Improvements of the US Army's Maintenance Management GCSS Accounts Registration Process

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Abstract *— This project explores the pattern of active and effective accounts within the Global Combat Support System, the Army's maintenance software, among key users and how in-proper practices related to decreased mission readiness indicators and the offload of maintenance funds. Reports obtained from Global Combat Support System did not show real information to drive sound decisions on whether or not a unit is capable to deploy to war or achieve its given mission. This project uses the lean six sigma methodology 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. By implementing lean six sigma methodology and techniques such as standard work, 5S, 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.*

Key Terms *— Deployable Units, Global Combat Support System (GCSS), Maintenance Funds, Maintenance Readiness.*

INTRODUCTION

The United States Army has three derivative components, the Active Component, the Army Reserve, and the Army National Guard. The Active Component's mission is to respond to contingency operations in foreign countries during peace time and during war. The Army Reserve shares the same mission as the Active Component but they act as a sustainment reserve. The Army National Guard also shares the same mission of the Active Component and Army Reserve however they have an additional mission stateside. This is to support their respective states on domestic contingency operations when called upon by the state governor. These include cases of civil disturbance, natural disaster, and any imminent event that may jeopardize the security within the home front.

Commanders at the strategic level, within the Department of Defense, and Commanders at the operational level take the decisions on which units are best fit for deployment based on readiness metrics and capabilities. Readiness levels include personnel status and qualifications, training, accountability and equipment maintenance.

For the Army, readiness is the number one priority in order to fight our wars. According to an interview with the Army Chief of Staff, General Mark Miley, maintenance readiness is critical; it's the long pole of the tent. You can do short-duration raids and operations without significant considerations of logistics and sustainment; you can't fight a war [1].

The Global Combat Support System (GCSS) is what drives maintenance readiness reports [2]; it is the tactical unit (field) and installation logistics (sustainment) and financial system for the Army. GCSS is an Enterprise Resource Planning solution that tracks supplies, spare parts and organizational equipment. It tracks unit maintenance, total cost of ownership and other financial transactions related to logistics for all Army units.

This modernized application subsumed outdated Standard Army Management Information Systems (STAMIS) that were not financially compliant and integrated about 40,000 local supply and logistics databases into a single, enterprise-wide authoritative system. Nevertheless, the system does not run by itself. This system is used incorporating different roles and trainings, is definitely required to operate effectively. Wrong

data in the system or inactivity triggers wrong readiness reports and hence wrong decisions at strategic levels.

PROBLEM STATEMENT

GCSS was implemented in multiple waves across the total Army; Puerto Rico was part of the second wave out of a total of seven. Back then, in 2017, key users were required to cleanse the legacy systems (STAMIS) in order to ensure a quality data migration into the new system's data base. Many time hacks and requirements were meant to be met. One of them was the registration of users in the new system and the completion of each user's web-based training. At that time, leadership focused on the numbers of Soldiers being registered and not the quality of the data that the system acquired. Finally, in 2018, the Puerto Rico Army National Guard was certified to have completed the transition to the new system.

After significant workloads left by the poor quality of data that was transferred from the legacy system, GCSS property accountability and financial areas were pretty much up to date. But that was not the case when it came to maintenance. After multiple command visits and inspections to line units, Commanders encountered that in many cases the physical situation of an equipment (i.e. a vehicle, generator, or weapon system) was not reflecting accordingly in the equipment readiness report [2] [3]. This leaded to multiple inspections all across the Puerto Rico Army National Guard. Leaders at the strategic level became concerned that they were not able to rely on the equipment readiness report obtained from GCSS in order to make decisions over deployable units.

Other quality issues following requirements established by the Army's Material Maintenance Regulations were not being met. Inspection items such as access forms and archived training certificates were not present at the time of inspection. This demonstrated lack of access management controls of the GCSS software; Soldiers that did not required the access had access to restricted areas.

