TECHNICAL SPECIFICATION
TITLE: JUSTIFICATION/COST FORM
NO.: TS9090-210B
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JCF PREPARATION

1.0 SCOPE: This specification provides criteria for the uniform preparation, processing, and approval of a Justification/Cost Form (JCF).

1.1 GENERAL: The JCF is used by System Commands (SYSCOMs) and Program Executive Offices (PEOs) to arrive at a management decision of whether or not to proceed with the development of a Ship Alteration (SHIPALT). The document in general will define the top-level requirements and anticipated costs for the SHIPALT and, when approved and assigned a number, will serve as the authorization to initiate Ship Alteration Record (SAR) development. In accordance with FMP Milestones, the JCF shall be submitted not later than A-16 for the availability of the first intended install and the Ship Program Manager (SPM) shall adjudicate the JCF no later than A-14. The JCF shall be completed in Microsoft Word using the requirements in the FMP Management and Operations Manual, residing on the **FMP Website, URL www.fmp.navy.mil.**

1.2 APPLICABILITY: This specification is applicable to carriers, surface ships, surface craft, and submarine JCFs and shall be utilized by all personnel for preparing, processing and maintaining JCFs except as noted herein (see Section 1.3).

1.3 EXCEPTIONS: This specification does not apply to:

- Nuclear Propulsion Systems under the cognizance of NAVSEA 08.
- Special Project Alterations (SPALTs) affecting the Configuration and/or Capabilities of systems and equipments under the cognizance of the Director, Strategic Systems Programs (DIRSSP).
- Aircraft launch and recovery equipment changes under the cognizance of the Naval Air Systems Command (NAVAIR).

2.0 REQUIREMENTS: All of the following requirements apply to the JCF format, as shown in Appendix A. This section provides step-by-step instructions for the preparation of a JCF. The amount of detail to be provided in the JCF will depend on the complexity of the proposed change or modification and should be determined by the submitter.

2.1 NO FOREIGN COUNTRIES (NOFORN): Determination of No Foreign (NOFORN) Countries will be established at outset and reflected at the top of the JCF.

2.2 PROGRAM EXECUTIVE OFFICE (PEO) ADMINISTATIVE USE ONLY:

PROGRAM EXECUTIVE OFFICE (PEO) ADMINISTRATIVE USE ONLY – This section to be completed by the designated				
ASSIGNED JCF TRACKING NO:		The designated PEO Administrator to enter the JCF tracking No..		
Assigned Execution No. To be completed after the JCF has been approved by the Program Manager and designated for accomplishment via AER, New Construction, SHIPALT or TEMPALT	**AER** The designated PEO ADMIN to enter assigned AER # (if applicable)	**New Construction** The designated PEO ADMIN to enter assigned Contract Mod # (if applicable)	**SHIPALT** The designated PEO ADMIN to enter assigned SHIPALT # (if applicable)	**TEMPALT** The designated PEO ADMIN to enter assigned TEMPALT # (if applicable)

2.3 SHIPALT BRIEF: The JCF Submitter is to enter a brief description of JCF - limited to 30 characters. Acronyms should be spelled out.

2.4 RECOMMENDED CATEGORY (check all applicable): The JCF Submitter is to check all applicable categories recommending how the change or alteration should be accomplished.

☐ **Alterations Equivalent to Repair (AER) -** An AER has one or more of the following TYCOM alteration attributes:

- Use of different material, which has been approved for like or similar use and such materials are available from standard stock.
- Replacement of obsolete, worn-out or damaged parts, assemblies, or equipment, requiring renewal by that of later and more efficient design previously approved by the System Commands (SYSCOMs) concerned providing such replacement does not cause a change to the existing system design and does not effect a change to the systems or equipment normally associated with the military characteristics of the ship.
- Strengthening of parts, which require repair or replacement in order to improve reliability of the parts and of the unit, provided no other change in design is involved.
- Minor modifications involving no significant changes in design or functioning of equipment but considered essential to prevent recurrence of unsatisfactory conditions.
- Replacement of parts, assemblies, or equipment with the following characteristics:
- Ships updated with like items of more efficient and less costly design.
- New parts, assemblies, or equipment and their installation less costly than maintaining existing parts, assemblies, or equipment.
  1. Update does not cause a change in the existing system design.
  2. Update does not effect any interfacing system design and does not affect a change to the system or equip normally associated with the military characteristics of the ship.
- AERs must meet all of the following criteria:
  1. It does not impact Battle Force Inter-operability (BFI).
  2. It does not impact the ship's stability records (weight and moment).
  3. It does not impact or alter the 3-dimensional footprint or the equipment it is replacing.
  4. It does not impact shipboard distributive systems (i.e. water, ventilation, electrical, or power), their Ship Selected Records (SSRs), or interfacing equipment or systems; compartmental arrangement records; or Damage Control records.
- It does not impact Manpower and Personnel.

☐ **New Construction** - Modifications to the shipbuilding contract.

☐ **Ship Alterations (SHIPALT); Title: ☐ D or ☐ K or ☐ KP -** Any change in hull, machinery equipment, or fittings which involves change in design, material quality, location, or relationship of the component parts of an assembly. SHIPALTS are classified by either Title D or K.

- **Title D SHIPALT** is a permanent alteration that is equivalent to a repair, does not affect the military characteristics of a ship, and may require Centrally Provided Material (CPM) but does not require Headquarters CPM (HCPM) for accomplishment.

- **Title K SHIPALT** is a permanent alteration to provide a military characteristic or additional capability not previously held by a ship affecting configuration controlled areas or systems of a ship or which otherwise requires the installation of HCPM.
- **Title KP SHIPALT** is for submarine use only.

