

# Army Maintenance Management Improvements

## GCSS Accounts Registration Improvement Process

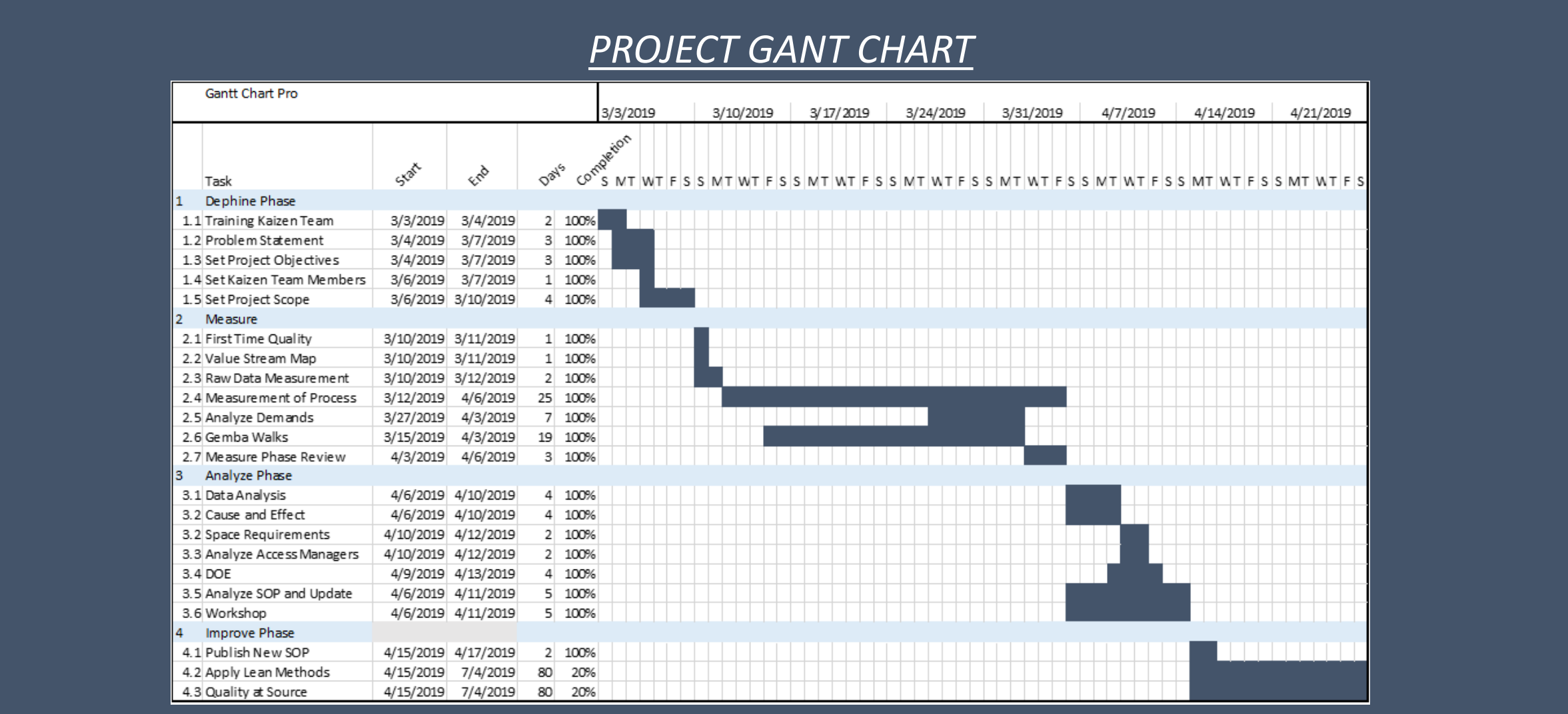
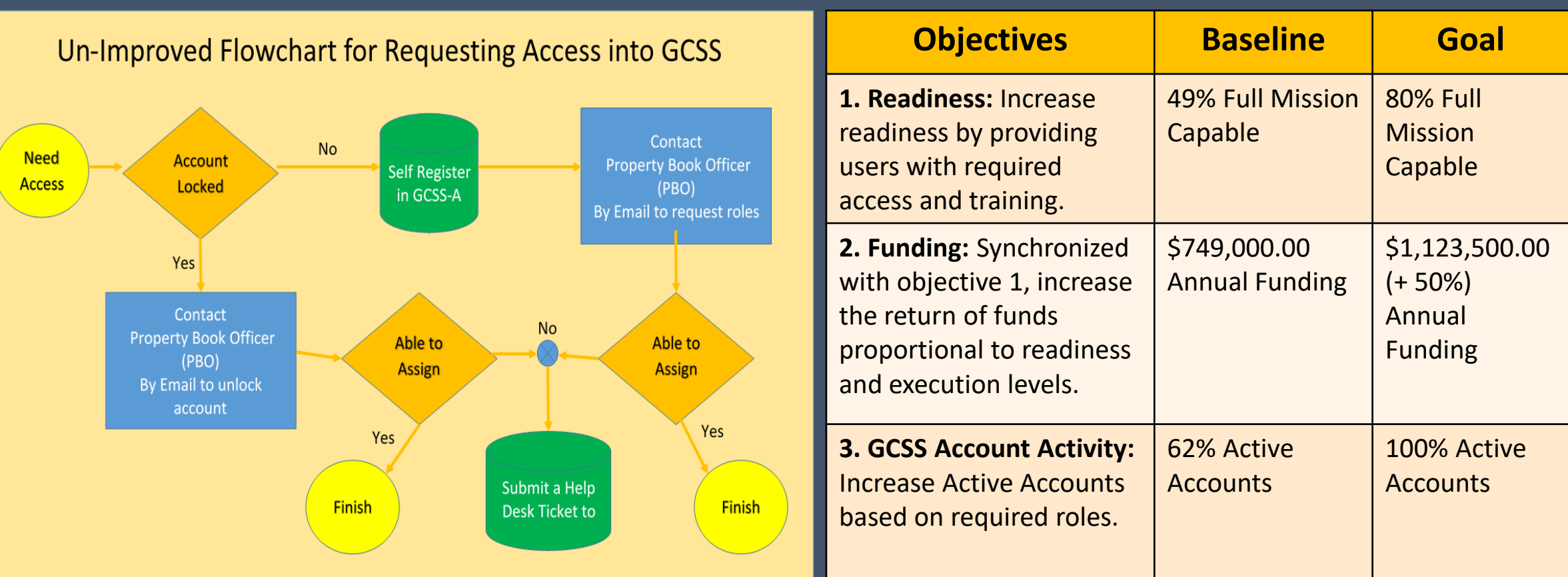
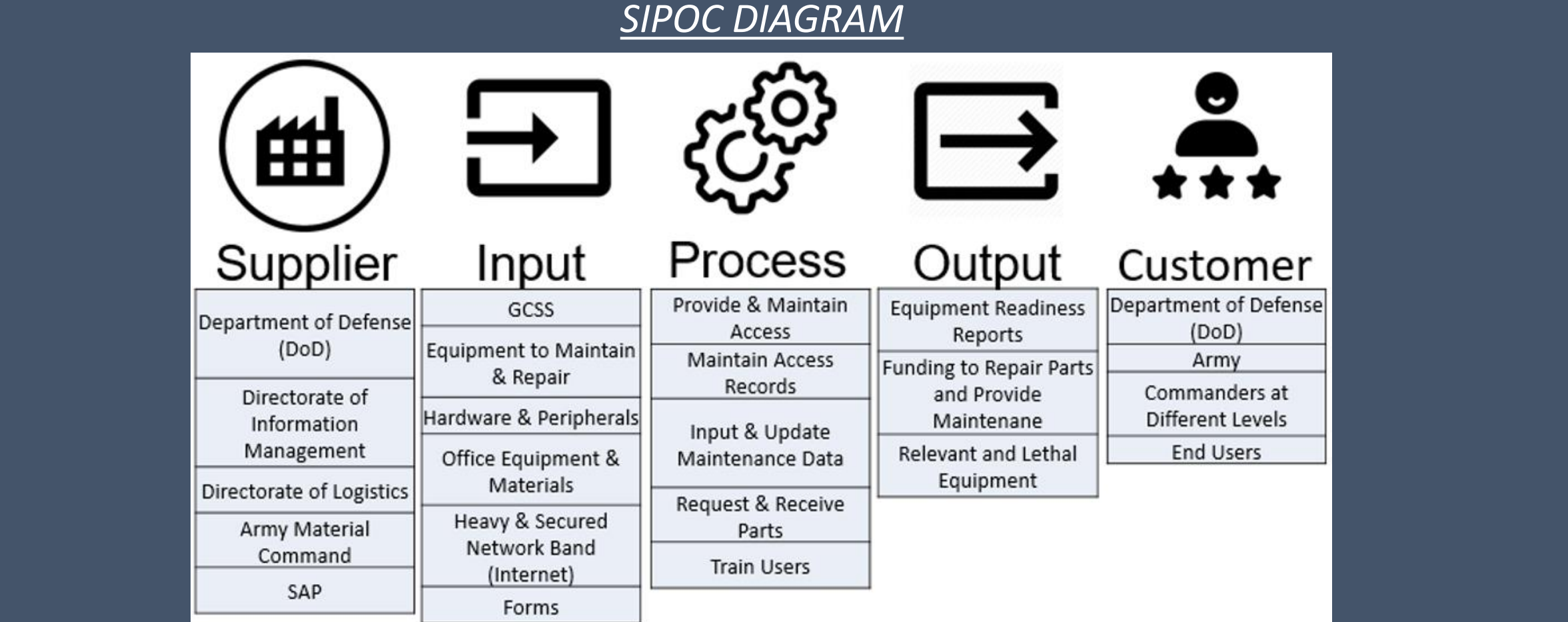
Joseph E. Vega-Quinones  
 MMP-6700 / SP-19 / Design Project  
 Professor Carlos Pons, Ph. D.

