigma Green Belt for the Department of Defense, Defense Media Activity, Fort Meade, Maryland. Ms. Burfeind has a master's degree in communication from the University of Oklahoma and extensive experience in VI planning, strategic communication, analysis and outreach.

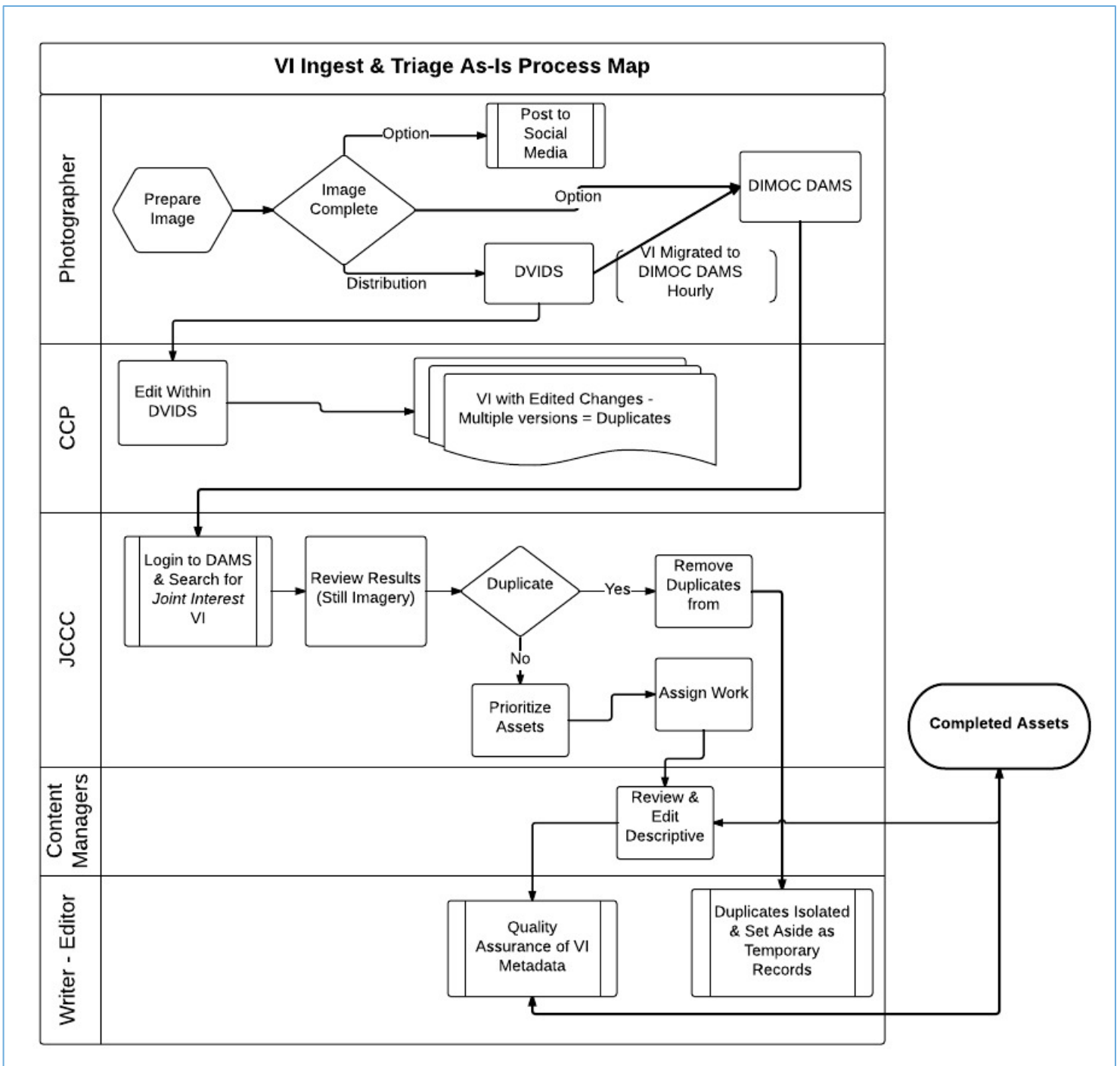


Figure 1: VI Ingest & Triage Process – As Is

VI Ingest Analysis Questions	JCCC	Air Force	Army	Marine Corps	Navy
1a. When editing VI records, does the CCP differentiate between Service and Joint Interest imagery?	Yes	No	No	Yes	No
1b. If so, approximately what percentage of your workload is Joint Interest?	65%			5%	
Of the VI records the CCP edits, which of the following provide VI into the workflow:					
Garrison PA/VI	Yes	Yes	Yes	Yes	Yes
Unit VI/COMCAM on Name Operations	Yes	Yes	Yes	Yes	Yes
Unit VI/COMCAM in Exercises or Home Station	Yes	Yes	Yes	Yes	Yes
Combatant Commands	Yes	Yes	Yes	No	Yes
Service Components of Combatant Commands	Yes	Yes	Yes	No	Yes
Yes / DoD, DHS/ICE, foreign photos, DoS, political, local police, fire and EMS, USAID, USACE		All photos, broadcasters respons.		None	Indiv PAOs Not affiliated with cmds shown, Reserve component PAOs, Non-PAO service mbrs assigned to units
3a. Do the CCP editors adjust or enhance images as authorized by DoDI 5040.02?	No	No	No	No	Yes
3b. If Yes, approximately what percentage of VI records require adjustment/enhancement?					15%
4. From the following list of seven critical metadata fields, please select the fields which your CCP routinely reviews and edits:					
Caption	Yes	No	Yes	Yes	Yes
VIRIN	Yes	No	Yes	Yes	Yes
PH Name/Rank	Yes	No	Yes	Yes	Yes
Keywords	Yes	No	Yes	Yes	Yes
OP/EXERCISE	Yes	No	Yes	Yes	Yes
Date shot	Yes	No	Yes	Yes	Yes
Release Status	Yes	No	Yes	Yes	Yes
Spelling, grammar, accuracy of ranks/rates (see survey)		AF CCP do Not edit VI or metadata	Spelling, grammar (see survey)	Spelling, Gmr, date shot, VIRIN	Accuracy & complete
5. For those data fields selected in questions #4, please briefly describe what editing tasks the CCP editors perform.					
6. For the purpose of CCP editing, please briefly explain the qualitative standard used to determine when a VI record is complete and ready to be maintained as a permanent record?			DoD Captin SG, Service SOP, DODI 5040.02	DoD & AP SG, dictmry, equip abbrev.	Navy/AP SG, VI SOP
7. What is the average number of VI records reviewed/processed by your CCP per week?	1,600	0	600	300	450
8. Based on your answer to question #7 above and the average staff man hours available per week in your CCP, what is the average amount of time (in minutes) spent processing a single VI still record? Motion record?	(blank)		12 mins	1.5 mins	4 mins
9. On average, what percentage of VI records does your CCP process and make required changes?	100%	0% (??)	100%	20%	100%
10. Based on the Date Shot, what is the average age of the VI records your CCP reviews/edits?	<10 days	(CCP does Not edit)	3-5 days	1 day	2-5 days
11. What is the average percentage of duplicate VI records and VIRINs received each week?	3%	0%	0%	0%	50%

Figure 2: VI Ingest Survey Analysis [12].