Improving Military Aircraft Maintenance Operations in Terms of Jobs Completion Time

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Abstract

Extensive job completion time in the aircraft maintenance operations has resulted in countless extra man-hours and impacted thousands of military missions for decades. The main cause of this problem narrows down to the time spent in preparation to start a maintenance task. Current operations of an aircraft maintenance organization in Kadena Air Base, Japan, were evaluated in efforts to reduce the time to at least 50%. It was found that by implementing a software tool developed by a startup company, maintenance start times can be reduced up to a 60%, allowing aircraft to a mission-ready status much quicker and giving back time to technicians for resiliency and proficiency training.

Introduction

As military aircraft technicians are dispatched to perform a maintenance task, three elements are most likely needed: tools & consumables, support equipment, and the technicians performing the task. It is essential for maintenance organizations and their members to start and complete the job as soon as possible. Doing so increases the aircraft's availability to support other missions and provides maintainers time to tackle other maintenance tasks or to conduct proficiency and readiness training as needed. Therefore, high efficiency in military aircraft maintenance operations is imperative [1]. Current maintenance operations in the United States Air Force are hindering the maximum potential of their force to conduct efficient maintenance. To solve this problem, a study was conducted in Kadena Air Base, Japan, to identify key factors and generate the most efficient solution.

Background & Problem

While specific maintenance tasks have benefit from the implementation of innovative ideas like AFSO21 [2], there still plenty room for improvement in the overall military aircraft maintenance operations, particularly within the United States Air Force. In most military bases, the three most-needed elements [3] to perform a maintenance task are geographically separated as shown in Figure 2. The problem lays in the integration of all three in the current process, particularly in the time spent between the notification of a maintenance task and having maintainers on the aircraft fully ready to perform the task. This time is known as "Start Time", which varies depending on the task requirements and directly affects overall job completion.

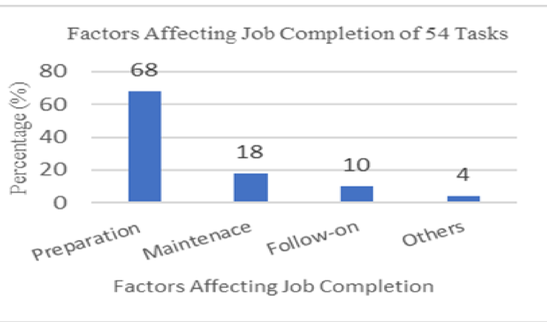

Figure 1
Factors Affecting Job Completion

Methodology

The following provides a quick overlook of the study roadmap:

- **Define –** Although there is a general knowledge of how efficiency is being affected across all military aircraft maintenance organizations, one will be selected to maintain relevance of the study and safeguard the integrity of the collected data.
- **Measure –** The study will revolve around the Time, Cost, and Feasibility of the alternative to improve the process.
- **Analyze –** Current operations will be monitored and documented for a period of one week to identify organizations-specific problems, investigate root causes, and generate possible solutions.
- **Improve –** Implement possible solutions for one week and compare results against current operations performance.
- **Control –** Determine which solutions best fit the organization needs and meet the study objective. Identify any areas within the recommended solutions that might be worth to go through another DMAIC study.

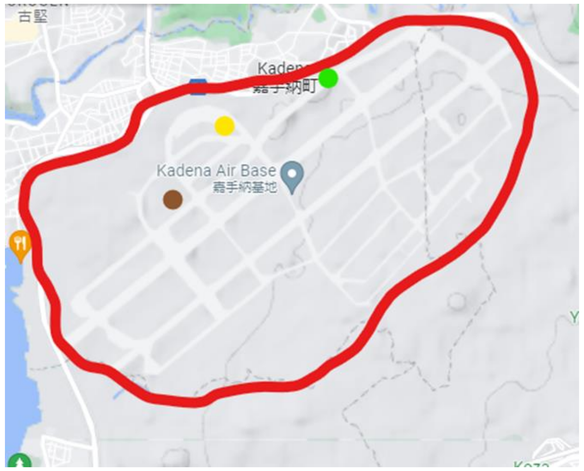

Figure 2
Kadena Air Base – Airport

Figure 5
Support Equipment

Figure 6
Aircraft Maintainer

Figure 7
Tools & Consumibles

Results and Discussion

Although there was two possible solutions, only primary solution was tested due to monetary capital and time required for the development of new infrastructure. However, as shown in Figure 4, the software tool seems promising to future aircraft maintenance operations. The trial run shows a 60% decrease in "Start Time" when compared to performance shown in Figure 3.

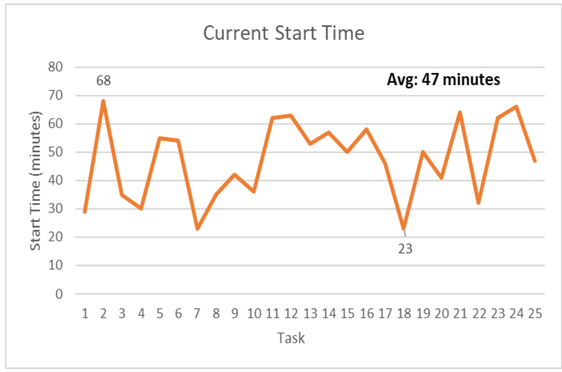

Figure 3
Current Start Time

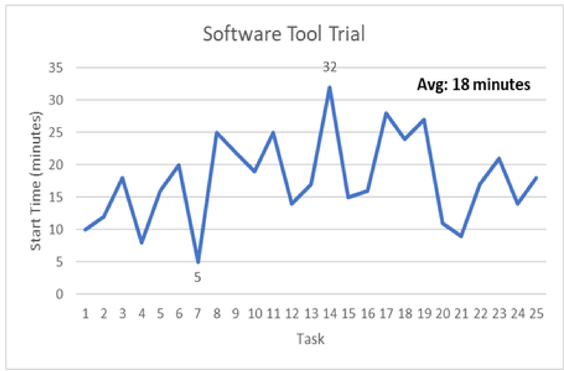

Figure 4
Software Tool Trial

Conclusions

The objective of this project was to increase military aircraft maintenance efficiency by reducing maintenance preparation time, also known as Start Time, to at least 50% of current time. While only one of the two possible solutions was conducted due monetary capital and time constraints, the application of a software tool showed a 60% decreased in maintenance preparation time, 10% more than the project's target.

Future Work

Next to step to follow is to test the software tool at different military organizations for possible implementation across the United States Air Force. For an even more efficient process, location tracker devices could be installed to some or all support equipment for easier finding and faster delivery.

Acknowledgements

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References

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