THE LOGISTA

Your Source for Specialty & Logistics Engineering Success

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Inside this Issue:

Hello Readers,

I hope this newsletter finds you and your family both safe and well during this challenging time. We are blessed that everyone at ALE and their families have remained healthy during the COVID-19 pandemic. Our goal first and foremost is for the continued health and safety of our ALE family.

I am very proud of all of our staff members. They seamlessly transitioned to working from home when the Governor of Ohio ordered the closure of businesses in the state. By employing our well-established VPN capabilities, our staff has continued to provide our customers with the quality analyses associated with the ALE name. While the future of the pandemic crisis is unknown at this time, ALE continues to remain open and operating as an essential business to support our customers.

I hope you enjoy this quarter's newsletter. Inside, you'll find ALE's approach and promise to continuing to protecting our staff during this pandemic while meeting our customers' needs. You'll also find information about **Virtual Workshops by ALE** and two excellent articles that discuss the practical application of two Logistics Engineering tools: **Backfit RCM** and **COTS Technical Manuals**.

Thank you for your readership and I hope you continue to stay safe.

Renee Coogan, President

About Acquisition Logistics Engineering

The ALE Advantage:

WOMAN OWNED SMALL BUSINESS

ISO 9001:2015 CERTIFIED

NIST SP 800-171 COMPLIANT

DCAA APPROVED ACCOUNTING SYSTEM

SEAPORT NXG PRIME CONTRACT HOLDER

CAGE:	1Z220
DUNS:	16-125-2218
NAICS:	541330, 541614, 541715

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ALE Response to COVID-19

At ALE, the health and safety of our customers, members and communities has always been a priority.

We have closely monitored the developments of the coronavirus pandemic from the early stages, and have taken proactive steps to maintain a healthy environment for our members while continuing to provide high quality service to our customers. Thanks to the coordinated efforts of our IT staff, nearly all members of ALE's team have been working from the safety of their homes since late March.

While working via remote access poses numerous challenges, the members of ALE have demonstrated their agility and resilience. Through execution of our Disaster Recovery and Disease Outbreak Response plans, we smoothly transitioned without missing a beat. Our NIST-compliant network and procedures safeguard our customers' information, while our strict adherence to our ISO 9001:2015 quality processes ensures we deliver the same high quality products that our customers have come to expect. ALE's social distancing measures have enabled our members to remain healthy and flatten the curve.

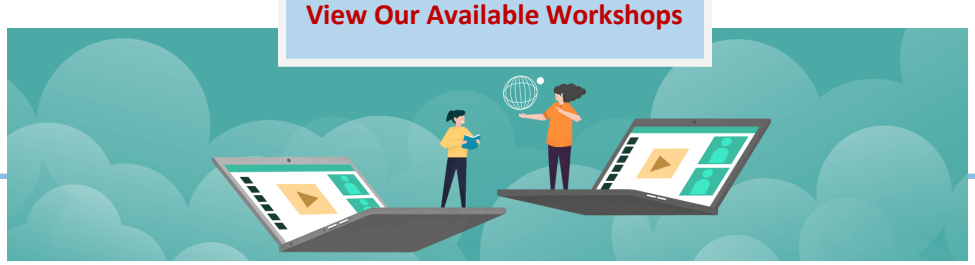
As this challenging situation matures, and lockdown restrictions are eased, we will adjust our operations, but continue to prioritize the health and safety of our customers, members, and communities.

VIRTUAL WORKSHOPS BY ALE

To meet the training needs of our customers, several of ALE's workshops are going virtual during the COVID-19 pandemic. Attendees will receive the same level of instructor interaction and high-quality content that our customers expect from an ALE workshop.

To express interest in attending a virtual workshop, contact staff@ale.com or call us at (614) 436-1609. We are actively developing our future workshop schedule, and your input is greatly valued.

View Our Available Workshops



Backfit RCM: Optimizing Maintenance Plans the Navy Way

By Zach Pusnik

Aircraft carriers and submarines are more than machines with missions, they are the ocean-going versions of small cities. They are the most serious of machines designed, built, and operated to perform the most serious of tasks. Given their missions and operating environments, deploying applicable and effective maintenance plans are essential to protect the lives of their crew, to maximize their lifecycles, and to secure the safety of our country and allies.

However, maintenance plans are notoriously expensive to develop and maintain. Program offices must work with large amounts of (changing) data, from many contributors with their own preferred style guides, subject maintenance plans to multiple reviewers with their own expertise and preferred methods. So, how does the U.S. Navy ensure the maintenance plans for these assets are efficient, effective, and economical? One effective approach is that they employ Backfit Reliability Centered Maintenance (RCM) as part of their comprehensive maintenance strategy.

