

U.S. Department of
Homeland Security

United States
Coast Guard



SURFACE FORCES TIME COMPLIANCE TECHNICAL ORDER (TCTO) PROCESS GUIDE



CGTO PG-85-00-40-S

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1 September 2009

U.S. Department of
Homeland Security

United States
Coast Guard



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1 Sept 09

MEMORANDUM

From: L. A. Wilkerson
CG SFLC ESD

To: CGTO PG-85-00-360-S Users

Subj: SURFACE FORCES TIME COMPLIANCE TECHNICAL ORDER (TCTO) PROCESS GUIDE, CGTO PG-85-00-40-S

Ref: (a) Naval Engineering Manual, COMDTINST M9000.6E
(b) Electronics Manual, COMDTINST M10550.25B
(c) COMDT COGARD Washington DC 301953Z SEP 08/ALCOAST 479/08, CG-4, COMDTNOTE 4000

1. PURPOSE. This memo promulgates the Surface Forces TCTO Process Guide for the Small Boat Product Line. The intent of this Process Guide is to help maintain configuration control on surface assets, one of the four “cornerstones” of logistics. This Process Guide was developed as an aid for those who originate, review, and have the authority to take action on TCTOs. TCTOs generally require a physical change to an asset, or a special, urgent, inspection, requiring compliance within specified time limits.

2. ACTION. This Process Guide applies to configuration management of all Coast Guard Boats, *at both Modernized and Non-Modernized units*. Although the Surface Forces TCTO Process Guide is written for application to all surface assets (cutters, barges, boats), the policy contained in references (a) and (b) has not yet been updated, providing SFLC the authority to implement this Process Guide for all surface assets. In the interim, this Process Guide only applies to boats, the configuration of which is managed by the Small Boat Product Line (SBPL). This Process Guide is written to reflect the “end state” of SFLC re-organization; thus some specific roles outlined in the Process Guide {particularly within the SFLC Engineering Services Division (ESD)} have not yet been fully implemented.

3. AUTHORITY AND RESPONSIBILITY. Reference (c) directs the Small Boat Product Line to map aviation business practices to Boat Forces; the TCTO process is one of these key business practices. In the future, the TCTO process will apply to all Surface assets.

4. CHANGES. Recommendations for changes and improvements to this process guide shall be submitted to the SFLC ESD using Form CG-22.

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RECORD OF CHANGES	
DATE OF CHANGE	DESCRIPTION
29 May 09	Added Record of Changes Page.
29 May 09	<i>Chapter 2.C.18:</i> Emphasized need to route and develop new MPCs and SICRs (for affected equipment) simultaneously with TCTOs.
29 May 09	<i>Chapter 7 & Appendix A:</i> These sections were re-written with more detailed format guidance for TCTO Developers, capturing lessons since implementation at SFLC.
29 May 09	<i>Chapter 1.A.4 & 2.B.7:</i> Clarified applicability of TCTO process for assets in acquisition.
1 Sep 09	Added Appendix P , a matrix of roles and responsibilities for submission, development, and implementation of TCTOs.
1 Sep 09	Changed ESD ACMS Maintenance Analyst to Product Line Maintenance Analyst throughout document.
1 Sep 09	Changed ESD Technical Writer to Product Line Technical Writer throughout document.
1 Sep 09	<i>Chapter 2.C.13:</i> Clarified semi-annual funding review procedures based on dissolution of a shared recapitalization budget in FY10, and segregation of AFC-45 funding by Product Line.
1 Sep 09	<i>Chapter 2.C.18:</i> Indicated ESD and Product Line roles in conducting Reliability Centered Maintenance (RCM) Analysis in support of MRL development.
1 Sep 09	<i>Chapter 2.C.19:</i> Modified ESD and Product Line roles in contracting engineering development for a TCTO if capacity does not exist in the ESD.
1 Sep 09	<i>Chapter 2.C.26:</i> Documented SFLC ALD role in cataloguing NSNs.
1 Sep 09	Removed reference to Product Line Division Chief throughout document since this position has been disestablished.
1 Sep 09	<i>Chapter 2.B.6:</i> Outlined requirement for CG-7X to certify operational need in writing for any change intended to modify operational capability, in the event an ORD does not exist for the asset class.
1 Sep 09	<i>Appendices B, C & I:</i> Updated Flow Charts to align with all changes made in 11 Aug 09 update.

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REFERENCES:

- (a) (Aviation) TCTO Process Guide, CGTO PG-85-00-40
- (b) Naval Engineering Manual, COMDTINST M9000.6 (series)
- (c) Electronics Manual, COMDTINST M10550.25 (series)
- (d) Surface Forces Configuration Control Board (SFCCB) Process Guide, CGTO PG-85-00-70-S
(*draft*)
- (e) Major Systems Acquisitions Manual, COMDTINST M5000.10 (series)
- (f) Ordnance Manual, COMDTINST M8000.2 (series)
- (g) Financial Resource Management Manual (FRMM), COMDTINST M7100.3 (series)
- (h) International Specifications for Technical Publications, S1000.D
- (i) COMDT COGARD Washington DC 021925Z JAN 09/ALCOAST 005/09, CG-8,
COMDTNOTE 7130
- (j) Surface Forces CG Form 22 Process Guide, CGTO PG-85-00-20-S (*draft*)
- (k) SFLC Preventive Maintenance Development Process Guide, CGTO PG-85-00-230-S
- (l) U.S. Government Printing Office Style Manual (series)

NOTE

The Surface Forces Configuration Control Board and Surface Forces CG-22 Process Guides are currently under development; in the interim consult the (Aviation) Configuration Control Board Process Guide, CGTO PG-85-00-70, and (Aviation) CG Form 22 Process Guide, CGTO PG-85-00-20.

CHAPTER 1: INTRODUCTION

A. General

1. The Surface Forces TCTO Process Guide is an adaptation of the Aviation TCTO Process Guide {reference (a)}, modified for application to Surface Forces. This Process Guide has greater detail than reference (a), given that this document is intended to serve as a “training resource” for the users of the new TCTO, who generally speaking, may not be familiar with the new CG Logistics Model. Furthermore, this Process Guide is intended to be a “living document” with changes made as the SFLC and C4IT Service Center mature, and users become more familiar with the processes outlined within the Guide.
2. This Process Guide supersedes the Engineering Change and configuration management processes outlined in Chapter 041 of the Naval Engineering Manual, and Chapter 5 of the Electronics Manual {references (b) and (c) respectively}. One goal of Logistics Modernization is to standardize configuration management policy and processes, to the greatest extent possible, throughout the Coast Guard. A component of this effort is the adaptation of TCTOs by Surface Forces, in place of Engineering Changes. Future revisions to references (b) and (c) will make reference to TCTOs instead of Engineering Changes.
3. The processes outlined in this guide apply to all Cutters, Barges, and Boats. The term “asset” (in the context of this Process Guide) is a general term used to describe Coast Guard Cutters, Barges, and Boats.
4. This Process Guide applies to assets throughout the entire life-cycle. During acquisition, any changes executed to an asset class after one or more such assets have already been delivered, must be retrofitted, or a new asset sub-type must be created and concurrently authorized by CG-45, CG-731/751, CG-64, CG-113, and CG-9 (the Tri-Partite). The decision to establish a sub-class is driven primarily by one or both of the following factors, as determined by the Tri-Partite:
 - a. The configuration differences cause an appreciable difference in the “per operating hour” cost.
 - b. There is a significant difference in logistics support requirements.
5. This guide applies to assets and units that have undergone Logistics Modernization (Modernized Units), and those that are operating under a traditional Naval Engineering and Electronics support infrastructure (Non-Modernized Units). Where differences exist in processes for Modernized and Non-Modernized Units, these differences are indicated in the Process Guide text.
6. The TCTO Process Guide also applies to personnel protective equipment and lifesaving gear intended specifically for use aboard assets when one or more such assets are assigned to units that have undergone Logistics Modernization, and if this equipment is enrolled in ALMIS.
7. TCTOs are required for the following configuration change proposals:
 - a. Changes to an asset’s mission characteristics or capability.
 - b. Changes in weight or moment that significantly affect intact or damaged stability. Although each case is unique due to different limiting factors, the following general criteria applies:

- Non-Self-Righting Small Boats (less than 65 feet in length): Changes that create more than a 0.002 ft change in the center of gravity in any direction (vertical, longitudinal, or transverse) or net weight changes of more than 1/5 of 1% of the full load displacement require a TCTO.
 - All Other Assets: Changes that create more than a 0.001 ft change in the center of gravity in any direction (vertical, longitudinal, or transverse) or net weight changes of more than 1/20 of 1% of the full load displacement require a TCTO.
- c. Changes to hull structure, space allocation, watertight integrity, or compartmentation.
 - d. Change to any system that affects spare parts allowances.
 - e. Changes to an approved fluid, or paint system.
 - f. Changes requiring prototype evaluation.
 - g. Changes that require Electromagnetic Compatibility (EMC) or TEMPEST Inspections.
 - h. Form, fit or function changes. A change to **form** is any change that affects the weight, balance, or moment of inertia of a component. A change to **fit** is any change that affects an interface with other components. A change to **function** is any change that affects operational characteristics.
 - i. Changes that require software modifications.

NOTE

Given that policies and processes governing software procurement, refreshment, recapitalization, and documentation are not aligned throughout the Coast Guard, all required software modifications affecting equipment installed on CG surface assets must be evaluated by the appropriate Product Line Manager to determine ultimate method of documentation (including through a TCTO).

- j. Any change that modifies the Damage Control classification of a fitting.
- k. Any change that modifies equipment, components, or materials used in a system, **even if it is not classified as a “form, fit or function” change still requires a TCTO**. An example includes replacement of an old fan motor (no longer manufactured) with a new fan motor that is a direct replacement with the same wiring connections, weight, and performance characteristics. Even though this example does not constitute a “form, fit, or function change,” it still requires a TCTO to document the modification in asset configuration.
- l. Fleet-wide time-sensitive inspections or changes.
- m. Revisions to previously approved TCTOs.

8. ***Phase 1 and Phase 2 Configuration Control Board approval are required for the changes listed in Paragraphs 1.A.7.a through 1.A.7.i.*** The changes listed in Paragraphs 1.A.7.j through 1.A.7.l do not require Phase 1 or Phase 2 SFCCB approval. Detailed Surface Forces Configuration Control Board procedures and processes are provided in reference (d).

9. Any proposed change that is intended to modify an asset's mission characteristics or capability must be accompanied by a modification to the asset's Operational Requirements Document (ORD). The ORD is a top-level decision document which establishes the minimum acceptable standards of performance and optimum performance goals for an asset. Details regarding ORD development and requirements are contained in reference (e).

NOTE

Minor capability changes that come about as a result of replacing an obsolete component or software system with the equivalent currently available component or system (termed "Technology Refreshment") do not require an ORD. An example includes the replacement of an obsolete RADAR (no longer produced or supported by the OEM) with the same model RADAR built 10 years later, that now has automated target tracking, collision avoidance warnings, and Automated Information System integration software. Although these capabilities did not exist in the previous version, the intent of the Radar replacement was to address the obsolete system, not to increase capability. The increased capability was simply an incidental outcome of the replacement, and not the primary intent of the configuration change.

CHAPTER 2: TIME COMPLIANCE TECHNICAL ORDER (TCTO)

A. **TCTO Development Criteria:** During the lifecycle of an asset, there are often many excellent ideas on how to improve the operational capabilities, efficiency, and effectiveness of the asset. Unfortunately, the Coast Guard has limited resources (both personnel and funding) to execute TCTOs, and only a very small portion of these ideas may be implemented. It is of utmost importance, therefore, that each and every prospective TCTO is evaluated through an objective set of criteria to ensure that changes are made only after a thorough analysis of the **business case** to make that change. These business analyses must evaluate life-cycle costs, safety, law/regulation, logistics, operational availability, maintainability, design interface, training, human factors, and facilities. Each TCTO requiring Phase I review shall undergo a review by the SFLC's Feasibility Board to ensure that only the most valuable changes are executed. Furthermore, any TCTO that results in a change to operational capability must be accompanied by a change to the Operational Requirements Document (ORD), as defined in reference (e), and must include requisite lifecycle funding from the program sponsor (CG-7 or CG-9). Details regarding thresholds for SFCCB approval of TCTOs, and detailed procedures for prioritizing work are contained in [Chapter 3](#) of this Process Guide and reference (d).

B. TCTO Applicable Conditions:

1. Close coordination is required amongst CG-45, CG-64, C4IT Service Center, and SFLC during all aspects of the TCTO process.
2. CG-9 serves as the Chair of the Surface Forces Configuration Control Board (SFCCB) only for those asset classes in acquisition. The applicable CG-7 staff chairs the SFCCB for asset classes in sustainment. Details regarding the SFCCB Process are contained in reference (d).
3. Once a TCTO is initiated, it may be cancelled at any phase of the process as indicated in [Chapter 2](#) and [Appendix B](#).
4. If a proposed TCTO is rejected or cancelled at any point in the TCTO development process (prior to Phase 1 CCB), the Product Line shall inform the applicable SFCCB to ensure there is adequate visibility of this cancellation. If the Product Line desires to cancel a TCTO after Phase 1 approval has been granted, the Product Line must seek permission from the SFCCB, as outlined in Chapter 2.C. The Product Line Engineering Section and the ESD Technical Writer shall be notified so the change may be cancelled in the Asset Logistics Management Information System (ALMIS) and SFLC Central Projects. The originator shall be notified in writing by the Product Line when a TCTO is cancelled.
5. Funding for all TCTOs must conform to policy discussed in the CG Finance Resource Management Manual {reference (g)} and reference (i), which discusses thresholds for use of AC&I and O&E funding. In general, O&E funding may be used for replacement of systems or components, technology refreshment, safety modifications, and repairs. System replacement includes activities that involve replacement of parts and components necessary to preserve the life of an asset. Technology refreshment may involve minor performance enhancements, but are intended to improve maintainability of the asset. Safety modifications are those configuration changes intended to allow an asset to perform its missions in a safe and efficient manner. TCTOs intended for major renovations and improvements are generally funded with AC&I funding, and include work associated with major service-life extensions, and major changes that improve operational capability. A TCTO can generally only be funded with one type of O&E funding (AFC-45/42 or AFC-30), and cannot be funded by both O&E and AC&I funding; mixing funding types violates policy provided in reference

(g). It is incumbent upon the Product Line to assess the appropriate funding type early in the TCTO Process, and ensure that the assessment conforms to applicable CG financial policy.

6. All proposed TCTOs submitted with the intent of improving operational capability require a change to the Operational Requirements Document (ORD), and an obligation of lifecycle funding from the TCTO sponsor (typically CG-7 for assets in sustainment and CG-9 for assets in acquisition) if the change affects lifecycle cost. In the event an ORD does not exist for an asset class, CG-731/751 must certify in writing that the change is indeed an operational requirement. Changes without this documentation and adequate funding shall not be processed for development.

7. Once a TCTO is in the deployment phase, it shall be completed on all assets among the class within the time constraints provided in the TCTO unless cancelled by the SFCCB. **A TCTO shall not be approved without a fully developed funding plan.**

a. As noted in Chapter 1, during acquisition, any changes executed to an asset class after one or more such assets have already been delivered, must be retrofitted, or a new asset sub-type must be created and concurrently authorized by CG-45, CG-731/751, CG-64, CG-113, and CG-9X. Funding for such changes must be discussed and agreed upon amongst the aforementioned HQ staff.

8. The process flow for a revised TCTO is the same as an original TCTO, except a revision TCTO must be reviewed by the Senior ACMS Analyst before the TCTO goes to print. If any additions or corrections are required to a published TCTO, a revised TCTO will be published. The revised TCTO is published in its entirety with all changes identified by revision bars.

9. As stated in Chapter 1, the policies and processes governing software procurement, refreshment, recapitalization, and documentation are not aligned throughout the Coast Guard, and often difficult to manage due to a number of factors. Therefore, it is critical that all TCTOs that affect a change to software are identified and evaluated early on in the TCTO process to ensure a smooth transition, and that all software and hardware design interface issues are captured.

C. TCTO Development Procedures: [Appendix A](#) contains an example TCTO that may be used as a guide when developing and reviewing a TCTO. Detailed flow charts outlining the TCTO process are contained in [Appendix B](#) and [Appendix C](#). Furthermore, The TCTO Template, TCTO Number Request, and TCTO Template instructions may be downloaded from the CG-web at <http://cgweb.ARSC.uscg.mil/eisd/tcto/index.cfm>. The specific procedures for developing a TCTO are as follows:

1. The TCTO process starts with an idea. This idea may start with suggestions from the field, MISHAPs, Original Equipment Manufacturer (OEM) Service Bulletins, or changes to operational requirements through Operational Requirements Documents (ORDs). They may also be initiated from within a Product Line, based on an Unsatisfactory Report (UR) for an affected part, an asset MISHAP, or from parts reliability data.

NOTE

Anyone in the Coast Guard can raise an issue that starts the TCTO process, however, TCTOs must undergo initial screening by the Chain of Command, Prime Unit, Product Line, and C4IT Service Center (when applicable).

2. TCTOs shall be initiated by submitting **Form CG-22** with an attached **draft TCTO**, to the respective Product Line through the chain of command. TCTOs shall be endorsed by one of the

authorities listed below, commenting specifically on the feasibility of the change based on the criteria established in reference (d). If the change is an operational improvement, the endorsing authority must comment specifically on the operational scope of the improvement, and specific impact on mission execution.

- Cutter Commanding Officer (O-5 and above)
- Group Commander
- Sector Commander
- DOG Unit Commander
- Training Center Commanding Officer
- District Chief of Response or Prevention
- OPCOM/FORCECOM (O-5 and above)
- Headquarters Staff (O-5 and above)
- Asset Project Office Commanding Officer
- Product Line Manager
- Engineering Services Division (GS-14/O-5 and above)
- C4IT Service Center of Excellence Commanding Officer
- Electronics Support Unit Commanding Officer

3. Any draft TCTO that proposes an improvement in asset operational capability must be accompanied by an Operational Requirements Document (ORD), and an endorsement by the respective CG-7 staff (CG-731 or CG-751), with appropriate funding for development, implementation, and full life-cycle support costs (including inventory, Standard Support Level (SSL) increases, personnel resources, training, etc.). Note that CG-45 and CG-64 staffs (along with the SFLC and C4IT Service Center) may provide assistance in developing these ORDs.

4. Draft TCTOs shall adhere to the format contained in [Appendix A](#), and shall include as much of the following information as available to the originator.

- a. *Application:* Must include all applicable assets.
- b. *Purpose:* List the intended purpose of the change.
- c. *TCTO Coordinator:* Leave blank.
- d. *When to be Accomplished:* Write down the recommended time frame for the change. Typically, unless the change is safety-related, the default time is four years (one availability cycle).
- e. *By Whom to be Accomplished:* Indicate the optimal installation activity (unit, depot, contractor, etc.).
- f. *What is Required:* Include a cost estimate, list of parts, stock numbers, references, special tools, and personnel required to perform the installation. Also include any changes in spare parts inventories. Furthermore, estimate the personnel required to perform the work, including estimated labor hours.
- g. *How Work is Accomplished:* Provide a description of how the work shall be performed, with sufficient detail to allow the Product Line and Prime Unit begin development of a TCTO.
- h. *Supplemental Information:* Include estimated weight and moment information, including the estimated weight removed or added, and the location of the net weight change in reference to the Longitudinal Center of Gravity (LCG), Vertical Center of Gravity (VCG), and Transverse Center of Gravity (TCG). Also indicate any changes that may impact training requirements.
- i. *Records:* Include all affected drawings, technical publications, and Maintenance Procedure Cards (MPCs), and if equipped, impacts to Operational Sequencing Systems.

NOTE

Operational Sequencing Systems (OSS) includes Engineering Operational Sequencing Systems (EOSS) and Combat Systems Operational Sequencing Systems (CSOSS). OSS provides ship-specific sets of procedures, diagrams, and status boards tailored for cutter configuration, and watch stations to support initialization and casualty/emergency systems control. CSOSS and EOSS are Navy-supported systems currently installed on the WMSL, and will be installed on other CG cutters in the future. OSS Systems are supported through the Navy Surface Warfare Center (NSWC).

5. When the Product Line receives a properly endorsed CG-22 and draft TCTO, they shall forward copies to the Prime Unit for initial validation, and begin taking action to process and track the draft TCTO. If the draft TCTO pertains to C4IT equipment, a copy shall also be forwarded to the C4IT Service Center. The Product Line shall hold routine audio conferences with the Prime Unit and C4IT Service Center to discuss status of pending draft TCTOs, and to coordinate the TCTO development process.

NOTE

Unlike the Aviation Logistics Center, a significant amount of TCTO technical development and implementation for C4IT Equipment occurs at the C4IT Service Center. The C4IT Service Center includes three “Centers of Excellence” (COEs): C2CEN, TISCOM, and OSC. Within these COEs, there are Core Technologies (CTs), aligned similarly to Product Lines, but responsible for a “family” of C4IT systems that apply across multiple Coast Guard Product Lines. An example is the Navigation CT, responsible for engineering and logistics for all electronic navigation systems installed on surface assets, Command Centers, and Vessel Traffic Centers. Under the current Logistics Center construct, the C4IT Service Center COEs perform some of the same roles of the SFLC ESD for C4IT TCTOs. Specifically, the C4IT Service Center COEs are responsible for technical development of draft C4IT TCTOs and accompanying technical documentation. The C4IT Service Center is also responsible for execution of approved C4IT TCTOs. The SFLC ESD Electronic Support Branch (ESD-ESB-ELEX) serves as the “asset integrator” assisting the C4IT Service Center with refining C4IT TCTOs, finalizing MPCs (adapting to particular assets), validating RCM analyses, and refining inventory and stocking requirements. Each SFLC Product Line has a staff-member assigned who is responsible for coordinating development and implementation of C4IT TCTOs between the SFLC and C4IT Service Center, recognizing that a significant amount of technical development occurs within the C4IT Service Center. Particular attention must be applied to tracking progress of C4IT changes given the new state of both organizations, geographic distribution of personnel involved in the process, and anticipated changes associated with maturity of both the SFLC and C4IT Service Center.

6. The Product Line Engineering Section shall enter a scanned copy of the CG-22 and draft TCTO into the SFLC Central Projects database for tracking purposes. This database shall be used to track all pending TCTOs. TCTOs that have been received by the Product Line, but have not yet been vetted by the Prime Unit are considered to be in “Concept” status. This database is located at: <http://elccentral.uscg.mil/forums/elc/dispatch.cgi/elcproj/viewReports/ReportELCMain>. Once the Prime Unit and Product Line have started an initial validation of the draft TCTO, the Product Line Engineering Section shall update the status of the TCTO in SFLC Central Projects database by changing the status from “Concept” to “Validation”. The respective C4IT Service Center CT shall team with the Prime Unit and Product Line to validate C4IT changes, commenting on impact to fleet readiness, and suitability for Phase I SFCCB review.

7. If the draft TCTO is such that it may impact the immediate readiness of an entire asset class, the Product Line Manager shall promptly notify CG-451 to discuss the issue so that it is raised at the next

Tri-Partite (Tri-P) Meeting. This notification may be accomplished by telephone, e-mail, or fax correspondence.

8. For all proposed changes requiring SFCCB approval, the Product Line Manager and CG-451 will discuss whether the change is worthy of consideration for approval at the Phase 1 SFCCB (based on the criteria in [Chapter 3](#)). This discussion may also be deferred by the Product Line Manager until after the SFLC Feasibility Board has reviewed the proposed TCTO.