☐ **Temporary Alterations (TEMPALTs)** - Alterations that provide new capabilities or improve existing capabilities on a temporary basis **(not to exceed one year or one operational deployment in duration). TEMPALTs** supports research development, test and evaluation, or military exercise or mission requirements. **Note: TEMPALT data package is required.**

2.5 OPNAV SPONSOR: The JCF Submitter is to enter the Name, Code, Phone Number, and Email Address of the OPNAV Sponsor or N/A. If the change proposal will result in a Title K SHIPALT, there must be an OPNAV Sponsor listed.

2.6 SUBMITTING ACTIVITY: The JCF Submitter is to enter his/her Name, Activity, Code, Phone Number, and Email.

2.7 TECHNICAL AUTHORITY ACTIVITY: The JCF Submitter is to enter the Name, Activity, Code, Phone Number, and Email of the organization that has technical authority over the change. If more than one activity has technical authority over the change, both shall be entered.

2.8 SEQUENCE NUMBER FOR PROPOSED ALTERATION, FROM NAVY DATA ENVIRONMENT-NAVY MODERNIZATION (NDE-NM) (if applicable): The sequence number is assigned automatically when the originator enters the proposed alteration into the NDE-NM. The JCF Submitter is to enter the sequence number or N/A, if not applicable.

2.9 ACQUISITION CATEGORY (ACAT) I-IV PROGRAM: ☐ Yes ☐ No This will be checked "yes" if the proposed change is an **ACAT I-IV** Program.

2.10 DESCRIPTION OF ALTERATION: The JCF Submitter is to provide a brief scope of the proposed change, including alternatives that may have been considered the technical risk, and why the proposed change is preferable. List equipment to be added and/or deleted. Discuss compensation that could be accomplished concurrently with this proposed change, in order to minimize or offset the weight, moment, or space impact of the proposed installation. Discuss interfaces with existing shipboard systems, including functional interfaces (diagrammatic) and physical interfaces. Include references to any other amplifying information or data, if available.

2.11 REQUIREMENT AND JUSTIFICATION OF ALTERATION (check all that apply): The JCF Submitter is to check all applicable boxes requiring the change or alteration and note requirements, deficiencies or explanations as requested.

☐ **Legislated (Statutory or Regulatory) Requirement** - Legislation

Cite Requirement: Enter the applicable requirement.

☐ **Proposed Military Improvement (PMI) -** Approved/directed by OPNAV and are intended to increase the ship's ability to meet its Required Operational Capability (ROC).

Cite Rationale: Enter the system/equipment level Operational Requirements Documents (ORD) and/or applicable ROCs.

☐ **Proposed Survivability Improvement (PSI) -** Approved/directed by OPNAV, and are intended to reduce the ship's susceptibility to defined threats, or to increase the ability to recover from damage.

Cite Requirement: Enter the system/equipment level Operational Requirements Documents (ORD) and/or applicable ROCs.

☐ **Reduction of Total Ownership Costs (R-TOC) -** This block shall only be checked when the primary purpose of the change proposal is R-TOC. These initiatives address long-standing concerns about the adverse impact of defense budgetary and operational trends on force structure and readiness. Department of Defense (DOD) has directed Program Managers to achieve specific R-TOC goals in their programs. ROI Enter the calculated ROI number; Payback Enter the calculated Payback Period. **(Refer to Appendix B)** – If this box is checked, the calculation sheets must be attached to the JCF.

☐ **Battle Force Interoperability (BFI)**

Cite Requirement: Enter the applicable requirement.

☐ **Safety -** Item changes are required to eliminate hazards to ship personnel or components as officially documented by oversight organizations. If safety analysis has been accomplished, attach copy to the JCF.

Cite Deficiency: Enter the officially documented deficiency.

☐ **Restoring Margins -** Restoring system capacity (weight and kilogram (kg); electrical system; heating, ventilation and air conditioning; etc).

Explanation: Provide an explanation.

☐ **Contract Defect -** Address correction of defective specifications, unavailable Government Furnished Equipment (GFE), or unavailable Government Furnished Information (GFI).

Cite Requirement: Enter contract number, CLIN, and problem to be corrected.

☐ **Unavailable, Obsolete or Unreliable Equipment -** Changes that replace equipment or components no longer available or supportable.

☐ **Testing and Trial Deficiency -** Testing and trial deficiencies address component or system modifications derived from deficiencies noted during developmental or operational testing.

☐ **Top Management Attention/Top Management Interest (TMA/TMI)** - Indicate whether or not this change is a TMA/TMI item and include number.

☐ **Aviation Capability and Air Wing Compatibility**

☐ **Other (Specify) -** Enter any other requirement not specified above.

Narrative Justification - The JCF Submitter is to enter a brief history of the need for this alteration. This data shall be provided with reference to the activity and official document that initially requested the change or alteration (i.e. TYCOM, PMI, etc). Include references to any other amplifying information or data, if available.

2.12 OPNAV CATEGORY CODE (1-6): Enter the most appropriate category code.

Category 1: Safety and Mandatory. Includes alterations required to provide a ship which is safe, mobile and capable of supporting future modernization. That level also includes those mandatory requirements imposed upon the Navy by outside agencies.