Further within this article the problem is defined using the DMAIC (Define, Measure, Analyze, Improve and Control) methodology. But in order to provide a glimpse, a voice of the customer survey was collected from 180 soldiers that take high involvement in the process. As a result, 47% of the problem yields to access to specific roles and poor knowledge of their roles within the system. As previously discussed in the background, access and roles were given to users to fulfill a requirement, no quality was given to that process. But each of the roles has a purpose that is tied to specific positions.

Although many other problems may affect the readiness and funding outcome, but this design project looks towards attending access and training since both areas have a direct impact.

Project Description

Within GCSS there is a total of ten (10) roles that directly impact maintenance readiness. There is an established minimum amount of accounts and roles required for each Major Command in order for the process to work effectively in accordance with Army Regulation (AR) 750-1 [4]. The fulfillment of this requirement at across the Army National Guard is summarized on Table 1.

Table 1
Summary of Required Versus Active Roles

Overall Minimum Roles Required	S54 Access Administrator	Maintenance Manager Access Administrator	S4 Officer or Equivalent	Maintenane Manager	Maintenance Supply Technician	Equipment & Parts Specialist	Commander Representative	Master Driver	Dispatcher	Business Display All
	3	5	8	8	155	106	49	49	49	> 10
Major Command										
191ST RSG	2	0	2	2	34	12	10	12	0	0
101ST TC	2	2	6	3	41	7	14	3	0	0
92D MP BDE	2	1	4	0	35	2	9	1	0	0
Maintenance Shops	0	12	0	0	21	15	0	0	0	13
Total	6	15	12	5	110	21	33	16	0	0
Fullfillment	200%	300%	150%	63%	85%	34%	67%	33%	0%	130%

Although the fulfillment shows active accounts above average for certain roles, those that are above average are used generally to generate reports and do not have a direct impact. Those that are below

average are roles that drive the maintenance execution process and the impact in readiness is significant. Also, there are many accounts that shouldn't be active because the user either is not in a position that requires it or it is no longer working for the organization. For each account a System Access Authorization Request Form (SAAR) needs to be completed along with the required web-based training certificates. Each role has specific training requirements however, web base training is not enough for a user to operate effectively.

The actual process to request access and roles into GCSS is not well-known by users. It may take many days for a user to have access into GCSS if the user is lucky enough to touch the door of the person who could help. This directly affects readiness since the person behind the operation is not performing his/her duties in the system.

The Puerto Rico Army National Guard has a total of 32,080 reportable equipment. Over 16,300 are deadlined with a direct impact on mission readiness. This represents that only 49.7% of reportable equipment is ready for any given task or mission. This is the baseline metric for readiness keeping in mind that reports are not 100% current. There is high rate of error in the maintenance process and documentation, poor maintenance software registration in GCSS – only 62% of required users have access, and low recovery of Operational Tempo funds – only $550K recovered of an expected $1.2M.

Project Objectives

- **Objective 1 (Readiness):** The current baseline for equipment readiness is 49%. The goal is to increase readiness by providing users with required access and training in order to increase overall readiness levels to 80% in accordance with AR 750-1, The Army Material Maintenance Policy [4]. Also, provide workshops in order for them to execute hands on training and networking with peers to update readiness data with current equipment situation.
- **Objective 2 (Funding):** The Puerto Rico Army National Guard only accounts with $749K for the purchase of repair parts. This is readiness and execution driven therefore, the goal is synchronized with objective 1, increase funding by 50%.
- **Objective 3 (GCSS Account Activity):** Last but not least, this is what allows users to execute their work. The current baseline is 62% active accounts and the goal is to increase to 100%.

LITERATURE REVIEW

All Army Components are measured with the same maintenance standard, AR 750-1 (The Army Materiel Maintenance Policy) [4]. Regardless of unit's personnel size or fulltime personnel, the standard is the same. At some point, this hinders Army Reserve and Army National Guard units because the amount of personnel that work full time in the unit are limited to a maximum of four Active Guard Reserve Soldiers. The remaining unit personnel reports to the unit only during monthly drills (2 to 3 days per month). In comparison with the active component that has an average of 100 Soldiers per unit working full time.