What is the purpose of Backfit RCM?

Backfit RCM is a methodology used to validate and optimize maintenance tasking contained within a maintenance plan. Backfit RCM accomplishes this by using a structured analysis process combined with operational and failure data to ensure current maintenance tasking is adequately preventing system and/or component failure. The methodology first looks to see if identified systems and components really experience the failure modes that the existing maintenance plans are designed to prevent. Where there is a history of system or component failures, the current tasks are analyzed for applicability and effectiveness. Where failure modes are found to not occur, or if they do not occur in the absence of preventive maintenance, then the corresponding maintenance tasks are deemed unnecessary and are removed from the maintenance plan. This core process of Backfit RCM keeps maintenance plans lean with only applicable and effective maintenance tasks.

What do you need to perform Backfit RCM?

To perform Backfit RCM, analysts should gather the following technical information for the system under analysis, as available:

- Existing documented maintenance tasks
- Previous RCM analysis data and/or worksheets
- Computerized Maintenance Management System (CMMS)/corrective maintenance work orders
- Technical manuals
- Condition Based Maintenance (CBM) data

How is Backfit RCM performed?

The Backfit RCM process follows a decision tree that buckets decisions into the areas of reliability degradation, task applicability, task effectiveness, and task optimization (refer to MIL-STD-3034A, Appendix D, Figure D-1). Within these buckets, there are seven key steps:

Step 1 Identify the functional failures and failure modes of the system/component that an existing task is intended to prevent.

Step 2 Determine if the failure actually occurs during the service life of the system/component. Use reliability predictions as a gauge of "probability of occurrence" and/or use failure data from the field to qualify "occurrence of failure".

Step 3 Determine and classify the type of maintenance task used to mitigate the failure. Is the task a condition directed, time directed, failure finding, servicing or a lubrication task?

Step 4 Is the existing maintenance task applicable? Does the task restore or maintain the original or inherent reliability of the system/component?

Step 5 Identify the consequences of failure. Is the task worth doing? Consider the impact of personnel injury, loss of mission capability, regulatory constraints, and economic costs.

Step 6 Is the existing maintenance task effective? Again, is the task worth doing? Does the maintenance task reduce the probability of failure to an acceptable level? Does the maintenance task reduce the risk of failure to an acceptable level? Is the cost of the maintenance task less than the cost of corrective repair plus the cost of the lost capability?

Step 7 Can you improve the task? For instance, can you integrate Internet of Things (IOT) technology to transform a time directed task into a condition directed task to maximize economic savings? Are the maintenance task instructions aligned to the current configuration of the system/component? Task improvement includes more than the refinement of maintenance task instructions, review maintenance tasks for completeness and accuracy to include the following:

- Listing of correct tools
- Listing of correct parts
- Needed consumables and other service materials
- Listing of the correct test equipment
- Correct man hours/mean time to repair
- Necessary PPE
- Identification of hazardous materials and disposal information

The Takeaway

Applying Backfit RCM is a proven way to efficiently review and improve maintenance plans. While the U.S. Navy utilizes this process on its largest and most complex assets, Backfit RCM can be used to improve any formal maintenance plan no matter its size or coverage of systems and components. Follow the Backfit RCM process if you're looking for a way to ensure your maintenance plan delivers the right maintenance, to the right systems and components, and at the right time. ■

How to Effectively Incorporate COTS Technical Manuals into DoD Development Programs

By Stephen Brunner and José Cavazos

Many of today's Department of Defense (DoD) acquisition programs are focused on two important factors: getting the technology in the warfighter's hands quickly and minimizing cost. But sometimes stakeholders get so enamored with the new technology, that life cycle considerations get overlooked. And, as we Logistics Engineers know, the "real" cost involved in an acquisition program is the cost of ownership for 20, 30, or more years. All one must do to see this reality in case form is look at the B-52 weapons system and the current efforts to re-engine this 50+ year old aircraft.

The cost aspect of bringing a functional capability to the field is often driven by available funding in today's budget. This can also drive the scope and level of detail with which many of the Supportability requirements are included in the overall program. While the Product Support program can no longer be ignored or eliminated from acquisition programs because they are mandated by DoD acquisition policy, there are creative ways to limit the Product Support program investment through requirements tailoring.

One method of limiting the cost of support system development, such as technical manuals and supply support, is to maximize the use of Commercial off-the-Shelf (COTS) equipment for which there is existing design, maintenance, and support documentation. This approach encompasses a wide variety of non-developmental functional solutions that includes COTS, Government off-the-Shelf (GOTS), and standard hardware that someone else or another program has already funded with the associated support system development. It also allows us to take advantage of established Integrated Product Support (IPS) elements such as technical manuals.