Category 2: Reliability and Maintainability: Primary Mission Area. Includes alterations that provide significant increases in reliability and maintainability of installed primary mission area systems/equipment.
Category 3: Primary Mission System Modernization. Includes alterations that provide increased capability in combat mission (combatant ships), primary mission (non-combatant ships), ship survivability and self-protection areas.
Category 4: Reliability and Maintainability: Secondary Mission Area. Includes alterations that provide significant increases in the reliability and maintainability of installed secondary mission area systems/equipment.
Category 5: Secondary Mission Area Modernization. Includes alterations that provide increased capability in secondary mission areas.
Category 6: Mission Support. Includes those alterations that are required to provide support to primary and secondary mission areas and are not included in the above categories.

2.13 TYCOM PRIORITY (if applicable): The TYCOM will provide narrative to indicate priority in relation to other candidate JCFs.

2.14 EXTENDED WORK BREAKDOWN STRUCUTRE (ESWBS) or SHIPWORK AUTHORIZATION BOUNDARY (SWAB) NUMBER: The JCF Submitter is to enter one ESWBS Number selected from NAVSEA S9040-SWAB-IDX-010/SWBS 5D, which is most closely associated with the system, component or structure being impacted by the alteration. This ESWBS is to be to the 5th level (ex. 15092). SWAB Number is a 3 or 4 digit number from the SWAB book (SUBMEPP ltr. 1843.7/231 of 3 Jun 93) which is an enclosure to joint COMSUBLANT/COMSUBPAC INST 4710.2. SWAB numbers range from 002.1 to 999.2.

2.15 DETAIL DESIGN CRITERIA TO BE USED (check all that apply): The JCF Submitter is to check all applicable boxes noting the design criteria to be used for the change or alteration.

- ☐ Ship Specification - The shipbuilding contract specifications for a particular ship.
- ☐ Deep Diving General Overhaul Specification - The contract specification for a particular ship.
- ☐ General Specifications for Overhaul (GSO) – Check if GSO Manual will be used.
- ☐ Other (Specify): Enter any design criteria to be used that is not addressed above.

2.16 DISTRIBUTED SYSTEMS IMPACT: The JCF Submitter is to indicate whether or not Ship's Critical Distributive Systems (SCDS) are impacted (net increase, net decrease or no impact) by the accomplishment of the change or alteration.

	Net Increase	Net Decrease	No Impact	N/A
Electrical (60 Hz)	☐	☐	☐	☐
Electrical (400 Hz)	☐	☐	☐	☐
HVAC	☐	☐	☐	☐
Chilled Water	☐	☐	☐	☐
Fire Main	☐	☐	☐	☐
Portable Water	☐	☐	☐	☐
Aviation Fuel System	☐	☐	☐	☐

	Net Increase	Net Decrease	No Impact	N/A
Networks (Identify Each Network Impacted)	☐	☐	☐	☐
Topside	☐	☐	☐	☐
Fiber Optic Cable Plant	☐	☐	☐	☐
OTHER:	☐	☐	☐	☐

2.17 OTHER CONSIDERATIONS (if yes, provide explanation):

- **Ship Characteristics Document change required:** ☐ Yes ☐ No
  The JCF Submitter is to indicate (Y/N) whether or not accomplishment of the change or alteration impacts the ship characteristics document.
  Explanation: If yes, provide details of how the change would impact ship characteristics document.

- **Ship/Aviation Systems Integration Impact:** ☐ Yes ☐ No
  The JCF Submitter is to indicate (Y/N) whether or not accomplishment of the change or alteration impacts the ship or aviation systems integration (for example, C4ISR, catapults or arresting gear) of applicable ships.
  Explanation: If yes, provide details of how the change would impact ship/aircraft integration.

- **Environmental Impact (Air/water discharge, use of hazardous materials, solid waste generation, etc.):** ☐ Yes ☐ No
  The JCF Submitter is to indicate (Y/N) whether or not accomplishment of the change or alteration has an environmental impact (air/water discharge, use of hazardous materials, solid waste generation, etc) to applicable ships.
  Explanation: If yes, provide details of how the change would impact the environment.

- **Flight Deck/Hangar Bay Encroachment:** ☐ Yes ☐ No ☐ N/A
  The JCF Submitter is to indicate (Y/N) whether or not accomplishment of the change or alteration impacts the flight deck or hangar bay of applicable ships.
  Explanation: If yes, provide details of how the change would encroach the hangar bay or flight deck.

- **Habitability:** ☐ Yes ☐ No
  The JCF Submitter is to indicate (Y/N) whether or not accomplishment of the change or alteration impacts the habitability (i.e. messing, berthing, recreational, and sanitary spaces) of applicable ships.
  Explanation: If yes, provide details of how the change would impact habitability spaces.

- **Storage Requirements:** ☐ Yes ☐ No
  The JCF Submitter is to indicate (Y/N) whether or not accomplishment of the change alteration impacts the storage requirements of applicable ships.
  Explanation: If yes, provide details of how the change would impact storage space.

- **Weight & Moment Change:** ☐ Yes ☐ No

The JCF Submitter is to indicate (Y/N) whether or not accomplishment of the change or alteration impacts the weight and moment of applicable ships.
Explanation: If yes, provide details of how the change would impact weight and moment. As a minimum a rough order of magnitude weight impact should be provided.

- **Dry Docking:** ☐ Yes ☐ No
  The JCF Submitter is to indicate (Y/N) whether or not the alteration requires the ship to be dry-docked.
  Explanation: If yes, provide details of why the change would require dry-docking.

- **Certification Required:** ☐ Yes ☐ No
  The JCF Submitter is to indicate (Y/N) whether or not certification is required (e.g. TEMPEST, EMI).
  Explanation (include responsible activity): If yes, provide details of certification requirements.