**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 software, among key users and how in-proper practices related to decreased mission readiness indicators and the offload of 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 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. 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, additional \$30K for funding, and an increase of 14% on active accounts within four (4) weeks into improvement implementations.



**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 other areas of the maintenance process.

**Problem Statement:** GCSS accounts in-activity leads to significant increase of deadlined equipment (un-realistic readiness reports) and a negative proportion return of Operations & Maintenance (OPTEMPO) funding.



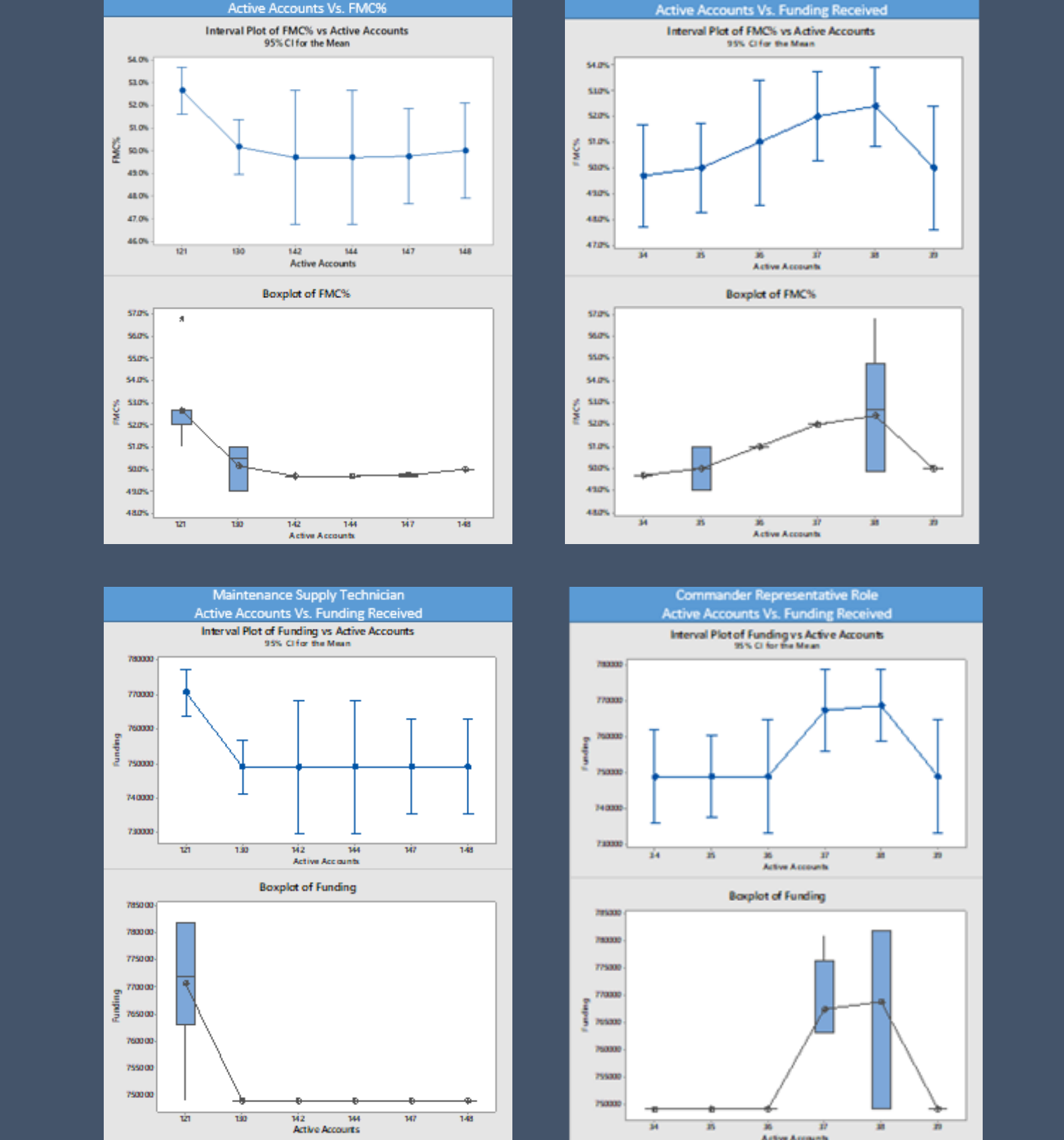
Within GCSS, there are ten (10) user roles that impact the maintenance process. The role requirement for each major command is summarized on figure (#). Through a four week period the process was measured while minor improvements were simultaneously applied. Descriptive statistics were taken for each 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 (#).