9. After receiving the CG-22 and draft TCTO, the Product Line and Prime Unit shall develop sufficient information so that the SFLC Feasibility Board may determine whether the change should undergo further development, or be disapproved. All draft TCTOs shall be scored by the Product Line Engineering Section Chief using the World of Work (WOW) prioritization criteria referenced in [Chapter 3](#). The SFLC Feasibility Board shall also apply the “SFLC Feasibility Board Checklist” contained in [Appendix N](#) to each proposed change in order to verify that all draft TCTOs have adequate justification for the investment of funding and resources. The SFLC Feasibility Board shall forward findings and recommendations back to the Product Line Manager for further action. The SFLC Feasibility Board has the authority to recommend disapproval of proposed TCTOs based on the criteria contained in reference (d), and to forward changes back to the Product Line that require further development, justification, or re-evaluation of WOW Scoring criteria.

a. While developing a government estimate for the proposed TCTO (which is part of the information necessary for presentation to the SFLC Feasibility Board and developing a WOW Score, the Product Line Engineering Section Chief shall determine the appropriate funding source (O&E or AC&I) based on the guidance provided in references (d) and (i). Once this determination has been made, the Product Line Engineering Section Chief shall ensure that a decision memo is “written to file” documenting the funding classification, along with the justification for this decision. An example of this memo to file is included as [Appendix M](#). For C4IT Changes, the respective C4IT Service Center CT Manager shall write the aforementioned memo to file, and attach a copy to the draft TCTO.

10. If the SFLC Feasibility Board deems that the proposed TCTO is worthy of further development, the Board will make this recommendation to the Product Line Manager, and forward him/her the completed Phase 1 SFCCB Checklist contained in reference (d).

11. The Product Line Manager shall determine if a Phase 1 SFCCB is required based on a review of the criteria contained in [Chapter 1](#). If a Phase 1 SFCCB is not required, and funds are immediately available, the TCTO will be forwarded to the ESD ACMS Analyst for formal TCTO tracking, as outlined in Paragraph 2.C.16 below. If funding is unavailable for development and implementation, the Product Line Manager shall place the TCTO in a queue awaiting funding.

12. If a Phase 1 SFCCB is required, and the proposed change is based on one of the criteria listed below, the Product Line Manager shall seek funding through all available means to develop and implement the change as soon as possible.

- Urgent safety issue.
- A change that is required in order to gain compliance with a law or regulation that cannot be mitigated through other means.
- An urgent operational requirement that has a significant impact on fleet readiness and the capacity to perform chartered missions (as determined by CG-7).

13. If funds are unavailable, or the TCTO does not meet any of the criteria listed in Paragraph 2.C.12, the TCTO shall be placed in a queue awaiting funds.

a. AFC-45 Funded TCTO Queue: These pending projects shall be reviewed during a semi-annual Product Line/SFCCB funding assessment. It is expected that each Product Line will have an open backlog of pending TCTOs, awaiting funding and development given the historic volume of changes and finite resources. This semi-annual assessment consists of a review by the Product Line Managers and SFCCB of all pending TCTOs (across all Product Lines) and prioritization of these TCTOs based on WOW Score and available recapitalization funding. Note that the Small Boat Product Line will have a separate assessment meeting because of the different SFCCB membership (CG-731 as opposed to CG-751), and the fact that recapitalization funding for Small Boats is segregated from Cutters. This semi-annual funding assessment is required until each Product Line has a better understanding of the cost per operating hour for their respective assets, and the number of backlogged TCTOs has been reduced significantly.

b. AFC-42 Funded TCTO Queue: These pending projects will be prioritized by the C4IT Service Center (for cutters and boats) based on WOW Score and available AFC-42 recapitalization funding.

14. If Phase 1 SFCCB approval is required, and funding is available, the voting members of the SFCCB shall validate the WOW Prioritization score provided by the Product Line, and then make a Phase 1 approval determination. The voting members of the SFCCB consist of staff assigned to CG-731/751, CG-64, CG-451, and CG-1134 *at the O-5 level*. For assets in sustainment, the CG-731/751 staff member serves as the president of the board; for assets in acquisition, CG-9X serves as the president. Note that members of both the Phase 1 and Phase 2 SFCCBs are members typically assigned to the respective boat or cutter Tri-Partite Board.

15. If Phase 1 SFCCB approval is obtained and funding exists for further development, CG-45 (O-6 level) will formally task the SFLC CO with evaluating the proposal and developing a prototype, with deadlines based on the WOW prioritization score and any other relevant factors. If an operational evaluation is required, the Product Line will task the appropriate Prime Unit. Phase 1 CCB approval comes with an implicit authorization to execute a prototype within the limitations proscribed by the respective Product Line Engineering Section. If the Prime Unit cannot conduct the operational evaluation, CG-751 or CG-731 will formally task another Station/ANT or Cutter (as appropriate) to serve as the prototype unit for the proposed change. Template Prototype Authorization memos are provided in [Appendix L](#).

16. The following are tracking activities that occur to a draft TCTO that has been approved by the Phase 1 SFCCB (if required), or when a PLM grants concept approval (for changes that do not require Phase 1 SFCCB approval):

a. TCTO Tracking (Non-Modernized Units): If the draft TCTO is approved by the Phase 1 SFCCB, or a Phase 1 SFCCB is not required, at this point the project will be updated in the SFLC Central Projects Database, changing the status from "Validation" to "Development".

b. TCTO Tracking (Modernized Units): If the draft TCTO is approved by the Phase 1 SFCCB, or a Phase 1 SFCCB is not required, at this point a TCTO Number Request and Tracking Form (form location: <http://cgweb.arsc.uscg.mil/eisd/tcto/index.cfm>) will be completed. The sequentially indexed and unique TCTO number is obtained from the ESD ACMS Analyst, using the ALMIS TCTO numbering function. All data entered into ACMS shall be entered by the ACMS Maintenance Analyst. *The CG-22 Form (that accompanied the draft TCTO) is*

subsequently closed, with a statement indicating the new TCTO Number. In addition to ACMS entries, the Product Line Engineering section will update the Project in the SFLC Central Projects Database, changing the status from “Validation” to “Development”.

NOTE

C4IT TCTOs that have been approved by the Phase I SFCCB shall be forwarded to the respective C4IT Service Center Core Technology (CT) by the Product Line for technical development. The C4IT Service Center is responsible for fully developing all technical aspects of C4IT TCTOs, and providing comprehensive input to the Product Line on development of allowances, Supply Item Change Records, Maintenance Procedure Cards, and installation kits. Note that prototype implementation at the Prime Unit must be coordinated through the Product Line.

17. Immediately following Phase I SFCCB, the appropriate SFLC Product Line Engineering Section will develop a draft TCTO. Specifically, Technical Writers inside the Product Line will collate all technical data from the Product Line and Prime Unit, and publish a draft TCTO. The Technical Writer shall highlight sections of the draft TCTO that require additional technical development. For C4IT TCTOs, the C4IT Service Center performs this function. The format of the draft TCTO shall conform to the template provided in [Appendix A](#).

a. For C4IT TCTOs, the work described in the aforementioned paragraph shall be accomplished within the respective C4IT COE.

18. The Product Line Technical Writer shall subsequently route the draft TCTO to the Product Line Maintenance Analyst. The Maintenance Analyst will continue technical development of the TCTO, identifying changes to the Maintenance Requirements List (MRL), identifying required MPCs (or MPC changes), changes to Technical Publications, and CG Drawings associated with the TCTO. MRL and MPC changes shall be initiated by the Maintenance Analyst using Form CG-22, and developed concurrently with the TCTO per the guidance provided in reference (k). The Maintenance Analyst may also engage the ESD (as required), requesting additional support for specific technical development.

a. For C4IT TCTOs, the work described in the aforementioned paragraph shall be accomplished within the respective C4IT Service Center COE, working in concert with the SFLC ESD Electronic Support Branch (ESD-ESB-ELEX). Note that SFLC ESD-ESB-ELEX serves as the “asset integrator” for C4IT TCTOs installed on surface assets, ensuring all design interface issues are resolved. The SFLC ESD-ESB-ELEX also performs final review and development of C4IT technical documentation and MPCs, ensuring that the information is adapted to specific asset classes.

b. If the Product Line does not have staff trained in performing Reliability Centered Maintenance (RCM) Analysis, the MRL modifications may need to be developed or reviewed by the ESD Aging Cutter/Boat Branch. Furthermore, there may be some aspects of TCTO technical development that are beyond the capabilities of the Product Line. In these cases, the Product Line shall request assistance from the ESD NAME Branch.

NOTE

The C4IT Service Center COEs must work closely together with the SFLC ESD-ESB-ELEX on development of TCTOs, MPCs, and SICRs given that development of C4IT TCTOs is a shared function between the two organizations.

c. It is extremely important that MPC and MRL changes are developed concurrently with the TCTO. Most TCTOs will affect a change that impacts an MPC, or will result in development of a new MPC. It is advisable to route and develop these MPCs concurrently with the TCTO to ensure both are approved and released simultaneously.

19. In many cases technical development of a TCTO may need to be contracted out given limited personnel resources.

a. SFLC: If capacity does not exist within the ESD to provide TCTO development support in the time constraints identified by the Product Line, the ESD will provide immediate notification to the Product Line. The Product Line may then make a determination on whether the work will be out-sourced. In the case of out-sourcing, the Product Line shall generate Scopes of Work (SOWs) and government estimates, requesting assistance from the ESD as appropriate. Generally speaking, the contracting for this work will occur in the affected Product Line Procurement Section, and will leverage COTR capacity inside the Product Line Engineering Section. In the case of C4IT TCTOs, this work is done at the C4IT Service Center.. When estimating the cost to implement a TCTO (and developing lifecycle cost estimates for the WOW), the Product Line must account for the cost of contracting technical development.

NOTE

All tasking between the SFLC ESD and Product Line will be accomplished using SFLC Central Activities.

b. C4IT Service Center: If capacity does not exist within the C4IT Service Center to provide TCTO development support in the time constraints identified by the C4IT CT, the CT may then make a determination on whether the work will be out-sourced. In the case of out-sourcing, the Product Line and CT must account for the cost of contracting technical development.

20. The Product Line Maintenance Analyst is responsible for identifying the requirement for Supply Item Change Records (SICRs), and forwarding these requirements to the Product Line Engineering Section for initiation. In the case of C4IT TCTOs, these SICRs shall be initiated and developed from within the C4IT Service Center COE, and forwarded to the SFLC ESD-ESB-ELEX for review and further action. All draft SICRs shall be forwarded with a copy of the TCTO for review and approval by the Product Line Supply Section, including the appropriate Equipment Specialist, Inventory Manager (IM) and Supply Section Leader. Once the Supply Section concurs with the proposed scope and recommendations proposed in the SICR(s), they will order parts in support of a prototype installation. For AFC-42 funded C4IT TCTOs, the C4IT Service Center will normally order parts in support of the prototype once SICRs have been approved and loaded into AMMIS.

a. Non-Modernized Product Lines may use Item Entry Proposals (IEPs) in place of SICRs until SICRs are adopted by the SFLC Asset Logistics Division.

NOTE

The identification of spare parts, allowances, and installation parts is a collaborative effort between the SFLC ESD, Product Line Supply and Engineering Sections, and C4IT Service Center CT (for C4IT TCTOs); this effort is ideally accomplished in committee, especially for complex TCTOs.

21. After the Product Line Maintenance Analyst and Supply Section have made changes to the Draft TCTO, copies are forwarded concurrently by the Maintenance Analyst to the ESD Naval Architecture and Marine Engineering Branch (NAME) for technical review and input as appropriate. Note that

this review should be an iterative process if changes are required that have an impact in more than one area. For instance, if a change involving installation of new electronics gear requires an increase in air conditioning capacity (due to increased heat load), this may require weight compensation, and an increase in electrical load capacity. Thus, for more complex changes, it is efficient for technical experts within the ESD NAME Branch to work in collaboration. The ESD NAME Branch shall conduct the following technical reviews, or indicate that no review is required (as applicable):

a. Pollution Prevention Review: The Pollution Prevention Coordinator will review each draft TCTO, and determine if modifications are required to the Authorized Chemical List (ACL). The Pollution Prevention Coordinator will work with the Product Line Supply Section Equipment Specialist to minimize the use of new HAZMAT and changes to the ACL. If an equivalent chemical is already in use on the asset class that meets the new application requirements, the objective is to use this existing chemical instead of increasing the number of different chemicals on the ACL.

b. Stability Review: The ESD NAME Branch shall provide weight, moment, and center of gravity (TCG, LCG, VCG) calculations for each draft TCTO. Where necessary, the ESD NAME Branch shall provide recommendations on ballast installation or design modifications to maintain satisfactory stability and sea-keeping characteristics. Where necessary, they shall also provide recommendations on any required structural modifications necessary to support the proposed change. In all cases, the ESD NAME Branch shall log the weight, moment, and center of gravity changes through the lifecycle of each asset class.

c. Auxiliary Systems Review: The ESD NAME Branch shall conduct the following evaluations of Auxiliary System design interface issues:

- Evaluate each TCTO to verify that required heating, ventilation and air conditioning (HVAC) capacity is adequate, and where necessary provide recommendations for modifications (this includes an evaluation of the heat load generated by any new electronic equipment or machinery, and identification of any required modifications to ventilation, air conditioning, or heating systems).
- Evaluate each TCTO to verify that any required distributed fluid system capacities and piping are adequate, and where necessary provide recommendations for modifications (this includes compressed air systems, fuel, lubricating oil, cooling water systems, potable water, feed-water, hydraulic systems, combustion air and exhaust systems).
- Evaluate the impact of the TCTO to installed auxiliary systems, to verify adequate capacity, and where necessary provide recommendations for modifications (this shall include water makers, boilers, compressors, incinerators, HPUs, steering gear, flight safety equipment, pumps, etc.).
- Evaluate each TCTO to verify that any required weight handling systems are adequate, and where necessary provide recommendations for modifications.

d. Propulsion Systems Review: The ESD NAME Branch shall conduct the following evaluations of Propulsion System design interface issues:

- Evaluate each TCTO for airborne noise and vibration impact, and where necessary provide recommendations for modifications.
- Evaluate each TCTO for propulsion powering impact, and when necessary provide recommendations for modifications to prevent overloading and degraded reliability of propulsion equipment. In certain cases, this could include conducting underway

propulsion performance trials (during the prototype evaluation) and modifications of either the speed/pitch profiles for controllable pitch propeller equipped vessels or modifying the pitch of fixed pitch propellers.

- Evaluate impact of the TCTO on equipment access (i.e. Engine and Reduction Gear removal routes), and where necessary provide recommendations for modifications.

e. Electrical System Review: The ESD NAME Branch shall conduct the following evaluations of Electrical System design interface issues:

- Evaluate each change against existing plant and/or distribution system equipment to ensure adequate capacities, ratings, and sizes. Where necessary, provide recommendations for modifications or analysis (this includes generators, switchboards, breakers, transformers, cables, wire-ways, load centers, panel boards, UPS, IC systems, machinery control/monitoring systems, etc.).
- Evaluate each change against applicable standards, requirements, and policies.
- Evaluate each change to assess any power quality issues, and when necessary provide recommendations for modifications.

22. The C4IT Service Center shall evaluate whether each proposed change requires a TEMPEST or Electromagnetic Compatibility (EMC) Inspection during the prototype evaluation phase. If so, they shall begin coordination with the respective Product Line to accomplish testing. TEMPEST is an unclassified short name referring to investigations and studies of compromising emanations. TEMPEST and EMC Inspections are typically required for certain electronic communication installations.

23. The Product Line Maintenance Analyst shall compile all updates and corrections from the ESD NAME Branch and C4IT Service Center (as applicable) to the draft TCTO and forward these to the ESD Technical Writer. The ESD Technical Writer shall make corrections and issue a revised TCTO for concurrent review by the Product Line Engineering Section Chief and Manager.

- a. For C4IT TCTOs, the respective C4IT COE shall work with the SFLC ESD-ESB-ELEX to compile all updates from the ESD NAME Branch and C4IT Service Center. A smooth draft of the TCTO will be developed by the ESD Technical Writer, and issued for concurrent review by the C4IT CT Manager, SFLC ESD-ESB-ELEX Branch Chief, Product Line Engineering Section Chief, and Product Line Manager.

24. After changes to the TCTO are complete, the Product Line Technical Writer shall review and make any corrections to the TCTO draft, reporting to the Product Line Engineering Section Chief when the TCTO is ready for prototype evaluation.

25. When directed by the Product Line, the Prime Unit (or unit designated in writing by CG-731/751) shall prototype the TCTO. The Product Line, C4IT Service Center CT (for C4IT TCTOs) and Prime Unit shall jointly generate a prototype evaluation plan, and review installation procedures, parts lists, and other technical information required to conduct operational testing and evaluation. The C4IT Service Center CT has the lead for plan development on all C4IT TCTOs, and obtains input from the respective Product Line. Each prototype evaluation plan shall consider the 10 elements of Logistics, as indicated below:

- Design interface
- Maintenance planning

- Manpower and personnel
- Supply support
- Support equipment
- Technical data (to include CG Drawings, Technical Manuals, Illustrated Parts Breakdowns, OSS, etc.)
- Training and Training Support
- Computer Resources Support
- Packaging, Handling, Storage and Transportation (PHS&T)
- Facilities

26. Based on the results of the prototype evaluation, the Product Line shall accomplish the actions listed below. For C4IT TCTOs, these actions will be completed (in concert) by the respective C4IT Service Center COE, SFLC ESD-ESB-ELEX, and Product Line:

- a. Make any required changes to MPCs and draft TCTO installation procedures.
- b. Identify any discrepancies with installation kits, and submit or update SICRs to address inventory or allowance corrections.
- c. The SFLC ALD loads unique descriptions for each item-of-supply and inputs all coded technical and management data into the Federal Logistics Information System (FLIS) for the purpose of obtaining an NSN for any new parts required to execute the TCTO or associated MPCs.
- d. Make updates to CSOSS or EOSS software, if the TCTO impacts Operational Sequencing Systems.
- e. Identify any discrepancies with technical publications, CG Drawings, or other technical information related to the change, and submit new CG-22s (as required) to accomplish changes previously unidentified prior to the prototype evaluation.
- f. Make recommendations regarding suitability for fleet-wide implementation.
- g. Take action to address any TEMPEST, EMC, electrical load capacity, electrical distribution, or other issues identified during the prototype evaluation.
- h. Work with the Prime Unit to make changes to the draft TCTO.
- i. Re-score the draft TCTO using the WOW prioritization criteria. This new score is calculated with updated information gleaned during the prototype evaluation. This includes (but is not limited to) actual installation costs, inventory costs, and projected maintenance/lifecycle costs given information gleaned during the prototype evaluation. This allows re-scoring of the WOW facilitates a more accurate assessment of the “business case” for executing the change on a fleet-wide basis.

27. A Phase 2 SFCCB shall convene if the change requires SFCCB approval (see [Chapter 1](#)). The Phase 2 SFCCB members are the same as those identified for the Phase 1 SFCCB. If Phase 2 SFCCB is required, the Product Line Manager shall forward a recommendation along with the draft TCTO to the SFCCB Coordinator through the ESD Chief (or representative designated by the SFLC CO) with an information copy to the appropriate Prime Unit.

28. *The Phase 2 SFCCB shall determine whether to go forth with fleet-wide implementation based on the information collected during development of the TCTO and subsequent prototype evaluation.* The Phase 2 SFCCB shall also validate the updated WOW Prioritization score provided by the Product Line. The SFCCB shall base the decision to execute the change fleet-wide using the criteria contained in reference (d) and [Chapter 3](#), including the revised WOW Prioritization score. The Phase 2 SFCCB shall use the WOW Prioritization score to help determine funding priority, and develop a funding plan for fleet-wide implementation. It is feasible that although a proposed TCTO undergoes successful prototyping, it may not score high enough to warrant execution (based on a holistic review of all surface recapitalization and improvement funding requirements). **Unfunded changes, and those that lack a comprehensive funding plan, shall be disapproved by the Phase 2 SFCCB.**

- a. Assets that received a prototype in support of a TCTO that is disapproved by the Phase 2 SFCCB shall be restored to the original configuration, with funding from the entity that provided initial prototype funding.

29. If the proposed TCTO is approved by the Phase 2 SFCCB, it will be submitted to CG-731/751 and CG-45 (O-6 level) for final approval. If final approval is granted, CG-45 will direct the SFLC CO to complete and publish the TCTO.

30. Immediately following Phase 2 SFCCB approval, the Product Line will proceed with executing the implementation strategy for the TCTO (including procurement activities). Lead time for inventory procurement is a prime consideration (particularly for complex changes), and must be considered in all funding plans and TCTO implementation deadlines.

- a. For C4IT TCTOs, the C4IT Service Center CT has the lead for developing the implementation and procurement strategies, working closely with the respective Product Line.

31. As parts are arriving for fleet-wide implementation, the following activities shall occur in parallel:

- a. The Product Line Technical Writer produces a smooth draft of the TCTO.
- b. The appropriate Product Line Engineering Section produces and/or updates all required CG-22s, and makes recommendations to any manuals or instructions not under the purview of the SFLC (which are accomplished outside of the CG-22 process). This includes, but is not limited to the Naval Engineering Manual, Boat Operator's Handbooks, and the Cutter Training and Qualification Manual. Input from the C4IT Service Center CT and SFLC ESD-ESB-ELEX is critical for all C4IT TCTOs. Modification of manuals under the purview of CG-6 shall be pursued by the C4IT Service Center.

32. If there were a significant number of changes made as a result of lessons learned during prototype evaluation, and/or the installation is perceived to be "high risk" from a technical or operational standpoint, CG-45 may direct a trial installation at a specific location. This is another installation, after the prototype, and typically not accomplished by the Prime Unit. The SFLC will manage all such trial installations with the exception of C4IT equipment; C4IT trial installations shall be managed by the C4IT Service Center. These installations are analyzed for optimal method of installation (field level, Contractor Field Team, Industrial, YARD, or commercial Programmed Depot Maintenance (PDM)). Furthermore, these trial installations allow the Product Line and C4IT Service Center (for C4IT TCTOs) to verify parts lists, make final refinements to MPCs, and ensure all issues were addressed during prototype testing.

NOTE

Note that trial installations may also be accomplished on a “hot mockup” where appropriate. For instance, if a major overhaul of the 270’ WMEC Machinery Propulsion Control and Monitoring System (MPCMS) were accomplished, it may be appropriate to perform a trial installation on the hot mockup (MPCMS training simulator) in Portsmouth, VA.

33. If recommended by the C4IT Service Center, the Product Line will arrange for final TEMPEST and/or EMC testing on the trial install unit (as applicable).

34. The following activities shall be accomplished in parallel (or in collaboration), following trial installation and EMC/TEMPEST testing (if conducted):

- a. The TCTO is reviewed by the Product Line Engineering Section Chief, attaching the TCTO Quality Assurance (QA) Checklist contained in [Appendix O](#).
- b. The TCTO is reviewed by the Supply Section Chief.
- c. The Supply Section Equipment Specialist shall follow up on parts kits, and verify delivery status of all parts, and make reports back to the Supply and Engineering Section Chiefs.

35. After review by the aforementioned SFLC staff, the Product Line Manager reviews the TCTO, and forwards it to the ESD Chief for approval. The ESD Chief shall review the TCTO ensuring that an adequate level of technical review has been performed, and that the development of the TCTO conforms to the processes outlined in this Process Guide.