- **SUBSAFE Impact:** ☐ Yes ☐ No ☐ N/A .
  Other: The submitter will include considerations not included in the above categories.

- **Nuclear Weapons Impact:** ☐ Yes ☐ No
  Explanation: The JCF Submitter is to indicate yes or no whether or not the alteration impacts are nuclear weapons factors.

2.18 SHOCK, VIBRATION, EMI, AND TEST REQUIREMENTS:

Shock Grade (check one):

☐ A - for Vital Systems/Equipment; Must Function After Shock Event
☐ B - In Spaces Manned at GQ, Housing A Level Equipment, Cannot be a Hazard (Missile, Electrical, Hazardous material (HAZMAT), Structures on Mast/Island B Minimum
☐ C - all others
☐ N/A – not applicable

Compliant with MIL-STD-167 –1, Vibration Requirements (check one):

☐ Yes ☐ No ☐ N/A

The JCF Submitter is to indicate (Y/N) whether or not the alteration is compliant with **MIL-STD-167-1, Mechanical Vibrations of Shipboard Equipment**. MIL-STD-167-1, which covers Reciprocating Machinery and Propulsion System and Shafting, is a NOFORN document.

Compliant with MIL-STD-461E EMI Requirements (check one):

☐ Yes ☐ No ☐ N/A

The JCF Submitter is to indicate (Y/N) whether or not the alteration is compliant with **MIL-STD-461E, Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment**

Compliant with MIL-STD-464 EMI Requirements (check one):

☐ Yes ☐ No ☐ Tailored (specifics appended) ☐ N/A

The JCF Submitter is to indicate (Yes, No, Tailored or Not Applicable) whether or not the alteration is compliant with **MIL-STD-464, Electromagnetic Environmental Effects Requirements for Systems**.

Compliant with OPNAVINST-2400.20E RF Spectrum Management Requirements (check one):

☐ Yes ☐ No ☐ N/A

The JCF Submitter is to indicate (Y/N or Not Applicable) whether or not the alteration is compliant with **OPNAV Instruction 2400.20E, Navy Management of the Radio Frequency Spectrum**.

Compliant with HERO/HERP/HERF Requirements (check one):

☐ Yes ☐ No ☐ N/A

The JCF Submitter is to indicate (Y/N or Not Applicable) whether or not the alteration is compliant **HERO/HERP/HERF** requirements detailed in DoDINST 6055.11 and OP 3565 Volume I.

HERO-Hazards of electromagnetic Radiation to ordnance
HERP -Hazards of electromagnetic Radiation to personnel
HERF -Hazards of electromagnetic Radiation to fuel

REMARKS - The JCF Submitter is to provide status on the above requirements and enter any other test requirements (e.g. component qualification) for installation of the proposed change.

2.19 APPLICABLE SHIPS (check all that apply): The JCF Submitter is to check all of the ships which the proposed change applies to, including those that have already had the change installed. In the event that this change has been accomplished on any ship or is contained within a shipbuilding contract it shall be noted in remarks section (2.28).

2.20 ILS IMPACT (check all that apply): The JCF Submitter is to check all boxes where installation of this alteration will affect the following Integrated Logistics Support (ILS) elements.

☐ Technical Manuals
☐ Provisioning
☐ Planned Maintenance System (PMS)
☐ Training/Personnel Qualification Standards (PQS)
☐ Ship's Selected Records (Drawings & Manuals)
☐ Operating Sequencing Systems (OSS)
☐ Steam Plant Manual (SPM)
☐ Manning Analysis Required
☐ Test Equipment
☐ Software Management
Specify software support activity: _____
☐ Spares Affected
Specify responsible activity: _____
☐ Other (Specify) _____

2.21 INDICATOR BILL OF MATERIAL SOURCE CODE (IBOM (0-8): The Indicator, Bill of Material (IBOM) is required by material management personnel to identify the source document used to enter the material into NDE. It provides the level of maturity of the list of material being reviewed. It indicates if a BOM is applicable to the alteration and the status of development. This

field will be updated as the alteration matures from JCF to SAR to SID for title "K", "D" and "F" alterations.

☐ 0- source of BOM not specified
☐ 1-BOM not yet developed
☐ 2-Justification Cost Form(JCF)
☐ 3-Shipalt Record (SAR) BOM
☐ 5-Ship installation Drawing(SID) BOM
☐ 6-Hull Unique Material
☐ 7-Material Required- Sub use only
☐ 8-BOM not required

2.22 CRITICAL MATERIAL: This data field will allow the JCF to enter the top line system configuration identification of the Hardware Systems Command (HSC) material to be installed. The items listed in this field should be the same as those that will be listed in the P1 funding line in NDE-NM/Fleet Modernization Program Management Information System (FMPMIS).

2.23 FIRST PLANNED INSTALLATION: The JCF submitter is to supply the intended hull for the first install and availability of first unit or lead-time for delivery of first unit. If there are significant differences in description, material requirements, and/or installation costs among ship classes, a separate JCF shall be developed for each class. The N/A box should be "X" if first hull availability has not yet been programmed.

Planned First Installation: Hull _____ Availability _____ N/A _____

2.24 CONCURRENT/PRIOR ALTERATION ACCOMPLISHMENT: The JCF submitter is to list any prior or concurrent alts required for this change or alteration to perform as stated. This section should include but not be limited to SHIPALTs (both approved and pending), MACHALTs, ORDALTs, Engineering Changes, Field Changes, SPALTs and Technical Directives. Ensure all concurrent/prior ship alterations are identified by class, number, title and Revision. **In other words: CG-47 Class 5000K, Revision 1.** The minutes from the CCBs should be available.