Role	% Active Accounts	% Active Accounts with DD Form 2875	% Accounts Holders with Required Training
Brigade Level	83%	100%	100%
Retention Level	50%	100%	100%
Unit (Company / Detachment)	30%	39%	40%
Field Maintenance Shops (FMS)	72%	80%	53%
Total	62%	76%	68%

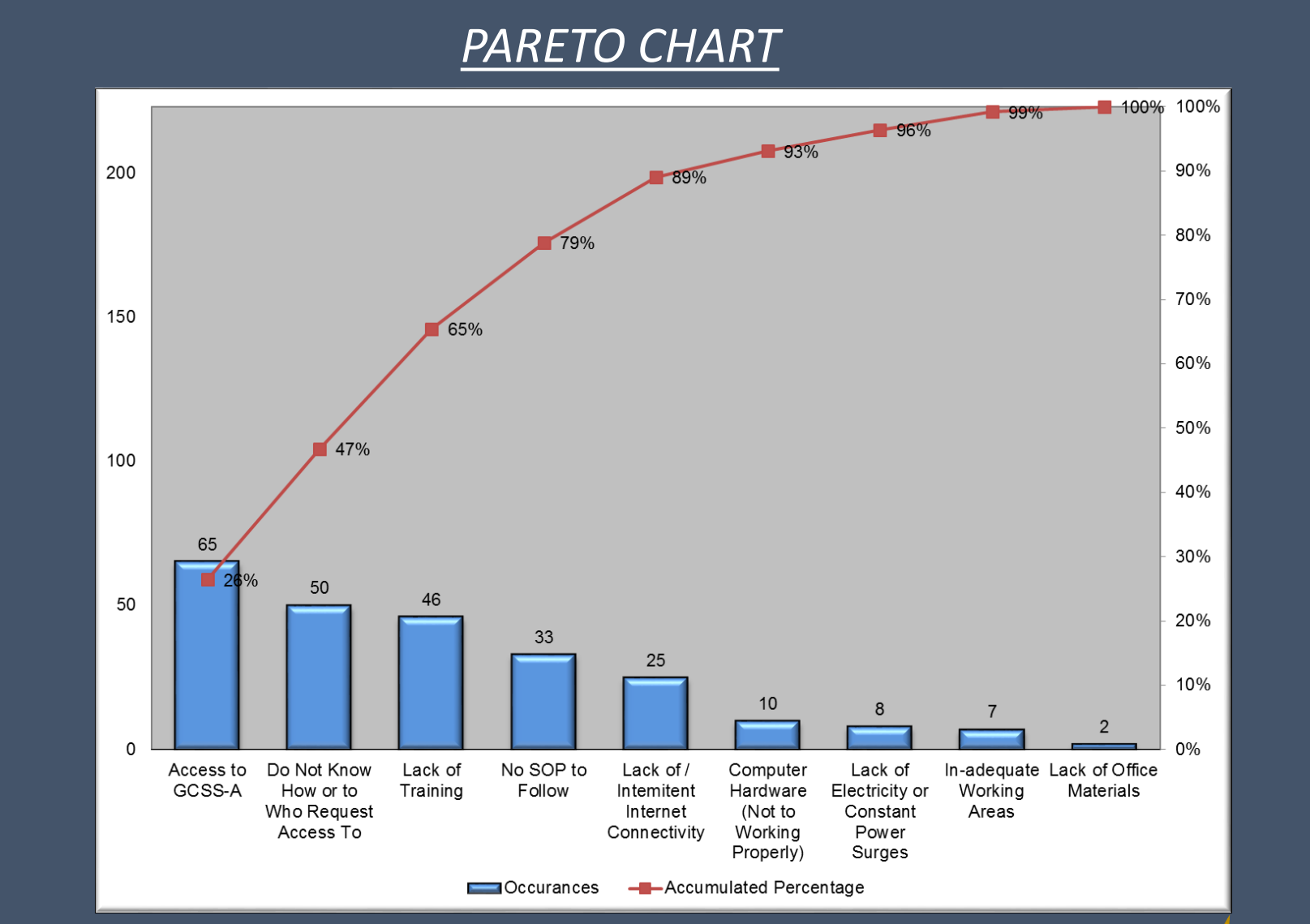
Role	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%
SSA Access Administrator	6	18	12	12	11	11	11	11	11	11	11
Maintenance Manager / Access Administrator	15	12	12	12	11	11	11	11	11	11	11
US Office or Equipment	32	7	7	7	7	7	7	7	7	7	7
Maintenance Manager	5	3	3	3	3	3	3	3	3	3	3
Equipment & Parts Specialist	15	15	15	15	15	15	15	15	15	15	15
Commander Representative	15	15	15	15	15	15	15	15	15	15	15
Maintenance Supply Technician	15	15	15	15	15	15	15	15	15	15	15
Master Chief	15	15	15	15	15	15	15	15	15	15	15
Dispatcher	15	15	15	15	15	15	15	15	15	15	15
Equipment & Parts Specialist	15	15	15	15	15	15	15	15	15	15	15
Totals	164	187	189	193	196	198	198	198	198	198	198

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.

