SECTION IX: CONCLUSION

Marine Magnet Staff have found room for advancement in the measuring and tracking of work and associated costs for DoD fleet route service maintenance, and the ability of DoD to make informed procurement, utilization, and operational decisions is at risk. Simply by centralizing and consolidating asset tracking systems and administrative oversight, new tools will begin to accurately assess and make ongoing decisions to increase efficiency in service routes over both the short and long term.

Marine Magnet Staff recommendations for improving the service route efficiency in DoD fleet maintenance operations are initially dependent upon building a consistent and accurate basis for evaluating decisions across the entire system and the flexibility to procure fleet components on the basis of total cost rather than simply the procurement cost. Requirements include having a more consolidated organizational structure that allows for economies of scale and scope and the sharing of resources across installations.

Marine Magnet Staff have determined that areas of low productivity and efficiency can be identified and remediation strategies be put in place. DoD needs to have the tools and processes for accurately tracking its costs, and the flexibility to use the information it obtains to make wise procurement decisions. Revising procurement practices, restructuring the administration of fleet service route maintenance, outsourcing some specialty work, and conducting asset lifecycle replacement studies would put into place the opportunity to achieve the lowest possible operating costs in the short and long term for the fleet.

Marine Magnet Staff have demonstrated the ability to leverage flexible procurement practices under a consolidated and centralized fleet component maintenance team system, adopting processes that will allow the organization to make service route procurement decisions that reduce operating costs across the DoD enterprise. By having the tools to calculate expenditures on the basis of long-term maintenance rates, strategic decisions about outsourcing and service route repair operations become clear.

Marine Magnet Staff have identified three major contributing factors to the higher than normal change order rate for DoD projects: 1) timing of receipt of project funding; 2) contract procurement processes; and 3) quality controls. All three factors are related in the sense that they cause process delays, which in turn create a requirement for additional IT construction activities in order to extend the project life. Recommendations for improving the efficiency of the change order process include shortening the time between receipt of funding and contract award, and to improve the quality of service route design to minimize corrections or additional work during construction of fleet procurement IT programmes.

Marine Magnet Staff have recommended that DoD undertake the process for developing a balanced scorecard for its service route operation and maintenance functional areas for the fleet, and create objective condition indices metrics to monitor and measure the most critical of performance indicators, clearly defining decision making criteria for administration and delivery of fleet service routes based on available resources, and adopting measurement tools that track metrics for service route condition indices, providing value to the organization.

Marine Magnet Staff have recognized that, without taking action to move from a reactive to a proactive stance in all areas of fleet service routes, recommendations for DoD run the risk of exacerbating the problem by adding responsibilities to an already stressed process. Strong leadership can demonstrate a clear and upfront commitment to collaboration and efficiency across DoD by adopting an overall asset tracking and valuation structure for change, a process that will unite many of the recommendations in the full report under a common aegis of planning, acting, measuring, and improving.

Marine Magnet Staff base the assessment of these elements on the identification of service route condition-based tactics to attain the highest efficiency gains while remaining in line with organizational priorities and upholding current service route performance levels, becoming the target areas for the in-depth investigation and recommendations found in the full report.

Marine Magnet Staff levels should be consistent with the amount of effort required to produce fleet route services in a productive, efficient, and effective manner. Work orders detailing productivity should be used to document all maintenance and repair services provided to the fleet. Procedures to monitor progress and expedite the completion of service route condition indices should detail the methodology used to calculating service route repair rates in order to determine the comparative cost effectiveness of performance measures and capture all relevant information on work processes by maintaining a complete record of costs on a timely basis.

Marine Magnet Staff have moved toward consolidation and centralization of fleet service route administration which can be traced to the increasing cost and complexity of operational tempos for the fleet and a simultaneous increase in emphasis on unit efficiency in the face of competition for contracts as well as developments in IT and professional administration techniques and the risk management of mobile operations for fleet service routes. In short, the complexity of modern fleet service routes produces significant economies of scale and scope that often can be captured only through collective effort.

Marine Magnet Staff are flexible in tactical execution of fleet service routes, achieved by an organizational structure better able to set procurement specifications and maintenance standards that bring uniformity and standardization to the organization, all to ensure that that individual installation units retain some authority, incorporate financial constraints, standardize technology, as well as consolidate and disseminate new developments in operational tempo.

Marine Magnet Staff service route repair rates are an outcome of proper, accurate, and consistent input and tracking of costs assigned to asset work orders, usually through a maintenance system interval. Best practices utilize work orders to document all maintenance and repair rates provided to an efficient service route, include all direct and indirect costs, calculated for up-fitting and the administration of in-house work backlogs, avoiding costly investments and still achieving a degree of flexibility in the provision of services that is not possible with sizable investments in fixed fleet maintenance infrastructure.