36. The Product Line Manager will ensure that the TCTO is not released until parts are available to execute the change in a timely manner. This ensures that TCTOs are released with kits, partial release as kits become available, or at a specified time for a particular reason (i.e., to align with a cutter/boat PDM availability). If a kit is required, it will be complete with all hardware items. Items such as fluids, consumables, and shelf-life-limited items, however, are not provided.

- a. Distribution of parts and kits shall be coordinated by the Product Line, specifically the PDM and Engineering Sections. If the proposed TCTO is intended to be accomplished during a maintenance availability, the PDM Section shall identify the parts and/or kits as “Government Furnished Equipment” in the contract specifications. For depot-level C4IT TCTOs, this often involves close coordination with the respective C4IT COE, who is likely to have contract authority over the installing activity and/or suppliers of parts and kits.

37. After the TCTO has been approved by the ESD Chief, and sufficient parts are on-hand for field implementation, the TCTO will undergo preparation for release in ACMS (for Modernized Units), field promulgation by message, and population in FLS as a Maintenance Standard (for Non-Modernized Units). To accomplish this, the following activities are performed:

- a. Modernized Units using ACMS: The following activities apply to TCTOs that effect one or more assets assigned to Modernized Units.
 - A TCTO Cover sheet is filled out by the Product Line Technical Writer, based on information provided by the Product Line Maintenance Analyst.
 - The final revision to the TCTO is converted to .xml format by ESD.

- The approved TCTO is added to the Maintenance Requirements List (MRL) in ACMS, by the Product Line ACMS Analyst along with a required completion date. The TCTO will become active (and readily visible to field units) when it is added to the MRL.
- A copy of the approved TCTO and all applicable CG-22s are given to SFLC ESD Technical Information Branch to provide final updates to all affected technical documents (i.e. CG Drawings and Technical Publications).
- The signed TCTO Final Version Coordination Sheet Form, [Appendix D](#), is returned to the ESD ACMS Analyst to close the SFLC internal tracking loop.
- The ESD ACMS Analyst will subsequently close the TCTO in ACMS.
- The approved TCTO is added to the [SFLC website](#) by the SFLC Business Operations Division (BOD).
- The Product Line Engineering Section Chief will release a message with guidance on timelines for implementation. The TCTO notification message shall not normally be released on a Friday, unless it is a safety issue.
- The status of the change in SFLC Central Projects will be changed from “Development” to “Deployment” by the Product Line Engineering Section.
- The TCTO will be “Closed” in SFLC Central Projects when all affected assets have accomplished the change. The final copy of the TCTO (along with all supporting documentation) will be loaded to SFLC Central Projects.

b. Non-Modernized Units: The following activities apply to TCTOs that effect one or more assets assigned to Non-Modernized Units.

- A TCTO Cover sheet is filled out by the Product Line Technical Writer, based on information provided by the Product Line Maintenance Analyst.
- The approved TCTO is provided to the ESD Configuration Data Manager. The Configuration Data Manager will update Configuration Item Functional Descriptions (CIFDs) in FLS, and create Maintenance Standards and Maintenance Items to document the configuration updates.
- A copy of the approved TCTO and all applicable CG-22s are given to SFLC ESD Technical Information Branch to provide final updates to all affected technical documents (i.e. CG Drawings and Technical Publications).
- The approved TCTO is added to the [SFLC website](#) by the SFLC BOD.
- The Product Line Engineering Section Chief will release a message with guidance on timelines for implementation. The TCTO notification message shall not normally be released on a Friday, unless it is a safety issue.
- The status of the change in SFLC Central Projects will be changed from “Development” to “Deployment” by the Product Line Engineering Section.
- The TCTO will be “Closed” in SFLC Central Projects when all affected assets have accomplished the change. The final copy of the TCTO (along with all supporting documentation) will be loaded to SFLC Central Projects.

D. Non-Modernized Unit TCTO Tracking: The tracking procedures below apply to Product Lines that have **one or more** assets enrolled in Non-Modernized Units. Note that if a Product Line has assets assigned to both Modernized and Non-Modernized Units, they must dual-track TCTOs using procedures outlined both in this Section, and in Section 2.E.

1. When a draft TCTO is first initiated, it shall be tracked using the CG-22 Process, outlined in reference (j). The draft TCTO will continue to be tracked using the CG-22 until after the Phase 1 SFCCB is complete. The Product Line Engineering Section shall also enter a scanned copy of the

CG-22 and draft TCTO into the SFLC Central Projects database for tracking purposes, immediately upon receipt by the Product Line.

2. The SFLC Central Projects database shall be used to track all TCTOs. This database is located at: <http://elccentral.uscg.mil/forums/elc/dispatch.cgi/elcproj/viewReports/ReportELCMain>.

3. TCTOs that have been received by the Product Line, but have not yet been vetted by the Prime Unit are considered to be in “Concept” status. Once the Prime Unit and Product Line have started an initial validation of the draft TCTO, those Product Lines with Non-Modernized assets shall update the status of the TCTO in the SFLC Central Projects database by changing the status from “Concept” to “Validation.” Validation is complete after the draft TCTO has been approved by the SFLC Feasibility Board, the draft TCTO has received a WOW Prioritization score, and it has been approved by the Phase 1 SFCCB.

a. The SFLC Central Projects Database is managed by the SFLC BOD; however, the respective Product Line is responsible for maintaining the recorded data. The status of records within SFLC Central Projects may only be changed by the Product Line Engineering Section, using guidance contained in this Chapter.

b. The Product Line Manager shall routinely review the contents of SFLC Central Projects to remain apprised of the status of all pending changes.

4. If the draft TCTO is approved by the Phase 1 SFCCB, or a Phase 1 SFCCB is not required, at this point the project will be updated in the SFLC Central Projects Database, changing the status from “Validation” to “Development”. Note, as stated above, those Product Lines that have assets assigned to both Modernized and Non-Modernized Units shall track TCTOs in both ACMS and SFLC Central Projects. *The CG-22 Form (that accompanied the draft TCTO) is subsequently closed, with a statement indicating the new TCTO Number.*

5. TCTOs contained in SFLC Central Projects contain the following information:

- SFLC Case File Number
- CG-22 and draft TCTO (replacing the traditional Engineering Change Request form)
- Title of the change
- Originator
- Request date
- Current status, and date last modified
- SFLC Office Location
- Due dates

6. TCTOs affecting Non-Modernized Units shall be numbered in the same manner as those that pertain to Modernized Units, as indicated in Section 2.E. The traditional Engineering Change Classification System (“A”, “B”, and “C” classification) is replaced by the timelines published with TCTOs. Note that “fix as fail” changes, and those that are non-urgent in nature may still be released as TCTOs, but with adjusted implementation dates and instructions that allow for the Product Line to determine when the change is accomplished.

7. After Phase 2 SFCCB approval, the TCTO Final Version Coordination Sheet shall be used to track and monitor internal routing of the TCTO within SFLC. An example of this coordination sheet is contained in [Appendix D](#).

8. Once a TCTO is completed, parts are on-hand, and it is ready for field deployment, the status of the change in SFLC Central will be changed from “Development” to “Deployment”. Field Units will receive notification by SFLC message to complete the change, along with instructions for reporting completion (normally reported through FLS).

9. As discussed previously, the Configuration Data Manager will update Configuration Item Functional Descriptions (CIFDs) in FLS, and create Maintenance Standards and Maintenance Items to document the TCTO. As Field Units complete the TCTO, the Maintenance Items will be completed in FLS by the Product Line Programmed Depot Maintenance Section. The TCTO will be “Closed” when all affected assets have accomplished the change. The final copy of the TCTO (along with all supporting documentation) shall be loaded to SFLC Central Projects.

E. Modernized Unit TCTO Tracking: The tracking procedures and guidelines below apply to Product Lines that have **one or more** assets enrolled in Modernized Units. Note that if a Product Line has assets assigned to both Modernized and Non-Modernized Units, they must dual-track TCTOs using procedures outlined both in this Section, and in Section 2.D. Furthermore, All TCTOs shall be tracked in SFLC Central Projects (even if they impact Modernized Units only), using the procedures identified in paragraph 2.D. The intent is to ensure that all TCTOs are available in a single repository. The following guidelines and procedures apply to Modernized Unit TCTO Tracking:

1. The SFLC ESD has overall responsibility for TCTO file maintenance and ACMS data integrity.
2. Only the ESD ACMS Maintenance Analyst can add, void, cancel, or modify records at any point in the TCTO process. The TCTO number deleted from the database will not be assigned to any future TCTO. Voided (cancelled) TCTOs do not appear on the ACMS Asset Comprehensive TCTO Status Report, but may still be retrieved from ACMS.
3. When a draft TCTO is first initiated, it shall be tracked using the CG-22 Process, outlined in reference (j). The draft TCTO will continue to be tracked using the CG-22 until after the Phase 1 SFCCB is complete.
4. When a draft TCTO is approved by the Phase 1 SFCCB, or a Phase 1 SFCCB is not required, at this point a TCTO Number Request and Tracking Form (form location: <http://cgweb.arsc.uscg.mil/eisd/tcto/index.cfm>) will be completed. The sequentially indexed and unique TCTO number is obtained from the ESD ACMS Analyst, using the ALMIS TCTO numbering function. *The CG-22 Form (that accompanied the draft TCTO) is subsequently closed, with a statement indicating the new TCTO Number.*
5. As stated above, a centralized TCTO tracking system is contained within ALMIS, and ported into ACMS. This tracking system shows where a particular TCTO is in the TCTO process.
6. TCTOs are categorized by asset type (RB-S, MLB, CPB, MSR, etc.), and also by sub-types where these exist. For instance, 270' WMECs have an “A” and “B” sub-type, and 75' WLRs would have “A” through “F” sub-types. Sub-types are only designated during acquisition or during major rehabilitation (with Tri-P approval), and are indicated in CG Drawings and other SFLC-managed configuration records.
 - a. Mandatory Special Requirements (MSR) sub-types include Life Support (LS), Ground Support (GS), Avionics (Electronics) Support (AS), and Publication Audit (PA).

7. A TCTO is next tracked by the ACMS code, which contains a total of six characters:
 - a. The first character shall be a T which identifies the ACMS code as a TCTO. The next two characters indicate the applicable S1000D Chapter based on the equipment affected (see [Appendix E](#)), i.e., J2 - Ventilation. The fourth and fifth characters contain the sequential number within an S1000D category, and are specified in reference (h).
 - b. The sixth character of the ACMS code is used to track TCTO revisions. An original TCTO ends with a zero. Revisions to existing TCTOs shall be identified by the basic four-digit TCTO number, followed by a sequential number, depending on the number of times the directive has been revised. For example, the third revision to TCTO UTB-41 TB1000 would be TCTO UTB-41 TB1003.
8. After Phase 2 SFCCB approval, the TCTO Final Version Coordination Sheet shall be used to track and monitor internal routing of the TCTO within SFLC. An example of this coordination sheet is contained in [Appendix D](#).
9. Once a TCTO is completed, parts are on-hand, and it is ready for promulgation, it shall be added to the Maintenance Requirements List (MRL) by the Product Line ACMS Maintenance Analyst. Once it is posted to the MRL, the change will be visible to the field, and will show up as maintenance due in respective asset Maintenance Due Lists (MDLs).
10. TCTO completion is automatically tracked through ACMS. Once a unit completes the change, the Field Unit provides the completed TCTO paperwork to the Field Terminal Operator (FTO), and it is removed by the FTO from the asset MDL. If a unit fails to complete the maintenance within the deadline issued within the TCTO, the item will show up on the Unit's Overdue Maintenance List web report, visible to all personnel with access to ALMIS.
11. Fleet-wide TCTO completion may be tracked by the Product Line in ACMS using the TCTO Tracking Update Screen ([Appendix F](#)), or the ACMS Asset Comprehensive TCTO Status Report ([Appendix G](#)).

CHAPTER 3: WORLD OF WORK (WOW) PRIORITIZATION CRITERIA

A. **Background:** Historically, the Surface Forces communities lacked sufficient funding to execute all proposed engineering changes that were approved by the respective Configuration Control Boards. Given that cutter and boat support resources are not expected to change significantly in the short-term, it is assumed that this problem will remain for the foreseeable future. Thus, as stated in [Chapter 2](#), there must be a robust methodology available to prioritize development and implementation of draft TCTOs. Furthermore, this methodology must have “buy-in” from the SFLC and the members of the Tri-Partite Board; if not, there is risk that Tri-Partite members may seek to re-prioritize TCTOs without viewing the total fleet-wide impact from a safety, operational, and cost standpoint. The World of Work (WOW) Prioritization Criteria will be used in conjunction with the TCTO Feasibility Checklist contained in reference (d) to prioritize funding, Engineering Services, and other resources necessary to approve, develop, and implement TCTOs. In the end-state, this WOW Prioritization Criteria will be applicable to all surface assets.

B. **WOW Prioritization:** [Appendix J](#) contains the FY09 WOW Prioritization Scoring Calculator. It is envisioned that this document will be modified significantly over the next several years to include full accountability for the following criteria:

1. **Safety:** Each TCTO will be evaluated to determine the expected decrease or avoidance of MISHAPs, involving loss or damage to property, and injury or death to personnel. Data for each proposed change will be developed in conjunction with CG-113 (one of the Tri-Partite members) using MISHAP data and Industrial Hygienists currently assigned to MLC Health and Safety Divisions. The impact to Safety (if any) will contribute to the WOW Prioritization Score.
2. **Legal Requirement:** Certain configuration changes are required in order to gain compliance with a law or regulation that cannot reasonably be mitigated through other means. In this case, the impact to the Coast Guard of reducing or changing the operation of the affected asset class to gain compliance with the law or regulation must be accounted for in the WOW Prioritization Score. Partial mission capability impact must also be considered. For example, if there were a regulatory change to the allowable 15 ppm oil discharge content for oily water separator systems (OWS), this might preclude a cutter class from operating their OWSs until a new system was installed. Failure to replace the OWS with a new compliant model would incur additional oily waste disposal costs, along with labor hours associated with offloading waste more frequently, and could potentially impact the endurance of the asset.
3. **Operational Impact:** Each TCTO shall be evaluated to determine the expected change in operational availability. The score will change based on asset type, mission profile, relative impact (if it prevents the asset from performing all missions, or if it affects partial mission capability). Particular weight will be provided to changes that allow assets to meet A_0 requirements, if they are not meeting these targets. To equate operational “value” between asset types, the Coast Guard must accurately define the per-hour operating costs of each asset, and also jointly develop (with CG-7 staff) objective values for each asset operating hour. Currently, the WOW Prioritization Criteria uses SSL and a “litmus” test on whether an asset is meeting A_0 requirements. The future criteria must be able to establish an objective value (from an operational standpoint) of every asset in inventory. This value must be such that it can be readily compared to lifecycle cost and safety.
4. **Lifecycle Value:** Each TCTO will be evaluated to determine the expected change to lifecycle cost. Labor costs shall be derived using the Standard Rates Labor Calculator (maintained by CG-83). An example of this Calculator is contained as [Appendix K](#). Lifecycle costs include capital and

recurring labor and O&E expenditures, and also include consideration for lifecycle and payback period. Criteria for this set of calculations include:

a. Lifecycle Cost:

- Expected capital (up-front) cost associated with implementing the change. This includes parts, labor, and service to actually implement the prototype, and the change fleet-wide.
- Labor cost of engineering services required for development (i.e. 1 GS-13, 1 GS-12, 1 CWO and 1 LT work 40 hours each to develop a change; per the Standard Rates Instruction, this costs the Coast Guard \$8,906.00 in FY09 Dollars).
- Labor cost of administrative support required for development and routing each TCTO, including command oversight, ESD and Product Line review, etc. (estimated at approximately \$11,000 per change in FY09 Dollars).
- Logistics costs, including the cost to kit material as well as the transportation cost for moving material from a central staging location to the installing activities.
- Other Development Costs: Includes the cost of prototyping the change, and any engineering work that is contracted out. This may also include the cost of contracted ACMS Analysts, Technical Writers, etc.
- Expected recurring maintenance costs associated with implementation.
- Expected recurring maintenance labor associated with implementation (both at depot and organizational level).
- Expected inventory costs (recurring and one-time).
- Any other anticipated recurring or one-time fixed overhead costs (e.g. disposal costs and changes to training curricula).
- Expected recapitalization requirements (when will the item need to be replaced).

b. Lifecycle Savings:

- Expected cost avoidance associated with implementing the change due to decrease in casualty expenditures. This includes parts, labor, and service for casualties.
- Expected recurring planned maintenance savings associated with implementation.
- Expected recurring planned maintenance labor savings associated with implementation (both at depot and organizational level).
- Expected inventory savings (recurring).
- Residual values of equipment removed.

c. Payback Period:

- Based on expected lifecycle savings and capital costs (both CG labor and O&E expenditures), what is the estimated payback period?
- Is the payback period within the expected lifecycle of the asset?

CHAPTER 4: MESSAGE TCTO

A. **General:** Message TCTOs are used for rapid dissemination of maintenance actions and configuration changes that are of an urgent nature (due to safety or severe operational degradation). Message TCTOs are not appropriate for complex changes with many design and logistics elements, since the Message TCTO process bypasses key portions of the TCTO development process that are intended to address these elements. The general guidelines for Message TCTOs are aligned with those of formal TCTOs, however, the timeline for execution is expedited, and the process bypasses the SFLC Feasibility Board and SFCCB. [Appendix H](#) contains an example Message TCTO, and [Appendix I](#) contains a flow chart showing the Message TCTO process. The “Ground Rules” for standard TCTOs contained in [Chapter 2](#) also apply to Message TCTOs. The process for Message TCTOs is identical for assets assigned to Modernized and Non-Modernized units, with the exception of tracking.

B. Message TCTO Development and Tracking Procedures:

1. The Message TCTO process starts with an **urgent** issue or problem. This issue may be triggered by a MISHAP, urgent OEM Service Bulletin, an Unsatisfactory Report (UR) for an affected part, or based on component reliability data. Anyone can raise an issue that starts the Message TCTO process, but the issue must be vetted through the chain of command, and endorsed (formally or informally - by email, message traffic, or memo) by one of the following authorities:

- Cutter Commanding Officer (O-5 and above)
- Group Commander
- Sector Commander
- DOG Unit Commander
- Training Center Commanding Officer
- District Chief of Response or Prevention
- OPCOM/FORCECOM (O-5 and above)
- Headquarters Staff (O-5 and above)
- Asset Project Office Commanding Officer
- Product Line Manager
- Engineering Services Division (GS-14/O-5 and above)
- C4IT Service Center of Excellence Commanding Officer
- Electronics Support Unit Commanding Officer

2. The content of the draft Message TCTO shall include all required information provided in [Appendix H](#). The draft Message TCTO shall be submitted to the Product Line Manager for action. The Product Line Manager will make a determination if the proposed change should move forward as a message TCTO, go back to the originator with a request to re-submit as a formal TCTO, or be disapproved. At this point, the Product Line Manager will immediately discuss the issue with CG-45. CG-45 may either disapprove the message TCTO, determine that a formal TCTO is warranted, or concur that a message TCTO is required.

3. If the proposed message TCTO has the potential to have a significant impact on crew safety or operational readiness, CG-45, CG-64 (for C4IT Message TCTOs), and the SFLC shall ensure appropriate notification is issued to respective Sector/District Commanders, DOG Unit COs, DOG, CG-7, CG-4, CG-6, DCMS, FORCECOM, and OPCOM.

4. If a Message TCTO is approved by CG-45 for development, a TCTO Number Request and Tracking Form (form location: <http://cgweb.arsc.uscg.mil/eisd/tcto/index.cfm>) shall be completed.

The sequentially indexed and unique TCTO number is obtained from the ESD ACMS Analyst, using the ALMIS TCTO numbering function.

5. The numbering system for Message TCTOs is identical to the formal TCTO process.
6. If a Message TCTO must be released after working hours, it will be numbered with a “proposed TCTO number” consisting of the asset type, T, chapter category, and “XXX” (e.g. RBS-25-TB1XXX). The Product Line Technical Writer shall notify the ESD ACMS Analyst the following work day.

NOTE

A proposed TCTO number shall only be used when circumstances preclude acquiring a number from the ESD ACMS Analyst.

7. After identifying the TCTO number, the Product Line Engineering Section shall draft the Message TCTO in the Record Message System. The Message TCTO shall conform to the format contained in [Appendix H](#).
8. The draft Message TCTO shall be forwarded to the Tri-P for concurrent review, with appropriate deadlines for feedback based on the relative urgency of the TCTO. After concurrent review by the Tri-P, the Product Line will make any recommended changes, and forward to the Product Line Division Chief and SFLC ESD Chief for concurrent approval.
 - a. Note that concurrent review may be waived for particularly urgent issues, with verbal authorization by CG-731/751 and CG-45.
9. The SFLC ESD Chief must approve release of all Message TCTOs; however, this approval may be provided verbally. If these individuals are unavailable and the Message TCTO is intended to address a particularly time sensitive safety or operational issue, the requirement may be waived, and the Message TCTO released by the Product Line Manager.
10. Unless the Message TCTO is intended to address an urgent safety issue, the SFLC shall avoid releasing the Message TCTO on a Friday. The intent of this guideline is to avoid having Field Units work excessive amounts of time (unnecessarily) over the weekend. Clearly, however, if the Message TCTO is intended to address an urgent safety issue, it should be released as soon as possible.
11. After the Message TCTO is released, Product Line Technical Writer shall complete the message TCTO cover sheet and forward it with the Message TCTO to the Maintenance Analyst.
12. The Maintenance Analyst shall publish and distribute an electronic or hard copy Message TCTO after it appears in CGMS to all members listed on the TCTO cover sheet.
13. The ESD ACMS Analyst shall close the SFLC internal tracking loop, load the change into ACMS, and close the Message TCTO (indicating that it is released for promulgation).
14. For assets assigned to Non-Modernized Units, the Product Line Engineering Section shall create a project in the SFLC Central Projects Database, and load a copy of the Message TCTO into the project. The project status shall be set to “Deployment” until all units have completed the TCTO. Once all units have completed the TCTO, the status in SFLC Central Projects will be changed to, “Complete.”

15. The approved Message TCTO is provided to the ESD Configuration Data Manager. The Configuration Data Manager will update Configuration Item Functional Descriptions (CIFDs) in FLS, and create Maintenance Standards and Maintenance Items to document configuration updates (as applicable).
16. The approved Message TCTO shall be added to the SFLC website by the SFLC BOD.
17. For Modernized Units, Message TCTO completion is automatically tracked through ACMS. Once a unit completes the change, the TCTO is closed out by the Field Terminal Operator (FTO), and it is removed from the MRL. If a unit fails to complete the maintenance within the deadline issued within the TCTO, the item will show up on the Unit's Overdue Maintenance List web report, visible to all personnel with access to ALMIS Electronic Asset Logbook (EAL), and the affected Field Unit will be unable to "check the asset out" in EAL.
18. Fleet-wide Message TCTO completion may be tracked by the Product Line in ACMS using the TCTO Tracking Update Screen ([Appendix F](#)), or the ACMS Asset Comprehensive TCTO Status Report ([Appendix G](#)).
19. As Field Units complete the TCTO at Non-Modernized Units, the Maintenance Item (associated with the TCTO) will be completed in FLS by the Product Line Programmed Depot Maintenance Section.

