

Army Maintenance Management Improvements

GCSS Accounts Registration Improvement Process

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Abstract: Armed Forces' readiness drives its own lethality therefore, in 2018 the Secretary of Defense mandated Commanders at all levels to grasp a real measure of their equipment readiness in order to make .sound decisions over deployable units. This project explores the pattern of active and effective accounts within the Global Combat Support System (GCSS), the Army's maintenance funds. Reports obtained from GCSS did not show real information to drive sound decisions on whether or not a unit is capable to deploy to identify problems with sound improvements. Within the process a study is conducted all 43 deployable units and their headquarters within the Puerto Rico Army National Guard. All stakeholders were given a voice of the customer survey to define problems behind the maintenance process. Results suggest that access and training deficiencies in the GCSS software negatively correlated with mission capability, offload of funds to purchase repair parts, and un-realistic reports affected decisions of Commanders. By implementing lean six sigma methodology and techniques such as standard work, 5's, quality at source, and visual management results in an increase of 56.8% in mission capable equipment, an additional \$30K for funding, and an increase of 14% on active accounts within four (4) weeks into improvement implementations.

Define

Introduction: This project pays particular attention to the mission capacity and funding

outputs obtained through GCSS access management; implementing adequate lean

techniques into the process in order to improve such outputs. Measurements are

obtained from GCSS account activity reports and visual data obtained from documents

on archives (i.e. access authorization forms and training certifications) simultaneously

while running the process during a four (4) week period. This project provides

information obtained through hypothesis testing using analysis of variance regarding

the comparison of Active Accounts versus Mission Capability % and Active Accounts vs.

Funding Received. Also, information is obtained through simple and multiple linear

regression analysis regarding the relationship of accounts managed vs. time engaged

on each in order to determine the requirement of account managers. A single factorial

design of experiment is used to determine whether there is any statistically significant

differences daily active accounts. While measurements are retrieved during the four (4)

week period, minor improvements on the process take place while considering the

behavior of descriptive statistics and failure mode analysis. Finally, this research

highlights major strength and weaknesses while making explanation of improvements

and observed changes. This project also makes recommendations that will improve

Problem Statement: GCSS accounts in-activity leads to significant increase of deadlined

equipment (un-realistic readiness reports) and a negative proportion return of

SIPOC DIAGRAM

Process

Maintain Access

Output

unding to Repair Parts

Relevant and Lethal

Equipment

Objectives

L. Readiness: Increase

readiness by providing

2. Funding: Synchronized

proportional to readiness

Increase Active Accounts

based on required roles.

with objective 1, increase | Annual Funding

3. GCSS Account Activity: 62% Active

users with required access and training.

the return of funds

and execution levels.

Customer

Commanders at

Different Levels

End Users

Baseline

49% Full Mission

\$749,000.00

Goal

\$1,123,500.00

80% Full

Mission Capable

Funding

100% Active

Accounts

other areas of the maintenance process.

Supplier

Directorate of

Information

Management

irectorate of Logisti

Army Material

Un-Improved Flowchart for Requesting Access into GCSS

Operations & Maintenance (OPTEMPO) funding.

Input

Hardware & Periphera

process. The role requirement for each major command is summarized on figure (#). Through a four week period the process was measured statistics were taken for each in order to understand critical aspects of each. Also, the fulfillment of requirements such as % of active accounts, % of accounts with DD Form 2875 (System Access Authorization Form) and % of training certificates on record were recorded for each week. This is summarized on figure (#).

Measure

The average usage of GCSS

for the past six (6) months

in accordance to the access

activity report was 42% as

seen in table 3. That is

because 58% of the

accounts are locked; GCSS

accounts are automatically

locked by the system after

30 days of inactivity. In the

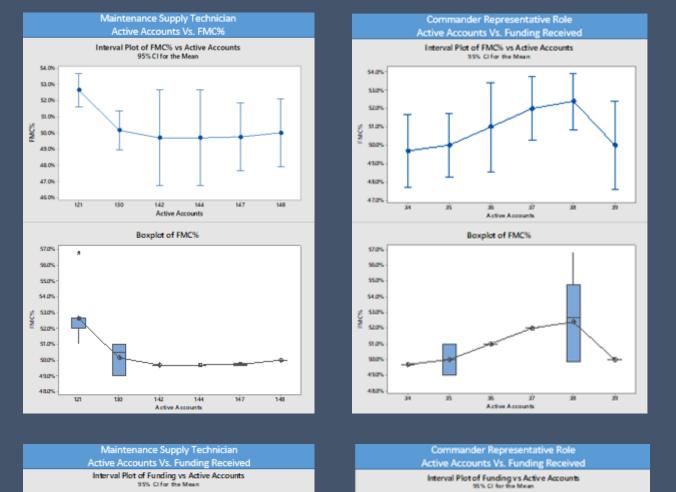
last 30 days only 0.8%

logged into the system.