The Army senior logistics officer states that the Army is converting and modernizing in order to accomplish the missions assigned to by the National Command Authority [5]. The Army's combat support forces must generate combat power in order to accomplish those missions. Part of modernizing is the incorporation of a new software: GCSS [2]. Today the force is very reluctant to changes and is up to leaders to break the culture of old business rules in order to meet the new challenges. The unwillingness of the force to work with this system has led to unrealistic readiness posture reports, the data on the system is not the most current and is not dependent. GCSS affects every supply room, motor pool, direct support repair shop, warehouse, and property book office in the Army, improving efficiency and visibility for over 100,000 users [6].

It is not new for Amy units to employ the Lean Six Sigma Methodology on many of their programs. Since 2006 the Department of Defense has saved billions of dollars in current programs, avoiding costs in future programs and generating revenue from reimbursable activities.

Lean Six Sigma is a performance enhancing methodology synthesized from the marriage of two related approaches, Six Sigma and Lean Manufacturing, which were both developed by the hugely successful Toyota Corporation during the half century following the Second World War [7]. It was specifically intended for a manufacturing environment in order to reduce costs and, at the same time, improve product quality.

Lean Six Sigma has been adopted by the Army in multiple strategic aspects such as deployments and readiness. Lean Six Sigma has proved particularly attractive to the military because of its emphasis on continual self-improvement and cost cutting. Since this methodology is top heavy with measurement, statistical analysis, a rigid optimization methodology, and process control it will seamlessly work with the high discipline requirements towards improving our maintenance readiness.

Lean Manufacturing and Six Sigma

Sustainment level organizations and below should implement continuous improvement methodology in order to identify deficiencies and maximize their capabilities. This is achievable by eliminating waste on the process. Using lean manufacturing principles, any process will be streamlined in order to achieve satisfaction. In this case, thought will be used when creating a standard operating procedure.

Six Sigma, a disciplined data driven approach and methodology for eliminating defects, is used in this project. The implementation of measurement strategies, further discussed in the Methodology chapter, will focus on process improvement and variation through the use of the DMAIC methodology [8].

METHODOLOGY

This project uses DMAIC as the logical steps that links the tools and techniques in a sequential manner and as a data driven strategy. During the process a SIPOC (Suppliers, Inputs, Process, Outputs, Customers) diagram was elaborated to map out the process for requesting access into GCSS. It describes the suppliers, process inputs, the process itself, outputs and customers. In addition, a value stream map (VSM) along with a process flowchart is generated to analyze and identify wastes within the process. The VSM denotes the sequence of the process and helps understand the flow of material or information as a product or service until all the way to the point when the customer is delivered with a final product.

In addition, a survey is elaborated to capture the voice of the customer (VOC) in order to detect possible faults within the process along with a House of Quality (HOQ). The HOQ and the VOC aids in describing what quality means for the customer and what are the root cause of problems instead of attacking merely the problem symptoms.

As much data as possible were gathered from the process, minor improvements started to take place and recorded in a daily Failure Mode & Effect Analysis worksheet. Daily data is taken from GCSS such as daily readiness status, access activity, and status of funds reports while the process runs at simultaneously is in order to obtain descriptive statistics and input variables that are affecting the outputs.

Results

The achieved results are presented subsequently to implementing visual management, 5S, standardized work, space utilization, productive team workshops, and quality at source techniques.

These techniques were implemented to the areas that deprive more. In order to review those area of increased or potential quality risk an assessment was conducted in order to prioritize and provide solutions. Direct observations obtained from Gemba walks and the VOC were assessed.

During the assessment 246 potential risks were summarized into their respective family areas. The top four (4) offenders were failure to maintain or obtain GCSS access, users did not know how or who to request access to, and users didn't actually had a general understanding of what to do in the system, and no standard operating procedure was established. These offenders compose 79% of the overall risk. For example, if a user does not know how to dispatch a vehicle and input mileage usage, then no operational status is recorded.

