

# Aviation Supply Support

## How Marines improved aircraft operations

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**A**cross the DOD, aviation commands face the formidable task of increasing the operational availability of aircraft. As the “First to Fight,” readiness is of extraordinary importance to the Marines, who increased aircraft availability through dramatic improvements to supply inventories (spare parts to fix aircraft). The Marines are enjoying optimal supply performance—specifically, historically high planeside consumable material availability rates—among the best rates of any Navy aviation command, past or present. Furthermore, Marine Aviation Groups (MAGs) are enjoying consumable part availability rates on par with the best commercial aviation companies. This change was realized through the formation of a team of subject matter experts, which included Marines, experts in DOD supply modeling, and others from industry and government. Together, the Marines implemented a proven spare parts forecasting model, the Customer Oriented Leveling Technique (COLT), and continually monitored and improved the supply chain process.<sup>1</sup>

### A Better Mix of Spare Parts on the Retail Shelf

As with many weapons systems across DOD around 2016–2017, Marine aircraft did not achieve mission capability (MC) goals for either fixed- or rotary-wing aircraft. To identify readiness degradation causes and effective corrective actions, the Deputy Commandant for Aviation commissioned an independent readiness review for

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the MV-22 Osprey. Consumable supply chain performance—highlighted by planeside availability below plan and long wait time for off-station,

high-priority requisitions—was a major contributor to MC below goal. The review recommended implementation of an alternative inventory-level model to



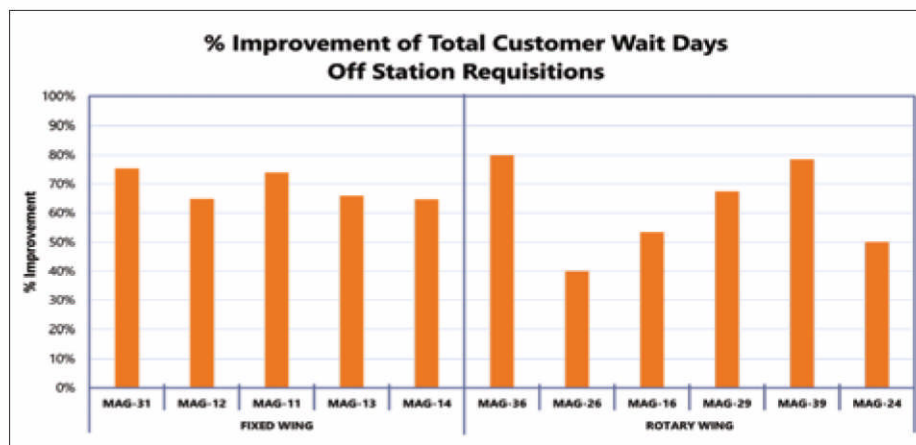
help correct these issues. COLT was the answer. Within two years, the Marines implemented this new supply model and associated processes across the eleven MAG locations. Within a year, the key inventory metric of customer wait time improved by an average of 65 percent.

to stock). It produces the optimal mix of parts that achieve an aircraft performance for the least cost. COLT focuses on consumable parts, which are far less expensive than repairable parts (the standard focus for supply improvements). Unlike your local superstore, stocking DOD shelves involves many

to produce the following actual inventory and aircraft improvements one year after implementation.

#### *At the Part Level (NIIN)*

COLT fills, from retail stock, more critical orders that would ground aircraft (requisitions that make the aircraft NMCS). Metrics such as *total wait days* (total days waiting for all NMCS/Partially MC aircraft for Supply requisitions received each month) dropped by 65 percent for rotary-wing MAGs and 69 percent for fixed-wing MAGs (see Figure 1); fill rates (the Navy terms *Gross/Net effectiveness for NMCS requisitions*) increased 10–13 percent at each location (MAG). For the month of June 2020, out of the 11 activities, 9 achieved in excess of 95 percent net supply effectiveness. This feat had never been achieved in Marine Corps Aviation history. (Note, one year later during COVID, total wait days improve by an additional four percent for both types of wings plus a 10th MAG achieves 95 percent supply effectiveness.)



**Figure 1. Consumable Requisition Wait Days Improvement by MAG (Off Station). Percent Improvement Customer Wait days period means estimating average wait days nine months before vs nine months after COLT implementation (ending March 2020 to avoid COVID impacts). Requisition Wait Days—off station used since directly correlate with non-mission capable aircraft for supply (NMCS) or Partially MC aircraft for Supply. (Figure provided by author.)**

Marines brought together: the software the Air Force has used for a decade and a half, self-correcting techniques that adjust to new problem parts, and experienced personnel who understand the processes and data, enabling implementation of good ideas and corrective actions. Too often, software claims are difficult to validate, since they occur in a model lab or dynamic environment, and it may take years to reveal the actual impacts. This project provided a rare opportunity to observe true impacts on a stable part of the supply chain and helped uncover several additional barriers to performance improvement.

#### **How Improved Inventory Levels Translate into Additional Mission Capable Aircraft**

The COLT software tool predicts when parts might fail and determines how many parts are needed in the future to cover most of those failures. Unlike other Navy models, COLT examines past problem parts that ground aircraft to determine the future range and depth of inventory (i.e., what and how much

sources of volatility: orders can take months or years to manufacture, suppliers are limited to one or two companies because of proprietary data constraints, and systems need to account for many external factors such as budget cuts or political dynamics.