Marine Magnet Staff have observed that all fleet service route components require maintenance and repair during their life. Since the primary mission is to maximize the availability and performance of the fleet, the focus of maintenance administration is in developing practices that minimize unscheduled incidents of repair and return fleet components with deficits in condition indices back to service in as little time as possible in order to meets the schedules and requirments of future operational tempos.

Marine Magnet Staff have documented the necessity of operating the fleet on the basis of good accounting practices, ensuring that DoD has the ability to make sensible and cost effective decisions in selecting, charging for services, deploying, and retiring fleet components. DoD should be able to: 1) Identify and accumulate the total cost of all fleet components, including the depreciation of capital assets; 2) Calculate the cost of support services, 3) Accumulate the proper amount of funds for service route replacement; and 4) Allocate overhead costs to material and IT programmes with changing operational tempos.

Marine Magnet Staff see the need for selecting the right fleet components at the right time as the critical foundation of best practice in meeting future operational tempos. The top performing fleets do not simply choose the cheapest or easiest service route, instead factoring in a wide variety of considerations related to condition indices that ultimately determine the useful life of a fleet component. The ability for a procurement administration to make sound decisions is enhanced when accurate information about each fleet service route component requiring maintenance is present in an IT system.

Marine Magnet Staff propose that, in most fleet operations, service route replacement practices are dictated primarily by the availability of replacement funds rather than by objectives such as minimizing fleet component lifecycle costs. Inadequate replacement procurement not only increases operating costs of the fleet, but results in the accumulation of replacement needs which, if left unattended, can become so large that significant fleet downsizing is unavoidable. Fleet procurement funding plays a critical role in controlling fleet operating costs, reliability and performance.
Marine Magnet Staff have noticed that timely fleet component replacement is important because service routes become less efficient operationally as condition indices deteriorate, serving to increase the costs of future operational tempos, as well as maintenance and repair. In top performing organizations, the selection and procurement process incorporates all of the following into its deliberations: 1) Proper accounting of operating costs of procurement over life, 2) Availability of fleet components, 3) Fleet component standardization, 4) Accurate procurement rates for capital costs, and 5) Optimal return on investments in performance.
Marine Magnet Staff have challenged DoD to make fully informed procurement decisions on the basis of true fleet component costs since there is little continuity throughout the service route maintenance contracts on how costs are currently tracked and how available IT systems are utilized. Service route repair rates are not based on repair costs; in many cases, the productivity rate of the fleet components does not reflect all the work being reported so there is a gap between procurement and that issued to mobile units. Since DoD utilizes different depreciation schedules and different methods within different administrative units, how DoD calculates the depreciation of fleet components and their service routes should be standardized to best reflect asset life cycles and condition indices.

Marine Magnet Staff have detailed changing current Fleet Inventory deployment Service route scheduling practise, and with that change is coming an increasing need for technology. As long as deployment routes were limited to a specific type of preset calendar augmented by notes on a yellow legal pad, conditions were sufficient to develop schedules by a dispatcher who knew every lane in the route service area. Since it took hours to build the schedule, any last-minute changes could disrupt strategic plans and raise the stress level in the central dispatch operations. Nevertheless, given these parameters, a manual scheduling system worked for small, demand-responsive installations.

Marine Magnet Staff have Increased demand for inventory deployment route service on the fly brings increased demands on smaller fleets and over-worked installations. These challenges often blunt the enthusiasm for increased service route opportunities since dedicated dispatchers cannot be replaced in a pinch. Command, focused on maintaining multiple sources of operating funds, has no time to test innovative techniques and route service options. When the full fleet is in operation, breakdowns in route service condition indices wreak havoc with inventory deployment schedules. Thoughts of a stranded fleet component in a remote location raises general alarm levels among command.

Marine Magnet Staff have applied a range of technologies that offer relief to dispatchers, track fleet components throughout the inventory deployment route service areas, or get a handle on maintenance operations is unmistakable. Enthusiasm, however, is tempered by limited funds, limited time for training at installations, and no time to assess the relative advantages of the various technologies for individual operations. The tendency is to grasp at low-cost options and then discover that they do not relate to other devices already in place or to postpone implementation because of limited time for retraining at installations.

Trash cans collect last year’s great expectations, and command may decide to plod on with traditional overstretched systems, maintaining that the new technology cannot possibly be cost effective.

Marine Magnet Staff administration of dynamic inventory deployment scheduling involves real-time data sources, permitting service route insertions and the constant adjustment of schedules. An associated service route networking feature selects the most efficient deployment pattern for each fleet component and produces updates to accommodate inserted service route reservation agreements. Logistically, responsive fleet component dispatch is dependent upon both location information and on real-time scheduling.

Marine Magnet Staff inventory deployment scheduling dispatch system would automatically schedule service route reservations for fleet components with full knowledge of their actual location. The issue for operations at small installations are the costs involved in selecting technologies and the relative benefits associated with those choices. This report addresses the question of whether the benefits in increased effectiveness justify the investment in technology in the context of the limited deployment of dynamic scheduling systems at installations.