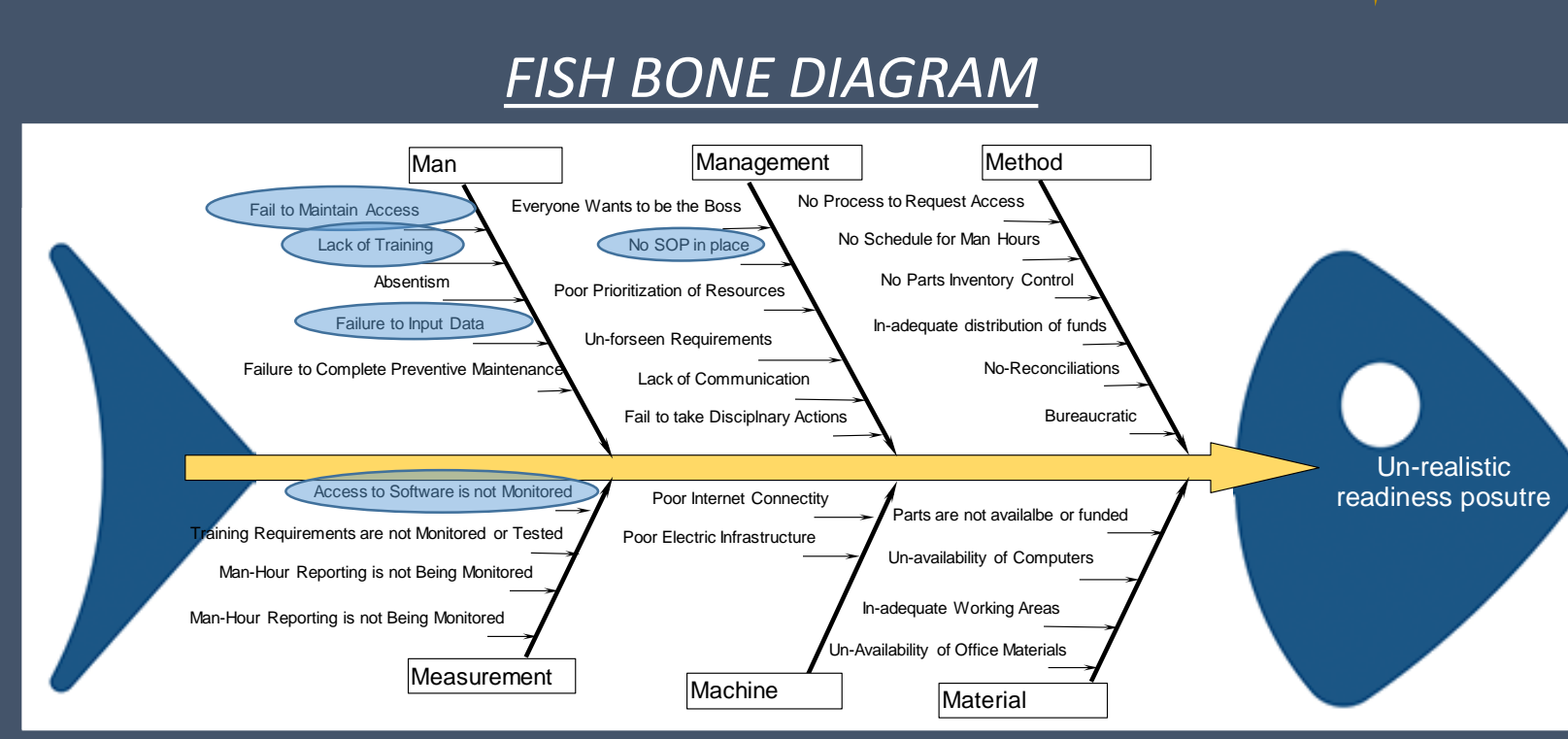
### PLOT DIAGRAMS COMPARISON ON OUTPUTS



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.