CHAPTER 5: NON-STANDARD BOAT TCTO

A. General: As of March 2009, there were more than 300 “Non-Standard” Boats assigned throughout the Coast Guard. Although these numbers are decreasing over time, it is anticipated that there will always be some unique non-standard assets required to fill certain “niche” operational requirements that are specific to unique geographic areas and specific missions. A primary intent of the TCTO process is to maintain fleet standardization. By definition, Non-Standard Boats are not built, spared, nor designed to the same standards of support as Standard Boats. However, proposed TCTOs for non-standard boats must be vetted by the SFLC to ensure that changes do not have unintended adverse impacts to stability, performance, electrical load, safety, and other design factors. Furthermore, for Non-Standard boats, the intent is to standardize as many systems as possible, aligning those with standard boats, to maximize logistics support.

B. Guidelines: The following guidelines apply to Non-Standard Boat TCTOs:

1. The list of Standard Boats is provided in Chapter 041 of reference (b). Any boat class not specified in Chapter 041, or otherwise classified by the Tri-P as a Standard Boat, is considered a “Non-Standard” Boat.
2. Changes to Non-Standard Boats may only be accomplished if one or more of the following conditions are met:
 - a. Failure to complete the change constitutes an *imminent* danger to the health and safety of Coast Guard personnel that *cannot be mitigated through any other action aside from implementing the proposed TCTO*.
 - b. The TCTO is a “form/fit/function” modification that will have an immediate impact on lifecycle operational cost, defined as savings with a payback period of less than one year, or less than one half of the boat’s remaining service life (whichever is the lesser value).
 - c. The change is a “form/fit/function” modification required due to un-supportability of an installed system, which if inoperative, prevents the asset from performing its primary mission(s).
3. TCTOs to Non-Standard Boats that modify operational capability are not authorized. These changes are not authorized, because by definition Non-Standard boats fill specific niche missions. Expanding mission capability requires a holistic evaluation of the affected Field Unit’s mission requirements, capabilities, and whether the non-standard asset should be replaced in entirety with another non-standard asset, or with a standard asset that meets the new operational needs. Furthermore, given the substantial resources required to accomplish a TCTO (both in manpower and funding), it is unforeseeable that a change made to improve the operational capability of a single Non-Standard Boat would ever be beneficial from a business-case standpoint.

C. Procedures: The following guidelines apply to Non-Standard Boat TCTOs:

1. TCTOs for Non-Standard Boats shall be initiated by submitting **Form CG-22** with an attached **draft TCTO**, to the respective Product Line through the chain of command. TCTOs shall be endorsed by one of the authorities listed below, commenting specifically on the feasibility of the change based on the criteria established in [Chapter 3](#), and certifying that the change meets one of the criteria contained in Chapter 5.B.2.

- Cutter Commanding Officer (O-5 and above)

- Group Commander
- Sector Commander
- DOG Unit Commander
- Training Center Commanding Officer
- District Chief of Response or Prevention
- OPCOM/FORCECOM (O-5 and above)
- Headquarters Staff (O-5 and above)
- Asset Project Office Commanding Officer
- Product Line Manager
- Engineering Services Division (GS-14/O-5 and above)
- C4IT Service Center of Excellence Commanding Officer
- Electronics Support Unit Commanding Officer

2. The Product Line Engineering Section will review the draft TCTO, and determine if the change meets the requirements contained in Chapter 5.B.2, and if it warrants further development based on the criteria contained in [Chapter 3](#).

3. If funding to execute the proposed TCTO is unavailable, it shall be cancelled, and an alternate strategy to address the problem identified in the TCTO shall be developed by the Product Line and Tri-P.

4. If the Product Line Manager determines that the change warrants development, and funding is available, he/she will forward it to the next Tri-P for discussion, and a request for SFCCB approval. Non-Standard Boats will only undergo one SFCCB review, since the change will normally only affect a single platform.

a. While developing a government estimate for the proposed TCTO, prior to submission to the SFCCB, the Asset Line Manager (in the Engineering Section) shall determine the appropriate funding source based on the guidance provided in references (d) and (i). Once this determination has been made, the Asset Line Manager shall write a memo to file documenting the decision, and the justification for this decision. An example of this memo to file is included as [Appendix O](#).

5. If the draft TCTO receives SFCCB approval, the Product Line Engineering Section will submit a rough-draft TCTO to the Product Line Technical Writer. The Technical Writer will conduct a quality assurance review of the draft document, collating all technical data from the Product Line and originating unit, and publish a draft TCTO in the format outlined in [Appendix A](#). The Technical Writer shall highlight sections of the draft TCTO that require additional technical development.

6. The draft TCTO shall receive a WOW prioritization score by the Product Line Manager, so that it may be prioritized with other competing technical resources.

7. The Product Line Technical Writer shall subsequently route the draft TCTO to the Product Line Maintenance Analyst. The Maintenance Analyst will continue technical development of the TCTO.

a. The Product Line may engage the ESD (as required), requesting support for specific technical development. All tasking between the ESD and Product Line will be accomplished using [SFLC Central Activities](#). If capacity does not exist within the ESD to provide TCTO development support in the time constraints identified by the Product Line, the ESD will provide immediate notification to the Product Line. The Product Line may then make a determination on whether the work will be out-sourced. In the case of out-sourcing, the Product Line shall generate Scopes

of Work (SOWs) and government estimates. It is anticipated that a significant portion of technical development for TCTOs will be contracted out given the limited capacity of Coast Guard in-house engineering services and the anticipated volume of technical work. The Product Line Procurement Section will provide contracting service for this work, and the Engineering Section will generally provide COTRs. When estimating the cost to implement a TCTO (and developing lifecycle cost estimates for the WOW), the Product Line must account for the cost of contracting technical development.

8. The Product Line Maintenance Analyst is also responsible for identifying required parts to complete the TCTO to the Product Line Supply Section. This parts list shall be forwarded with a copy of the Draft TCTO for review by the Supply Section, including the appropriate Equipment Specialist, Inventory Manager and Supply Section Leader. Note, that the identification of parts, allowances, and identification of installation parts is a collaborative effort between the Product Line Supply and Engineering Sections, and may be accomplished in committee. Note, that for non-standard boats, SICRs are not normally accomplished due to the fact that parts for these boats are generally not centrally managed. The only exception is if the system is common across multiple platforms, and it makes sense from a business-case perspective to do so.

9. After the Maintenance Analyst has made changes to the Draft TCTO, copies are forwarded concurrently by the Maintenance Analyst to the ESD Naval Architecture and Marine Engineering Branch (NAME) for technical review and input as appropriate. Note that this review should be an iterative process if changes are required that have an impact in more than one area. For instance, if a change involving installation of new electronics gear requires an increase in air conditioning capacity (due to increased heat load), this may require weight compensation, and an increase in electrical load capacity. The ESD NAME Branch shall conduct the following technical reviews, or indicate that no review is required (as applicable):

a. Pollution Prevention Review: The Pollution Prevention Coordinator will review each draft TCTO, and determine if modifications are required to the Authorized Chemical List (ACL). The Pollution Prevention Coordinator will work with the Product Line Supply Section Equipment Specialist to minimize the use of new HAZMAT and changes to the ACL. If an equivalent chemical is already in use on the asset class that meets the new application requirements, the objective is to use this existing chemical instead of increasing the number of different chemicals on the ACL.

b. Stability Review: The ESD NAME Branch shall provide weight, moment, and center of gravity (TCG, LCG, VCG) calculations for each draft TCTO. Where necessary, the ESD NAME Branch shall provide recommendations on ballast installation or design modifications to maintain satisfactory stability and sea-keeping characteristics. Where necessary, they shall also provide recommendations on any required structural modifications necessary to support the proposed change.

c. Auxiliary Systems Review: The ESD NAME Branch shall conduct the following evaluations of Auxiliary System design interface issues:

- Evaluate each change to verify that required heating, ventilation and air conditioning (HVAC) capacity is adequate, and where necessary provide recommendations for modifications (this includes an evaluation of the heat load generated by any new electronic equipment or machinery, and identification of any required modifications to ventilation, air conditioning, or heating systems).

- Evaluate each change to verify that any required distributed fluid system capacities and piping are adequate, and where necessary provide recommendations for modifications (this includes compressed air systems, fuel, lubricating oil, cooling water systems, hydraulic systems, combustion air and exhaust systems).
- Evaluate each change against all installed auxiliary systems to verify adequate capacity, and where necessary provide recommendations for modifications (this shall include water makers, compressors, HPUs, steering gear, pumps, etc.).
- Evaluate each change to verify that any required weight handling systems are adequate, and where necessary provide recommendations for modifications.

d. Propulsion Systems Review: The ESD NAME Branch shall conduct the following evaluations of Propulsion System design interface issues:

- Evaluate each TCTO for airborne noise and vibration impact, and where necessary provide recommendations for modifications.
- Evaluate each TCTO for propulsion powering impact, and when necessary provide recommendations for modifications to prevent overloading and degraded reliability of propulsion equipment. In certain cases, this could include conducting underway propulsion performance trials (during the prototype evaluation) and modifications of either the speed/pitch profiles for controllable pitch propeller equipped vessels or modifying the pitch of fixed pitch propellers.
- Evaluate impact of the TCTO on equipment access (i.e. Engine and Reduction Gear removal routes), and where necessary provide recommendations for modifications.

e. Electrical System Review: The ESD NAME Branch shall conduct the following evaluations of Electrical System design interface issues:

- Evaluate each change against existing plant and/or distribution system equipment to ensure adequate capacities, ratings, and sizes. Where necessary, provide recommendations for modifications or analysis (this includes generators, switchboards, breakers, transformers, cables, wire-ways, load centers, panel boards, UPS, IC systems, machinery control/monitoring systems, etc.).
- Evaluate each change against applicable standards, requirements, and policies.
- Evaluate each change to assess any power quality issues, and when necessary provide recommendations for modifications.

10. The C4IT Service Center shall evaluate whether each proposed change requires a TEMPEST or Electromagnetic Compatibility (EMC) Inspection during the prototype evaluation phase. If so, they shall begin coordination with the respective Product Line to accomplish testing. TEMPEST is an unclassified short name referring to investigations and studies of compromising emanations. TEMPEST and EMC Inspections are typically required for certain electronic communication installations.

11. The Maintenance Analyst shall compile all updates and corrections to the draft TCTO and forward these to the Technical Writer. The Technical Writer shall make corrections and issue a smooth copy TCTO for review by the Product Line Engineering Section Chief. The Product Line Engineering Section Chief shall attach a completed TCTO Quality Assurance (QA) Checklist (contained in [Appendix O](#)), and forward the TCTO with the Quality Assurance Checklist for final approval by the Product Line Manager.

12. After changes to the TCTO are complete, the Technical Writer will report to the Product Line, indicating the TCTO is ready for installation.

13. At this point, the Product Line Supply Section will order parts to execute the TCTO. Upon receipt of parts, the Product Line Engineering Section (and PDM Section if applicable) will coordinate installation of the TCTO.

14. Once the TCTO is complete, the unit shall report in writing by CG memo to the SBPL that the change was complete, and keep a copy of the memo and TCTO in the Unit Boat Record.

D. TCTO Tracking for Non-Standard Boats: The tracking procedures below apply to Product Lines that have assets enrolled in both Non-Modernized and Modernized Units. Configuration of Non-Standard Boats is not tracked in ACMS or FLS, except where it makes sense from a business case to do so (such as a system that is common across multiple asset classes). Therefore, it is often not necessary to make updates to these databases. In the event that it makes sense from a business case to track the information (based on a determination made by the Small Boat Product Line Manager), the Product Line Manager shall proscribe the tracking procedures. The following general process applies for Non-Standard Boats:

1. Non-Standard Boat TCTOs will be tracked from the time it is received by the Product Line until TCTO approval using the CG-22 Process, outlined in reference (j). Neither ACMS nor SFLC Central Projects will be used to track Non-Standard Boat TCTOs.

2. TCTOs for Non-Standard Boats shall be numbered based on the guidance provided in Section 2.D. The traditional Engineering Change Classification System (“A”, “B”, and “C” classification) is replaced by the implementation deadline published with the TCTO.

3. After the Smooth Copy of the TCTO is completed by the Technical Writer, it shall be reviewed and approved by the Product Line Manager. The TCTO Coordination Sheet ([Appendix D](#)) is not required.

4. Non-Standard Boat TCTOs are not tracked in SFLC Central Projects. The final copy of the TCTO shall be included in the affected Unit Boat Record(s). The Product Line will keep a scanned electronic copy of the TCTO on an SFLC Public Folder until the affected asset is decommissioned.

CHAPTER 6: AMPLIFYING REQUIREMENTS FOR NAVY-TYPE, NAVY-OWNED (NTNO) EQUIPMENT

A. Navy-Type, Navy-Owned (NTNO) Equipment: Modifications to Navy-Type, Navy-Owned Equipment, including both Electronics and Ordnance Systems, are originated and developed by the U.S. Navy. Details regarding configuration management and alteration of these systems are contained in reference (f). Configuration changes to this equipment are governed entirely by the Navy; the Coast Guard does not have configuration management authority for this equipment.

1. Configuration changes to NTNO equipment are fully funded from the AFC-77 account, and do not compete with other TCTOs for resources. To ensure that configuration management is maintained on all assets with NTNO installed, if the Navy issues an Ordnance Alteration (ORDALT) or other valid configuration change order, the SFLC ESD-Electronics Branch will take this information and promulgate it in a TCTO using the format in [Appendix A](#). Generally speaking, these TCTOs will consist of a sign-off/cover sheet (the form provided in [Appendix A](#)), and reference the attached DOD-developed configuration change.
2. NTNO TCTOs do not require SFCCB approval unless the change constitutes a change in operational capability (which also requires an Operational Requirements Document). Examples include proposed installation of a new Mk15 25mm gun on a CG cutter that does not currently have such a gun.

CHAPTER 7: TCTO GUIDELINES

A. General

1. Time Compliance Technical Orders (TCTOs) are developed and maintained using Arbortext® software. The software Document Type Definition (DTD) sets the format for the TCTO and the Formatting Output Specification Instance (FOSI) determines the printed copy. TCTOs shall conform to the format described below.
2. Appendix A contains sample TCTO format (with instructions) that shall be used as a guide for developing and reviewing TCTOs. The cover sheet used for TCTOs is the CG ACMS cover sheet. A TCTO template (without the cover sheet) is available at the following website: http://cgweb.arsc.uscg.mil/eisd/tcto/tcto_tpl.rtf. Samples of previously approved/promulgated TCTOs for surface and aviation forces are located at: <http://cgweb.arsc.uscg.mil/eisd/tcto/index.cfm>. TCTO developers and those submitting TCTOs are highly encouraged to review these resources prior to submitting a TCTO.
3. Making changes after submission of copy (conversion to .XML format) delays TCTO publication and adds to the expense of the work; therefore, TCTOs must be carefully edited before being submitted. Reference (I) shall be used as guidance to achieve uniform writing style. Reference (I) is located at <http://www.gpoaccess.gov/stylemanual/browse.html>.

B. Standard Format

1. All TCTO sign off sheet headings contain the TCTO number and revision date in the upper right-hand corner. The revision date is determined by the document's coordinator.
 - a. The TCTO number format is eight places, including the decimal. For example: TA6010.0.
2. TCTO sign-off sheets have standard headings for date/time/hours of accomplishment, Component End Item Number (CEINUM), and the necessary fields for tracking individual maintenance parameters.
3. The body of the TCTO starts on page 2.
4. Use black, Arial 10-pitch font, except where otherwise indicated.
5. The TCTO number in black, Arial 10-pitch font is located on the upper right-hand corner of the header: Example, TCTO MLB-47 TN0000.
6. The page number (i.e. Page X of Y) in black, Arial 10-pitch font is located on the bottom right-hand corner of the footer, starting on page 2.
7. The body of the TCTO has no border or image at the bottom of the page.
8. The body of the TCTO uses the following heading outline:
 1. (Level 1)
 - a. (Level 2)

- (1) (Level 3)
 - (a) (Level 4)
 - 1. (Level 5)
 - a. (Level 6)

- 9. Level 1 headings shall be Arial, 10 pt, uppercase, bold with no punctuation.
- 10. Level 2 headings shall be Arial, 10 pt, uppercase, with no punctuation, with the exception of those in paragraph 7, which shall be Arial, 10 pt, sentence case with punctuation as required.
- 11. Heading level 3 and beyond shall be Arial, 10 pt, sentence case with punctuation as required, with the exception of 6. a. (1), which will be in title case with no punctuation.
- 12. Use short, concise sentences, ensuring they are technically accurate. Phrases, incomplete sentences, and run-on sentences are not acceptable.
- 13. Spell out numerical quantities under ten unless they are followed by a unit of measurement, time, or quantity used in series with other items expressed as numerals. This rule includes ordinal numbers - first, second, etc.
- 14. The use of commonly recognized Coast Guard acronyms is acceptable.
- 15. When providing dimensions in the text of a TCTO or on diagrams, use the following guidelines:
 - a. All dimensions shall be listed in inches and feet, and if appropriate, with metric dimensions added in parentheses.
 - b. Use two letter abbreviations for dimensions, such as in, ft, mm, cm, etc. Do not use ', ", etc.
 - c. If a given dimension is less than 1, place a 0 to the left of the decimal point. For example, write 0.15 instead of .15.
 - d. Ensure the same accuracy is used for a given dimension between text and diagram. For example, do not list a dimension of 0.12 in. in the text and indicate the same dimension on the diagram as 0.124 in.
 - e. Measurements given in decimal format are generally preferred with exception when clarity dictates the use of fractions.
- 16. If Quality Assurance inspections are required, always show a line item estimate for quality assurance labor-hours and skill requirements in the personnel information paragraph, paragraph 6.b.
- 17. Part numbers listed in the Supply Information and Requirements paragraph shall be consistent with the text and figures.
- 18. Put commas between part numbers and nomenclature.

EXAMPLE:

INCORRECT: Install screws P/N MS27039-1-09 and washers P/N AN960C10L.

CORRECT: Install screws, P/N: MS27039-1-09, and washers, P/N: AN960C10L.

19. Foldout pages shall be used only for diagrams or charts which cannot be reduced for satisfactory presentation on single pages.

20. Weight and center of gravity information must be included in the TCTO. Insert one of the three below comments regarding weight and KG:

- a. No effect. If the TCTO involves only an adjustment or procedure that does not affect asset weight or stability.
- b. Negligible change. Changes in weight or moment that do not significantly affect intact or damaged stability. Although each case is unique due to different limiting factors, the general thresholds listed below apply. Note that SFLC (023 and 024) possess the authority to make weight and moment determinations.
 - Non-Self-Righting Small Boats (less than 65 feet in length): Changes that create more than a 0.002 ft change in the center of gravity in any direction (vertical, longitudinal, or transverse) or net weight changes of more than 1/5 of 1% of the full load displacement require a TCTO.
 - All Other Vessels: Changes that create more than a 0.001 ft change in the center of gravity in any direction (vertical, longitudinal, or transverse) or net weight changes of more than 1/20 of 1% of the full load displacement require a TCTO.
- c. As follows. This is for changes in weight or moment that significantly affect intact or damaged stability, and thus require full documentation. These also include any changes that require ballast compensation. The format prescribed in [Appendix A](#) indicates how this information should be documented in the TCTO.

21. A revision TCTO requires a black revision bar in the margin next to where the change was made. A statement in paragraph 2.b., Purpose of the TCTO, shall state the reason why the TCTO is being revised.

C. Use of Capital Letters, Quotations Marks, Commas, and Virgules

1. Use the following guidelines:
 - a. CAPITALS – Placard name of switches, controls, fuses, circuit breakers, illuminated push button switch lights, valves, proper nouns, acronyms, etc.
 - b. “CAPITALS IN QUOTATION MARKS” – Marked or unmarked switch/control positions.
 - c. Quotation Marks
 - Computer commands, icons, page display, etc.
 - Computer menus/menu items should read the way they show on screen display.
 - The phrase “if installed” is used where equipment/switch locations could not accurately be determined before publication of the manual. If used with a checklist challenge, it means all class assets do not or will not have this item installed. If used with a checklist response, it

means the item's location varies with different assets within the class.

2. Checklists:

- a. In checklist responses/actions, placarded names, and un-placarded switch positions will be in capitals.
- b. Un-placarded names/actions will be in initial capitals.
- c. Challenges will be in initial capitals.
- d. Quotation marks are reserved for spoken responses.
- e. A comma between crew positions or responses indicates that both will be applicable.
- f. A virgule (/) between positions or responses indicates either one or the other will apply.
- g. Due to varying configurations of assets within a class, the word "Typical" is used when a description or figure is representative of the majority of the class.

D. Revision Bar Placement

1. A revision TCTO requires a black revision bar in the margin next to where the change was made.
2. A statement in paragraph 2.b., Purpose of the TCTO, shall state the reason why the TCTO is being revised.
3. Revision bars are placed at the point of change to inform the user where a change has been made in the document. Changes and deletions are identified and shown in Table 7-1.

Table 7-1. Revision Bar Placement

Description	Revision Bar Placement
Typo corrections only if the meaning is not changed (Example, missing letter (Torque), inverted letters (otrque))	No rev bar
Typo corrections if the meaning has changed (Example: incorrect, MIL-PFR-81390, corrected MIL-PRF-81309)	Add rev bar
Text changes within a step	Rev bar on affected step
Inserting a new step	Rev bar on new step
Deletion of entire step	Rev bar on all following renumbered steps
Deletions with no following step	Rev bar on step preceding deletion
Deletions in lists (Tools and Test, References,	No rev bar

Expendables and Consumables, tables etc.)	
Deletions of paragraph	Rev bar on the paragraph that followed the deleted paragraph (Delete A and B becomes A, rev bar new A)
Deletion of item	Rev bar on ITEM title if number changes (II becomes I)
New figures	Rev bar on figure
New document (first time in the system)	No rev bar

E. Warnings, Cautions, and Notes

1. Warnings, Cautions, and Notes should immediately precede the steps to which they apply.

WARNING

THIS FORMAT IS USED FOR WARNINGS. A WARNING IS AN OPERATING PROCEDURE, TECHNIQUE, OR PRACTICE THAT, IF NOT CORRECTLY FOLLOWED, COULD RESULT IN INJURY OR DEATH. WARNINGS SHOULD PRECEDE THE STEP THAT THEY ARE EMPHASIZING AND SHOULD NOT END A PAGE. AN EXCEPTION IS WHEN A LENGTHY WARNING (LIKE COMPRESSED AIR), WILL CAUSE MORE THAN A THIRD OF THE PAGE TO BE LEFT BLANK DUE TO A REFERENCED STEP ROLLING TO THE NEXT PAGE. THE WARNING CAN END A PAGE AND THE FIRST STEP OR TEXT FOLLOWING THE WARNING MUST APPEAR IMMEDIATELY ON THE NEXT PAGE.

Warnings for HAZMAT/chemical use are required only once per page for each chemical regardless of how many times the HAZMAT/chemical is referenced on the page. Standard hazardous material warnings shall be used for HAZMAT consumables.

CAUTION

THIS FORMAT IS USED FOR CAUTIONS. A CAUTION IS AN OPERATING PROCEDURE, TECHNIQUE OR PRACTICE THAT, IF NOT CORRECTLY FOLLOWED, COULD RESULT IN DAMAGE TO OR DESTRUCTION OF EQUIPMENT. IN TCTOS, CAUTIONS ARE DISPLAYED IN RED UPPERCASE LETTERS. CAUTIONS SHOULD PRECEDE THE STEP THAT THEY ARE EMPHASIZING AND SHOULD NOT END A PAGE. AN EXCEPTION IS WHEN A LENGTHY CAUTION WILL CAUSE MORE THAN A THIRD OF THE PAGE TO BE LEFT BLANK DUE TO REFERENCED STEP ROLLING TO THE NEXT PAGE. THE CAUTION CAN END A PAGE AND THE FIRST STEP OR TEXT FOLLOWING THE CAUTION MUST APPEAR IMMEDIATELY ON THE NEXT PAGE.