The average usage of GCSS for the past six (6) months in accordance to the access activity report was 42%. 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. The Pareto diagram showed the number of defects or occurrence for each specific family. Most defects are associated or translated into access, training, and Standard Operating Procedure (SOP) problems. The fish bone diagram worked during the project, exposed that the cause of these errors yields to obtaining an unrealistic readiness posture and the loss of recoverable maintenance funds.

5S and Visual Management

The first part of the process was to set the Surface Maintenance Management's (SMM) house in order. When analyzing the first set of raw GCSS access data it was identified through the first glimpse that roles were being filled by personnel who (1) were no longer an active member of the armed forces – retired, (2) were no longer in a position with a duty related with the role they had, or (3) were an active member with a role specified duty position but did not have the required access documentation (DD Form 2875 System Access Authorization Form) and required training on file.

In order to establish a correlation with personnel that was no longer an active member of the armed forces a roster with personal identifiable information was requested to the Human Resources office. Using this information, a correlation solution using the Vertical Look-up tool within Microsoft Excel was conducted in order to identify inactive personnel. Inactive personnel were deleted from the GCSS access database, cleansing and narrowing down accounts to those users who were actually in a duty related position. This provided a clear baseline.

The SMM office did not have an access manager administrator in property. Therefore, there was no specific archive were access records (DD Form 2875 and Certificates) were stored. For this reason, two (2) access administrators were appointed by orders and a unique network database was created in order to store access records. This database prompted users missing required record. Also, if a person was changed from duty position or discharged, the Human Resources now provides a notice (Kanban) in order to deactivate account.

Visual Management is 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 (Critical Equipment Status Report). This report is shown on 55 inches monitor were color guides make it easier to determine what action the equipment specialist will take with specific units.

The office layout was also changed to order to satisfy reasonable space utilization. The SMM division had its employees staggered on cubicles all around the Directorate of Logistics. Employees needed to walk around large distances in order to network on job related situations. Having them together in the same area allows for the office to be more organized and for work to flow. Also, new office equipment and furniture were incorporated for the exact amount of employees required (i.e. access managers, etc.). The amount of access managers required at the SMM office is further discussed within the standard work implementation process.

Quality at Source

A Commander's Maintenance Evaluation Team (COMET) inspection is implemented a lean principle known as Quality at Source. This is to ensure that quality outputs – in this case readiness reports at the strategic level – are not only measured at the end of the process but at every step. Also, responsibility is attributed to each individual who contributes to the maintenance process and the results.

This inspection appraises the level and quality of unit maintenance management and current readiness status of each unit. It also measures the proficiency of each contributor in maintenance and operator level preventive maintenance checks and services. It assesses the combat readiness of unit's equipment and identifies systemic issues such as GCSS access problems. If any fault or occurrence is found by the inspector a corrective action plan (CAPA) is established. This inspection has various checklists and inspection sheets used to inspect GCSS access at the unit level. Before inspections maintenance shops incorporated 5S principles, demonstrating their user's sense of ownership on the improvement process.

Controlling Re-Work

Another issue noted by conducting direct observation on the process was the amount of System Access Authorization Request (SAAR) forms – better known as DD Forms 2875 – being returned by access managers because they were incorrectly filled. Forms had to be returned to be corrected and resigned by the Commander and Security Manager. In many occasions the security manager was not available to sign, causing a bottleneck in the process.

During the second week of measuring the process, once access managers were re-arranged (explained in the Standard Work section), the average processing rate of access forms processed yielded to 78% based out of the four (4) access managers at the SMM office (Table 2). This means that nearly 22% of forms were returned to the field for re-work.

Table 2

Access Manager DD Form 2875 Processing Rate Week 2

Week 2			
Access Manager	*Total of Forms Received*	*Forms Returned*	*Processing Rate*
1	63	18	71%
2	70	9	87%
3	59	15	75%
4	61	12	80%
		Average Processing Rate:	*78%*

A visual management tool was provided to users as part of the new Standard Operating Procedure (SOP). The pre-filled form aided users to eliminate common human error while filling the form out. In addition, two (2) extra security managers were training and assigned with additional duty in order to ease the load of work at the security manager stage.