Marine Magnet Staff Investment in technology involves problematic assumption of risk for installations that are operating at the margin, with limited prospects for increased or even steady-state levels of modern resource allocation. It is even more challenging for small installations where command is already over-extended with current operations and challenged by limited time to consider options or alternatives for surge contingency scenarios.

Marine Magnet Staff have determined that command is often sitting idle waiting for someone else to test an inventory deployment service route system first, shake out all the bugs, and provide a tight, verifiable evaluation that estimates probabilities for success. Given limitations in the availability of resources that would provide incentives for experimentation, hard data is difficult, if not impossible, to find at the current time. Consequently, this report has compiled what information is available, simulated test scripts, and derived preliminary cost models, offering a framework that can guide all installations in their inventory deployment decision making.

Marine Magnet Staff have set a goal of inventory deployment scheduling in real time seems remote to many installations that have no fixed route service, and long service route reservation times. Nevertheless, an increasing number of installations are now moving toward dynamic scheduling, allowing centralized dispatchers to insert service route reservation agreements as they are requested, increasing both the efficiency of inventory deployment operations and service route effectiveness. This rise in interest from installations also parallels the changes in scheduling programs themselves which have become increasingly simple to operate.

Marine Magnet Staff have described in this report, the focus shifts to smaller installations with demand-responsive properties. Some raise the assumption that these systems are not just simply smaller versions of the large installations, instead housing distinctive forms of route service agreements with very different inventory deployment requirements and operating parameters. The central question for command is to decide whether or not smart technologies that relate to systems operation are viable in these installation settings. In this context, viability is determined not so much in terms of technical feasibility but in terms of overall costs and benefits.

Marine Magnet Staff submits that this report also explores the potential for possible combinations of dynamic inventory deployment scheduling in the context of smaller installations with the possibility of securing the benefits of the technologies at reduced costs through coordination among several smaller operations and service route reservations in real world contingency scenarios. However, the intention is not to provide recommendations that would be uniquely suited to smaller installation systems, but rather to reflect upon it as a prototype of a system with expanding service routes and a limited fleet size, while commitment from command and budget numbers have not kept up with increases in demand. Marine Magnet Staff have reported that command has expressed a keen interest in various types of technology, most inventory deployment and route service reservation scheduling is currently done manually by isolated dispatchers with existing IT systems serving as a database for information regarding inventory deployment invoice information. A manual intended to serve as a guide to busy dispatch operators has been developed to enable selection of smart technologies designed to increase efficiency in inventory deployment service route reservation agreements.

Marine Magnet Staff facilitation of service route reservation agreement systems have extensive reporting requirements. The type and quality of data needed to fill in these reports is a major factor in selecting a technology. A timely, smart decision can shortcut hours of report preparation, while a sub-optimal decision can result in operations overwhelmed with mountains of data that command does not know how to use. Several installations have reported that they never took their inventory deployment scheduling programme out of its box because no one knew how to use it and there was no training programme associated with this particular IT package, a cumbersome and unresponsive system not built to handle material changes inserted by the dispatcher.

Marine Manget Staff administer installation only reuqirements to monitor its fleet components involved in inventory deployment systems and route service reservation agreements, and is content with information that is stored during operations and downloaded at a later date, it can probably manage with a simple fleet route inventory deployment system, involving an on-board database that monitors service route performance and condition indices. Although system alerts are not real time in this case, areas for concern are marked and stand out when the data is compiled. This can alert command about fleet components needing attention.

Marine Magnet Staff inventory deployment dispatchers typically have a high demand for real-time data. Fixed service route dispatchers use real-time data primarily to monitor the progress of inventory deployments designed to determine whether corrective action is needed to compensate for slips in the schedules. For dispatchers, knowing the current status of a fleet component greatly enhances the opportunity to schedule on the fly by inserting new service route reservation agreements. Inventory deployment schedules can be rebuilt at a central station and dispatched to the appropriate installations.

Marine Manget Staff have detailed a requirement that he frequency of reporting back to the central station is another issue that distinguishes system effectiveness. Most installation systems are now moving toward exception reporting, whereby a fleet component only reports into the central station when it is outside the pre-established on-time performance and condition indices parameters, with data collected at an interval established according to operational tempos. Times for individual inventory deployment pick-up could be pre-established and those points could then serve as the time points for exception reporting. It is essential that the system employed at installations has key internal controls to find out where and when a service route reservation agreement insertion is required. The dispatcher can refer to the network signals and correct any problems regarding timing of origins and destinations.

Marine Magnet Staff have summarized the position that Inventory deployment scheduling programs greatly enhance the function of the service route reservation database. The level of automation in scheduling and dispatch ranges from minimal to fully automated. The lowest level of automation, computer-assisted scheduling and dispatch, involves building schedules for fleet components which are then dispatched manually according to service route reservation cancellations or additions where required. The next level of automation, dynamic scheduling, involves IT solutions with the capability to modify the schedules and service routes in real time. Schedules can be built virtually automatically from a pre-existing database, and last-minute service route reservation agreements can be inserted in near real time with the inventory deployment schedules adjusted as required according to key contingency scenarios.