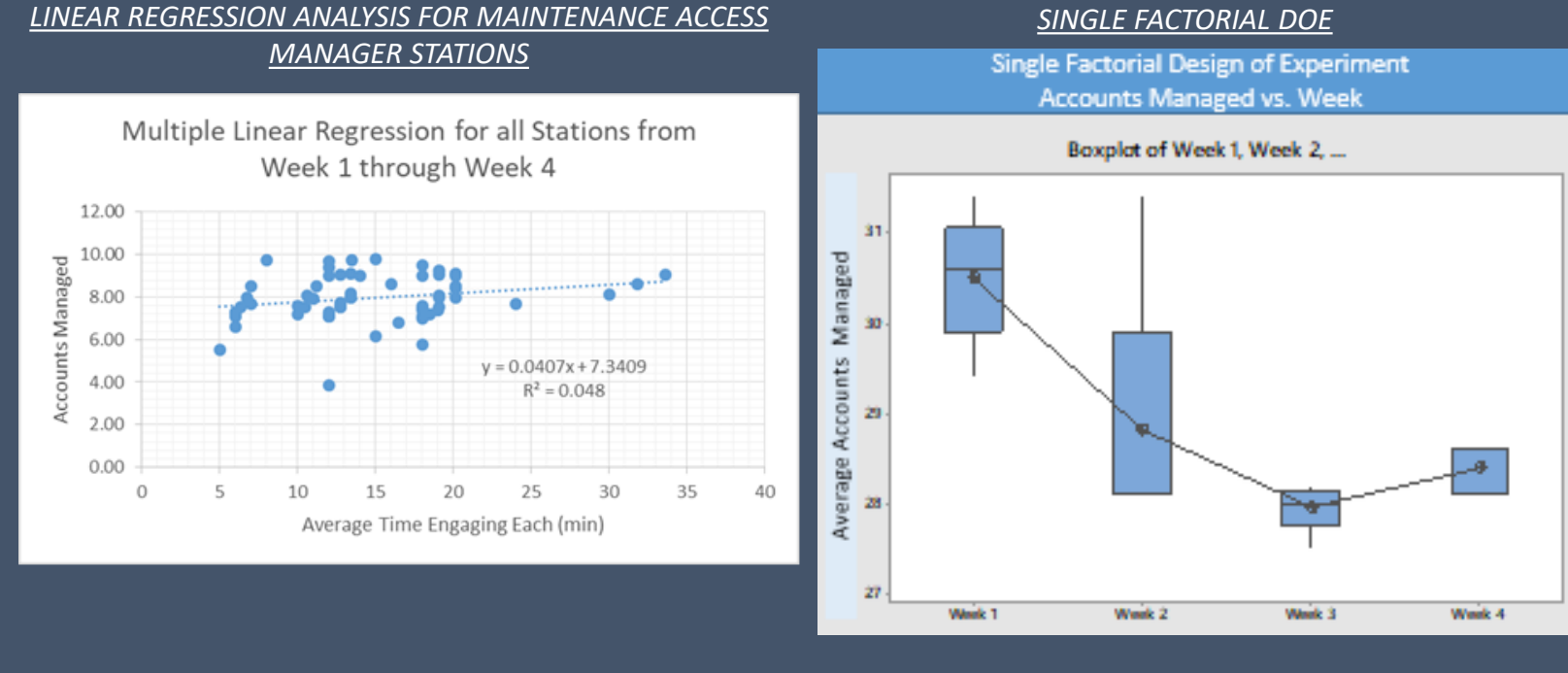


- Top Offenders:**
- Access to GCSS and specific required roles
  - Users do not know how or who to request access to
  - Lack of training to execute required tasks with given roles
  - No Standard Operating Procedure in place



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.

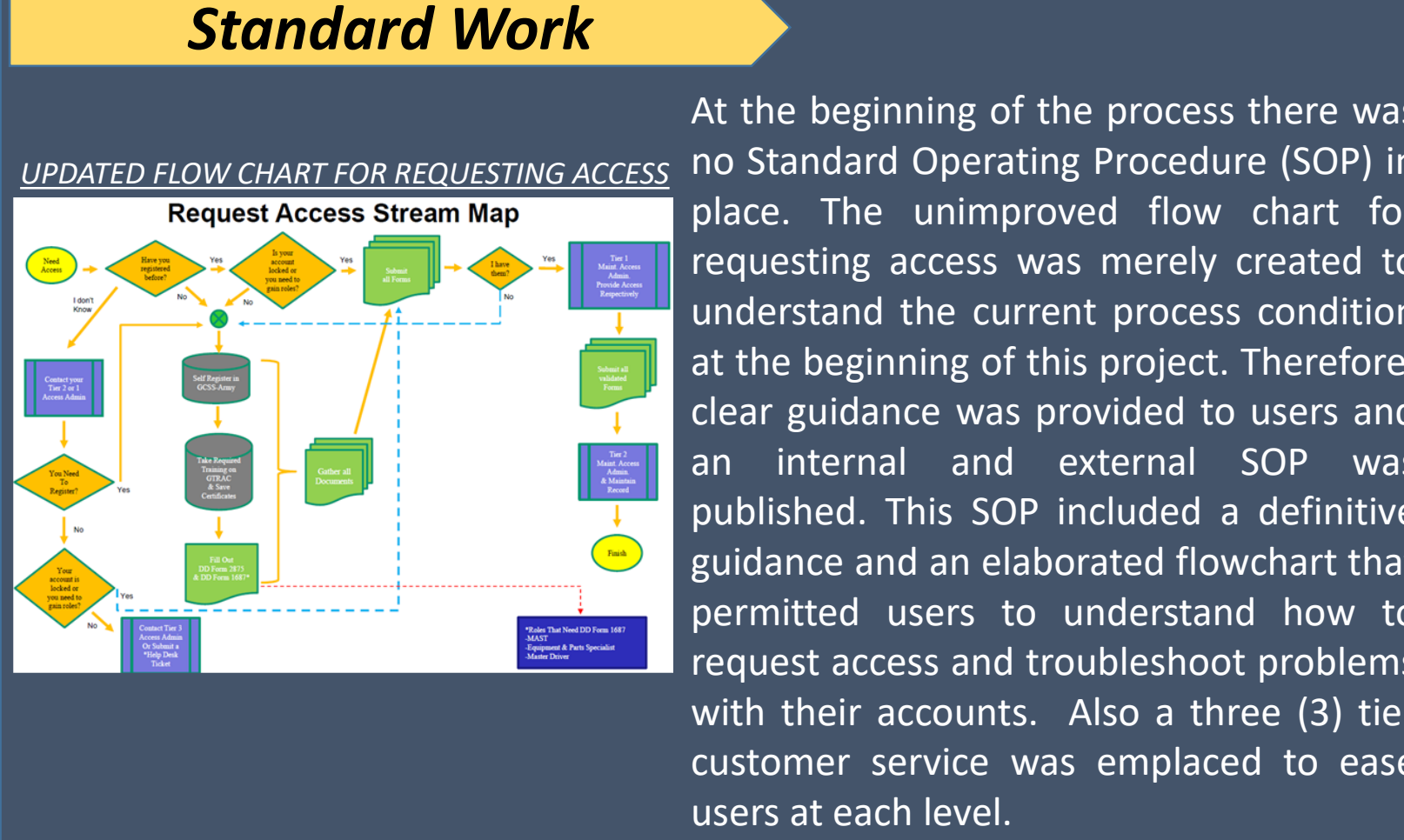


Access Manager	Total of Forms Received	Forms Returned	Processing Rate
1	63	18	71%
2	70	9	87%
3	59	15	75%
4	61	12	80%
<b>Average Processing Rate:</b>			<b>78%</b>