After these minor improvements were put to work the results yielded to a 91% average processing rate (Table 3). Also, the amount of access managers was reduced from four (4) to three (3). This means that the process capability (CpK) increased from 0.012 to 0.821.

Table 3

Access Manager DD Form 2875 Processing Rate Week 4

Week 4			
Access Manager	*Total of Forms Received*	*Forms Returned*	*Processing Rate*
1	41	5	88%
2	43	2	95%
3	38	4	89%
		Average Processing Rate:	*91%*

Standard Work

In order to generate a standard operating procedure the entire process was measured to evaluate each step involving effect of roles in the process and the effectiveness of access managers. This helped ease identify necessary and unnecessary steps (value added and non-value added) in order to eliminate areas that do not add value to the process.

Descriptive statistics were obtained using data from GCSS (access activity, status of funds, and readiness reports) and data obtained from direct observation. By conducting an analysis of variance for each role it is determine that certain roles have a direct impact on the funding obtain and an increase of mission capability.

There are ten roles within GCSS that involve maintenance operations. Off course there are many

more roles within GCSS – 58 to be exact, but these ten are the ones that are used at the maintenance level. When completing the analyze phase, a hypothesis test was conducted in order to identify if system access and roles (general account activity) has a relation with funding received and mission capacity ratios. It was determined that some roles have a critical impact towards the desired output. These were SS4 Access Administrator, S4 or Equivalent, Dispatcher, Maintenance Supply Technician, Maintenance Access Administrator, Maintenance Manager, and Equipment & Parts Specialist. These roles are critical because the actions they produce in the system directly affect the outputs of funding and mission capability. The null hypothesis was accepted for these roles stating that the data demonstrates a significant relationship between them and the outputs. Although an increase in funding and mission capability was experienced when some roles were revoked, this was a result of system cleansing removing the access to personnel who shouldn't have the access (as discussed in the 5S and Visual Management section).

When it comes to the other roles (Commander Representative, Business Display All, and Master Driver) they didn't provide statistical data that directly show a significant relationship with the outputs. However, these roles are essential to the process as they are assigned to monitor the quality and execution of the maintenance process. They do have an indirect impact. The rejection does not mean that these roles are not critical however, this study does provide management to understand that those roles that are critical may influence greatly the outputs (funding and FMC %). In other words, it answers the question of what role assignment should priority be given to or pay more attention to.

This was determined by taking the raw data obtained in the measure phase, a relationship between the active registered accounts for each role versus the Amount of Funding Receive and the Full Mission Capability Percentage is established. With a confidence level of 95% (Error Type I at 5%), it is verified if the active registered accounts for the named role holds any relationship with the funding being received and the mission capability (if the output variable, the Funding and FMC%, is dependent of active registered accounts). A total of 20 samples were collected (1 per day). The established hypothesis (null & alternative) is as follows:

- H0: Active accounts do not hold a linear relationship with funding received or mission capability.
- H1: Active accounts hold a linear relationship with funding received or mission capability.

Plots obtained for Funding versus Active Accounts, specifically the interval plot, showed that a higher concentration with less variance is obtained when 121 Maintenance Supply Technician accounts were active. This demonstrates that the output increased positively when accounts were cleansed providing access to the correct users.

After analyzing the results obtained using the Minitab software while performing a simple linear regression analysis, correlation analysis, and an analysis of variance (one-way ANOVA) it is identified that in both cases (active accounts versus funding and active accounts versus mission capability) the P-Value is lower than 0.05. Therefore, the results are statistically significant rejecting the null hypothesis. This means that the alternative hypothesis stating that there is a significant relationship is accepted for both cases.

On the other hand, for the Commander Representative role, the Individual Value Plot and Boxplot obtained for Funding versus Active Accounts shows that there is a significant change in the output when the accounts reach the 38 point. The reason for this is because there are more active accounts under this role. The same behavior is noted in the the Individual Value Plot and Boxplot for Funding versus Active Account. However, using the same method for the Maintenance Supply Technician role, the P-Value resulted higher than 0.05. Therefore, the results are not statistically significant to determine that a relationship exist for this role and the outputs.