NOTE: This format is used for notes. Notes should precede the step that they are emphasizing.

- a. If the Warning, Caution, or Note applies to multiple steps, it only needs to be listed prior to the first instance per page. The exception is for notes regarding no torque value required which shall appear before each where tightening of fasteners is called for.
- b. If more than Warning, Caution, or Note applies to a single step, they shall be listed in the following order:
 - **WARNING**
 - **CAUTION**
 - *Note:*

F. Illustrations, Figures, Tables, Charts, and Forms


1. The use of illustrations and tables is encouraged; however, they must be referenced in the text of the TCTO.
2. Figures should be numbered 1, 2, etc., and appear in the same sequence as referenced in the body of the TCTO. Photographs and drawings should appear as figures and be included in the page numbering sequence. Drawings should include a reference to the drawing number. Figures, tables, charts and forms should appear in the following order after the end of the text:
 - Figures
 - Tables
 - Charts
 - Forms
3. The following guidelines apply for photographs submitted with a TCTO:
 - a. Digital images are preferred media for photos.
 - b. The digital images should be submitted in JPEG format.
 - c. Always use an electronic flash and a contrasting background when taking photographs.
 - d. Never take a photograph of an area larger than necessary to convey the intended message.
 - e. All photos must have captions.
4. Illustrations, figures, tables, charts, or forms may be placed within the text as requested by the coordinating activity. However, unless otherwise specified, tables, charts, and/or forms will be placed at the end of the text and preceding illustrations.
5. Illustrations should be clear and concise; any item numbers or descriptions not used in the text of

the MPC should be removed from the illustration.

- a. Item names/descriptions may be used instead of item numbers. If names or descriptions are used they shall be called out in the text as well.
 - b. Titles shall be added to the illustration.
 - c. Illustrations/graphics can be titled Figure, Table, Chart, or Form.
6. Tables, charts, and forms are available in portrait format only. If a table, chart, or form is such that landscape format is required; it must be developed as a graphic.
7. A chart or form, regardless of size, when tagged in the Arbortext ® software, inserts a page break so nothing else can be put on that page.
 - a. Furthermore, EPIC is restricted in font size, page margins, and in building individual inserts/boxes to develop the customer requested appearance of a chart or form. This may require that a chart or form be developed as a graphic depiction to utilize page space or satisfy a customer request.

APPENDIX A: SAMPLE TCTO

The following is a sample template cover TCTO sheet:

U.S. COAST GUARD ASSET COMPUTERIZED MAINTENANCE SYSTEM										MLB - 47 TH1000.0 REV'D: 02/25/09			
ASSET NUMBER		OPERATING ACTIVITY		MAINTENANCE ACCOMPLISHED				MAINTENANCE DUE					
				DATE		ASSET HOURS		DATE		ASSET HOURS			
				MO	DAY			YEAR	MO			DAY	YEAR
				ZULU DATE		ZULU TIME							
				MO	DAY							YEAR	
ITEM NO. [X] DUE	CMS CODE TH1000	ACTION REPLACE		DESCRIPTION AUTOPILOT				CEINUM ML-B000-001					
<input type="checkbox"/> SCHEDULED <input type="checkbox"/> UNSCHEDULED													
MAN HOURS: MK DC EM ET GM SM FN SN OTHER													
REMARKS:													
TECHNICIAN'S SIGNATURE						TECHNICIAN'S ID							
*ASTERISK INDICATES QA REQUIRED				QA									
<div style="border: 1px solid black; display: inline-block; padding: 5px; margin-bottom: 10px;"> IMMEDIATE ATTENTION REQUIRED </div> <div style="border: 1px solid black; display: inline-block; padding: 5px; margin-bottom: 10px;"> TIME COMPLIANCE TECHNICAL ORDER </div> TCTO MLB-47 TH1000 THIS TECHNICAL ORDER IS APPLICABLE TO ALL 47 FOOT MLB STANDARD BOAT HULLS. THIS TECHNICAL ORDER DIRECTS AND AUTHORIZES THE REPLACEMENT OF THE CURRENT RAYTHEON AUTOPILOT SYSTEM WITH THE FURUNO NAVPILOT 500 AUTOPILOT SYSTEM.													
REVIEWED BY				LOG YN				DATA ENTRY COMPLETED					
<div style="float: left; width: 150px;">  </div> <div style="float: right; text-align: right;"> Page 1 of X </div>													

The following format shall be used in the “body” of all TCTOs. Note that the bullets provided below are instructions on content for the applicable section. A TCTO template (without the cover sheet) is available at the following website: http://cgweb.arsc.uscg.mil/eisd/tcto/tcto_tpl.rtf. Samples of previously approved/promulgated TCTOs for surface and aviation forces are located at: <http://cgweb.arsc.uscg.mil/eisd/tcto/index.cfm>.

1. APPLICATION

- Identify the applicable asset. For example, “This technical order is applicable to all Coast Guard 47 ft MLBs.”
- If this is a “record purposes only” TCTO, include the following statement in capital letters: THIS TCTO IS FOR RECORD PURPOSES ONLY.”
- If prototype installations were completed, include the asset, where and when the prototype was installed, and if it will or will not remain installed. For example, “Prototype installation was accomplished on CG 47221 at STA Ocean City (Prime Unit) in July 2008, and will remain installed.”

2. PURPOSE

- State the purpose of the TCTO.
- For a revision to a TCTO, state the purpose of the original TCTO and include a brief explanation of why the original TCTO is being revised. Include the statement “This TCTO supersedes [TCTO MLB-47 TJ2000].”

3. TCTO COORDINATOR

- List the point of contact, telephone number, fax number and/or e-mail address of the person to contact for questions or comments associated with the TCTO.

4. WHEN TO BE ACCOMPLISHED

- State when the TCTO should be completed. For example “Within 180 days after receipt of this TCTO.”

5. BY WHOM TO BE ACCOMPLISHED

- State who will be accomplishing the work of the TCTO. For example, “CG YARD during road-shows arranged by the PDM Section. Contact your RPDM Cell to arrange for implementation.”

6. WHAT IS REQUIRED

a. SUPPLY INFORMATION AND REQUIREMENTS

(1) Kit/Parts/Materials Required

- The TCTO must specifically state how parts will be delivered to field units (or PDM facility). For example, “All parts kits to accomplish this TCTO will be delivered directly to all affected Sectors, from SAFE Boat (the manufacturer’s facility in Port Orchard, WA). Units shall contact their respective Sector AMM to obtain the kit.
- If the parts required will be provided in a kit, use the following standard statement: “The following kit contains the parts required to comply with this TCTO, and shall be requisitioned from Coast

Guard Surface Forces Logistics Center, 2401 Hawkins Point Rd, Baltimore, MD 21226-5000 (the address for acquiring the kit). Questions regarding the 14 degree frame repair kit (name of the kit) should be referred to Small Boat Product Line Supply Cell Equipment Specialist (position of person to contact), telephone number (410) _____, fax number (410) _____. List the kit quantity, national stock number, part number, nomenclature, and source using the following five column table.

QTY	NSN	PART NUMBER	NOMENCLATURE	SOURCE
x	xxxx-xx-xxx-xxxx	xxxxxx	(as stated in Fedlog)	SOS: xxx
x		xxxxxx		CAGE: xxxxx
x		xxxxxx		Contractor Provided
x		xxxxxx		(name address and contact information of provider)
x		xxxxxx		Procure locally

- After the kit information provided above, write the following statement: "The following parts are furnished in the 14 degree frame repair kit (name of kit) and do not need to be requisitioned separately."

NOTE

Authorized chemicals are never shipped as part of the kit.

- List the parts provided in the kit and include one copy of the TCTO. See example below.

QTY	NSN	PART NUMBER	NOMENCLATURE	SOURCE
x	xxxx-xx-xxx-xxxx	xxxxxx	(as stated in Fedlog)	SOS: xxx
x		xxxxxx		CAGE: xxxxx
x		xxxxxx		Contractor Provided
x		xxxxxx		(name address and contact information of provider)
x		xxxxxx		(name only of provider after providing address and contact information for a previous item in this table)
x			(provide enough information to positively identify items with procure locally sources)	Procure locally

- If the parts/materials required are not provided in a kit and are not being staged as a single item, use the following statement: "The following parts required to comply with this TCTO are not furnished in a kit and will be obtained through the appropriate supply source." See below for an example showing the listing of the parts/materials.

QTY	NSN	PART NUMBER	NOMENCLATURE	SOURCE
x	XXXX-XX-XXX-XXXX	XXXXXX	(as stated in Fedlog)	SOS: xxx
x		XXXXXX		CAGE: xxxxx
x		XXXXXX		Contractor Provided
x		XXXXXX		(name address and contact information of provider)
x		XXXXXX		(name only of provider after providing address and contact information for a previous item in this table)
x			(provide enough information to positively identify items with procure locally sources)	Procure locally

- If the parts/materials are not provided in a kit and will be staged as Government Furnished Equipment for a PDM availability, use the following paragraph: "The following parts/materials required to support this TCTO will not be assembled as a kit but will be staged as Government Furnished Equipment. A sufficient supply of all parts to complete all asset installations shall be staged by the PDM Section prior to the issuance of this TCTO. These parts shall be segregated from other parts storage and be reserved for their intended use." See below for an example showing the listing of Government Furnished Equipment:

QTY	NSN	PART NUMBER	NOMENCLATURE	SOURCE
x	XXXX-XX-XXX-XXXX	XXXXXX	(as stated in Fedlog)	SOS: xxx
x		XXXXXX		CAGE: xxxxx
x		XXXXXX		Contractor Provided
x		XXXXXX		(name address and contact information of provider)
x		XXXXXX		(name only of provider after providing address and contact information for a previous

				item in this table)
x			(provide enough information to positively identify items with procure locally sources)	Procure locally

- The PDM Section will order the parts/materials as required and label them as “reserved for TCTO MLB-47-TXXXXX” if the TCTO is intended for implementation during a PDM availability.

(2) Action Required on Items in Stock

- If there are no actions required on items already in stock, write “Not applicable.” If there is action required on items in stock, list information as follows:

NSN PART NUMBER NOMENCLATURE

- Modify all in accordance with this TCTO. Modifications may include survey or disposal of existing inventory, reprogramming the material stocked under the NSN, or other action.

(3) Kits/Parts/Materials Required to Modify Items in Stock

- If paragraph 6.a.(2) is “Not applicable,” this paragraph should also be “Not applicable.” If parts are listed in paragraph 6.a.(2), the following statement shall be written in this paragraph: “Materials required to modify items in stock are listed in paragraph 6.a.(1).”

(4) Disposition of Removed and Replaced Parts/Materials

- If there are no parts/materials that need to be disposed of, show “Not applicable.” If there are removed/replaced parts/materials that need to be disposed of, list information as follows:

QTY NSN PART NUMBER NOMENCLATURE DISPOSITION

(5) Drawings Required

- List drawings that are required in order to complete the TCTO. If no drawings are required, write “Not applicable.” If CG Drawings are required or were modified, list the drawing numbers and insert the following statement: “Consult NE-TIMS (<http://10.38.16.120:1088/ne-tims/index.html>) for the most current drawing revision.” Selected Record Drawings must also be modified, as required in Chapter 085 of the Naval Engineering Manual, COMDTINST M9000.6 (series).

(6) Estimated Size, Weight, and Cost of Kits

20L x 20W x 26H inches, 120 lbs, \$1,500.00 each
(to be provided by Equipment Specialist or Technical Services)

b. PERSONNEL INFORMATION AND REQUIREMENTS

- List work, skill level, and the number of labor-hours required. See below.

WORK PHASE	SKILLS	LABOR-HOURS
Installation	AWS-Certified Welder	16.0
Inspection	Marine Chemist	1.0
Inspection	QA	0.5
TOTAL		8.5

c. SPECIAL TOOLS, FIXTURES, AND SOFTWARE REQUIRED

- This is a list of all special tools and/or test equipment referred to in the text. The list should also include special personnel protective equipment (other than safety glasses and hearing protection). Torque wrenches include the required torque value/range. Special tools should include a description and a National Item Identification Number (NIIN) or Allowance Change Number. Common tools normally contained in a standard toolbox should only be listed if during the procedure the technician may not have ready access to their toolbox. For example, if the procedure requires the technician to go aloft on a mast or enter a tank, then the tools needed should be identified. The list will be in alphanumeric order.
- If none are required, state "Not applicable."

7. HOW WORK IS ACCOMPLISHED

- Give a concise description in sequential steps how the work shall be accomplished.
- Use only one action verb per sentence.
- Acronyms shall be spelled out in title case then followed by the acronym in the first occurrence as in the following example: Time Compliance Technical Order (TCTO).
- For those TCTOs that will be accomplished by contractors, provide only the amount of detail required for the organizational unit point of contact to ensure that contractor is performing work required by the contract SOW.
- All parts and material listed in paragraph 6.a.(1) shall be used in the text of paragraph 7.
- All special tools listed in paragraph 6.c. shall be used in the text of paragraph 7.
- Include any illustrations as necessary and give step-by-step instructions for performing all inspections, replacements, retrofit changes, etc., required by the TCTO.
- Figures, Tables, Charts and Forms shall appear at the end of the TCTO Body in the order that they were referenced in the TCTO body.
- Describe what to do with all of the parts and/or material listed in paragraph 6.a.(1).
- Any chemicals shall be listed in the Authorized Chemical List (ACL). If a chemical is required that is not in the ACL, a CG Form 22 shall be completed to add the chemical to the ACL. An ACL is maintained by the ESD Pollution Prevention Coordinator for each Asset Class. There must be a warning listed for the chemical prior to citing the work procedure involving use of that chemical. Formatting examples are shown below.
- If quality assurance inspections are required, place the statement below directly following that step. List the time required for the QA inspection in paragraph 6.b.

*** Q.A. REQUIRED (X)**

8. SUPPLEMENTAL INFORMATION

a. OPERATIONAL CHECKOUT REQUIREMENTS

- If operational tests are required prior to placing the equipment or asset back in service, they shall be written in this paragraph. If none are required, state "Not applicable."

b. WEIGHT AND CENTER OF GRAVITY INFORMATION

- Weight and moment information must be included in the TCTO. Insert one of the three comments below (depending on applicability):
 - “No effect.” If the TCTO involves only an adjustment or procedure that does not affect asset weight or stability.
 - “Negligible change.” Changes in weight or moment that do not significantly affect intact or damaged stability. Although each case is unique due to different limiting factors, the general thresholds listed below apply. Note that SFLC (023 and 024) possess the authority to make weight and moment determinations.

Non-Self-Righting Small Boats (less than 65 feet in length): Changes that create more than a 0.002 ft change in the center of gravity in any direction (vertical, longitudinal, or transverse) or net weight changes of more than 1/5 of 1% of the full load displacement require a TCTO.

All Other Vessels: Changes that create more than a 0.001 ft change in the center of gravity in any direction (vertical, longitudinal, or transverse) or net weight changes of more than 1/20 of 1% of the full load displacement require a TCTO.

- “As Follows.” This is for changes in weight or moment that significantly affect intact or damaged stability, and thus require full documentation. These also include any changes that require ballast compensation. The format prescribed below indicates how this information should be documented in the TCTO:

Total weight removed: XX.X pounds at:
 XX.XX ft above the baseline
 XX.XX ft (port/stbd) of centerline.
 XX.XX ft (fwd/aft) of frame (xx)

Total weight added: XX.X lbs. at:
 XX.XX ft above the baseline
 XX.XX ft (port/stbd) of centerline.
 XX.XX ft (fwd/aft) of frame (xx)

Net change in:
 VCG (+/- XX.XXX ft)
 TCG (+/-XX.XXX ft)
 LCG (+/-XX.XXX ft)

New VCG: X.XXX ft above the baseline
 New TCG: XXX.X ft (port/stbd) of centerline
 New LCG: X.XXX ft (fwd/aft) of (frame or station)

c. TECHNICAL PUBLICATIONS AFFECTED

NUMBER	CG-22	SICR	DOD Pub (Ordnance)	PUB. REVISION DATE
1C-130H-4	4274			1 March 1996

- (If this TCTO affects a published Technical Publication, include the Technical Publication number, revision date, and tracking number of the corresponding CG-22. If the change also affects inventory requirements, the SICR number must also be identified. If the TCTO affects a published ACMS MPC, include the MPC number, revision date, and tracking number of the CG-22 that was submitted with the TCTO. If maintenance or operational procedures contained in a DOD manual

were affected, list these as well. Note, DOD Manuals are normally only affected for Navy-Owned Coast Guard Operated Electronics and Ordnance systems.

- If the TCTO affects a published ACMS MPC (or creates a new MPC), include the MPC number, revision date, and tracking number of the CG-22 that was submitted with the TCTO.

d. TRAINING EQUIPMENT AFFECTED

- If this TCTO affects training requirements or formal training curricula, include a statement describing the impact of the change and recommended changes. If this does not apply write, "Not applicable."

9. RECORDS

a. ACTION REQUIRED ON MAINTENANCE RECORDS

- If the affected item is tracked in the Significant Component History Report (SCHR), it will automatically be updated upon completion of the TCTO, when the FTO enters the completion date in ACMS. For Non-Modernized Units, the TCTO must indicate any changes to Configuration Item Function Descriptions (CIFDs) in CMPlus and FLS.

b. ACTION REQUIRED ON SUPPLY RECORDS

- If any inventory changes were affected, this information should be indicated in this paragraph. If there was a SICR processed for the change, there will generally be information in this paragraph. If there were no changes write, "Not applicable."

c. MODIFICATION IDENTIFICATION MARKINGS

- Show specific markings if required; for example, "TCTO number stenciled next to nameplate" or "mark out number 6 on the modification plate." If none, show "Not applicable."

FIGURES

- Figures shall be labeled and described as in the following example:
Figure 1 ...DESCRIPTION...

TABLES

- Tables shall be labeled and described as in the following example:
Table 1 ...DESCRIPTION...

CHARTS

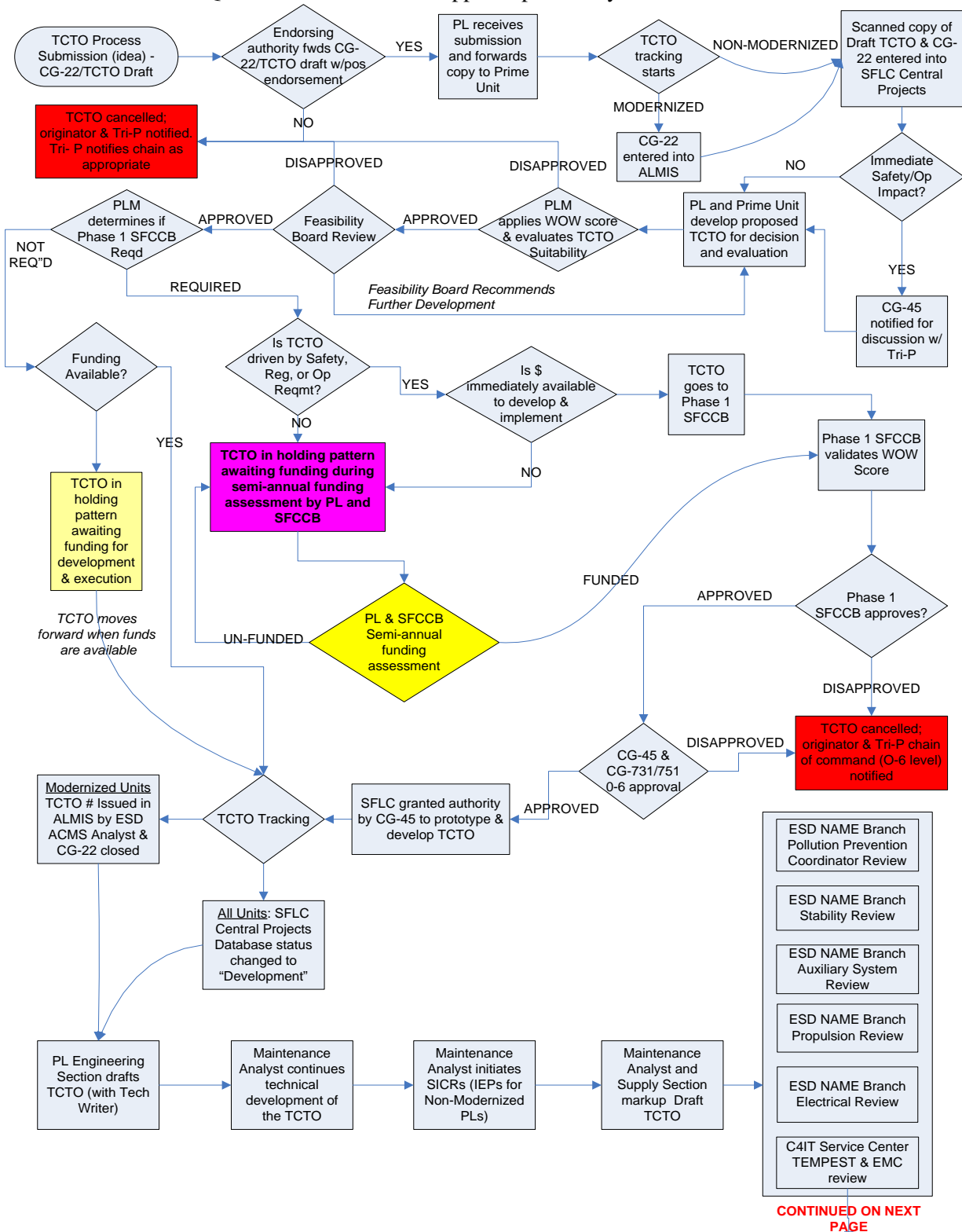
- Charts shall be labeled and described as in the following example:
Chart 1 ...DESCRIPTION...

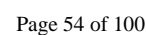
FORMS

- Forms shall be labeled and described as in the following example:
Form 1 ...DESCRIPTION...