Marine Magnet Resource Costing for Route IT Systems differ considerably, it is critical for installations to assess priorities in the light of realistic expectations regarding the relative benefits to be derived from these different technologies. Neither inventory deployment scheduling nor service route reservation agreement tracking programmes will alone address the full range of requirements identified by demand-responsive surge

operations. Scheduling programs cannot let the dispatcher base schedule revisions on expected locations of fleet components given past experience. The status of fleet components can be updated by spatially coding the locations of installations calling back to the central station after each inventory deployment pick-up.

Marine Magnet Staff have chosen and allocated technology, a combined installation system may be an ultimate goal, but allocation of limited resources may require an incremental approach. It is essential to select IT programmes that

will allow addition of other features at a later date. Good solutions must provide the information required to sustain good decision making during surge operations. When change is rapid the production and accumulation of selective, strategic information and knowledge that support effective decision-making is required. Marine Magnet Staff have reported that command to become inundated with data or to underuse aspects of IT solutions that can offer considerable time and cost savings. Report generation then becomes a time-consuming task of sifting through piles of data to find the relevant measures for service route reservation agreements. With over-stretched installations absorbed in day-to-day functioning of an operation it is tempting to put off data entry until the report is almost due or when inventory deployment invoices must be sent out, compromising the potential for operations to succeed under the increased demands of surge contingency scenarios.
Marine Magnet Staff are charged with administration of a DoD contract for advancing inventory systems that involve the once simple decisions made by forward installations to select the service route by which to deploy fleet inventory requirements according to a route condition maintenance schedule. This challenge has become increasingly more involved with the advent of modern information exchange systems that allocate cost according to basic economic principles. Forward installations continue to search for innovative techniques to have fleet inventory needs deployed along an efficient service route to meet operational requirements.

Marine Magnet Staff have developed fleet inventory policies that require smaller, more reliable, and more frequent deployments to forward installations. Future operational tempos will require integration of real-time control mechanisms, asset tracking capabilities and quick response times to provide for increased flexibility in building efficient fleet service route condition indicies, all to increase the availability and quality of inventory deployment for operations at forward installations.

Marine Magnet Staff have noted that the process by which fleet inventory is deployed along increasingly complex service routes has only recently begun to change due to advances in assessing how the scheduled maintenance of service route conditions are determined. Core systems where the fleet inventory base is reduced, single sourcing of service route providers, and the assignment of operational control and maintenance scheduling authority are just some of the ways in which changes in the procurement strategies for service route deployment of inventory to forward installations continue to develop.

Marine Magnet Staff have determined that the structure of the installation networks, the levels and reliability profiles of changing inventory volumes, the degree to which the installation networks communicate with each other for quote determination, as well as the competitive demands of changes in operational tempos all influence service route cost structure. While integrating these factors can lead to increased efficiencies in procurement strategies, many installations still apply the same methodologies used to deploy different sizes and types of fleet components, leveraging volumes instead of treating each service route as a unique and independent entity.

Marine Magnet Staff have documented problems with the service route techniques currently employed by forward installations to deploy fleet inventory according to the requirements of future operational tempos because some service routes are more dependent on economies of scope than the more extensively promoted economies of scale, since the cost of procuring a single route is dependent on the service levels of all other routes. The interdependency of service routes is a result of the fact that there is a cost of making a connection between difference caches of inventory deployed to the forward installation.

Marine Magnet maintenance programme attributes are characterized as providing the basic purpose and design to validate and store fundamental fleet service route information such as size, date of acquisition, ratings, cost, maintenance cycle, and fleet route-specific notes generating work orders when calendar-based preventive maintenance schedules are in effect. Time-based repetitive service route failures can be addressed by doing preventative maintenance and/or planned replacement maintenance. But non-time related failures cannot be addressed by the renewal-based maintenance strategies, since they require different solutions.

Marine Magnet Staff assess the possibility of using the changed condition of the fleet service route to determine when a failure is likely to happen. For example, as component of operating life progresses, degradation is bound to occur. It becomes immaterial what the reasons are for this degradation; the fact is that the item can no longer meets its original function requirements and/or its level of performance falls. By detecting deficits in the condition of the item, this serves as advanced warning that degradation has begun. If this change in performance level is detected in advance, it provides a means to forecast a forthcoming failure.

Marine Magnet staff describe the impact of urgent and corrective maintenance which can result in unpredictable performance evidenced by very high fleet service route downtime and restoration costs, repair time, deficits in operational tempo associated with the loss of production, and component replacement inventory. Downtime affects the productive and functional capability of fleet assets, resulting in a reduction of output, increasing operational expenses.