For this reason, priority was given to critical roles while stabilizing access issues. Therefore, by employing this technique faster results were obseved for the readiness outputs and hence provided strategic leaders with a more realistic readiness report.

Besides understanding how each role impacts the outputs, it was imperative to analyze how many maintenance access managers should be actively engaged. Generally, maintenance access managers also have other tasks to complete other than monitoring access at the SMM or at other echelons. At the beginning of the process measurement, there were 15 active Maintenance Access Administrator roles, this was immediately reduced to four (4), and later after the third week it was reduced to three (3).

The changes on this particular role were very critical, these roles provide access to all GCSS user. In order to improve requirement of active access administrator accounts the process had to be measured and balanced. This was done by recording the amount of time an access manager spent managing each account. With this data a multiple regression analysis obtained using Minitab and a single factorial design of experiment was built.

After having analyzed the multiple linear regression analysis, it was concluded that after changing the amount of access administrators there was no relationship between the average time of engagement during each week and the accounts being managed. The correlation coefficient did not approach the expected value of one (1). This explain that the process did not experience a negative impact from these changes.

The Design of Experiments (DOE) was used as a systematic method to confirm that the applied statistics that determined these relationships between factors (active access administrators) did not affect the process or the output in of that process (Figure 1). It helped determined that no negative cause-and-effect impact is obtained by with planning or changing the access administrator parameters. Being Fexp < Fcritical it is concluded that significance differences do not exist. This confirm that the changes have no correlation between the variables. Access Managers were reduced from 15 to three (3) resulted to an increase in process capability (CpK) from 0.012 to 0.821.

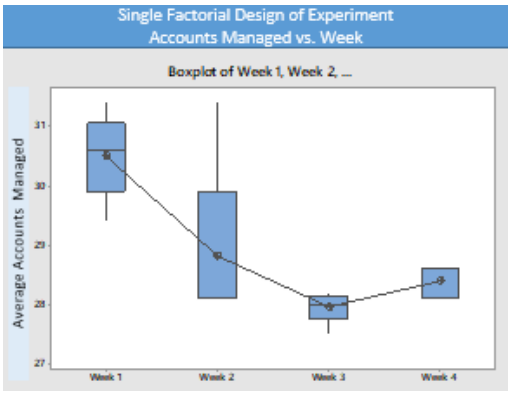

Figure 1
Single Factorial Analysis DOE – Account Management

Having analyzed all this information the best parameters were put together one of the most important things that was implemented during the four weeks periods. It went through different changes in order to improve the process. This was a Standard Operating Procedure (SOP) for requesting access and to exercise correct access management (internal and external SOP). This SOP was embedded on a three (3) tier access management support hierarchy. It assists the end user to understand who will be responsible for providing access and support at their respective levels and provides a leaner stream map in order to request access into the system. It also guides users on how to take required training for their respective roles, a step by step process on how to register, and a step by step process for access managers to submit help desk tickets. After establishing a new SOP, three (3) workshops were conducted by the SMM office in order to induce ownership to end users. One of them focused on the actions required by access manager, the other two focused on actions required by critical roles. These workshops aided end users to have an on the job training experience (learning by doing). They learned how to work with their own unit's equipment instructor led. Participants also have the opportunity to network with other counterparts. The results of these workshops were

very satisfactory as instructors allotted time in order for users to get their things right based on what they learned. Also, goals within the workshop were established (i.e. award program to user with most updated data – operator records, equipment utilization report, etc.).

Control Phase Application

Although the Control phase has not yet begun, part of the improvements that are 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 Command Maintenance Discipline Program (CMDP). Many states share this initiative and has delivered good results. However, nothing like it was ever established for the Puerto Rico Army National Guard units.