GCSS Account Activity Register	Total Roles Active	Monthly Accounts Locked as of: 03/10/2019									
Role	절	-180	-150	-120	-90	-60	-30				
SS4 Access Administrator	6	3	3	4	4	3	3	5			
Maintenance Manager Access Administrator	15	12	12	12	12	12	12	8			
S4 Officer or Equivalent	12	7	7	8	8	8	8	6			
Maintenane Manager	5	3	3	3	4	4	4	7			
Equipment & Parts Specialist	106	85	90	91	93	90	90	8			
Commander Representative	49	35	38	38	38	38	39	7			
Maintenance Supply Technician	155	130	136	137	137	135	135	8			
Master Driver	16	12	10	10	10	10	9	6			
Dispatcher	0	0	0	0	0	0	0				
Equipment & Parts Specialist	0	0	0	0	0	0	0				
Totals	364	287	299	303	306	300	300	5			

A relationship between active accounts versus received funding and mission capability ratio is established using the recorded data for daily active accounts per role (input), daily status of funds (output 1), and daily mission capability ratio (output 2). This is done by obtaining descriptive statistics and analysis of variance (ANOVA) through Minitab. Roles are further described as critical and non-critical. A critical role has significant influence on the output. The figures below show a comparison of interval and boxplots obtained for the Maintenance Supply Technician Roles (Critical) and the Commander Representative Role (Non-Critical)

PLOT DIAGRAMS COMPARISON ON OUTPUTS



			<u>P</u>	ROJ	<u>IEC</u>	T	ŝΑ	N7	Γ <u></u>	.H.	A	RT														
Gantt Chart Pro			0/					3/17/2019			3/24/2019			3/31/201				4/7/2019			4/14/2019					
			,	3/2019	1 2	3/10/20	19	3/1//	2019		3/24	/2019		3/31	/201	9	4	///20	019	+	4/1	4/20	19	4/	21/2019	
Task	Stat End	Q	ays Complet	MT WT	FSSN	ит шт	FS	SMT	MT F	SSI	мт	ΛTF	s s	мт	wт	F S	s M	T W	T F	s s	мт	wт	FS	s M	TWT	
1 Dephine Phase			_																							
1.1 Training Kaizen Team	3/3/2019 3/4/2		100%																							
1.2 Problem Statement	3/4/2019 3/7/2	019 3	100%																							
1.3 Set Project Objectives	3/4/2019 3/7/2	019 3	100%																							
1.4 Set Kaizen Team Members	3/6/2019 3/7/2	019 1	100%																							
1.5 Set Project Scope	3/6/2019 3/10/2	019 4	100%																							
2 Me asure																										
2.1 First Time Quality	3/10/2019 3/11/2	019 1	100%																							
2.2 Value Stream Map	3/10/2019 3/11/2	019 1	100%																							
2.3 Raw Data Measurement	3/10/2019 3/12/2	019 2	100%																							
2.4 Measurement of Process	3/12/2019 4/6/2	019 25	100%																							
2.5 Analyze Demands	3/27/2019 4/3/2	019 7	100%																							
2.6 Gemba Walks	3/15/2019 4/3/2	019 19	100%																							
2.7 Measure Phase Review	4/3/2019 4/6/2	019 3	100%																							
3 Analyze Phase																										
3.1 Data Analysis	4/6/2019 4/10/2	019 4	100%																							
3.2 Cause and Effect	4/6/2019 4/10/2	019 4	100%																							
3.2 Space Requirements	4/10/2019 4/12/2	019 2	100%																							
3.3 Analyze Access Managers	4/10/2019 4/12/2	019 2	100%																							
3.4 DOE	4/9/2019 4/13/2	019 4	100%																							
3.5 Analyze SOP and Update	4/6/2019 4/11/2	019 5	100%																							
3.6 Workshop	4/6/2019 4/11/2	019 5	100%																							
4 Improve Phase																										
4.1 Publish New SOP	4/15/2019 4/17/2	019 2	100%																							
4.2 Apply Lean Methods	4/15/2019 7/4/2	019 80	20%																							
4.3 Quality at Source	4/15/2019 7/4/2	019 80	20%																							

750000 34 25 26 37 38

The average processing rate of accounts entailed measuring the daily average amount of time an access administrator took to process each account per day. Also, the amount of access forms received, processed, and returned (error) was recorded in order to measure a weekly process capability based of account processing rate.