APPENDIX B: TCTO FLOW CHART

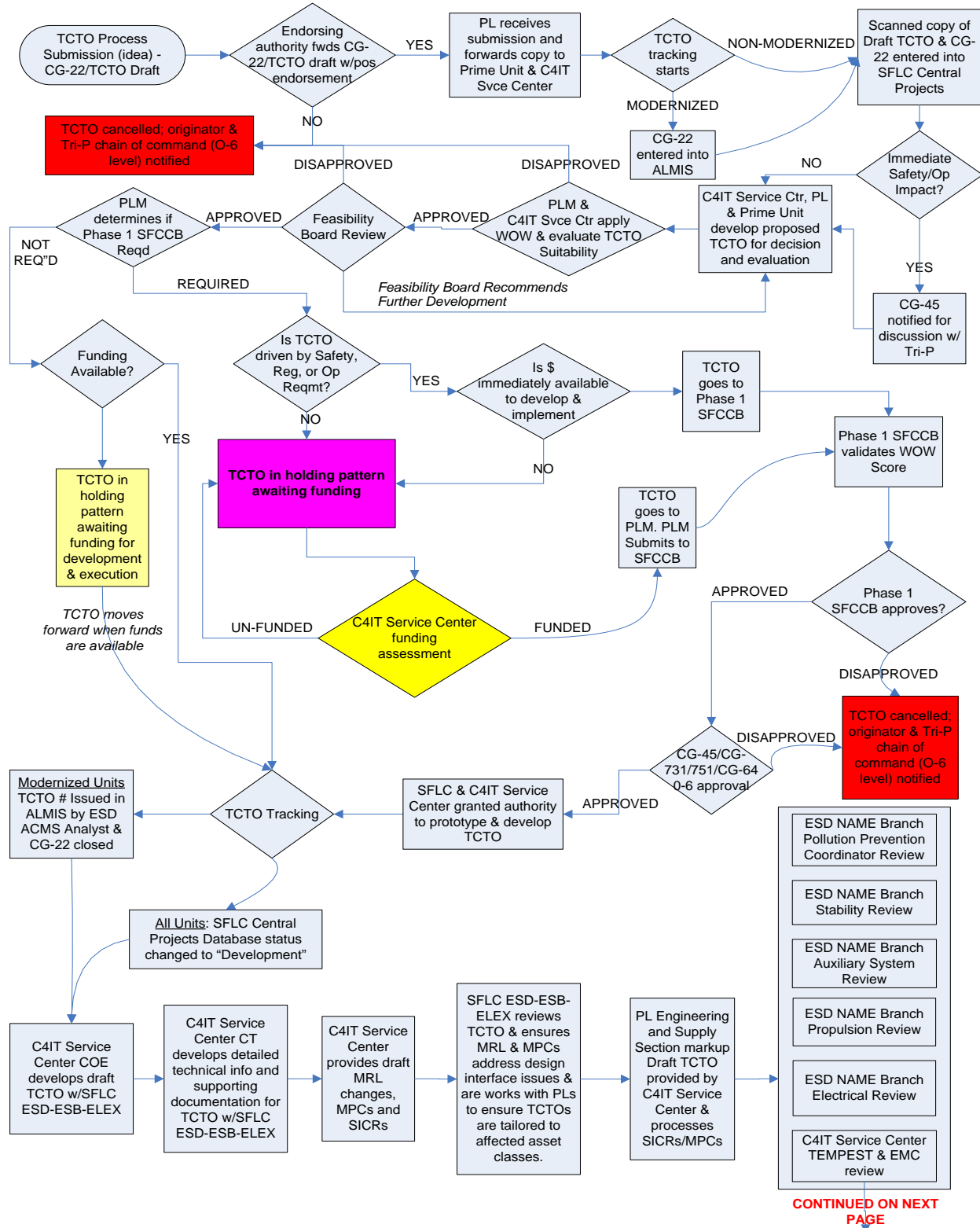
The flow chart below outlines the routing and development process for TCTOs, including the interfaces with the SFCCB and HQ staff. This Flow Chart applies specifically to Non-C4IT TCTOs.

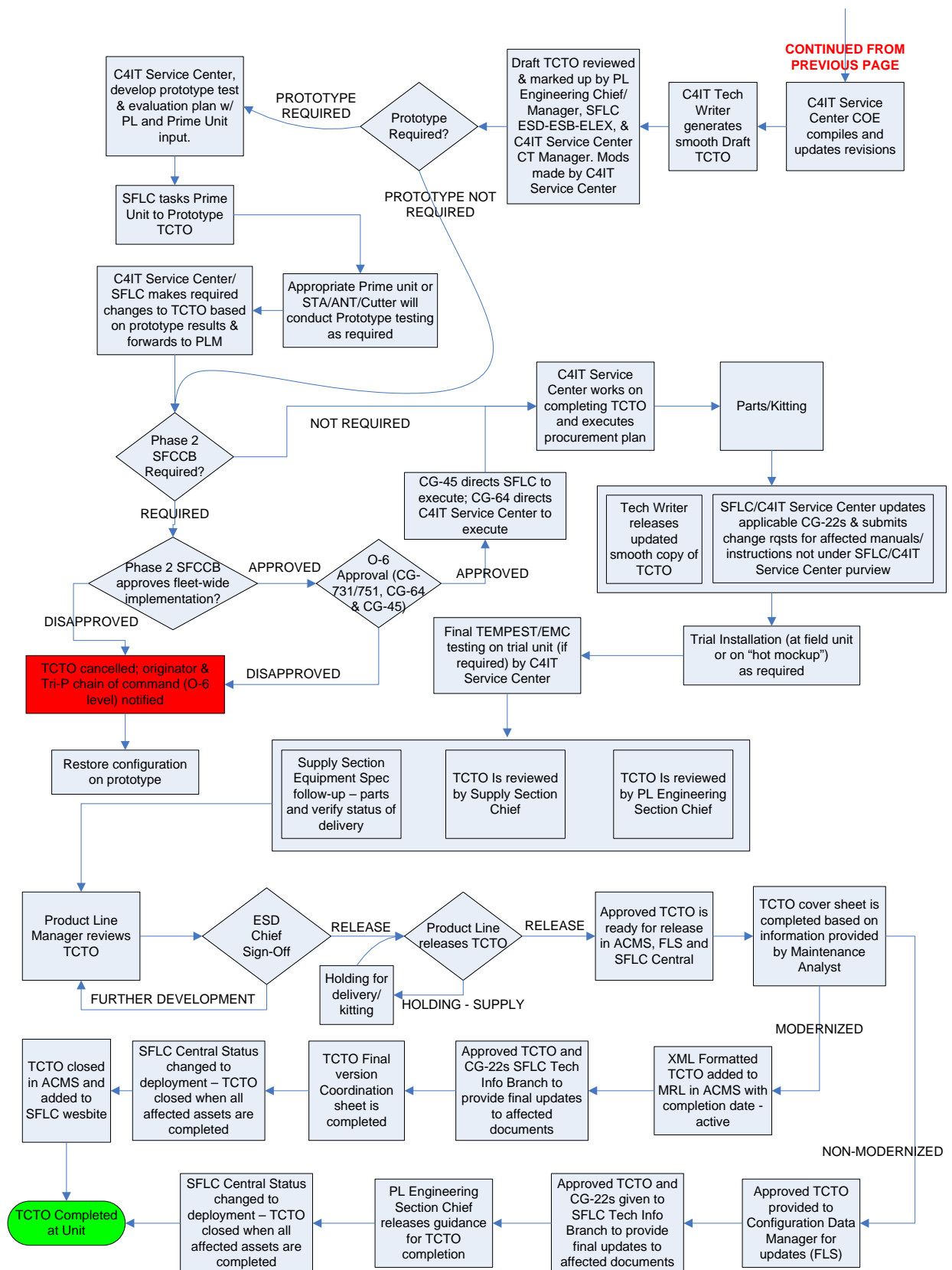




APPENDIX C: ELECTRONIC SYSTEMS TCTO FLOW CHART

The flow chart below outlines the routing and development process for C4IT TCTOs, including the interfaces with the Product Line, SFCCB and HQ staff.





APPENDIX D: TCTO FINAL VERSION COORDINATION SHEET

The attached file contains an interactive TCTO Final Version Coordination Sheet, for use with all TCTOs routed for final signature within SFLC:

(Double-Click to Open):



Final Coordination
Sheet.pdf

APPENDIX E: S1000D CHAPTERS

TCTOs and MPCs are classified and numbered based on the Standard Numbering System (SNS) found in S1000D. S1000D is an international specification for the procurement and production of technical publications. The S1000D extract below is associated specifically with marine vessels. S1000D Chapters are used in lieu of Ship's Work Breakdown Structure (SWBS) Codes for TCTO and MPC numbering. A detailed listing of all S1000D Chapters and associated sub-system codes are contained in reference (h).

CHAPTER DESCRIPTION

A0 - Propulsion - General
 A1 - Power pack - General
 A2 - Secondary propulsion drives
 A3 - Emergency propulsion drives
 A4 - Propulsion transmission systems - General
 A5 - Propulsion support systems - General
 A6 - Propulsion control systems -General
 B0 - Structure - General
 B1 - Hull - General
 B2 - Body/cab - General
 B3 - Special structures - General
 B4 - Bulkheads/decks - General
 B5 - Masts - General
 C0 - Armaments - General
 C1 - Gun systems - General
 C2 - Guided missile systems - General
 C3 - Rocket systems and pyrotechnics - General
 C4 - Aircraft related weapon systems - General
 C5 - Fire control systems - General
 C6 - Torpedo systems - GeneralC7 - Electronic warfare - General
 D0 - Electrical system - General
 D1 - Electrical power generation - General
 D2 - Primary supply and distribution systems - General
 D3 - Electrical power converted supplies - General
 D4 - Electrical power lighting - General
 D5 - Electrical power support systems - General
 D6 - Electrical power emergency supplies - General
 D7 - Electrical control systems - General
 D8 - Batteries - General
 E0 - Communications - General
 E1 - SHF/EHF - General
 E2 - UHF/VHF - General
 E3 - HF/MF - General
 E4 - LF/VLF - General
 E5 - Audio integration - General
 E6 - Digital – General
 E7 - Internal - General
 E8 - Flight Control and instrument landing systems - General
 F0 - Navigation - General
 F1 - Independent - General
 F2 - Dependent - General
 F3 - Computing - General

- G0 - Surveillance - General
- G1 - Control - General
- G2 - Radar - General
- G3 - Sonar - General
- G4 - Electromagnetic - General
- G5 - Optical - General
- G6 - Digital - General
- G7 - Identification systems
- H0 - Steering - General
- H1 - Steering systems and control - General
- H2 - Thrusters - General
- H3 - Stabilizing systems and control - General
- H4 - Diving control systems - General
- H5 - Hydroplanes - General
- J0 - Ventilation/ heating/ cooling - General
- J1 - Climatic control systems - General
- J2 - Ventilation systems - General
- J3 - Air conditioning systems - General
- J4 - Oxygen generating system - General
- K0 - Hydraulic system - General
- K1 - Main hydraulic power systems - General
- K2 - Auxiliary hydraulics power systems - General
- K3 - Pneumatic system - General
- L0 - Electronic system - General
- L1 - Cathodic protection - General
- L2 - Degaussing - General
- M0 - Auxiliary - General
- M1 - Aircraft handling systems - General
- M2 - Sea water systems - General
- M3 - Fresh water systems - General
- M4 - Fuels and lubricants systems - General
- M5 - Gas systems - General
- M6 - Cargo handling replenishment systems – General
- M7 - Machinery - General
- N0 - Survivability - General
- N1 - Damage control - General
- N2 - Escape facilities - General
- N3 - Firefighting systems - General
- N4 - Nuclear, biological, chemical - General
- N5 - Salvage systems - General
- N6 - Stability - General
- P0 - Special equipment/ system - General
- P1 - Special to type equipment - General
- P2 - Special recovery equipment - General
- P3 - Special fit equipment - General
- P4 - Special purpose equipment - General
- Q0 - Outfit and furnishings - General
- Q1 - Preservations and coverings - General
- Q2 - Protective coatings - General
- Q3 - Storerooms - General
- Q4 - Bathrooms and toilets - General

Q5 - Workshops - General
Q6 - Laboratories - General
Q7 - Test areas - General
Q8 - Galley/pantry/scullery - General
Q9 - Commissary - General
QA - Accommodation spaces - General
QB - Offices - General
QC - Control Centers - General
QD - Machinery spaces - General
QE - Medical, dental and pharmaceutical spaces - General
QF - Laundry - General
R0 - Training - General
S0 - Repair test and support - General

APPENDIX F: TCTO TRACKING UPDATE SCREEN**TCTO/SCTO TRACKING UPDATE SCREEN**

File Edit Settings Plugin VT Options Tunnels Help			
FMUPTCTO		TCTO TRACKING UPDATE	
		11-MAY-2007	
TCTO NUMBER	TCTO TITLE	DATE INITIATED	VOIDED
PROJECT OFFICER:			
ARSC RECVD	ARSC MAILED	MRL DATE	TCTO COMPLETION DATE
Please enter a TCTO Number OR use <LOOKUP>			
UPDATE (F5) DELETE (F6) LOOKUP (ALT 0) END (F3)			

cg0000002a

APPENDIX G: COMPREHENSIVE TCTO TRACKING REPORT

The following is an excerpt from ACMS, showing the TCTO Tracking Report by asset type (in this case HH-60s):

CG / HH-60 TCTO TRACKING REPORT ALL TCTOs						PAGE: 16 DATE: 14-Jul-2003
TCTO	TITLE	DATE INITIATED	ARSC		MRL DATE	TCTO COMPLETION DATE
			RECV	MAIL		
T23190	HF ALE AUTO LINK ESTABLIS DRAFTER: CWO WALSH	08/03/2001	08/08/2002	09/06/2002	09/13/2002	09/17/2002
T23200	IGS SYSTEM MODIFICATION DRAFTER: LCDR PESEK	02/14/2002	03/28/2002	11/26/2002	12/06/2002	12/10/2002
T23210	TCAS ANTENNA MOUNT ROD DRAFTER: CWO STORM	03/26/2003	03/26/2003	05/27/2003	06/05/2003	06/06/2003
T23220	RT-5000 WITH P25 TRUNKING DRAFTER: CDR GIBBONS	04/30/2003				
T23230	HF-ALE POWER SWITCH DRAFTER: LCDR PESEK	05/09/2003				
T24110	EGI VOLTAGE SOURCE DRAFTER: CWO STORM	05/01/2002	05/01/2002	06/12/2002	06/20/2002	06/21/2002
T25340	INSP SEAT TOP PLATE ASSY DRAFTER: CWO STORM	08/08/2002	08/08/2002	08/08/2002	08/15/2002	01/03/2003
T25350	MSG SEAT ATTENUATOR ASSY DRAFTER: CWO STORM	11/26/2002			12/06/2002	12/11/2002
T25360	AIRCREW SEAT ARM REST DRAFTER: CDR GIBBONS	12/02/2002	12/03/2002	02/19/2003	02/28/2003	03/05/2003
T28110	PAINT FUEL TANKS 120 GAL DRAFTER: LCDR PESEK	01/18/2002	02/12/2002	04/02/2002	04/08/2002	04/09/2002
T28120	PAINT FUEL TANK 80 GAL DRAFTER: LCDR PESEK	02/26/2002	03/14/2002	04/02/2002	04/08/2002	04/09/2002
T28130	PTFE FUEL HOSE ASSEMBLIES DRAFTER: CWO STORM	11/04/2002				
T29020	TRS 1/2 HYDR HOSES	02/25/2003	03/19/2003	05/07/2003	05/14/2003	05/15/2003

APPENDIX H: MESSAGE TCTO TEMPLATE

The following is a Message TCTO template:

O 252030Z NOV 08 ZUI
 FM COMDT COGARD WASHINGTON DC//CG-1134/CG-44/CG-45/CG-53/CG-731//
 TO AIG 4901
 INFO COGARD ENGLOGCEN BALTIMORE MD
 COMCOGARD MLC LANT NORFOLK VA//V/VR//
 COMCOGARD MLC PAC ALAMEDA CA//V/VR//
 COGARD DEPLOYABLE OPS GROUP WASHINGTON DC
 COMLANTAREA COGARD PORTSMOUTH VA
 COMPACAREA COGARD ALAMEDA CA
 CCGDONE BOSTON MA
 CCGDFIVE PORTSMOUTH VA
 CCGDSEVEN MIAMI FL
 CCGDEIGHT NEW ORLEANS LA
 CCGDNINE CLEVELAND OH
 CCGDELEVEN ALAMEDA CA
 CCGDTHIRTEEN SEATTLE WA
 CCGDFOURTEEN HONOLULU HI
 CCGDSEVENTEEN JUNEAU AK
 BT
 UNCLAS //N04406//
 SUBJ: TIME COMPLIANCE TECHNICAL ORDER AFFECTING ALL BOAT MASTER
 TRAILERS (THBO10)
 A. COMDT COGARD WASHINGTON DC 301953Z SEP 08, ALCOAST 479/08, CG-4,
 COMDTNOTE 4000
 B. MAINTENANCE PROCEDURE CARD HB0203.0, TANB-26 TRAILER WHEEL
 BEARINGS (INSPECT/REPLACE)
 C. MAINTENANCE PROCEDURE CARD HB0207.0, TANB-26 TRAILER WHEEL
 (REPLACE)
 D. MAINTENANCE PROCEDURE CARD HB0201.0, TANB-26 TRAILER (SERVICE)
 1. PURPOSE.
 A. THIS TIME COMPLIANCE TECHNICAL ORDER (TCTO) APPLIES TO ALL
 BOAT FORCE UNITS WITH BOAT MASTER BRAND TRAILERS
 B. THIS TCTO PROVIDES INSTRUCTIONS FOR CONDUCTING AN IMMEDIATE
 MANDATORY INSPECTION OF ALL BOAT MASTER TRAILER WHEELS TO DETERMINE
 IF THE WHEEL BEARINGS ARE CORRODED OR OTHERWISE DAMAGED AND TO
 DETERMINE IF THE WHEEL LUG NUTS ARE INSTALLED PROPERLY.
 2. BACKGROUND.
 A. REF A IMPLEMENTED THE SMALL BOAT PRODUCT LINE (SBPL), AND
 ESTABLISHED A REQUIREMENT FOR SURFACE FORCES TO MAP AVIATION
 BUSINESS PRACTICES TO BOAT ENGINEERING AND LOGISTICS. ONE EXAMPLE
 OF OUR EFFORT TO ALIGN WITH THE AVIATION MODEL IS THE MESSAGE TIME
 COMPLIANCE TECHNICAL ORDER (TCTO). A TCTO IS USED TO DISSEMINATE
 MAINTENANCE ACTIONS THAT ARE GENERALLY URGENT AND SAFETY RELATED.
 B. THIS TCTO IS GENERATED IN RESPONSE TO A MISHAP THAT OCCURRED
 INVOLVING A 26 FT TANB BEING TOWED AT HIGHWAY SPEED WHEN THE RIGHT
 REAR WHEEL BEARING FAILED. THE BEARING FAILURE CAUSED THE WHEEL TO
 COME OFF OF THE TRAILER, STRIKING A CIVILIAN VEHICLE AND INJURING
 THE OCCUPANT. A PRELIMINARY INVESTIGATION IDENTIFIED DAMAGE TO THE
 AXLE, HUB, BRAKES AND TIRE DUE TO INSUFFICIENT GREASE IN THE WHEEL
 BEARING. IN ADDITION, LUG NUTS ON SEVERAL TRAILER WHEELS MAY HAVE
 BEEN IMPROPERLY INSTALLED AFTER MAINTENANCE. SUBSEQUENT INSPECTIONS
 AT THE 26 FT TANB PRIME UNIT AND A QUERY OF FIELD UNITS DETERMINED

THAT THIS IS NOT AN ISOLATED CASE.

3. ACTION.

A. THIS TCTO SHALL BE ACCOMPLISHED IMMEDIATELY. ALL TOWING SHALL BE SUSPENDED UNTIL THE INSPECTIONS OUTLINED IN THIS TCTO HAVE BEEN COMPLETED BY THE UNIT.

B. ALL BOAT FORCE UNITS WITH ONE OR MORE BOAT MASTER TRAILERS SHALL PERFORM THE FOLLOWING:

- 1) REMOVE EACH TRAILER WHEEL IAW REF B.
- 2) INSPECT THE WHEEL BEARINGS IAW REF B. IF ANY OF THE FOLLOWING CONDITIONS EXIST, RENEW WHEEL BEARINGS IAW REF C.
 - (A) CORROSION
 - (B) SCORING
 - (C) DEFORMITIES
 - (D) WATER INTRUSION (MILKY GREASE)
- 3) SERVICE WHEEL BEARINGS PER REFERENCE D: LUBRICATE THE WHEEL BEARINGS; PUMP GREASE INTO EACH BEARING UNTIL CLEAN BEARING GREASE IS OBSERVED COMING OUT OF THE VENT HOLE LOCATED ON THE BACKSIDE OF THE BEARING HOUSING. NOTE THAT THE BEARING SEALS ON BOAT MASTER TRAILERS ARE DESIGNED TO WITHSTAND RELATIVELY HIGH PRESSURE (55 PSI), AND ARE INTENDED TO BE FULLY SATURATED WITH GREASE.
- 4) INSPECT CHAMFERED SEATS ON EACH WHEEL FOR THE FOLLOWING, IF ANY OF THE FOLLOWING CONDITIONS EXIST, RENEW THE WHEEL IAW REF C:
 - (A) DISTORTION
 - (B) CRACKS
 - (C) ELONGATION
 - (D) FLATTENING OF THE CHAMFERED SURFACE
 - (E) INSTALL WHEEL IAW REF B.
 - (F) INSTALL WHEEL LUG NUTS. NOTE: INSTALL LUG NUTS WITH THE TAPERED END FACING THE WHEEL.
- 5) REFS B, C AND D PROVIDE INFORMATION TO ASSIST WITH THE MATERIEL CONDITION INSPECTION AND SERVICE OF THE TANB-26, CB-L, AND SPC-LE BEARINGS AND WHEELS. THIS INFORMATION MAY BE ACCESSED AT <http://cgweb.arsc.uscg.mil/eisd/mpc/index.cfm>. TO DOWNLOAD THESE MPCs FROM THIS SITE, CLICK THE SURFACE ASSETS DROP DOWN TAB, SELECT MANDATORY SPECIAL REQUIREMENTS (MSR), CLICK THE MAINTENANCE PROCEDURE CARD BUTTON, THEN SCROLL DOWN AND SELECT THE APPLICABLE MPCs, WHICH ARE THOSE LISTED AS REFERENCES B-D

C. RECORDS.

1) ALL NON-MODERNIZED BOAT FORCE UNITS IN POSSESSION OF A BOAT MASTER TRAILER SHALL DOCUMENT COMPLETION OF THIS TCTO BY RESPONDING TO EACH APPLICABLE SERVICE BULLETIN (SB); SB-11 FOR 26 FT TANB, SB-002 FOR CB-L AND SB-013 FOR SPC-LE IN THE BOAT FORCES FLEET MANAGEMENT INFORMATION SYSTEM (FMIS) AT - www.boatforces.com - AND MAKE THE APPROPRIATE ENTRIES IN EACH BOAT RECORD. UNITS WITH THE SPC-LE WILL HAVE FURTHER INSTRUCTIONS TO CONTACT THEIR RESPECTIVE MAINTENANCE REPRESENTATIVE FOR COMPLETION OF SB-13. UNITS WITH NON-STANDARD BOATS WITH BOAT MASTER TRAILERS SHALL REPORT COMPLETION OF THE INSPECTION BY SENDING AN EMAIL TO RESPECTIVE DISTRICT/AREA BOAT MANAGER AND LT KEVIN WILKINSON, SBPL TIER 2/3 ASSET LINE MANAGER VIA EMAIL: KEVIN.S.WILKINSON(AT)USCG.MIL.

2) ALL MODERNIZED UNITS SHALL REPORT COMPLETION THROUGH ALMIS. THE TRAILER SIGNIFICANT COMPONENT HISTORY REPORT WILL BE AUTOMATICALLY UPDATED UPON COMPLETION OF THIS TCTO IN ALMIS.

6. FUTURE PLANS. AN EVALUATION OF MAINTENANCE INTERVALS WILL BE

ACCOMPLISHED BY THE SBPL. RESULTS FROM THE PENDING MISHAP INVESTIGATION WILL BE USED TO TAKE FURTHER ACTION IF APPROPRIATE.

7. POCS:

A. 26 FT TANB ASSET LINE MANAGER (SBPL): CWO ROBERT D. HENRY, AT (410) 762-6118, OR ROBERT.D.HENRY(AT)USCG.MIL.

B. OFFICE OF BOAT FORCES, CG-731: LCDR KENNETH R.POST AT (202) 372-2462, OR KENNETH.R.POST(AT)USCG.MIL.

C. OFFICE OF NAVAL ENGINEERING, CG-451, LCDR DONALD DEIBLER, AT (202) 475-5726, OR DONALD.D.DEIBLER(AT)USCG.MIL.

D. OFFICE OF SAFETY AND ENVIRONMENTAL HEALTH, CG-113: MR. GEORGE BORLASE AT (202) 475-5218, OR GEORGE.W.BORLASE(AT)USCG.MIL.