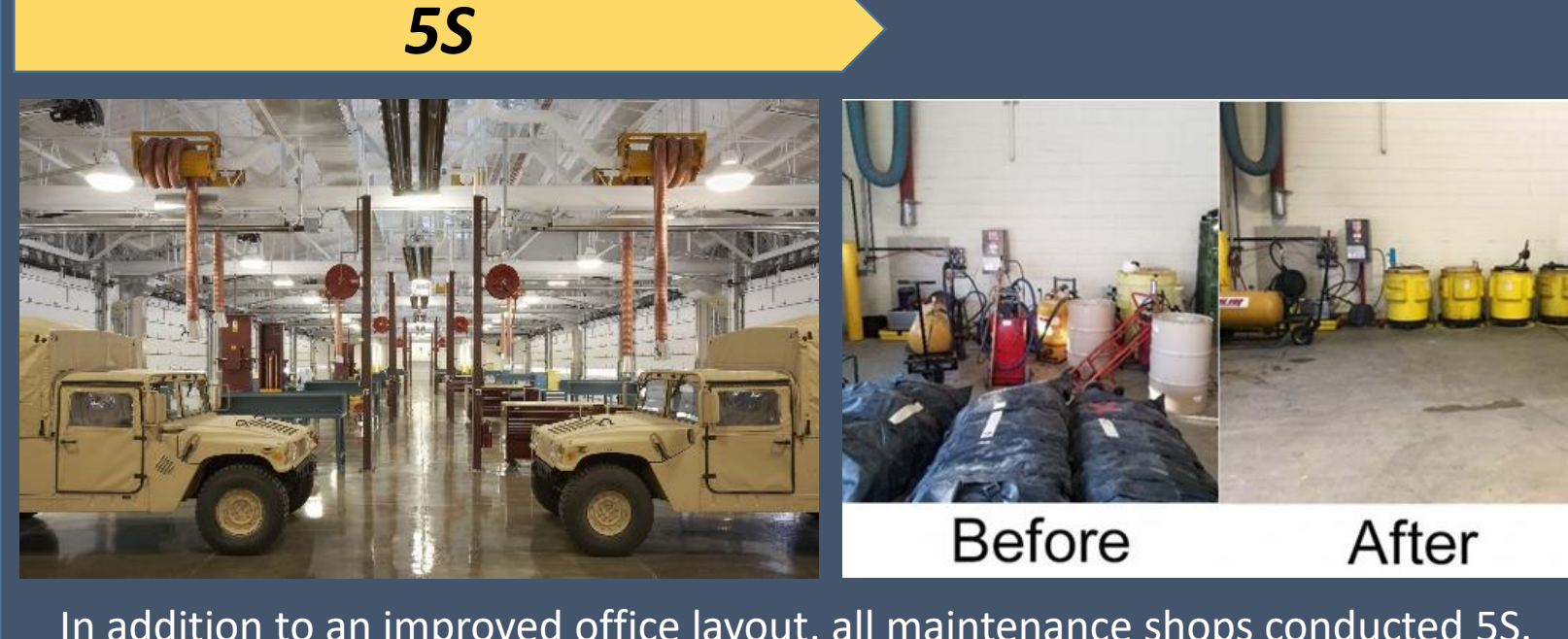
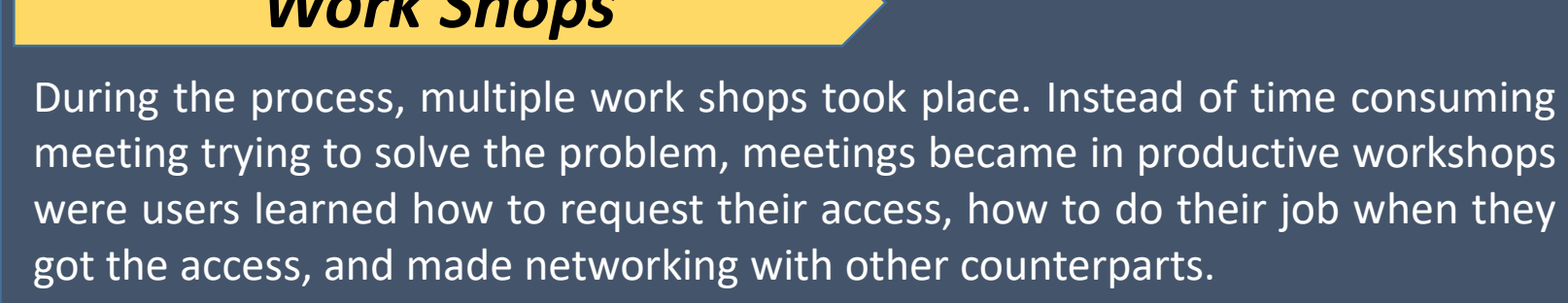