The implementation guidance has full support of higher leadership within the organization establishing maintenance discipline as a regulatory guidance and standardizes maintenance requirements. CMDP will provide responsible personnel with a single list of policy requirements and eliminate repeated findings of non-compliance. The end state of the program is to identify and resolve logistical problems that adversely affect maintenance readiness.

Another measure of control will be through control charts. The control chart in Figure 2 is an example of what it would look like. It measures the weekly status of the overall Puerto Rico Army National Guard maintenance readiness. A similar control chart will be applied for funding and individual GCSS role activity. In this case, figure 2 show a future scenario based on a linear trend line equation taken from the behavior of mission capability for the four weeks measured. This means that in the worst case scenario and if the measures in this project continue in place, readiness will hit the 80% lower control limit by the 46th week into the process.

As improvement is not a separate activity and must be built into the work process, a plan–do–check–act (PDCA) cycle, known also as the Shewhart cycle will be developed with the intention to repeat the improvement efforts continuously.

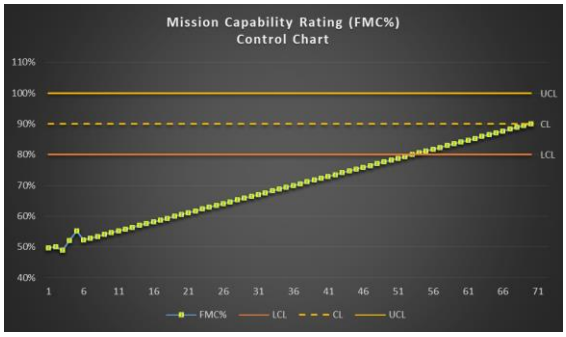

Figure 2
Mission Capability Rating (FMC %) Control Chart

CONCLUSION

This project strives to use of the DMAIC methodology using lean six sigma principles to achieve organizational goals. The importance of equipment readiness to execute the mission is depicted as the main output of this project. It entails many other variables such software, funding, and input from individuals performing their respective duties. This project improves certain flaws in the process since management was not able to rely on the validity of reports provided by the GCSS software (the organization's maintenance software platform). Also, the risk in quality affected inaccurate funding apportionment from the Department of Defense in order to maintain lifecycle purchase of repair parts and sustain maintenance operations. Last but not less important readiness or mission capability was degraded (ability to use equipment on hand to execute missions).

By the end of week four the following metrics were obtained in comparison with the initial baselines:

- **Objective 1 (Readiness):** The prior baseline for readiness was 49.7% mission capability. The goal was to increase full mission capable equipment to 80%. The result after week 4 shows a significant improvement to 56.8%.

- **Objective 2 (Funding):** The prior baseline for funding was $749K of annual funding. The goal was to increase funding by 50%. The result after week 4 shows the recovery of over $33K in four weeks, that represents a 4% increase.
- **Objective 3 (GCSS Account Activity):** The prior baseline for GCSS active accounts was 62%. The organization goal is to increase active accounts to 100%. The results after the week 4 was 76%.

The organization is now in the right direction to achieve the goals of maintenance readiness. The trend shows that the goals will be met on or before the 46th week of progress although some areas such as funding will experience a slower recovery. The results for mission capability and funding take long into the process to observe due to its nature out of the organizational zone of influence. Nevertheless, continuous improvement is strongly encouraged in other areas of the maintenance process. A new value stream map is created showing the entire maintenance operation process, outside the GCSS box, with Kaizen bursts of areas with strong improvement potential.

There are many lessons learned from this project. In the measure phase, many improvements took place applying lean techniques such as visual management, quality assurance, among others. Also, the Standard Operating Procedures (SOP) was established. But while implementing those improvements the most difficult tasks during the process was breaking the cultures of current employees who though their way was right and there was no other way to do things. GCSS is an all-encompassing system, designed to replace several aging and outdated Army management information systems across tactical logistics environments within the Army that contains the functionality associated with the areas of supply, maintenance, property and tactical finance. It is no small task to combine systems that have been around for decades and expect that users know how to use it 100% and how to obtain access. This project's end state is to contribute to that cause.

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