So, how does a Logistics Engineer with a limited budget for technical manuals meet the acquisition program requirements for military standard technical documentation addressing the operating and support of a newly acquired system? We must be involved early in the development program and leverage whatever is available in the marketplace that will meet our needs or contribute to meeting the requirement. Being involved early ensures that existing technical data and operating/support instructions will be included in the purchase orders from suppliers of equipment, hopefully at a fraction of the cost of developing the data from scratch.

An astute Logistics Engineer will also utilize the multiple resources available from experience on similar developmental programs, public data centers, as well as the data-rich environment afforded by internet access. Does anyone remember the supply sergeant from M*A*S*H? Radar O'Reilly was an expert at finding or acquiring the key elements of support needed to run an efficient medical facility using both traditional (Army supply) and non-traditional (bartering with locals) means.

What we need is a plan to identify, gather, assess, and utilize the available technical data that will support the Logistics Engineer efforts to integrate these COTS systems and equipment into the overall support system planning activities. Figure 1 presents a logical, repeatable methodology for evaluating the status of, coordinating missing or inadequate, and incorporating available technical source data into technical manuals sufficient for the DoD/Department of Homeland Security (DHS) customer to safely operate and maintain the weapons system.

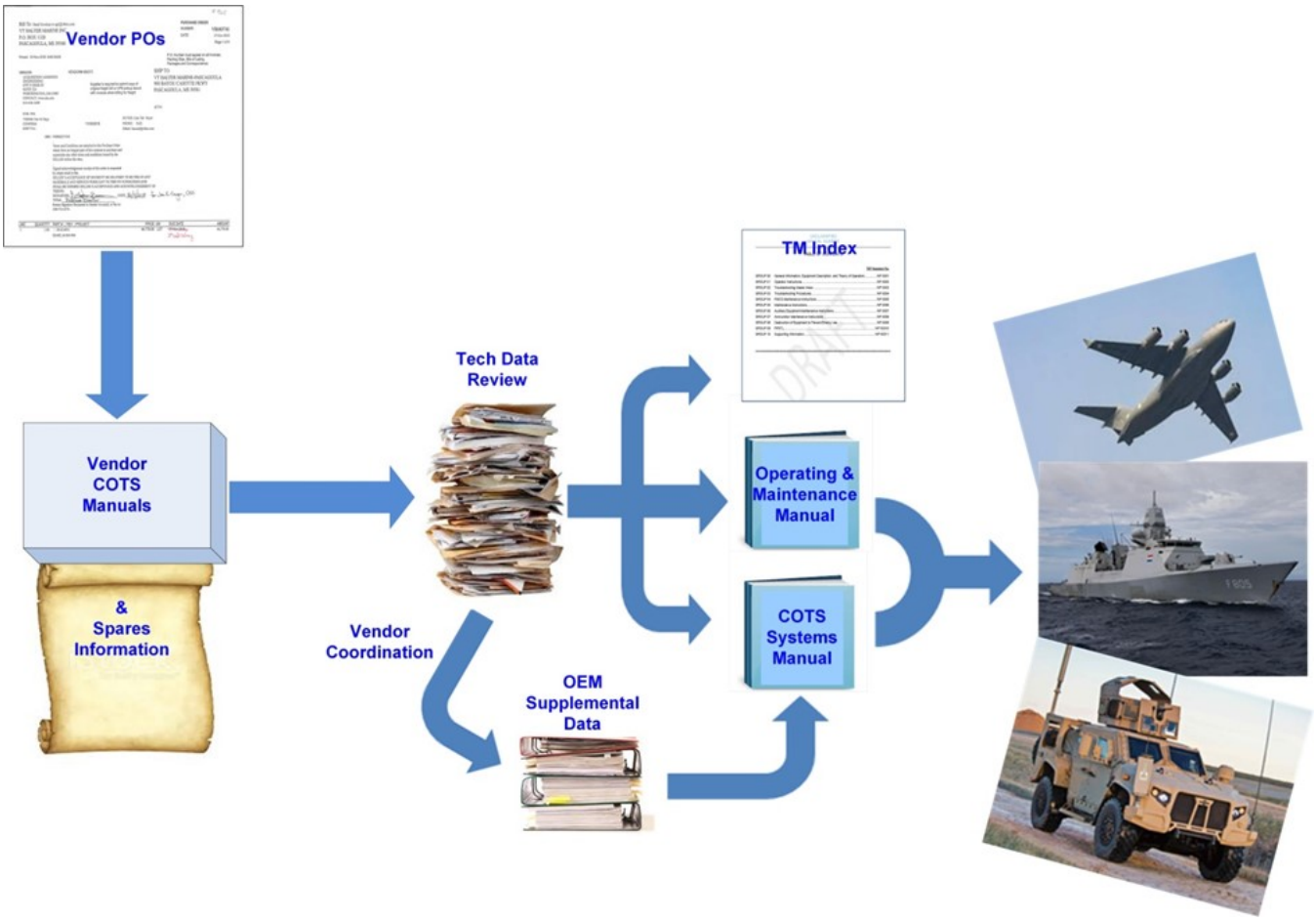


Figure 1. COTS TM Development Process

What kind of data is needed to support a comprehensive supportability analysis for these COTS systems and equipment? If we believe that these commercially available, catalog items are already operating in the field, then our development program should look to capitalize on current user experience. This encompasses technical data representing a comprehensive collection of the available information on the installed equipment that matches the delivered equipment configuration and includes all information necessary to operate the equipment and perform on-equipment maintenance, such as installation, start-up and shutdown.

By leveraging existing operating manuals, illustrated parts breakdowns, and maintenance procedures, we can develop an understanding of the supportability issues associated with a commercial item by adding insights related to the DoD operating environment and support capabilities. This understanding is developed using technical data from the people who know the equipment the best – the Original Equipment Manufacturer (OEM). Thereby, supporting maintenance planning efforts and focusing development program resources on the appropriate IPS elements.

After identifying available technical data, the next big task for the Logistics Engineer is to ensure that the data is sufficiently comprehensive and accurate to support Product Support Analysis (PSA) and maintenance planning activities that allow for a meaningful assessment of this “new” system’s readiness and life cycle cost impacts.

The level of detail in existing COTS operating and support documentation can be insufficient from a DoD perspective, particularly when considering the robust capability of the typical military operator and the desire to maximize the DoD's organic repair capability. We need to recognize that the manufacturer or vendor usually provides data to commercial entities, who have minimal interest in life cycle support.