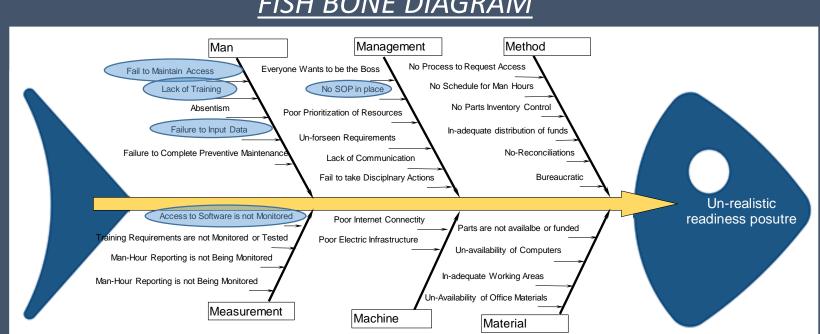
Analyze

PARETO CHART

Top Offenders:

- Access to GCSS and specific required roles • Users do not know how or who to request access to
- Lack of training to execute required tasks with given roles
- No Standard Operating Procedure in place

FISH BONE DIAGRAM



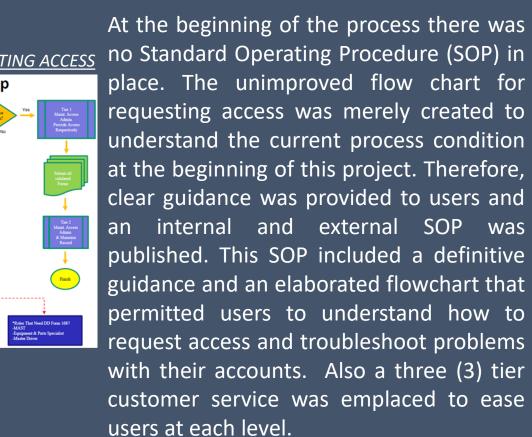
Most defects are associated or translated into access, training, and SOP issues. The fish bone diagram yields that the cause of these errors yield to obtaining an unrealistic readiness posture and the loss of recoverable maintenance funds.

The employment of an adequate amount of Access Administrators was analyzed. Generally, access administrators are required to perform other main tasks. The Access Administrator duty falls as an additional duty. If access administrators were reduced a bottleneck may occur in the process. Therefore, the best parameter was selected by analyzing a multiple regression analysis. To obtain the best process capability with the least amount of access administrators the result yielded to three (3) access administrators. Anything lower than three (3) had a negative impact on the outputs. Also, based out of improvements managed through a failure mode and effect analysis the CpK for the access record processing was improved from 0.012 to 0.821.

INEAR REGRESSION ANALYSIS FOR MAINTENANCE ACCESS <u>SINGLE FACTORIAL DOE</u> MANAGER STATIONS ingle Factorial Design of Experiment Multiple Linear Regression for all Stations from Boxplot of Week 1, Week 2, . Week 1 through Week 4 0 5 10 15 20 25 30 35 Average Time Engaging Each (min) Week 2 Week 3 Week 4

ACCESS FORMS PROCESS CAPABILITY Access Manager | Total of Forms Received | Forms Returned | Processing Rate CpK Week 2 0.012 Average Processing Rate: Access Manager | Total of Forms Received | Forms Returned | Processing Rate CpK Week 4 95% 0.821

Standard Work



Fill Out DD Form 2875

PRARNG
4. PHONE (DSN or Commercial)
787-289-1400 EXT

SEMFs Maint. Access Admin
.SSG Jorge J. Vargas
.MSG Miguel Perez
.SGT Frank Gonzalez

Maint Access Admin.
-SEMF Supervisors MSG Miguel Perer directly
-MSO Marino Hernandez
-MSO Marino Hernandez

Improve

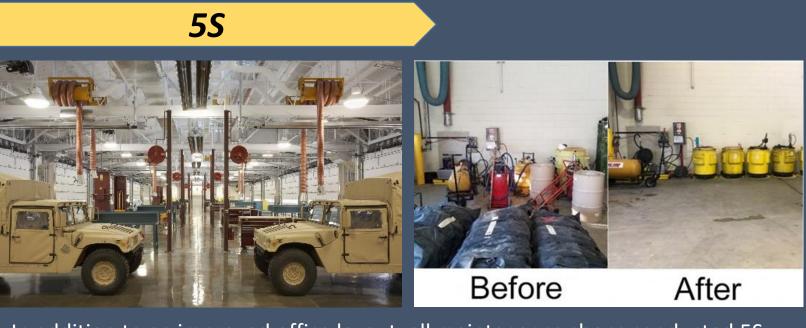
Visual Management

A pre-filled system authorization form (DD Form 2875) is provided as a visual management in order to aide user to fill out the form correctly and evade from being returned. This helps to increase the process capabilities of access record processing. Visual Management employed as well through a stop and fix standard. This was placed into the material management section in order to define and standardize an escalation system and criteria to ensure all units were operating accordingly. Equipment specialists are empowered to take actions into units that drop readiness levels on specific areas. These is monitored through a weekly Andon Call

Work Shops

(Critical Equipment Status Report).