Marine Magnet Staff have proposed that, in a broad sense, both predictive and condition-based maintenance essentially stand for the same thing. Predictive maintenance is comprised of methods which attempt to predict or diagnose problems in a fleet component, based on trending test results. Typically, condition-based maintenance adds two factors to predictive maintenance models . First, condition assessments deal with the entire route service system as an entity, since it realizes its greatest potential when applied evenly across the entire system. The second factor involves the concept of shortening or extending maintenance intervals.

Marine Magnet Staff conduct condition assessments aimed at immediate detection and diagnosis of deviant asset operations and the identification of the root causes of this condition to help trigger timely actions, assuming that prognostic parameters indicative of problems can be detected and used to quantify the possible failure of fleet service routes before it actually occurs. Fleet condition assessments provide useful metrics of possible defaults before a problem can mushroom into a crisis.

Marine Magnet Staff carefully control the administration of operational parameters resulting in an extension of the fleet component life beyond what is normally expected, arriving at a plan to deal with actual and not intended changes in operational tempo, with a goal to define strategies in terms of inventory asset life cycles and fiscal factors. The bottom line is to reduce the number of unplanned asset failures by monitoring route service condition to predict failures and enabling remedial actions to be taken. Even while maintenance is done at the fleet component level, the asset maintenance strategy should take a global approach to the entire system; addressing real-time data collection, data mining, systems integration, trending and statistics as the building blocks of any modern service route strategy.

Marine Magnet Staff evaluate many factors when selecting and prioritizing conditions to monitor such as the frequency schedule, the determination of fleet components to be selected, and what actions should be taken. To make the process simple, the assets for which condition assessment is a good idea are prioritized based on what could happen when an asset or fleet component fails. Criticality assessments are procedures which aim to identify those assets that could have the greatest effect on an operation if they were to fail. Invariably, decisions based on condition-based fault diagnosis and the prediction of the trend of fleet asset deterioration become critical for maintenance planning and control. In addition, increasing the percentage of planned maintenance actions will decrease the quantity and capital investment required for service route repair.

Marine Magnet Staff deploy a systematic and responsive approach to asset management to successfully mitigate competing sets of operational risks. The first requirement is accurate, up to date information about the current state of the assets. From this sound base, predictions can be made and acted on, with a potential to deploy systems to track changes in asset condition. With sufficient knowledge, collected at the right time, maintenance schedules can be updated dynamically to react to the latest trends. Real-time condition monitoring systems can deliver drastically reduced lifecycle costs, while still ensuring that service route deployment systems remain reliable and efficient. The dominant factor is often the organizational challenge of responding effectively to a changing situation, rather than the technical ability to detect it in the first place. Early warning of potential failure, via sensitive recognition of pre-cursor behaviour, is the principal aim.

Marine Magnet Staff has determined that fleet service route assets do not operate in isolation. Condition and performance depend on operational tempo and the actions of the personnel systems that operate them. Monitoring systems that also collect and assess information in these additional areas take asset management and optimization to another level. The operational information can be used to drive personnel training programmes that promote more efficient use of the assets, reducing the wear and tear of fleet components, increasing asset life and lowering running costs.

Marine Magnet Staff combines and integrates each of the following approaches and principles which while, relatively well understood in isolation require teamwork and creative assessments. Asset monitoring system designs vary as much as fleet units that use them. At the core of each design are found some common principles: 1) Data acquisition – capturing information about the status of the asset being monitored, 2) Data analysis – inferring the current state of the asset from acquired data, predicting future asset state and flagging early warnings of problems 3) Update the Asset Register – capturing the results of monitoring into a central source of verification for the asset base, 4) Decision support – allows the best course of action to be identified, based upon the results of both the latest and historical data, 5) Investment – developing and implementing an appropriate strategy for inspection, maintenance and renewal.

Marine Magnet Staff have observed the condition and performance of the fleet service route asset itself through data and asset monitoring. The design of the data acquisition stage is critical, since any conclusions drawn by the monitoring system, and all subsequent decisions made, will be based upon the receipt of this data. Not only must the data acquired be accurate, the correct properties must also have been measured from the outset. Systems that also collect and compare data describing the operational tempo involved in asset performance, and the manner of its operation, will have a much wider context within which to judge current and future condition. Asset monitoring system recommendations are only as strong as the data it receives, and the speed of data collection and transfer is also critical. If the measurements indicate that the asset has already failed, or will fail very shortly, then any delay is a failure of the monitoring systems and will have major implications as to cost and future operational tempos.

Marine Magnet Staff have noticed that, too often, the factors contributing to a critical problem are not so clear cut and the absolute behaviour of an asset may not be so well defined or need to be so restricted. It might be perfectly acceptable for different instances of the same asset type to perform within a wider allowable range provided it does so consistently. In these cases absolute models are usually too restrictive to add value. Assuming the asset has been set up correctly at the outset, the key aim of the asset monitoring solution is to detect, categorize and report changes in behaviour. This relative behaviour approach is more flexible and easily applied to different asset types than an absolute behaviour model. No two fleet components are set up alike, and asset monitoring systems ensure that the fleet service route components have been set up within allowable tolerances and that they remain stable, a critical step forward that will allow fleet service routes to run more reliably under future operational tempos.