2.25 O&S COST IMPACT: ☐ Increase ☐ Decrease ☐ No Impact
The JCF Submitter is to indicate whether or not the Operation & Support Cost is impacted (increase, decrease or no impact) by the accomplishment of the change or alteration. The O&S Costs are fleet operating and support costs associated with the maintenance and repair of systems or equipment.

2.26 ESTIMATED COSTS: The JCF Submitter is to provide estimated costs for all below items. Note: M/D x Rate = Cost. If alt impacts EMI spectrum, the cost should reflect the EMI effort.

Engineering Planning (Shipchecks/Drawings/etc)($K): The JCF Submitter is to provide estimated cost for engineering planning, including costs for shipchecks, drawing development, etc.

GFE Cost ($K): The JCF Submitter to provide estimated costs for Government Furnished Equipment (GFE).

CFE and Installation Material Cost ($K): The JCF Submitter is to provide estimated costs for Contractor Furnished Equipment (CFE) and installation material cost.

- Installation Mandays: The JCF Submitter is to provide an estimated installation mandays for accomplishing the change or alteration. These estimate will be ballpark (+/- 40%) cost estimate.
- Services (Mandays): For Alteration Installation Team (AIT) capable alterations, the JCF Submitter is to provide an estimated shipyard services cost in mandays. Shipyard services include crane services, welding, gas freeing, tag-outs, work authorization forms, work integrations, etc. For changes that are not AIT capable, enter N/A.
- Accomplishing Activity: ☐ **Shipyard** ☐ **AIT** The JCF Submitter is to recommend the appropriate activity to accomplish the change or alteration either the shipyard or an AIT.

ILS Cost ($K): The JCF Submitter is to provide estimated costs for Integrated Logistics Support (ILS) elements identified in paragraph 14.

Total Cost Estimate per Carrier (BALLPARK) ($K): The JCF submitter is to provide a ballpark (+/- 40%) cost estimate for the installation per Carrier. This estimate should include all costs (ILS, material, services, EMI surveys etc.) associated with this alteration. If a more refined cost estimate is available provided the cost estimate and the designated estimate classification. See reference (h) section 5.2 for classification of cost estimates information.

2.27 RECOMMENDED EXECUTION PARAMETER (check all that apply).

SAR Required: ☐ **Yes** ☐ **No** The JCF Submitter is to indicate whether or not a SHIPALT Record (SAR) is required for the change or alteration.

If Yes, Approval level: ☐ **NAVSEA** ☐ **PY** The JCF Submitter is to indicate whether the NAVSEA SPM should approve the SHIPALT Record or if it can be delegated to the Planning Yard to approve the SAR and sign in the SPM block.

Technical Guidance Package Required: ☐ **Yes** ☐ **No List** any additional guidance (drawings, schematics, etc.) required the planning yard to develop the SAR.

NAVSEA Review Initial Ship Installation Drawing (SID) Package: ☐ **Yes** ☐ **No** The JCF Submitter to indicate whether or not NAVSEA should review the initial SID Package.

AIT Capable: ☐ **Yes** ☐ **No**

The JCF Submitter is to indicate (Y/N) whether or not accomplishment of this alteration is within the capability of an Alteration Installation Team (AIT). If this field is marked **Yes** then the services mandays must be provided.

New Construction: ☐ **During Construction** ☐ **PSA** ☐ **IN-SERVICE**
The JCF Submitter is to recommend if the change or alteration is to be accomplished during construction, Post Shakedown Availability (PSA,) or IN-SERVICE.

2.28 REMARKS: The JCF Submitter is to enter any amplifying information relating to the change or alteration that is not addressed elsewhere in the JCF. Provide in this section a list of all carriers that have had this installation already completed or if the change is already included in shipbuilding contract. For example (1) "This change was accomplished on CVN 68 during RCOH by ECP 1460", (2) "This change is contained in the CVN 77 baseline contract", or (3) This change will be incorporated in the CVN 77 by HMR___ or FMR___." If the CV 63 or CV 64 is checked the statement "The CV 63 or CV 64 is within the 5 year decommissioning window and a SECNAV

Waiver is required IAW FMP Manual Subsection 1-6." must be added to the remarks. Identify cost, schedule, and technical risks associated with this change proposal.

2.29 APPROVING OFFICIAL SIGNATURES

To be signed by Submitting Activity official with appropriate signature authority. Name is to be typed in and signed.	Date signed	Lead Ship Design Manager's for the carrier program recommending the change. Name is to be typed in and signed.	Date signed
SUBMITTING ACTIVITY	**DATE**	**LEAD SHIP DESIGN MANAGER**	**DATE**
To be signed by SEA08 official with appropriate signature authority, if applicable, if not enter "N/A". Name is to be typed in and signed.	Date signed	To be signed by the PEO Carriers IWS Director, if applicable, if not enter "N/A". Name is to be typed in and signed.	Date signed
NUCLEAR PROPULSION DIR. (SEA08 if applicable)	**DATE**	**PEO IWS DIRECTOR (PEO IWS if applicable)**	**DATE**
To be signed by the PEO Carriers Aviation Director, if applicable, if not enter "N/A". Name is to be typed in and signed.	Date signed	To be signed by PEO Carriers Technical Director or Deputy. Name is to be typed in and signed.	Date signed
PEO AVIATION DIRECTOR (PEO CV if applicable)	**DATE**	**PEO CARRIERS TECHNICAL DIRECTOR**	**DATE**
To be signed by PMS312 Program Manager after CCB recommended approval. Name is to be typed in and signed.	Date signed		
PMS APPROVAL	**DATE**		

3.1 APPENDIX A: JUSTIFICATION/COST FORM

(2.1)

JUSTIFICATION/COST FORM

Note: Numbers in parenthesis ( ) corresponds to the procedure documented in the required technical specification TS9090-210B, Justification Cost/Form.