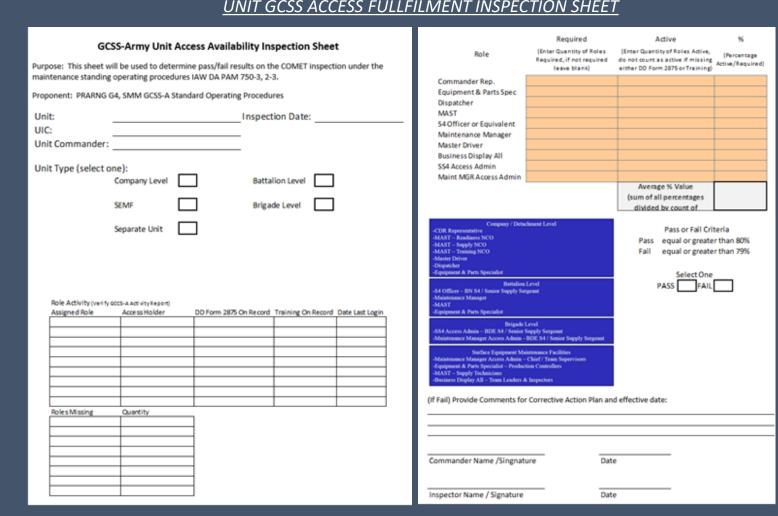
During the process, multiple work shops took place. Instead of time consuming meeting trying to solve the problem, meetings became in productive workshops were users learned how to request their access, how to do their job when they got the access, and made networking with other counterparts.



n addition to an improved office layout, all maintenance shops conducted 5S.

Quality at Source





In order to ensure quality at source, all subordinate units at the lowest level were inspected on the fulfillment of their GCSS Access requirements. A work sheet such as the one in figure is used to assess the units fulfillment score and determine if the meet the standard.





ensuring that the outputs are within the control limit. Although the Control phase has not yet begun, part of the currently taking place will be used to ensure that the established process is under control. One of the controls that is currently taking shape is

the implementation of the Maintenance Discipline Program (CMDP) in order to inspect units and ensure that they adhere to the maintenance standards.

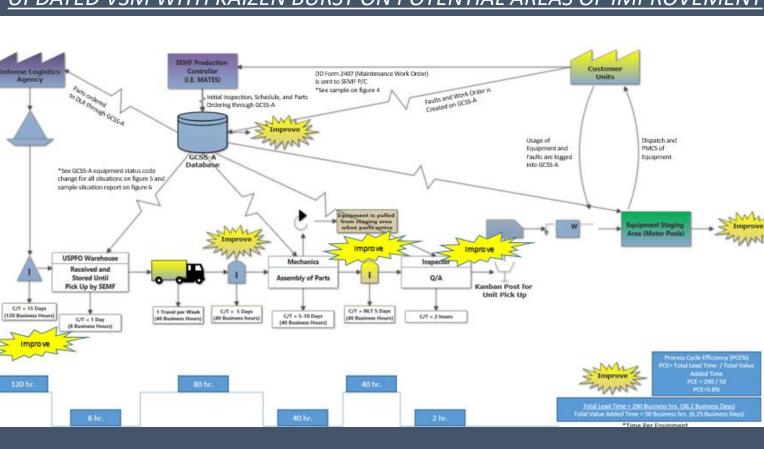
CMDP EXTERNAL AND INTERNAL EVALUATION INTERVALS am (COMET) to MSCs, BNs, and unit

Control

JPDATED VSM WITH KAIZEN BURST ON POTENTIAL AREAS OF IMPROVEMENT

CMDP Internal Evaluations

Every 10 to 12 months, after



PLAN-DO-CHECK-ACT METHODOLOGY



Recommendations

- ✓ Improve maintenance shops supply stocks by incorporation space utilization, incorporate 5S on parts warehouse, and eliminate waste by
- reducing inventory requirements. ✓ Recover funds from returned recoverable items and use these funds towards improvement of common maintenance shops. ✓ Optimize the parts requisition process in order to reduce wait times of
- parts from the moment ordered to the moment received to the maintenance shop.
- ✓ Maintain an authorized safety stock of essential parts in order to reduce wait times of parts and accelerate the increase of readiness levels.