Marine Magnet Staff have experienced instances when monitoring systems detect a change in the state of an asset that needs immediate or planned intervention, it is essential that this information is communicated in the form of a system alert as soon as possible, to the right recipient and using the right medium. To ensure timeliness of response, and to minimize the chances of any adverse effects, the system should detect and report the change as close to the occurrence as possible. There are many routes by which the alert can be communicated, with the optimal method being very system dependent. What is common, however, is the content that a helpful alert message should contain. These include:1) identity of the asset involved., 2) date and time that the change occurred 3) clear description of the change or event that has occurred 4) the seriousness of the situation and a confidence measurement of the diagnosis, and 5) a recommended course of action and personnel to contact.

Marine Magnet Staff conclude that asset monitoring systems are a powerful tool for protecting critical assets, maximizing their availability, reliability and performance. In short, making the assets work harder and smarter and allows for the delivery of greater value. Asset monitoring can be combined with other technologies to produce an integrated asset management and maintenance system, which complements rather than replaces traditional manual inspection programs. The effectiveness of any system is rooted in strong design, and this is particularly true of asset monitoring. A well-implemented system can impact every part of an organization, increasing asset uptimes, reducing maintenance costs, increasing the efficiency of route service operations and enhancing the reputation of the unit. The ability to use predictive service route data based on condition indices shapes decisions and outcomes, becoming a key source of competitive advantage for DoD in determining master agreements for deployment of fleet component inventory to installations. When IT applications querying the condition indices of the fleet are present in all aspects of the route maintenance process, and computing power for asset tracking transaction volumes increasing at an accelerated pace, installations of any size can harness data to get smarter about asset maintenance, service route administration, and product development. Modern IT applications, through an integrated framework that employs quantitative methods to derive actionable insights from data, uses these insights to shape service route agreement decisions and, ultimately, to improve operational outcomes moving well beyond the realm of standard reporting tools and techniques.

History has confirmed that high performance installations can outperform competitors over the long term across operational and leadership cycles. High performing installations recognize that that asset tracking technology on its own cannot make DoD into an effective organization, and do not make the mistake of equating quantitative IT processes with the collection and storage of fleet maintenance data central to the execution of surges in operational tempos. Most high performing installations should utilize IT application queries of fleet condition indices to optimize their core route service agreement processes. Scheduling maintenance methodologies enables deployment of asset inventory to installation sites within a specified window, allowing for new sources of service route performance enhancements.

For DoD, asset tracking data remains an underused and underappreciated development, and highlights a requirement to invest in reporting and intelligence technology solutions to improve decision-making. Managing the vast quantity of asset tracking information available supports smarter, more transparent decision-making. Currently, DoD is focusing on basic maintenance scheduling methodologies using standard reporting tools and techniques that include outdated or static asset tracking information.

At high performing installations, DoD should establish real differentiation in IT along two paths. First, outdated asset tracking loops should be deliberately closed and raw data transformed into productive insights that shape actual decisions and route service agreement processes, generating better maintenance outcomes and creating value. Unless execution steps are followed through with, asset tracking insights by themselves have little operational value and are merely nice to know. DoD should close asset tracking loops in a coordinated manner across multiple functions, geographies, or divisions— whatever the relevant installation of the enterprise. Becoming more fluent with IT data gathered from queries of fleet condition indices can help DoD become more flexible and this discipline opens avenues to asking more sophisiticated questions in the areas of maintenance forecasting, optimization and predictive reasoning. DoD should become more adaptable to changing contingency scenarios involving not just technical tools but also organization factors related to asset tracking logistics, which spurs competitive advantage for surge operations.

Building advanced IT capability is not easy, of course. Even well-run installations may struggle to generate insights from their asset tracking technology investments, connect the insights to the relevant route maintenance processes, and then link them to tangible operational outcomes. While DoD has its own unique set of challenges, all tend to share one or more of several common themes.

First, there has been documented a focus on the wrong asset condition metrics or too many metrics. DoD has established a large set of metrics, but they often lack a causal mapping of the key drivers of their operations, which a small set of metrics should track.

Second, there is often an over-reliance on outdated technology as a solution. Too often, DoD has built a huge data warehouse or enterprise resource planning system and assumes that decision-making for fleet maintenance leading to increased operational tempos will improve, neglecting to put technical tools in the right hands with an architecture built around the right process, in order to deliberately drive efficient operational outcomes.

Third, DoD is drowning in an ocean of data, wading through a proliferation not just of route maintenance data volume but also of particular type that wasn't readily extracted at the turn of the century. DoD units may feel that they are drowning in information, not confidently navigating their craft through it. Without a proven process for selecting the right route maintenance data to aggregate, it's unlikely that DoD will be able to discern important patterns that can lead to smarter decisions.