8. INTERNET RELEASE NOT AUTHORIZED.

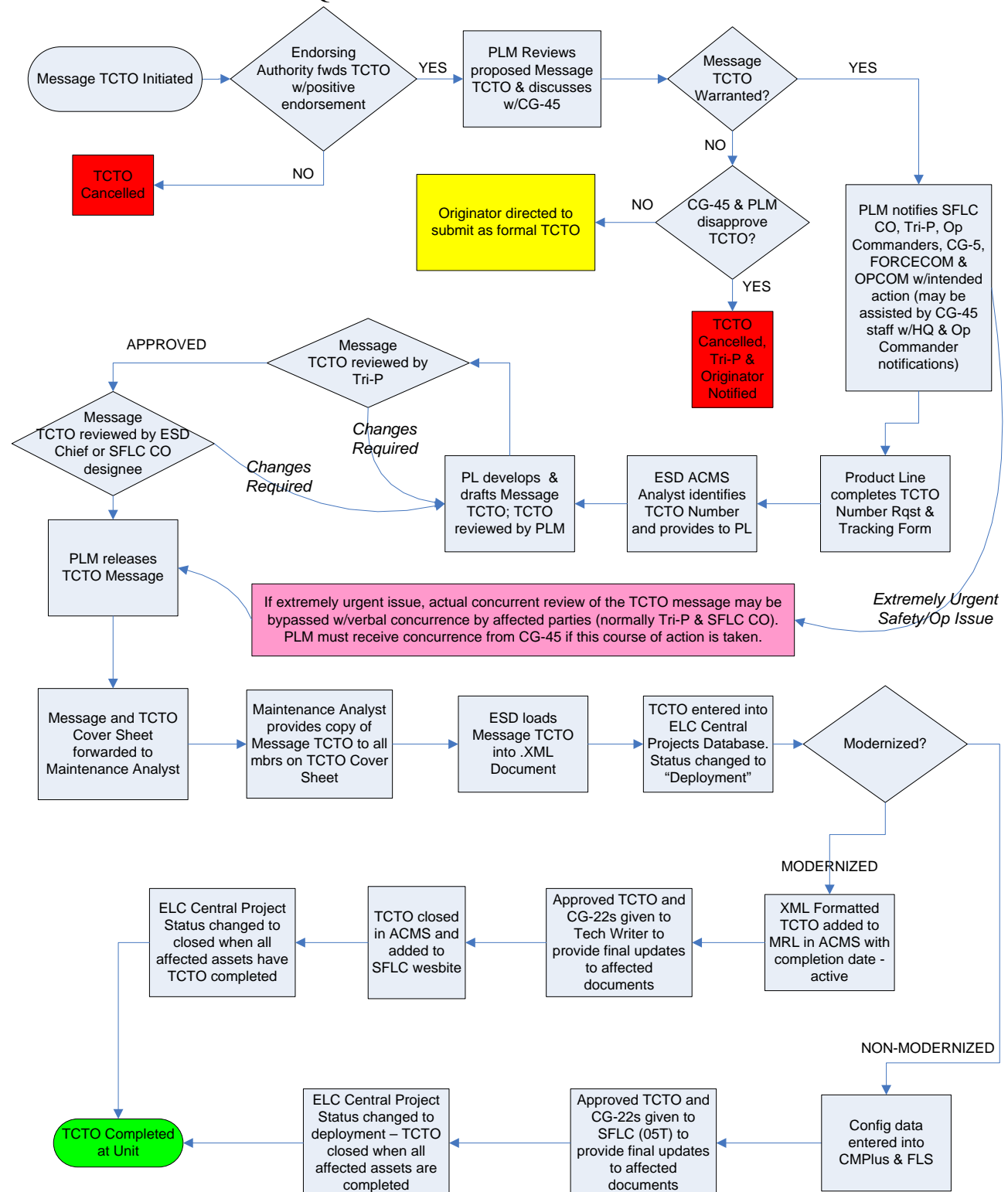
9. CAPT P.J. RODEN, CHIEF, NAVAL ENGINEERING, SENDS.

BT

NNNN

APPENDIX I: MESSAGE TCTO FLOW CHART

The flow chart below outlines the routing and development process for Message TCTOs, including the interfaces with the SFCCB and HQ staff.



APPENDIX J: WOW PRIORITIZATION SCORING CALCULATOR

The attached file contains the World of Work (WOW) Prioritization Scoring Calculator. This calculator shall be used by the Product Line and SFLC Feasibility Board to score all pending TCTOs prior to Phase 1 SFCCB (concept approval) and Prior to Phase 2 SFCCB (after full prototype development, prior to fleet-wide implementation).

(Double-Click to Open):



WoW_Score
Calculator

APPENDIX K: STANDARD RATES LABOR CALCULATOR

The link below contains the Standard Rates Labor Calculator, maintained by CG-832. This calculator shall be used by the Product Line and SFLC Feasibility Board to assess the cost of Coast Guard labor (civilian and military). Labor costs are often very significant when developing a lifecycle cost evaluation, and must be included in all Lifecycle cost-benefit analyses.

<http://cgweb.comdt.uscg.mil/CG8/CG83/CG832/SCT/SR/Index.htm>

APPENDIX L: PROTOTYPE EVALUATION AUTHORIZATION MEMO TEMPLATES

The memos below are template prototype evaluation memos. The first memo (signed by CG-731) shall be used when the prototype is accomplished by another Field Unit, aside from the Prime Unit. The second memo is for use when the Prime Unit is tasked with accomplishing the prototype.

U.S. Department of
Homeland Security

United States
Coast Guard



Commandant
United States Coast Guard

2100 Second Street, S.W.
Washington, DC 20593-0001
Staff Symbol: CG-731
Phone: (202) 372-2469
Fax: (202) 372-2909

4720
XX Jan 2009

MEMORANDUM

From: T. F. Harrop, CAPT [Chief of Boat or Cutter Forces]
COMDT (CG-731)

To: CG STA Xxxxx
Thru: (1) CGD XXX (dr)
(2) CG SECTOR Xxxxx

Subj: AUTHORIZATION TO PROTOTYPE RB-S COLLAR SYSTEM MODIFICATIONS

Ref: (a) Surface Forces Time Compliance Technical Order (TCTO) Process Guide, CGTO
PG-85-00-40-S

1. Per reference (a), and approval by the Surface Forces CCB on 4 Jan 2009, you are authorized to prototype "*Collar Design Alternatives 1 and 2*," as defined in enclosure (1). You shall accomplish Design Alternative 1 on CG 25XXX, and Design Alternative 2 on CG 25XXX. The intent of the proposed configuration changes is to improve the reliability of RB-S collaring systems, and decrease lifecycle cost. Your prototype evaluation is critical in determining whether the proposed changes are suitable for fleet-wide implementation. The Small Boat Product Line (SBPL) has assigned this project case file number RBS-025-04-009 in SFLC Central. The evaluation period shall begin on the date of installation and continue for 30 days.
2. Funding for this prototype will be provided by the SBPL. Details regarding logistics support are contained in enclosure (1). Details regarding the test criteria, installation specifications, and feedback procedures will be provided by the SBPL in separate correspondence. Please coordinate execution and validation of this prototype evaluation with the SBPL RB-S Asset Line.
3. If you have any further questions regarding this authorization, please contact MKCS Jon Blanchard at (410) 762-6198. Thanks for your assistance in helping to improve reliability and maintainability of the fleet.

#

Enclosure: (1) Phase 1 CCB Proposal & Prototype Evaluation Plan

Copy: w/o Enclosures
COMDT (G-45)
CG SFLC

U.S. Department of
Homeland Security

United States
Coast Guard



Commanding Officer
Surface Forces Logistics Center

707 East Ordnance Road
Baltimore, MD 21044
Phone: (410) 762-6209
Fax: (410) 762-6203

4720

XX Jan 2009

MEMORANDUM

From: J. L. Bragaw, CDR [Product Line Manager]
CG SFLC

To: CG STA Washington

Subj: AUTHORIZATION TO PROTOTYPE RB-S COLLAR SYSTEM MODIFICATIONS

Ref: (b) Surface Forces Time Compliance Technical Order (TCTO) Process Guide, CGTO
PG-85-00-40-S

1. Per reference (a), and approval by the Surface Forces CCB on XX Jan 2009, you are authorized to prototype "*Collar Design Alternatives 1 and 2*," as defined in enclosure (1). You shall accomplish Design Alternative 1 on CG 25XXX, and Design Alternative 2 on CG 25XXX. The intent of the proposed configuration changes is to improve the reliability of RB-S collaring systems, and decrease lifecycle cost. Your prototype evaluation is critical in determining whether the proposed changes are suitable for fleet-wide implementation. The Small Boat Product Line (SBPL) has assigned this project case file number RBHS-025-04-009 in SFLC Central. The evaluation period shall begin on the date of installation and continue for a period of 30 days.

2. Funding for this prototype will be provided by the SBPL. Details regarding logistics support are contained in enclosure (1). Details regarding the test criteria, installation specifications, and feedback procedures will be provided by the SBPL in separate correspondence. Please coordinate execution and validation of this prototype evaluation with the SBPL RB-S Asset Line.

3. If you have any further questions regarding this authorization, please contact MKCS Jon Blanchard at (410) 762-6198. Thanks for your assistance in helping to improve reliability and maintainability of the fleet.

#

Enclosure: (1) Phase 1 CCB Proposal & Prototype Evaluation Plan

Copy: w/o Enclosures
COMDT (G-45)
SFLC (01, 014)

Enclosure (1): Phase 1 CCB Proposal & Prototype Evaluation Plan *RB-S Collar Design Modifications*

Background

The Coast Guard has approximately 460 RB-HS and RB-S boats stationed throughout the Coast Guard; these boats were manufactured by SAFE Boats International. These vessels are equipped with a foam collar design, comprised of polyethylene foam with a sprayed polyurethane (rhino-liner) coating. The collar has three pieces: bow, port, and starboard sections. The collar system is held in place with a series of lag bolts secured to the hull; the port and starboard sections are also held in place with a coating of marine adhesive (a recent change designed to improve reliability).

Since construction, there have been recurring failures of this collar system. The failures are attributed to water intrusion, which normally causes tearing or rupture of the outer polyurethane membrane after the foam absorbs water. It appears that there are multiple points of failure (water entry) for the collar system including: punctures of the outer membrane, water intrusion between the Lower Flange & mounting hardware (in between the hull and collar), and in the vicinity of the lag bolts. SAFE Boat has done several design modifications with the intent of limiting failures due to water intrusion, however, there still appears to be high failure rates throughout the fleet.

Over the past three years, the Coast Guard replaced 90.7 collars per year, at a cost of approximately \$5,400 each (excluding shipping and storage). This equates to nearly 1 failure every 4 days. The ratio of failures for each side is 2:3 (starboard : port).

The Coast Guard and Safeboat have looked at other collar designs, including the one currently installed on the 33' SPC-LE boats. Unfortunately, during testing, this collar caused the prototype RB-S to have slightly different handling characteristics than the original design. These handling characteristics were deemed unacceptable by the Configuration Control Board.

Problem Statement/Desired Outcome

The Standard Boat Product Line (SBPL) desired to identify a collar system with identical (or nearly identical) geometry, buoyancy/density, and mounting characteristics that will have a lower failure rate than the existing RB-S collar system. A new collar must be less susceptible to water intrusion and punctures. Moreover, installation of the collar must be worthwhile from an operational and life-cycle cost perspective.

In conjunction with testing a new collar design, it is desired to identify methods by which to reduce failures of the existing collar system through slight modifications in design, installation, or maintenance.

Assumptions and Constraints

1. For the purposes of this prototype evaluation, SBPL will assume a maximum RB-S lifecycle of 12 years.
2. Based on the past 3 years of data, there have been 80 collar failures (requiring replacement outside of warranty) in three years, and 64 collar failures per year (for boats in warranty), yielding a total average of 90.7 failures per year. It is projected that the Coast Guard will spend \$591,500 per year for failures (post-warranty) - including shipping and warehousing costs. The assumed lead time to fabricate & deliver an RFI collar is approximately 45 days. The minimum RFI stocking is approximately 31 units (distributed 2:3 ratio of starboard : port) a cost of approximately \$167,400. The intent of this prototype evaluation is to identify a configuration change that will ***improve reliability and decrease lifecycle cost***.
3. For any collar retrofit, minimize structural modifications required to perform the work. This will minimize lost operational availability, reduce lifecycle cost (both initial installation and logistics support), and minimize risk of damage to the hull structure during retrofit caused by welding.
4. Any new collar must not adversely impact or substantially change the handling or performance characteristics of the existing boat. Ideally, any new collar design must have similar geometry and density/buoyancy characteristics as the existing design.

Prototype Alternatives

SBPL tasked ELC (02) with conducting research into suitable alternative foam collar designs. In parallel to this effort, the SBPL asked SAFE Boat to identify a means (that did not involve collar retrofit) to further improve reliability. ELC (02) study identified two potential alternatives, an Ionomer foam collaring system and a Wing Collar system, which uses an inflatable air bladder surrounded by foam. The Wing Collar system has already been tested on the RB-S, and found to impact performance characteristics; given the results of this previous testing, and the constraints stated above, this is not considered by the SBPL to be a suitable design alternative. SAFE Boat identified one potential modification to improve reliability that is not likely to impact handling characteristics, but may provide an incremental increase in reliability at minimal cost. Based on these studies, SBPL considers the following alternatives sufficiently viable to warrant formal prototype evaluation:

Alternative 1: Install a Gilman Ionomer foam collar system as a direct replacement for the currently-installed polyurethane-coated polyethylene foam collars.

1. Gilman Corporation has provided a laminated foam product as a fendering material for a variety of boat types, and to build CG buoys for many years. This product is a closed cell product laminated out of sheets of foam by a process that eliminates interstices for water absorption (a significant problem plaguing the existing polyethylene foam collars). The block of homogenous foam thus formed is carved to the required geometry. *It does not have a separate cover.* Another potential advantage of this collaring system is that minor abrasions and punctures can be accomplished at the organizational level with patching

kits and heat guns (Ionomer is a type of thermoplastic that can be molded with application of heat).

2. Gilman fenders (of the configuration proposed for this prototype evaluation) are currently used on the RB-M. A version of their foam collars are also used on the 47' MLB, however, the application and design are quite a bit different than the collars that will be installed on the RB-S, and are currently installed on the RB-M. The most significant difference is the manner in which the collars are attached to the hull (which currently appears to be the source of fender reliability issues on the 47' MLB). Gilman Corporation representatives examined a Defender class boat and concluded that they can produce a prototype fender using the existing mounting system at a cost of \$5,200 per side. Currently, this is a comparable price to the collars currently provided by SAFE Boat. If this collaring system can improve reliability appreciably, this change has the potential to decrease lifecycle costs and improve operational readiness.
3. Design Specifics:
 - a. The "skin" of the proposed Ionomer foam collars has greater surface tear strength (200 lbf/sq in vs. 185 lbf/sq in) compared to the existing Polyurethane coating on the RB-S. Moreover, Ionomer foam dampening and energy/impact absorption characteristics are similar to those of polyethylene foam. Thus, it meets the requirements for durability and ballistic strength.
 - b. The Ionomer foam collars are non-marking, and thus will not mark or damage vessels/piers when maneuvering alongside, conducting boardings, or operating with other CG vessels.
 - c. Based on information from Gilman, the weight differences between the two collaring systems will be approximately 46 lbs (the Gillman system is slightly lighter). The geometry of the new collaring system can be built to closely match the existing collars. Given the relatively small difference in weight, geometry, and buoyancy, the performance characteristics of the two collaring systems have the potential to be very similar.
 - d. It appears that this new collaring system meets or exceeds all of the stability, impact absorption, ballistic, and durability requirements that exist for the current RB-S collar system. This hypothesis will have to be verified during the prototype evaluation.



Figure 1: Ionomer Foam Collar Cross-Section Currently in use on the RB-M

Alternative 2: Install a strip of polyurethane that covers the intersection of the foam collar and Lower Flange, as shown in the figure below.

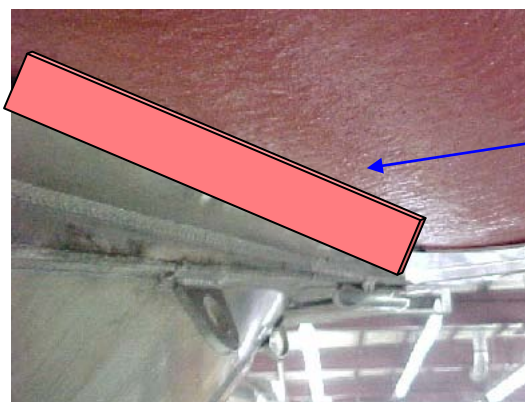
1. The intent of this change is to provide improved reliability by addressing one of the root causes of current collar failures. Specifically, it is intended to reduce the risk of water getting to the backside of the collar (in between the hull and collar). Recently, the CG and SAFE Boat modified maintenance and construction procedures, installing a bed of marine adhesive between the Lower Flange and Collar, creating a silicone barrier that prevents water from reaching the backside of the collar. When the seal is intact, this modification also reduces the risk of the collar pulling away from the Lower Flange during violent maneuvers (allowing water to get on the backside of the collar). Once water gets to the backside of the collar, since the coating in this area is relatively thin, it is susceptible to failure. Increasing the thickness of the collar polyurethane coating is not a viable option, because it will increase the weight of the collar and adversely impact performance. As long as the marine adhesive seal remains intact between the collar and Lower Flange, the risk of collar failure is substantially reduced. The problem is that it is very difficult to determine if the seal is intact. Specifically, the collar has an interference fit with the mounting system. To detect if the seal is intact (required during routine inspection), the unit has to exert a lot of force (in some cases with a crow bar), at the flange/collar interface. In some cases, the inspection procedure actually causes the seal to fail. Because this maintenance is difficult to accomplish effectively, this modification is not as successful as was initially anticipated by SAFE Boat and the CG.
2. By installing a polyurethane strip (with marine adhesive) at the interface of the Lower Flange and Collar, this creates an additional barrier preventing water from making it behind

the collar. Moreover, it makes it very easy for crews to recognize a failing barrier, because the polyurethane strip will physically pull off of the collar or Lower Flange when the seal is breached. This will prompt the unit to reseal the polyurethane strip, reducing the risk of water intrusion.

3. This alternative will cost approximately \$200 per boat; if it is successful in improving reliability, it could be accomplished fleet-wide within a year by contracting SAFE Boat to develop retrofit kits for fleet-wide distribution. SPBL has already requested SAFE Boat develop such a retrofit kit for the purpose of this prototype evaluation.



Figures 2 & 3: Current configuration of RB-S Collar/Fin interface, showing installation and details of Adhesive seal between the collar and Lower Flange.



Install polyurethane strip (approx 5" wide) over the interface of the collar and Lower Flange with marine adhesive (3M)

Figures 4: Proposed new configuration of RB-S Collar/Lower Flange interface.

Prototype Evaluation Plan

With Phase 1 CCB Approval, SBPL intends on conducting prototype testing of both design alternatives 1 and 2, simultaneously at three units throughout the Coast Guard. The intent is to conduct testing at units with at least three RB-Ss assigned (preferably four), and that have a relatively high PWCS mission load (using RB-Ss that routinely engage in tactical and high-speed maneuvers). SBPL desires to test the design alternatives outlined above at three different units to ensure that all performance issues are adequately identified, and to obtain useable feedback in a short period that will facilitate rapid development and fleet-wide implementation (if warranted from a lifecycle cost and operational standpoint, and if approved by the Phase 2 CCB).

SBPL intends to involve SAFE Boat during this prototype testing, so that if either design alternative is successful, it may be retrofitted during construction of new boats delivered by SAFE Boat. Moreover, if the Ionomer foam collar design is successful on the RB-S, it may provide the impetus for SAFE Boat to re-tool their collar production, using Ionomer foam.

Part of the evaluation plan for the Ionomer foam collars will include weighing the collars, and measuring geometry, comparing these values with those of the existing RB-S collars. If there are significant differences, an inclining experiment shall be performed to identify differences in stability.

The following test criteria will be evaluated during the prototype test period:

- Maintenance Planning: Identify and develop new MPCs (or required MPC modifications) for installation, removal, inspection, and other routine maintenance.
- Supply Support: Identify sources of supply and identify lead times considering fleet-wide implementation. Develop a kitting strategy, if Alternative 2 is selected.
- Support and Test Equipment/Equipment Support: Identify any required equipment for lifecycle logistics support.
- Manpower and Personnel: Identify differences in maintenance (labor) for each alternative, compared to the status quo. Account for these labor differences in the lifecycle cost evaluation.
- Training and Training Support: Identify any new training requirements, or training requirements that can be eliminated due to a proposed change.
- Technical Data: Identify any changes to stability, weight, and performance characteristics. This will include a full range of tactical maneuvering under full load, and operation in various sea states, to ensure the boat still meets all mission requirements. Also identify all affected drawings and technical publications that are affected by this change.
- Computer Resources Support: Provide updates to ACMS during TCTO development.
- Facilities: N/A
- Packaging, Handling, Storage, and Transportation (PHS&T): Identify storage and shipping constraints/procedures. PHS&T is of significant concern with the existing collars, so this will be an important test factor.
- Design Interface: Determine how the new collar (or collar modifications) interfaces with the hull and other components.

Specific details regarding the prototype evaluation criteria and test procedures will be provided separately to Prototype units.

References

1. CG Drawing 25-RB-S-166-1, Revision A
2. Defender Class Operating Handbook, COMDTINST M16114.37B

3. Defender Class Collar Retrofit Cost-Benefit Analysis dated 19 Aug 2008, CDI Corporation
4. SAFE Boat Collar Repair and Installation Information:
http://www.safeboats.com/default/boats_collar_repair.php
5. Defender Class B (RB-S) Alternative Foam Collar Designs, ELC Task 9264, 21 Dec 2008

Points of Contact

1. LCDR Matt Lake, Small Boat Product Line Engineering Chief, 410-762-6283
2. LT Igor Landyshev, RB-S Asset Line Manager, (510) 637-5831
3. MKCS Jon Blanchard, RB-S Assistant Asset Line Manager, 410-762- 6918
4. MKCS Daniel Baumgardner, RB-S Asset Line, 410-762-6992

APPENDIX M: FUNDING DETERMINATION MEMO TEMPLATE

The memo below is a template funding determination “memo to file”, required by reference (i). A copy of the memo below (tailored for each configuration change) shall be kept in the respective TCTO case-file, and provided (on request) to the Funds Manager and/or Contracting Officer. The intent is to document the Coast Guard’s decision on the use of O&E or AC&I funding to pay for a configuration change.