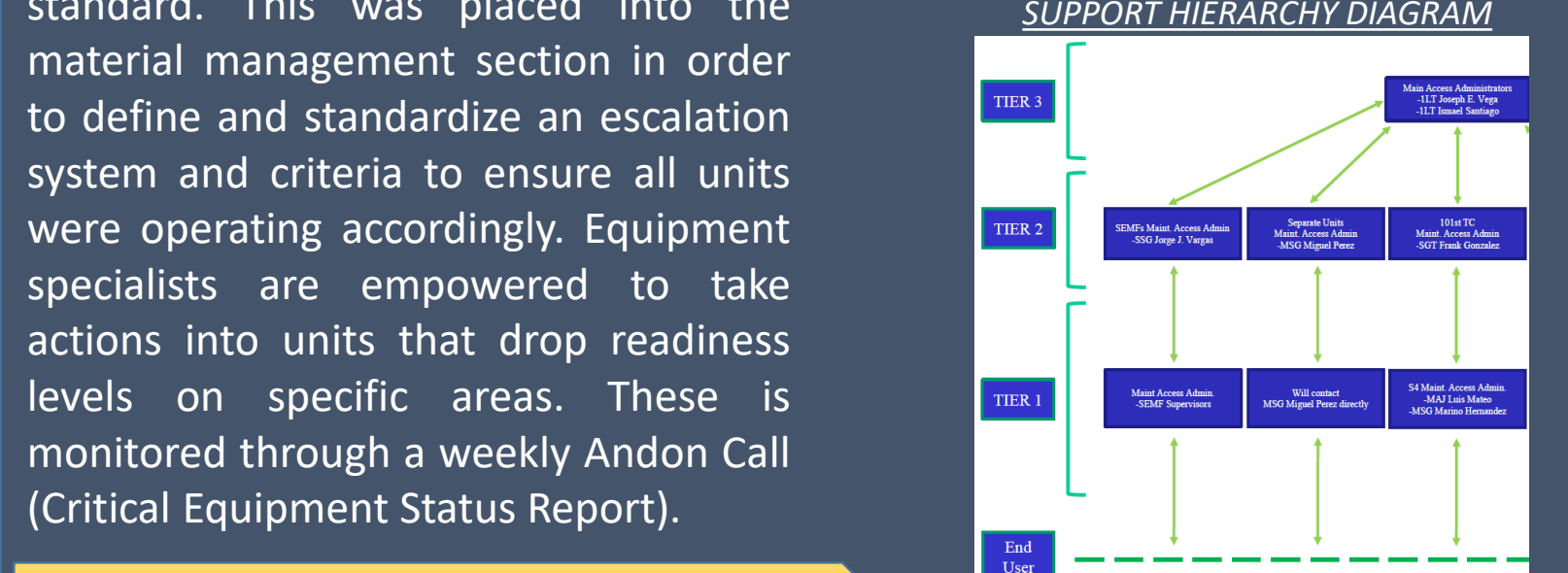
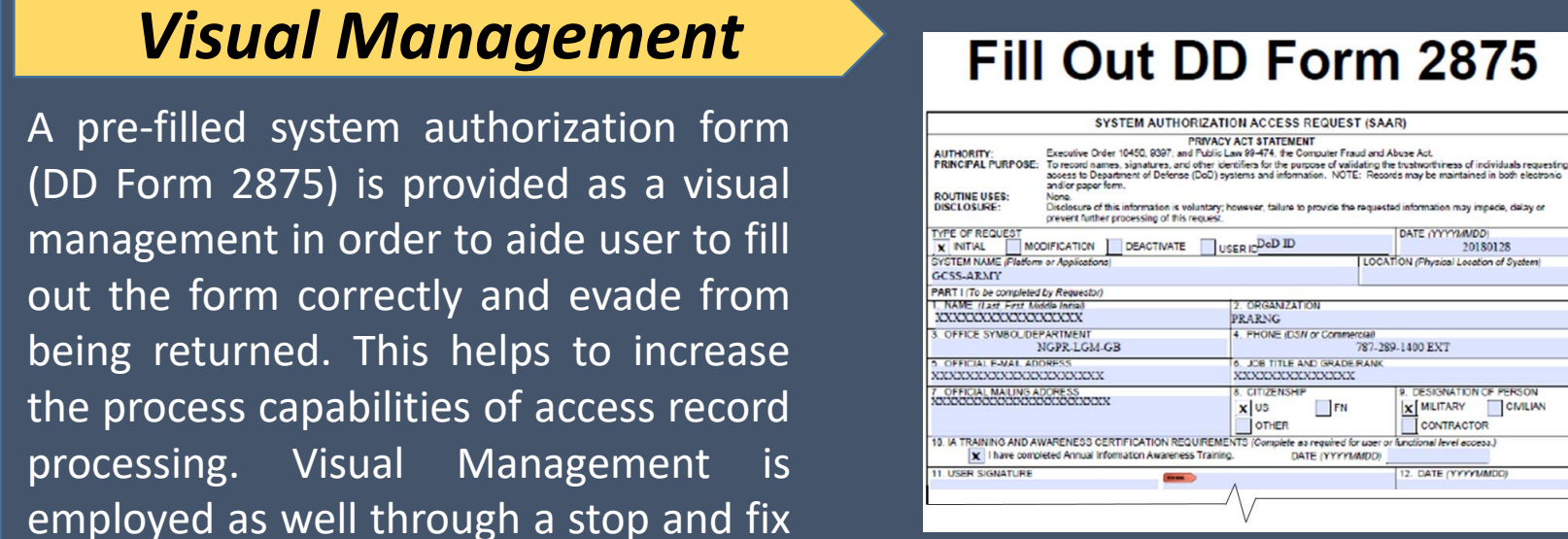
**CpK Week 2: 0.012**