Evaluating existing COTS Technical Manuals to ensure they meet the requirements starts with the specific program requirements, typically contained in the Technical Manual Contract Requirements (TMCR) and Data Item Description (DID) from the program Statement of Work (SOW) and Contract Data Requirements List (CDRL). In development and review of technical manuals and documentation, MIL-PRF-32216A has proven to be a useful tool to verify compliance of COTS manuals contents in an arrangement that provides the appropriate level of detail and continuity from each supplier/vendor/manufacturer. Appendix A of the guidance document provides the analyst with a set of criteria (checklist) which the TMs must meet in order to fulfill their role on the program. These data requirements include, but are not limited to, information necessary to operate the equipment and to perform maintenance of the item. The TM will need to contain, at a minimum, detailed information needed to install, start-up, operate, troubleshoot, maintain, and safely shut down each piece of equipment provided by the supplier. More often, the Government includes a requirement for information necessary to overhaul and perform depot level repairs of the equipment in the supplied COTS data.

If a delivered COTS manual is deficient in content, the Prime Contractor will coordinate with their supplier to provide supplemental information that meets the data requirement. This data will be added to the basic COTS TM to create a comprehensive technical resource. If a COTS manual covers multiple models, series, or configurations of the equipment, then the applicable configuration will be clearly identified by use of difference data sheets, errata sheets (including crossing-out of non-applicable data), or be highlighted in the text or table(s) in the manual.

Total and complete integration of this commercial technical data into the system and the subsystem technical documentation package ensures the end item can perform when called upon to accomplish its mission. Data packages from the vendor/manufacturer will be combined or integrated with data packages from other vendors to support development of Weapons Systems technical manuals to be submitted to the approving government entity. The earlier that technical documentation (in the form of COTS TMs) is obtained during the acquisition program, the more effectively it will support PSA activities and development of a cost-effective maintenance strategy.

Lessons Learned

Some of ALE's lessons learned while working with COTS TMs in a development program environment include:

- Ensure program TM requirements are understood and accepted by both the Government and Prime Contractor.
- Clearly communicate to the suppliers, via Purchase Order (PO) or other means, requirements such as availability of Technical Manuals, supplemental data requirements, and Recommended Spares for each supplied item.
- Include remediation in the supplier Purchase Orders for not providing timely COTS technical data submittals to the prime and effectively implement those, when required.
- Ensure configuration (Part Numbers) matches across supplied equipment and technical documentation such as supplier POs, Technical Manuals, source control drawings, Bill of Materials (BOM), and Data Item submittals.
- Utilize available Government and commercial data centers such as FLIS, BINCS, GIDEP, PUBLOG, Supplier website, and others to identify specific item or vendor supplemental data. ■