U.S. Department of
Homeland Security

United States
Coast Guard



Commanding Officer
Surface Forces Logistics Center

705 East Ordance Road
Baltimore, MD 21044
Phone: (410) 762-6283
Fax: (410) 672-6085

7130
XX Jan 2009

MEMORANDUM

From: J. D. Woods, CWO2
CG SFLC

To: File

Subj: FUNDING DETERMINATION FOR TCTO BUSL-49-TXXXXX

Ref: (a) COMDT COGARD Washington DC 021925Z JAN 09/ALCOAST 005/09, CG-8,
COMDTNOTE 7130

1. Pursuant to reference (a), I have evaluated the scope and intent of draft TCTO BUSL-49-TXXXXX, and have determined that it constitutes ["Technology Refreshment" / "Replacement of Systems or Subsystems" / "Safety Modifications" / "Major Repair, Renovation, or Improvement" {Select One}]. The following is a synopsis of the information that led to my finding [select only one paragraph below; delete all others that do not apply]:

a. Technology Refreshment: Per reference (a), "Technology Refreshment" is the intentional incremental insertion of newer technology to improve reliability, maintainability, and/or reduce maintenance costs. Technology refreshment may involve minor performance enhancement of an asset, but is typically done with the intention of improving the maintainability of the asset. This TCTO meets the criteria of "Technology Refreshment" because of the following factors [Include discussion of project scope, intent, and engineering rationale]: XXXXXXXXXXXXXXXXXXXX. Given that this change is considered a "Technology Refreshment", I intend to use O&E funding to accomplish this TCTO.

b. Replacement of Subsystems and Components: Per reference (a), "Replacement of Subsystems and Components" includes in-kind replacement of systems or components. This includes replacement of older components or systems with those using current/new technology, provided that the change is not specifically intended to improve operational capacity or capability, or extend the useful life of an asset. This TCTO meets the criteria of "Replacement of Subsystems and Components" because of the following factors [Include discussion of project scope, intent, and engineering rationale]: XXXXXXXXXXXXXXXXXXXX. Given that this change is considered to be "Replacement of Subsystems and Components", I intend to use O&E funding to accomplish this TCTO.

c. Safety Modifications: Per reference (a), "Safety Modifications" includes any change intended to allow the asset to perform its missions in a safe and efficient manner. This does not include modifications that are specifically targeted to improve operational capacity or capability, or extend the useful life of an asset. This TCTO meets the criteria of "Safety Modifications"

because of the following factors [Include discussion of project scope, intent, and engineering rationale]: XXXXXXXXXXXXXXXXXXXX. Given that this change is considered to be a “Safety Modification”, I intend to use O&E funding to accomplish this TCTO.

d. Major Repair and Improvements: Per reference (a), “Major Repair and Improvements” are defined as any activity that specifically increases the capacity or capabilities, or extends useful life of an asset. This TCTO meets the criteria of “Major Repair and Improvement” because of the following factors [Include discussion of project scope, intent, and engineering rationale]: XXXXXXXXXXXXXXXXXXXX. Given that this change is considered “Major Repairs and Improvements”, I intend to use AC&I funding to accomplish this TCTO.

#

APPENDIX N: SFLC FEASIBILITY BOARD CHECKLIST

The SFLC Feasibility Board ensures that each proposed TCTO makes sense from a business-case perspective, and that the change is sound from an engineering and logistics standpoint. Furthermore, the SFLC Feasibility Board serves as a “peer review” function, in that TCTOs are critically reviewed by the Engineering Chiefs from each Product Line, to ensure that TCTOs leaving the SFLC are well-developed and are suitable for fleet-wide implementation. The specific intent of the SFLC Feasibility Board is to ensure essential logistical support elements are considered prior to a Phase 1 SFCCB submission, and that logistic preparations are sufficient to support a successful Phase 2 SFCCB promulgation. The Board shall ensure proposed changes to an asset do not conflict across product lines and that known logistic support issues will not preclude the eventual adoption of an SFCCB approved change. Additionally, the Feasibility Board should communicate with other Coast Guard commands (training, operations, etc) to ensure changes to an asset’s configuration coincide with appropriate alteration to logistic support elements not under the cognizance of the SFLC. The membership of the Feasibility Board is comprised of those necessary Division and Product Line personnel who have a vested interest in a submitted SFCCB proposal. The Feasibility Board shall include, at a minimum:

- ESD Chief
- All Product Line Engineering Chiefs
- Aging Asset Branch Chief
- C4IT Service Center Representative (TISCOM, NAVCEN, C2CEN or OSC depending on TCTO types)
- Affected Product Line Supply Chief (as required)
- Representatives from the SFLC Asset Logistics Division or Industrial Operations Division (as required)

For a Phase 1 proposal, the Feasibility Board shall specifically evaluate the adequacy of the proposed test plan to meet the ten aspects of operational suitability:

Availability	Will the SFCCB result in an acceptable change in the asset’s availability?
Reliability	Will the SFCCB result in an acceptable change in the asset’s reliability?
Logistic Supportability	Will the SFCCB be logistically supportable?
Maintainability	Will the SFCCB be maintainable by fleet personnel?
Interoperability	Will the system be interoperable with other systems with which it must interface?
Compatibility	Will the equipment be compatible with its operating environment?
Human Factors	Will human factors aspects of the proposal support mission completion?
Training	Is training developed to support the system’s operation and maintenance by fleet personnel?
Documentation	Is the technical documentation to support operation and maintenance of the proposal available and drafted?
Safety	Will the SFCCB proposal be safe to operate and maintain?

The Feasibility Checklist is provided to assist in documenting and presenting sound recommendations to the SFCCB. A comprehensive Prototype Evaluation Plan will identify the technical performance parameters and critical operational issues (COIs) to be evaluated during the test. Additionally, the Prototype Evaluation Plan will define all the necessary resources, schedule, and projected costs for execution. To streamline the process for introducing non-major acquisition change proposals, a complete

operational evaluation report need not be produced. The Feasibility Checklist, when completed with appropriate detail, should provide sufficient information for the SFCCB members to make a final determination.

SFLC Feasibility Board Checklist

Does an ORD exist? **YES** (See attached) **NO** (Give brief explanation below)

Prototype Evaluation Plan Developed? **YES** (See attached) **NO** (Give brief explanation below)

Modifications to ILSP Attached? **YES** (See attached) **NO** (Give brief explanation below)

Reason for no ORD:

Reason for no Prototype Evaluation Plan:

Reason for no ILSP:

[illegible]

Page 85 of 100

This image shows a full page of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page, providing a template for handwriting practice or general writing. There are no margins, text, or other markings on the page.

Page 86 of 100

[illegible]

Page 87 of 100

RISK ASSESSMENT**COLOR CODE****RED****YELLOW****GREEN****WHITE****DESCRIPTION**

High level of risk identified

Moderate level of risk identified

Little or no risk identified

Not evaluated or assessed

Critical Operational Issues (COI)	Color Code
*Technical Performance	
Availability	
Reliability	
Logistic Supportability	
Maintainability	
Interoperability	
Compatibility	
Human Factors	
Training	
Documentation	
Safety	

NOTE

* Specific Technical Performance COIs may be added to this table as necessary (i.e., radar detection range, radio bandwidth, etc.).

APPENDIX O: TCTO QUALITY ASSURANCE (QA) CHECKLIST

The TCTO QA checklist below shall accompany all TCTOs in the routing process, as outlined in Chapter 2 of this Process Guide.

Quality Assurance Checklist

Time Compliance Technical Order Development

Asset Applicability: _____

System Applicability: _____

TCTO #: _____

Title: _____

Step	QA Action	N/A	Correct	Incorrect	Comments
APPLICATION					
	Applicable Boat Class Identified				
	Applicable Hulls Identified				
	Prototype installation location and date Identified				
PURPOSE					
	Purpose of TCTO stated				
	If a revision, TCTO states the purpose of the original TCTO and brief explanation of why the original TCTO is revised. Includes "This TCTO supersedes [TCTO MLB-47 TJ2000]."				
TCTO COORDINATOR					
	Coordinator Identified by Name				
	Coordinator telephone and fax number provided				
WHEN TO BE ACCOMPLISHED					
	States period that TCTO is to be completed within.				
BY WHOM TO BE ACCOMPLISHED					
	States who will be accomplishing the work directed by the TCTO (unit, depot, contractor, etc.)				
WHAT IS REQUIRED					
	Part numbers are verified.				
	NIIN numbers are verified.				
	Kit/Parts/Materials Required paragraph IAW TCTO Process Guide.				
	Action Required on Items in Stock paragraph IAW TCTO Process Guide.				
	Kit/Parts/Materials Required to Modify Items in Stock paragraph IAW TCTO Process Guide.				
	Disposition of Removed and Replaced Parts/Materials paragraph IAW TCTO Process Guide.				
	Any chemicals required shall be listed in the Authorized Chemical List (ACL).				
	Includes quantity, NSN, part number, nomenclature and source using the following five column				

	table in TCTO process guide.				
	Part numbers consistent with the text and figures.				
	Drawings Required paragraph IAW Process Guide.				
	Estimated Size, Weight, and Cost of Kits IAW Process Guide.				
	Personnel Information And Requirements IAW Process Guide.				
	Special Tools, Fixtures, And Software Required IAW Process Guide.				
	Tools are listed in alpha-numeric order.				
	All tools have part number and cage assigned. Note: some fabricated tools may not have part numbers.				
	Tool Format is: Noun Name, SPMIG ####, P/N: #####, CAGE: #####, SCAT: ####, NIIN: ###-##-####.				
	Only the tool noun name is used in the body.				
HOW WORK IS ACCOMPLISHED					
	WARNING Warning text is fully justified. The headings are typed in 12 point bold and uppercase. The body is typed in 10 point bold upper/lowercase.				
	Only approved WARNINGS are used.				
	CAUTION Use the same format as a warning except only the heading is in bold print.				
	NOTE <i>A note uses the same format as a warning and a caution, but in italics.</i>				
	Warning for chemicals listed prior to citing the procedure involving use of that chemical.				
	Tag-outs use the following text: "Complete Red Danger Tags IAW COMDTINST 9077.1 (series) and attach them to the following in the "OFF" position:" This is followed by a list of components to be tagged. If the position is to be other than OFF it will be indicated in parentheses after the component name, ex. ("Closed " position).				
	Steps removing Tag-outs use the following text: "Remove Danger Tags IAW COMDTINST 9077.1 (series) from the following and				

	place in the normal position". This is followed by a list of components, usually the opposite of the Tag-out step.				
	When a procedure specifies "tighten", other than "hand tight" include the following note NOTE There is no torque value required, do not over-tighten.				
	QA requirements identified in text by: ** Q.A. (1) REQUIRED AT THIS POINT **				
	Quality Assurance inspections show as a line item estimate in the personnel information paragraph (para 6.b.).				
	Level of detail appropriate to the entity performing the work.				
	Describes what to do with all of the parts and/or material listed in paragraph 6.a.(1).				
SUPPLEMENTAL INFORMATION					
	Operational Checkout Requirements IAW TCTO Process Guide.				
	Weight And Center Of Gravity Information IAW TCTO Guide				
	Weight, Moment, and Stability Data Certified by SFLC NAME Branch.				
	Auxiliary Design Interface Analysis performed/reviewed by SFLC NAME.				
	Electrical Design Interface Analysis performed/reviewed by SFLC NAME.				
	Propulsion Design Interface Analysis performed/reviewed by SFLC NAME.				
	TEMPEST Inspection requirement.				
	Technical Manuals properly identified and updated.				
	Training Equipment/Doctrine identified and updated.				
RECORDS					
	Action Required On Maintenance Records (MPCs) IAW TCTO and MPC Development Process Guides.				
	SICRs submitted/processed.				
	Modification Identification Markings complete.				
LEVEL OF TECHNICAL REVIEW					
	The TCTO has undergone the appropriate level of technical review (within ESD, Product Line and/or OEM).				

FORMATTING					
	Outline IAW TCTO Process Guide.				
	Black, Arial 10-pitch font, except where indicated in TCTO Process Guide.				
	Text of the TCTO starts on page 2.				
	TCTO number is located on the upper right-hand corner of the header.				
	Page Number (page X of Y) is located on the bottom right-hand corner of the footer.				
	Short, concise technically accurate sentences.				
	Numerical quantities under ten spelled out unless followed by unit of measurement, time, or quantity used in series with other items expressed as numerals.				
	Illustrations and tables referenced in the text.				
	Figures numbered 1, 2,				
	Figures appear in the same sequence as referenced in the body.				
	Photographs and drawings appear as figures.				
	Drawings include a reference to the drawing number.				
	Photographs meet guidelines in process guide, JPEG format, have captions.				
	Dimensions listed in inches and feet, if appropriate metric dimensions added in parentheses.				
	Two letter abbreviations for dimensions, such as in, ft, mm, cm.				
	Dimension less than 1, have a 0 to the left of the decimal point. Example, 0.15 instead of .15.				
	Same accuracy used for a given dimension in text and on diagrams.				
	Measurements given in decimal format are generally preferred with exception when clarity dictates the use of fractions				
	Revision TCTO requires a black revision bar in the margin next to where the change was made. A statement in paragraph 2.b. (purpose) of the TCTO, shall state the reason why the TCTO is being revised				
REFERENCES					
	All references are in title case.				
	References are listed in alphabetic order.				
	MPC references only include MPC				

	number.				
	Use "Comply with MPC#####.# " when the entire procedure must be completed.				
	Use "Refer to MPC #####.#" when only a portion of the MPC is to be completed.				

Reviewer Information

Name: _____

Date: _____

Phone: _____

Email: _____

APPENDIX P: TCTO ROLES AND RESPONSIBILITIES MATRIX

The matrix provided below contains a detailed matrix describing the roles and responsibilities for the submission, development, and implementation of TCTOs.



TCTO Matrix - Roles
& Ownership.xls

APPENDIX Q: ACRONYMS & GLOSSARY OF TERMS

A

ACL Authorized Chemical List

ACMS Asset Computerized Maintenance System - the system used to track and schedule maintenance actions on U.S. Coast Guard assets

AFC Allotment Fund Code

ALC Aviation Logistics Center (previously Aircraft Repair & Supply Center [AR&SC])

ALM Asset Line Manager – The Asset Line is responsible for all engineering and logistics associated with a single asset type. There may be multiple Asset Lines within a single Product Line (as is the case with small boats).

AMM Asset Materiel Manager

ALMIS Asset Logistics Management Information System integrates two mature, transactional systems: AMMIS and ACMS

AMMIS Asset Maintenance Management Information System is the fully integrated system that records and reports all aviation information, including inventory functions, at AR&SC.

Asset Term used to describe Aircraft, Cutters, Boats, and Barges.

B

BOD Business Operations Division – The BOD

C

C4IT Service Center Command, Control, Communications, Computers & Information Technology Center. This is the modernized electronics support entity that consists of TISCOM, C2CEN, OSC and both MLC (t) divisions. The C4IT Service Center provides development and implementation of all C4IT TCTOs, MPCs, and associated technical documentation.

CG-22 A form used to recommend changes to MPCs, Technical Publications, Drawings, and engineering instructions. CG-22s are also used to initiate the TCTO process.

COE Center of Excellence – The C4IT Service Center is comprised of three COEs: C2CEN, OSC, and TISCOM.

COTR Contracting Officer Technical Representative

CSOSS Combat Systems Operational Sequencing System - A system developed and maintained by Navy Surface Warfare Center to manage combat systems casualty control. CSOSS is currently installed on WMSL class cutters, and will be installed on other cutters in the future.

CT Core Technology – Each COE has several CTs, responsible for support of standardized C4IT equipment, systems, and services which cross multiple Product Lines. An example is the Navigation CT, responsible for support of all electronic navigation systems on assets and at shore units throughout the Coast Guard.

CTM Core Technology Manager – The CTM is the single “touch point” for all C4IT engineering, logistics, and maintenance support for the C4IT systems and services assigned to them. The CTM reports to the C4IT Service Center COE they are assigned to.

D

DC Damage Control

DOG Deployable Operations Group

E

EAL Electronic Asset Logbook – The software system used to log, track, and view asset status and activities. EAL is used by Modernized Units, and is accessed through ALMIS.

EC Engineering Change – The EC process has been superseded by the TCTO Process.

EOSS Engineering Operational Sequencing System - A system developed and maintained by Navy Surface Warfare Center to manage engineering casualty control. EOSS is currently installed on WMSL class cutters, and will be installed on other cutters in the future.

ESD Engineering Services Division; the primary ESD for SFLC is located in Baltimore, MD. The ESD is responsible for the TCTO process. Note that there are also ESD Support elements at the two traditional Maintenance and Logistics Commands (the Specifications Branches). Furthermore, the C4IT Service Center provides technical development and implementation of all electronics TCTOs (an ESD function).

ESD Electronics Support Detachment

ESD-ESB-ELEX Engineering Services Division – Electronics Support Branch – The ESD-ESB-ELEX serves as the “asset integrator” for all electronic systems installed on surface forces assets, and works across SFLC Product Lines to implement C4IT TCTOs common across multiple asset classes. This ESD branch works routinely with C4IT Service Center, developing TCTOs, MPCs, and allowance/sparing requirements.

ESU Electronics Support Unit

F

Fit The term “fit” is used to describe any change that affects an interface with other components

Feasibility Board The SFLC is responsible for maintaining a Feasibility Board to provide oversight of the SFCCB process at the SFLC. The ESD Chief serves as the chairperson of the board; the members include all of the Product Line Engineering Section Chiefs, a representative from the C4IT Service Center (for C4IT TCTOs), and cross-product line subject matter experts (when appropriate). The SFLC may adjust the board membership as necessary to provide appropriate oversight and input to the SFCCB process.

FLS Fleet Logistics System – this is the software application used to associate maintenance with funds expenditures, manage configuration, and develop the Naval Engineering Project List. FLS is used in support of Non-Modernized Units. Furthermore, FLS currently supports programmed depot maintenance for both Modernized and Non-Modernized Units.

Form The term “form” is used to describe any change that affects the weight, balance, or moment of inertia of a component.

FTO Field Terminal Operator – Modernized units are assigned an FTO, who is responsible for entering certain data into ALMIS, including TCTO and MPC completion.

Function The term “function” is used to describe any change that affects operational characteristics.

G

GFE Government Furnished Equipment

GFP Government Furnished Property

H

HM&E Hull, Mechanical, and Electrical

I

IEP Item Entry Proposal

J

K

KO Contracting Officer

KS Contracting Specialist

L

Logistics Modernization This is a term to describe the broad CG-wide alignment of all shore, surface, and aviation engineering and logistics policies and processes to the aviation business model. Logistics Modernization of surface forces includes transformation to a bi-level maintenance program, centralization of funding, personnel resources, and support under Product Lines, and a shift to aviation IT tools (ALMIS).

M

Modernized Units Modernized Units are those that have undergone Logistics Modernization. This is a term to describe transformation to a new bi-level maintenance and logistics structure, mapped from the aviation business model.

MPC Maintenance Procedure Card

MDL Maintenance Due List – this is a comprehensive list of all depot and organizational-level maintenance due on a platform. The MDL is available to Modernized Units in ALMIS.

MRL Maintenance Requirement List – this is the Modernized Unit / ALMIS equivalent to the NEPL, with the exception that it includes all naval, ordnance, and electronics systems requirements.

MSR Mandatory Special Requirements – MSR are maintenance requirements not tied specifically to an asset, or common across multiple assets. Examples include boat trailers, damage control gear, and personnel protective equipment.

N

NAME Naval Architecture and Marine Engineering

Non-Modernized Units Non-Modernized units are those that have not yet undergone Logistics Modernization. These units are supported by traditional Naval Engineering and Electronics processes and organizations that have not yet been mapped to the new CG Logistics Model.

NEM Naval Engineering Manual

NEPL Naval Engineering Project List

NE-TIMS Naval Engineering Technical Information Management System – this is an on-line database of all CG Drawings and Technical Publications for surface assets.

O

OEM Original Equipment Manufacturer

ORD Operational Requirements Document - A top-level decision document which establishes the minimum acceptable standards of performance and optimum performance goals for an asset. Details regarding ORD development and requirements are contained in reference (e).

OSS Operational Sequencing System – A set of systems developed and maintained by Navy Surface Warfare Center to manage combat and engineering casualty control. OSS includes the Combat Systems Operational Sequencing System (CSOSS) and Engineering Operational Sequencing System (EOSS). OSS is currently installed on WMSL class cutters, and will be installed on other cutters in the future.

P

PL Product Line – the PL is responsible for all assets within a certain class. Examples include the 378’ WHEC Product Line, Patrol Boat Product Line, and the Small Boat Product Line. A PL may be responsible for a single asset type (i.e. 378’ WHEC Product Line), or multiple asset types (i.e. Small Boat Product Line).

PLM Product Line Manager – the PLM is the single “touch point” for all engineering, logistics, and maintenance support for the assets assigned to them. The PLM reports to the SFLC Command.

Prime Unit The purpose of a Prime Unit is to ensure a centralized point of technical responsiveness to field level maintenance management of a specific asset type. Prime Units receive their tasking from the Product Line. Prototypes and MPC development in support of TCTOs are normally accomplished at the Prime Unit. The Prime Unit verifies all aspects of the proposed TCTO, including: inspections, installation procedures, parts, and changes to operating and maintenance procedures. Prime Units are designated by the PLM, with concurrence from CG-731/CG-751.

Q

QA Quality Assurance

Tri-P Tri-Partite - the Tri-Partite is a working group comprised of CG-45, CG-731, CG-64, and CG-1134 that addresses CG-wide boat issues. The Tri-P typically meets on a weekly basis.

R

RCM Reliability Centered Maintenance

S

S1000D An international convention for Technical Publication development and numbering. S1000D is an international specification for the procurement and production of technical publications. The guidance for data labeling includes a recommended Standard Numbering System (SNS). The S1000D SNS may be used in place of SWBS codes in all modernized technical information applications including ACMS, MPCs, and TCTOs. CG Drawings and legacy Technical Publications still use SWBS codes rather than S1000D.

SFCCB Surface Configuration Control Board – the SFCCB meets as required to vote on proposed TCTOs. The SFCCB generally convenes twice for each TCTO (Phase 1 and Phase 2 approval). The Phase 1 SFCCB meets to provide concept approval, and the Phase 2 SFCCB meets to provide approval for fleet-wide implementation. The SFCCB also makes determinations on funding and priority of pending changes, based on input from the SFLC, an evaluation of the WOW Prioritization, and a holistic review of all pending changes.

SCH Significant Component History

SCHR Significant Component History Report

SFLC Surface Forces Logistics Center – this is the new surface forces engineering and logistics organization, which is an amalgamation of the ELC, all MLCs, NESUs, and Industrials.

SFLC Central Activities – Engineering Logistics Center Central Activities is a task management software tool used by SFLC to manage internal tasking, and external tasking from CG-4.

SFLC Central Projects – Engineering Logistics Center Central Projects Database – this is an MS-Access database that houses all historic data on TCTOs and Engineering Changes. SFLC Central Projects will continue to be used by the SFLC to manage the development and implementation of TCTOs, and store historical data.

SICR Supply Item Change Record – Form used to enter data into AMMIS. SICRs address inventory requirements, are used to create stock numbers, and provide details on acceptable part numbers and CAGE codes associated with Federal Stock Numbers.

SNS Standardized Numbering System – data labeling system outlined in the S1000D international specification for the procurement and production of technical publications.

SSL Standard Support Level – this is the annual recurring O&E funding (including AFC-4X and AFC-30) received per asset. SSL varies by asset class.

SWBS Ship Work Breakdown Structure

T

TCTO Time Compliance Technical Order – the TCTO replaces the Engineering Change. TCTOs are used to document a physical change to an asset (boat, barge or cutter), or a special, urgent, or repeated inspection, requiring compliance within specified time limits.

TP Technical Publication

U

UR Unsatisfactory Report of Asset Material – the UR is a report used to document a deficiency in a component provided by the SFLC. This document is similar to the SFLC Supply Deficiency and Quality Deficiency Reports.

V

W

WOW World of Work – A tool used to prioritize TCTO development and implementation. The WOW should include the following elements: Safety, Law/Regulation, Operational Impact, and Lifecycle Cost Benefit. The WOW score is used to prioritize funding, technical development resources, and other resources required to implement a configuration change to an asset class.

X

Y

Z