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In February 2018, the Marine Corps began implementing COLT at all its MAGs to forecast their spare parts requirements using a more optimal objective for retail stock. For the same investment in spares, COLT was able

#### *At the Aircraft Level*

Six of eleven MAGs experienced readiness improvement (MC rates) ranging from five–thirteen percent, driven mostly by the reduction in aircraft down for supply (NMCS). As COLT was the only major improvement in spares during that time, we hypothesize that the significant parts-level improvements translated to more aircraft flying, although there is no one-to-one relationship as many consumable parts may be grounding a single aircraft. MAGs with fixed-wing aircraft highlight that achievement, as shown in Figure 2 on the following page.

Improving wait times by 65 percent translated into 60 more mission capable aircraft. This improvement demonstrates that addressing consumable supply issues reduced one of the barriers to improving aircraft availability. MAGs with rotary-wing aircraft have other barriers that must be removed; our analysis identified retail repairables as the next focus area to improve the rotary-wing MC rates.

The analysis timeframe avoided including the unique conditions caused



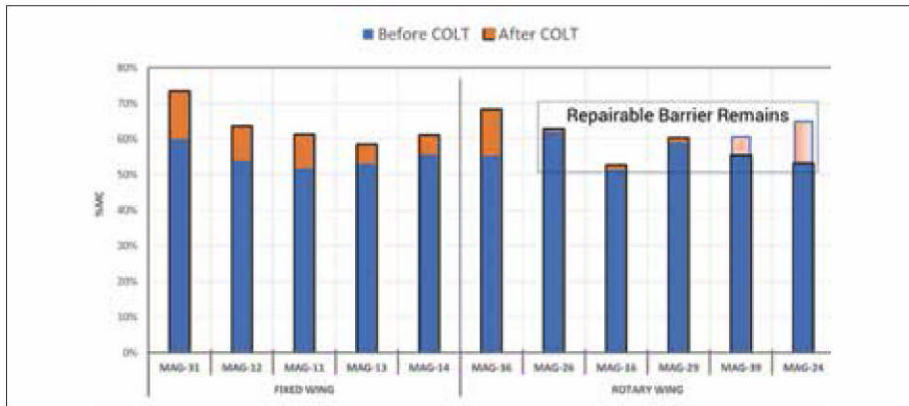
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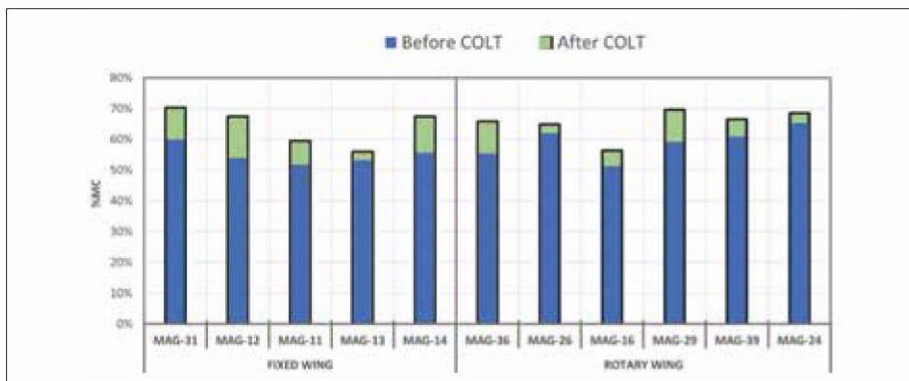
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**Figure 2. Mission Capability Improvement by MAG.** (Figure provided by author.)



**Figure 3. Mission Capable Improvement by MAG (including COVID timeframe).** (Figure provided by author.)

by COVID concluded with March of 2020. However, if we did include more recent operations (May 2021), the MC rate improved since COLT implementation by eight percent (three percent before COVID and five percent during COVID) averaged across all MAGs (see Figure 3).

The *Commandant's Planning Guidance*, providing metrics for supply chain performance, directs as follows:

The Marine Corps will be trained and equipped as a naval expeditionary force-in-readiness and prepared to operate inside actively contested maritime spaces in support of fleet operations. In crisis prevention and crisis response, the FME, acting as an extension of the fleet, will be first on the scene, first to help, first to contain a brewing crisis, and first to fight if required to do so.

A force ready to fight on short notice must receive sustainment that enables maintenance and training, aligned with readiness goals. The Marines' efforts in

retail inventory optimization represent an important step toward meeting those goals.

## Note

1. COLT is a Government Off the Shelf Supply Model developed and maintained by LMI. The submodule (Proactive Demand Leveling) develops the range of NIINs based upon enterprise requisition. PDL increase in range of parts provides roughly half of the model's benefit so is often referred to as COLT/PDL.

>Author's Note: To learn more about COLT, please reach out to at Polca, Mark A CIV USN COMNAVAIRSYSCOM PAX (USA) [mark.polca@navy.mil](mailto:mark.polca@navy.mil) or Mr. Rob Kline, Senior Fellow at LMI, [rkline@lmi.org](mailto:rkline@lmi.org).



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