PROGRAM EXECUTIVE OFFICES (PEOs) ADMINISTRATIVE USE ONLY (2.2)				
ASSIGNED JCF TRACKING NUMBER: _____				
ASSIGNED EXECUTION NUMBER:	AER _____	New Construction _____	SHIPALT _____	TEMPALT _____

1. **SHIP ALTERATION BRIEF:** (2.3)
2. **RECOMMENDED CATEGORY (check all that apply): (2.4)**
   - ☐ **Alterations Equivalent to Repair (AER)**
   - ☐ **New Construction**
   - ☐ **Ship Alterations (SHIPALT); Title: ☐ D or ☐ K or ☐ KP**
   - ☐ **Temporary Alterations (TEMPALT)**
3. **OPNAV SPONSOR: (2.5)** **NAME _____ CODE _____ PHONE _____ EMAIL _____**
   N/A _____
4. **SUBMITTING ACTIVITY: (2.6)** **NAME _____ CODE _____ PHONE _____ EMAIL _____**
5. **TECHNICAL AUTHORITY ACTIVITY: (2.7)** **NAME _____ CODE _____ PHONE _____ EMAIL _____**
6. **SEQUENCE NUMBER FOR PROPOSED ALTERATION, FROM NAVY DATA ENVIRONMENT (NDE) (if applicable): (2.8) _____**
7. **ACQUISITION CATEGORY (ACAT) I-IV Program: (2.9)** ☐Yes ☐ No
8. **DESCRIPTION OF ALTERATION: (2.10)**
9. **REQUIREMENT AND JUSTIFICATION OF ALTERATION (check all that apply): (2.11)**
   - ☐ **Legislated (Statutory or Regulatory) Requirement**
     Cite Requirement: _____
   - ☐ **Proposed Military Improvement (PMI)**
     Cite Rationale: _____
   - ☐ **Proposed Survivability Improvement (PSI)**
     Cite Requirement: _____
   - ☐ **Reduction of Total Ownership Costs (R-TOC) (Refer to 9090-210B Appendix B)**
     ROI _____; Payback _____
   - ☐ **Battle Force Interoperability (BFI)**
     Cite Requirement: _____
   - ☐ **Safety**
     Cite Deficiency: _____
   - ☐ **Restoring Margins**
     Explanation: _____

☐ **Contract Defect**
Cite Requirement: _____

☐ **Unavailable, Obsolete or Unreliable Equipment**

☐ **Testing and Trial Deficiency**

☐ **Top Management Attention/Top Management Initiative (TMA/TMI)**

☐ **Aviation Capability and Air Wing Compatibility**

☐ **Other (Specify)_____**

Narrative Justification:

10. OPNAV CATEGORY CODE (1-6): _____ (2.12)

☐ **Category 1: Safety and Mandatory**

☐ **Category 2: Reliability and Maintainability: Primary Mission Area**

☐ **Category 3: Primary Mission System Modernization**

☐ **Category 4: Reliability and Maintainability: Secondary Mission Area**

☐ **Category 5: Secondary Mission Area Modernization**

☐ **Category 6: Mission Support**

11. TYCOM PRIORITY (if applicable): _____ (2.13)

12. EXTENDED SHIP WORK BREAKDOWN STRUCTURE (ESWBS) OR SHIP WORK AUTHORIZATION BOUNDARY (SWAB) NUMBER: _____ (2.14)

13. DETAIL DESIGN CRITERIA TO BE USED (CHECK ALL THAT APPLY): (2.15)

☐ Ship Specification
☐ Deep Diving General Overhaul Specification
☐ General Specifications for Overhaul (GSO)
☐ Other (Specify): _____

14. DISTRIBUTED SYSTEMS IMPACT: (2.16)

	Net Increase	Net Decrease	N/A	No Impact
Electrical (60 Hz)	☐	☐	☐	☐
Electrical (400 Hz)	☐	☐	☐	☐
HVAC	☐	☐	☐	☐
Chilled Water	☐	☐	☐	☐
Fire Main	☐	☐	☐	☐
Potable Water	☐	☐	☐	☐
Aviation Fuel System	☐	☐	☐	☐
Networks (Identify Each Network Impacted)	☐	☐	☐	☐
Topside	☐	☐	☐	☐
Fiber Optic Cable Plant	☐	☐	☐	☐
OTHER:	☐	☐	☐	☐

15. OTHER CONSIDERATIONS (IF YES, PROVIDE EXPLANATION): (2.17)

Ship Characteristics Document change required: ☐ Yes ☐ No

Explanation:

Ship/Aviation Integration Impact: ☐ **Yes** ☐ **No**
Explanation:

Environmental Impact (Air/water discharge, use of hazardous materials, solid waste generation, etc.):
☐ **Yes** ☐ **No**
Explanation:

Flight Deck/Hangar Bay Encroachment: ☐ **Yes** ☐ **No** ☐ **N/A**
Explanation:

Habitability Impact: ☐**Yes** ☐ **No**
Explanation:

Storage Requirements: ☐ **Yes** ☐ **No**
Explanation:

Weight & Moment Change: ☐ **Yes** ☐ **No**
Explanation:

Dry Docking Required: ☐ **Yes** ☐ **No**
Explanation:

Certification Required: ☐ **Yes** ☐ **No**
Explanation (include responsible activity):

SUBSAFE Impact: ☐ **Yes** ☐ **No** ☐ **N/A**

Nuclear Weapons Impact: ☐ **Yes** ☐ **No**

Other: _____
Explanation:

16. SHOCK, VIBRATION AND EMI REQUIREMENTS: (2.18)

Shock Grade (check one):
☐ A ☐ B ☐ C ☐ N/A

Compliant with MIL-STD-167 Vibration Requirements (check one):
☐ Yes ☐ No ☐ N/A

Compliant with MIL-STD-461E EMI Requirements (check one):
☐ Yes ☐ No ☐ N/A

Compliant with MIL-STD-464 EMI Requirements (check one):
☐ Yes ☐ No ☐ Tailored (specifics appended) ☐ N/A

Compliant with OPNAVINST-2400.20E RF Spectrum Management Requirements
☐ Yes ☐ No ☐ N/A

Compliant with HERO/HERP/HERF Requirements (check one):
☐ Yes ☐ No ☐ N/A

Remarks: _____

17. APPLICABLE SHIPS (list all that apply): _____ (2.19)

18. INTEGRATED LOGISTICS SUPPORT (ILS) IMPACT (check all that apply): (2.20)

☐ Technical Manuals
☐ Provisioning
☐ Planned Maintenance System (PMS)
☐ Training/Personnel Qualification Standards (PQS)
☐ Ship's Selected Records (Drawings & Manuals)

☐ Operating Sequencing Systems (OSS)
☐ Steam Plant Manual (SPM)
☐ Manning Analysis Required
☐ Test Equipment
☐ Software Management
Specify software support activity: _____
☐ Spares Affected
Specify responsible activity: _____
☐ Other (Specify) _____

19. IBOM CODE (0-8): (2.21) _____
☐ 0- source of BOM not specified
☐ 1-BOM not yet developed
☐ 2-Justification Cost Form(JCF)
☐ 3-Shipalt Record (SAR) BOM
☐ 5-Ship installation Drawing(SID) BOM
☐ 6-Hull Unique Material
☐ 7-Material Required- Sub use only
☐ 8-BOM not required

20. CRITICAL MATERIAL: (2.22) _____

21. FIRST PLANNED INSTALLATION: (2.23)
Hull _____ Availability _____ or QTR/FY _____ N/A _____

22. CONCURRENT/PRIOR ALTERATION ACCOMPLISHMENT: (2.24)

23. OPERATION & SUPPORT COST IMPACT: (2.25)
☐ **Increase** ☐ **Decrease** ☐ **No Impact**

24. ESTIMATED COSTS: (2.26)
Engineering Planning (Shipchecks/Drawings/etc)($K) _____
GFE Cost ($K) _____
CFE and Installation Material Cost ($K) _____
Installation (Mandays) _____
Accomplishing Activity: ☐ **Shipyard (D)** ☐ **AIT (T)** ☐ **IMA(I)** ☐ **SHIP FORCE (F)**
ILS Cost ($K) _____
Total Cost Estimate per Ship (ROM)($K) _____
Support Services Required ☐**Yes** ☐ **No,** if yes, provide M/D estimate _____

25. RECOMMENDED EXECUTION PARAMETER (check all that apply): (2.27)
SAR Required ☐**Yes** ☐ **No**
If Yes, Approval level: ☐**NAVSEA** ☐ **Planning Yard**
Technical Guidance Package Required, i.e. ICDs, schematics etc. ☐ **Yes** ☐**No**
NAVSEA Review Initial SID Package ☐**Yes** ☐ **No**
AIT Capable ☐ **Yes** ☐ **No**
New Construction ☐ **During Construction** ☐**PSA** ☐ **INSERVICE**

26. REMARKS: (2.28)

27-35 APPROVING OFFICIALS SIGNATURES (2.29)

27.	SUBMITTING ACTIVITY	DATE	28.	LEAD SHIP DESIGN MANAGER	DATE
29.	NUCLEAR PROPULSION DIRECTOR (SEA08 if applicable)	DATE	30.	PEO IWS MANAGER (PEO IWS if applicable)	DATE
31.	PEO AVIATION MANAGER (PEO CV if applicable)	DATE	32.	LEAD TYCOM APPROVAL (if applicable)	DATE
33.	PMS APPROVAL	DATE	34.	PEO TECHNICAL DIRECTOR	DATE
35.	PMS APPROVAL	DATE			DATE

3.2 APPENDIX B: CALCULATING RETURN ON INVESTMENT

CALCULATING RETURN ON INVESTMENT

Notes: The Return on Investment (ROI) calculations described herein will assist decision authorities in determining the best course of action for ship equipment/system upgrades, installations, and replacements. It is not necessary to use the services of a trained cost estimator to provide the level of detail needed to make an informed management decision; approximations based upon the best available information at the time are adequate for this purpose.

Also note that in order to reduce calculation complexity, time value of money calculations are not used when discussing dollar amounts of costs or savings.

1. Life Cycle Maintenance Costs, Present ($LCMC_p$):

This is the current cost of doing business.