Access Manager	Total of Forms Received	Forms Returned	Processing Rate
1	41	5	88%
2	43	4	91%
3	38	4	89%
<b>Average Processing Rate:</b>			<b>91%</b>

**CpK Week 4: 0.821**

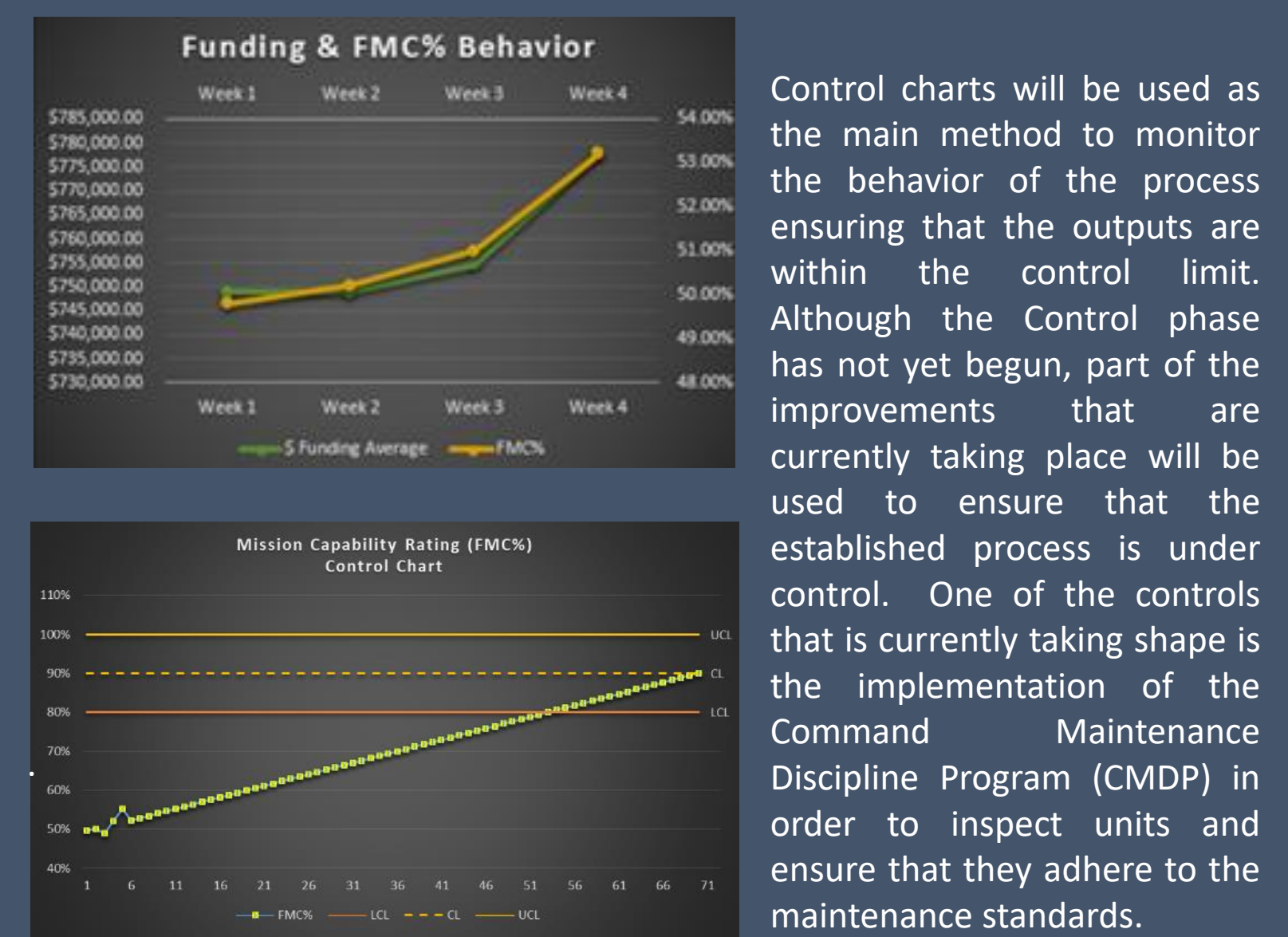


At the beginning of the process there was no Standard Operating Procedure (SOP) in place. The unimproved flow chart for requesting access was merely created to understand the current process condition at the beginning of this project. Therefore, clear guidance was provided to users and an internal and external SOP was published. This SOP included a definitive guidance and an elaborated flowchart that permitted users to understand how to request access and troubleshoot problems with their accounts. Also a three (3) tier customer service was employed to ease users at each level.



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

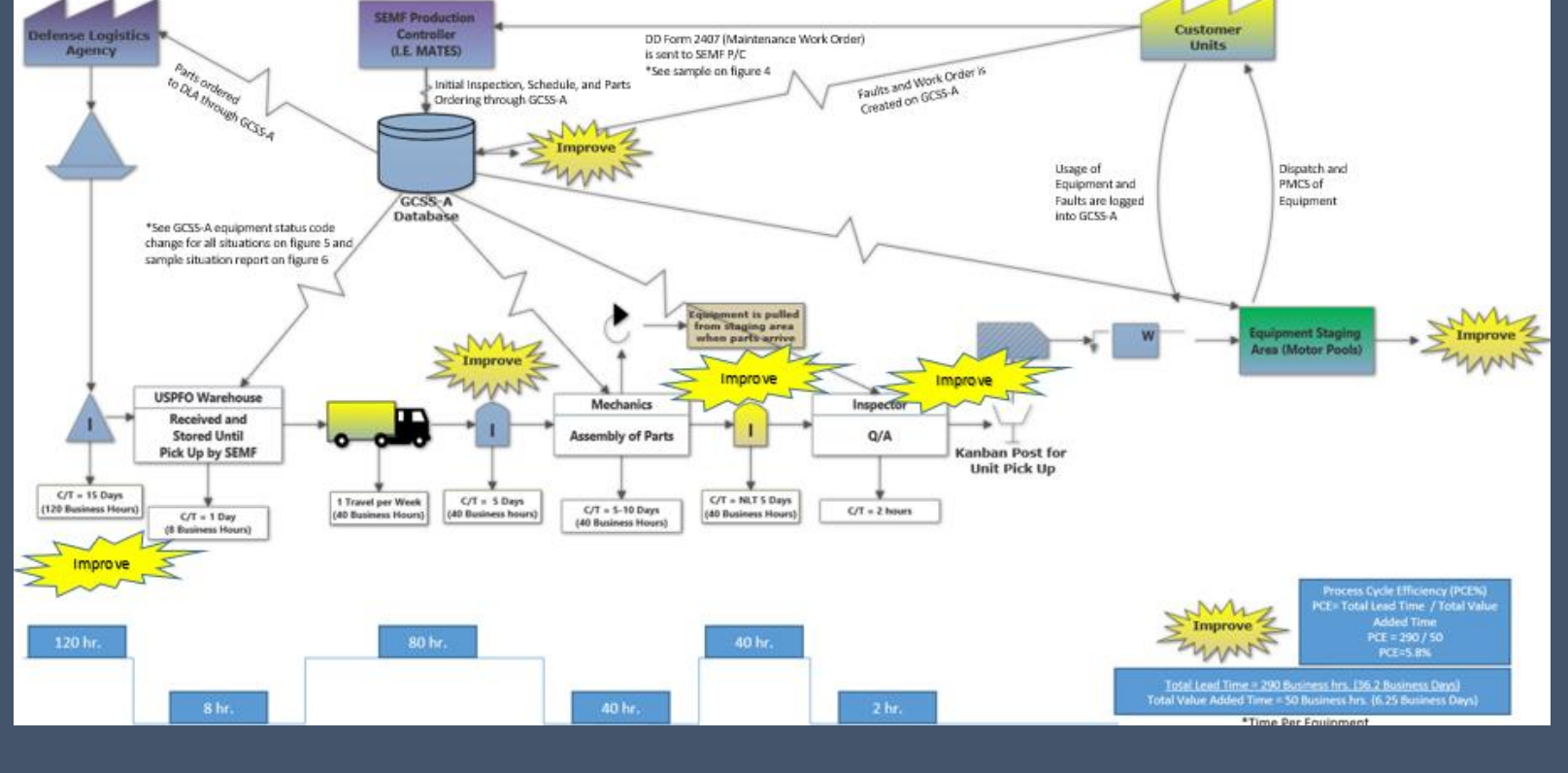
In order to ensure quality at source, all subordinate units at the lowest level were inspected on the fulfillment of their GCSS Access requirements. A work sheet such as the one in figure is used to assess the units fulfillment score and determine if they meet the standard.



### CMDP INTERNAL AND INTERNAL EVALUATION INTERVALS



### UPDATED VSM WITH KAIZEN BURST ON POTENTIAL AREAS OF IMPROVEMENT



### 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.