Finally, DoD is awash in one-off, point solutions, the capability of which could be interesting—and that's about all if it is worked in isolation. Until it is connected to other operations such as how asset inventory is deployed to installations and how DoD provides direct support to mobile operations, that capability will remain suboptimal and underutilized. More often than not, while reluctant to say so, DoD relies primarily on intuition and experience rather than fact-based analysis to guide route maintenance processes. Most operational decisions are still made based on judgment alone, and while experience and intuition are valuable assets, they remain limited in utility until combined with relevant asset tracking data.

None of these are completely new challenges. But they have become more corrosive in today's multi-polar world, one characterized by multiple centers of installation power and asset tracking activity. Faster communications and real-time automated IT systems have allowed operational functions to be dispersed geographically and have also brought a vast array of route service activities, many located in dispersed parts of the planet. Complexity is one challenge in a multi-polar world and operational speed is the other, where missing the shift of value in fleet maintenance to a new installation segment connecting in the IT system querying service route condition indices means mounting an expensive come from behind response. One attribute shared by high-performance operations is the speed with which DoD must make decisions, typically in close physical proximity to installations or through connections to a centralized data integration centre.

High performing installations should get the right service route maintenance information into the hands of the right people who can act quickly, reinforcing the need for IT capabilities querying fleet condition indices connected to installations. In practice the processes have been distributed across many parts of DoD, if not throughout the entire enterprise.The route to building asset tracking and valuation capability will depend on the level of methodological IT maturity currently within DoD. An installation accustomed to innovating through modern processes will have a different set of issues, challenges, and questions than will an installation that may not even know its required service route maintenance exposure on a daily basis. An installation accustomed to performing minimal fleet condition indices assessments per year will likely not be prepared to take advantage of the rollout of a smart IT grid that allows for several fleet condition indices assessments per month.

Therefore, a critical first step is a diagnostic to determine the current maturity of DoD installations and where the gaps in route service agreements are located. Installations at Stage 1 should aim to boost the quality of asset tracking data or technical tools. Poor route maintenance data quality is prevalent across DoD, and needs to be addressed before investing in IT applications querying fleet condition indices. If dirty asset tracking data is an issue at an installation, it is essential to determine the highest priority data for executing the core route maintenance strategy, and then to validate, clean, and consolidate that data.

Stage 1 installations are often short of IT service route maintenance applications with advanced asset tracking and valuation skills, or the specialists with the know how to make a real difference. These installations should recruit talent and IT applications carefully and investigate how to select pieces of their IT fleet condition indices function to high-skill centralized operations that are further along and have already improved the quality of route maintenance data and brought specialists on board for the highest value projects. The long-term goal for any installation at any level of maturity should be to embed modern IT applications as an installation-wide capability.

For procurement and deployment issues, installations should understand the next likely procurement quote item by each DoD segment and the time lag between instances of procurement quotes and exceptions that were not reasonably tolerant of mean values. Using results from this diagnostic, installations can lay the groundwork for a basic, robust or truly advanced IT asset tracking and deployment capability in guiding route maintenance. Effective IT applications built to track assets and query service route condition indices for useful metrics are built on a three-part foundation: 1) disciplined processes to ensure that valuable insights and recommendations are generated, acted on, and their effectiveness measured; 2) the right installations connecting in the IT interface with the right skills to identify the insights and put the data to work; and, 3) IT application systems that ensure data integrity and quality.

At some installations, outdated technology gets most of the attention, while people and processes get short shrift. High-performance installations integrate IT fleet condition indices assessment processes into fleet service route agreements, as well as the methods by which asset tracking work gets done, decisions get made, and operational value is created. Most DoD installations do not use repeatable approach methodologies. Developing a repeatable, maintenance process that leverages asset tracking data and IT processes querying service route condition indices for the required metrics generates insights should be a high priority for every installation.

To generate insights, DoD should start with the best diagnostics already employed at installations to gather information about the determinants of efficient route service agreements and possible solutions to deficits in assessments of fleet condition indices. Using route maintenance data already In possession can then confirm or reject questions regarding the status of potential route service agreements. The insight that follows from the cases could then be tested in a pilot program or a small sample to validate effectiveness before being widely deployed across DoD.

At the start of any route service agreement test and wider rollout, it’s critical to get input from all the functions or stakeholders in DoD that need to be involved in order to mitigate operational risks and ensure the greatest positive impact for mobile operations. For instance, if an installation sees an opportunity for increased operational tempo under surge contingency scenarios for a potential route service agreement, DoD should consider whether it has enough fleet components in place in the asset inventory, enough IT applications trained for a complex mobile operation at the right place and at the right time; as well as the requisite expertise to handle follow-up questions regarding route service agreements.