First, calculate the present cost for repairing the old equipment (**P$/e**):

P$/e = Present man-hours (PMH) to repair/equipment X Present Labor Cost ((PL$)/PMH + Present Material Cost (PM$)/equipment

Then, calculate the present cost per equipment per year (**P$/e/y**):

P$/e/y = P$/e X Present Maintenance Periodicity/equipment/year (PMP/e/y)
where: PMP/e/y is the number of times equipment is repaired each year

Next, calculate the present cost per ship per year (**P$/s/y**):

P$/s/y = P$/e/y X Number of Equipment/Ship (N1)

Next, calculate the present cost per ship class per year (**P$/sc/y**):

P$/sc/y = P$/s/y X Number of Ships/Class (N2)

Finally, calculate **$LCMC_p$ through End of Life (EOL)**:

$LCMC_p$ = P$/sc/y X Years of EOL

CALCULATING RETURN ON INVESTMENT (ROI)
(continued)

2. Life Cycle Maintenance Cost, Future ($LCMC_f$):
The cost of the process once the change is made.

For figuring the $LCMC_f$ metrics associated with the new equipment, the same basic logic as that used for the $LCMC_p$ would apply.

First, calculate the future cost for repairing the new equipment (**F$/e**):

F$/e = Future Man-hours (FMH) to repair/equipment X Future Labor Cost (FL$)/FMH + Future Material Cost (FM$)/equipment

Then, calculate the future cost per new equipment per year (**F$/e/y**):

F$/e/y = F$/e X Future Maintenance Periodicity/equipment/year (FMP/e/y)
where: FMP/e/y is the number of times the new equipment is repaired each year

Next, calculate the future cost per ship per year (**F$/s/y**):

F$/s/y = F$/e/y X Number of Equipment/Ship (N1)

Next, calculate the future cost per ship class per year (**F$/sc/y**):

F$/sc/y = F$/s/y X Number of Ships/Class (N2)

Finally, calculate **$LCMC_f$ through End of Life (EOL):**

$LCMC_f$ = F$/sc/y X Years to EOL

Note that for calculating the Life Cycle Maintenance Cost, Future ($LCMC_f$), the Future Man-hours (FMH), Future Material Cost (FM$), and Future Maintenance Periodicity (FMP) would probably be different, while the Future Labor Cost (FL$), the number of equipment (N1), and the number of ships (N2) may be the same as those for $LCMC_p$.

CALCULATING RETURN ON INVESTMENT (ROI)
(continued)

3. Maintenance Cost Effectiveness (MCE):

The maintenance cost effectiveness {or anticipated cost savings} of a modification is the total change in Life Cycle Maintenance Cost (LCMC) over the remaining life of a system or given ship class. Accordingly, it is computed by subtracting the approximated $LCMC_f$ from the $LCMC_p$.

$MCE = LCMC_p - LCMC_f$

4. Implementation Cost (IMP$):

The cost to develop and test the modification. Implementation Costs (IMP$) consists of all costs associated with new product or process development up to the point where it is ready to be installed. This would include Research and Development Costs (RD$), prototypes, lab tests, and reports, in addition to such costs as the preparation of class drawings for SHIPALTs, etc. These costs are shared as "overhead" costs as they are invoked only once and are spread over the ships, classes of ships, or groups of ships as far as the modification would apply. For example a new radar technology would have the RD$ spread over all ships having or requiring that radar.

IMP$ = All one time costs associated with fielding new equipment or using a new process

5. Pay Back Period (PBP):

The Payback Period (PBP) is a metric that tells the decision maker how long it will take for the new process, system, equipment, or technology (PSET) to pay for itself. It is expressed in units of time (normally years) and is based on the Implementation Costs (IMP$) for the new PSET compared to the costs savings realized once the new PSET is in place.

$$PBP = \frac{IMP\$}{P\$/sc/y - F\$/sc/y}$$

CALCULATING RETURN ON INVESTMENT (ROI)
(continued)

6. Return on Investment (ROI):

The ROI metric relates the MCE to the up-front IMP$.

$$ROI = \frac{MCE}{IMP\$}$$

.....

ROI EXAMPLE

The example that follows is a representation of a transmitter assembly modification that will require some RD$ for new parts purchases, but will result in enhanced performance and longer service life, therefore extending periods between repairs and radar downtime.

Number of Transmitter Assemblies/Ship (N1) = 10

Number of Ships/Class (N2) = 50

Remaining Years to EOL = 10

Implementation Cost (IMP$) = $100K

P$/e = $500 Labor + $250 Material = $750

F$/e = $200 Labor + $300 Material = $500

Present Maintenance Periodicity/transmitter/year
(PMP/e/y) = 4 repairs per year

Future Maintenance Periodicity/transmitter/year
(FMP/e/y) = 1/4 (one repair every 4 years)

CALCULATING RETURN ON INVESTMENT (ROI)
ROI EXAMPLE
(continued)

Life Cycle Maintenance Cost, Present ($LCMC_p$):

P$/e/y = $750 X 4 = $3K per year

P$/s/y = $3K/yr X 10 transmitters/ship = $30K/yr/ship

P$sc/y = $30K X 50 ships = $1.5M per year

$LCMC_p$ (EOL) = $1.5M X 10 years = $15M

Life Cycle Maintenance Cost, Future ($LCMC_f$):

F$/e/y = $500 X 1/4 year = $125/yr

F$/s/y = $125 X 10 transmitters/ship = $1.25K/yr

F$/sc/y = $1.25K X 50 ships = $62.5K/yr

$LCMC_f$ (EOL) = $62.5K X 10 years = $625K

Maintenance Cost Effectiveness (MCE):

MCE = $LCMC_p$ - $LCMC_f$ = $15M - $625K = $14.375M

Pay Back Period (PBP):

PBP = IMP$/(P$/sc/y - F$/sc/y)
= $100K/($1.5M - $62.5K) = $100K/$1,437,500
= 0.07 years

Return on Investment (ROI):

ROI = $14.375M/$100K = 14400% or

ROI is 144:1