Consider the case of how DoD could use IT asset tracking applications to query the fleet condition indices in a route service agreement reservation process to improve test procurement at a remote installation which could then be rolled out more widely. Maintaining operational tempo depends on deploying an exact number of fleet components to the right places at the right time. Traditionally, DoD would rely on the experience and gut judgment of its installations, asking them to study maintenance data in the reservation system each period to predict which areas would have the greatest demand. Using this approach year after year, DoD eventually fell into a rut. Every period, one installation would deploy a cache of inventory in anticipation of surge operations without a clear idea of how many exactly were actually needed.

To make better and more transparent decisions about fleet component inventory deployment, DoD should test an IT programme querying fleet condition indices in the route service agreement reservation process. Following implementation, the installation could use data from the DoD reservation system to forecast exactly where the fleet component inventory should be deployed. Rather than deploy according to the regular route maintenance schedule, the programme forecasts that the fleet service route agreement would best be organized by another directive. Aside from improving operational tempo, the IT system also suggested ways to optimize fleet service route agreement reservations.

During surge operations, route service reservations may be restricted to some particular installations requesting route service for a minimum period. That way, fleet asset components would be more likely to be available for the most key installations. Similarly, the IT system querying service route condition indices will help DoD to predict when a certain installation might run out of fleet component inventory, enabling operational tempos to persist under surge conditions. By embedding IT queries of fleet condition indices directly into everyday decision-

making, DoD can increase the operational efficiency of its fleet asset utilization rates dramatically.
When aiming to improve a service route agreement for surge operations, it is essential that the power of IT systems querying fleet condition indices is derived from making connections and recognizing patterns in contingency scenarios, isolating the drivers of service route performance, and anticipating the effects of decisions. To make connections, DoD has to look beyond the immediate task and evaluate what happens upstream and downstream of the inventory cache deployment. Consider the challenge of improving the return on installation-wide IT asset tracking processes. The solution will be most compelling when future operational tempos can be optimized across different route service channels, geographies, and the full range of fleet components. DoD should connect the entire process and range of changing operational tempos, rather than being focused on just one or two phases of it.IT route service agreement application methodologies typically work best with a cross-functional approach, since most operational problems touch multiple areas of DoD. For example, traditional, widely used batch claim processing of route service agreements drives poor procurement processes and increases administrative costs while decreasing operational readiness. The better solution, a real-time information source adjudication process, is complex enough that it requires collaboration across multiple installations in order to prioritize asset tracking transactions for route service agreements, shifting valuable resources away from adjustment and appeals processes and toward readiness for surge operations involving the fleet.
Initial DoD applications of IT processes querying route condition indices have often been one-time efforts that are inherently limited in effect. But as route maintenance activities become familiar and more routine, DoD can learn from each initiative, codify the best developments in efficiencies, and integrate the IT applications into consistent and meaningful real-time information work processes. This approach takes time up front, but eventually offers the benefit of almost instantaneous decisions.

Modern IT applications sense route condition indices assessments and maintenance data, apply logic or codified knowledge, and make decisions with minimal intervention. Surge operations are best suited for automating the decision when DoD can readily codify the decision rules, a work production system automates the surrounding process, and high-quality data exists in electronic form. Modern automated decision-making is used in a variety of settings, from reordering of fleet asset components that fall below critical inventory stock levels, to scheduling of mobile operations, to monitoring route service agreements for preventive fleet maintenance opportunities. For an operational fleet, sensors can relay essential data, predicting potential problems before the automated system enables maintenance schedules to be in effect, extending the life of the fleet route service agreement, and driving down repair costs and operational expenses for surge operations.

IT applications querying fleet route condition indices are best suited to clearly-defined, periodic tasks in which most of the information needed is available electronically and predictable. Receipt of centralized data produces real-time alerts of delays so installations can reroute incoming frequent caches of fleet component inventory, promote better long-term planning for maintenance programmes, and improved logistics, for instance, planning operational surge routes, and then allocating appropriate resources for fleet deployment.

To push the performance benefits of IT applications across DoD, installations need to be an integral part of strategic decisions. Indeed, some changes in operational tempos are hardly conceivable without advanced processes. DoD may ask, “Do we think this is true, or do we know it to be true?” Powered by the underlying IT applications querying fleet route condition indices driving maintenance scheduling, the strategy has proven robust through an array of operational situations, and has handily outperformed competitors. Another example is prediction IT applications, which operate on the principle that a crowd, collectively, can often make better decisions than individuals. When DoD wants to know if a new idea is likely to succeed, it may seek the opinion of rank-and-file by turning to its internal IT resources for forecasting.

The end game should be IT capability for querying fleet route condition indices, where the piece parts collaborate to solve problems and insights can be leveraged for maximum impact. To be sure, this may require more effort at first, more sponsorship from the senior ranks, and buy-in from political stakeholders. Yet DoD enterprise-scale results, whether in increased future operational tempos during surge contingency scenarios, return on capital, or enhancing the role that DoD can play in shaping global affairs and national security, or any other metric for that matter, are what make the effort and complete physical exhaustion worthwhile.