TECHNICAL INSTRUCTIONAL GUIDANCE DOCUMENT
TITLE: SHIP CHANGE DOCUMENT (SCD)
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1.0 SCOPE: This specification provides criteria for the uniform preparation, processing, and

approval of a Ship Change Document (SCD)

1.1 APPLICABILITY: This specification is applicable to carriers, surface ships, and surface craft SCDs and shall be utilized by all personnel for preparing, processing and maintaining SCDs.

1.2 REQUIREMENTS: All of the following requirements apply to the preparation of a SCD. This document provides step-by-step instructions for the preparation of a SCD. The amount of detail to be provided in the SCD will depend on the complexity of the proposed change or modification and should be determined by the submitter.

2.0 SHIP CHANGE DOCUMENT (SCD) REQUIREMENTS

2.1 SCD Phase 1

a. **Ship change title (Block 1):** Ship change title will identify the ship change in no more then 60 characters. This title will be used throughout the life of the change and cannot be changed.

b. **Applicable ship/ship class/sites (Block 2):** List of all ships, ship classes, and selected shore sites as applicable. The user will also have an option to choose multiple ship classes or shore sites. Shore sites will not include unique requirements. Drop down menus will be provided as a selection tool for ship, ship classes and sites.

c. **Recommended SCD (Block 3):** Identifies the scope, category, duration and funding for the proposed change.

Scope: (Check all that applies)
__Internal equipment modification
__Ship modification
__Site modification – ***If choosing a shore site the ship change must also be applicable to a ship or ship class.***

Category: (Check all that applies)
__Hull, Mechanical & Electrical (HM&E)
__Command, Control, Communications, Computers/Intelligence Surveillance and Reconnaissance (C4/ISR)
__Combat Systems (CS)
__Computer Program/Software

The user will choose one of the following HM&E, C4/ISR or CS. If computer program/software is involved this block will be checked in association with the previous choose.

The possible choices are:

HM&E	HM&E and Computer Program/Software
C4/ISR	C4/ISR and Computer Program/Software
CS	CS and Computer Program/Software
Computer Program/Software	

Duration:
Permanent – Modifications of ships and its systems that are not temporary in nature.
Temporary - 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.

Funding: (Check all that applies)
__Program
__Fleet
__Joint

The user will choose program or fleet and then joint if applicable. The possible choices are:

Program
Fleet
Program Joint
Fleet Joint

Block 4,5,6,7 and 8 will have the following format:
Name: Last Name, First Name
Activity
Code
Phone: xxx-xxx-xxxx
Email

ALL INFORMATION IS REQUIRED FOR THE BLOCKS BEING FILLED OUT.

d. **Initiating point of contact (Block 4):** Point of contact is the user entering the idea into SCD Phase 1. Initiating point of contact may be anyone with Navy Data Environment (NDE) access. The SCD will then be forwarded to the submitting point of contact for approval. If the initiator is a designated submitting activity the information can be provided or the N/A block can be checked.

e. **Submitting point of contact (Block 5):** Point of contact is limited to: Type Commander (TYCOM), Participating Manager (PARM)/Life Cycle Managers

(LCMs), PEO's, FFC, Regional Maintenance Centers (RMCs) or OPNAV. Submitted point of contact (POC) will be responsible and accountable for all phases of the SCD. They will be the primary point of contact for questions or clarification throughout the process. Subsequent approvals, disapprovals, and notification to complete the next phase of the SCD will be forwarded to this point of contact.

f. **PARM point of contact (Block 6):** Point of contact will be the activity associated with completing the engineering, procurement and identification of life-cycle support for the ship change and its associated ship changes. If the PARM is not known, then the submitter will check the box "to be determined (TBD)." The PARM will then be identified by the technical assessment team (TAT) during its Phase 1 assessment.

g. **Type Commander (TYCOM) point of contact (Block 7):** Point of contact will be the Lead Type Commander associated with the change.

h. **Technical point of contact (Block 8):** Point of contact as identified by the PARM, TYCOM or TAT. If the technical point of contact is not known, the "TBD" box shall be checked. The technical point of contact will then be identified by the TAT during its Phase 1 assessment. This point of contact does not have to be the warrant holder.

i. **Executive Summary (Block 9):** Provides a summary (100 words max) of the ship change that will be used to describe the change throughout the entitled process.

j. **Description of proposed change (Block 10):** Description provides 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.

k. **Impact if not accomplished (Block 11):** Addresses the impact (no more than 100 words) to equipment, system, ship, site, or fleet readiness if the ship change is not accomplished.

l. **Requirement and justification of proposed change (Block 12):** Submitter is to check all applicable boxes requiring the change and note requirements, deficiencies or explanations for each item checked.

- **Anti-Terrorism/Force Protection**

- **Aviation Capability and Air Wing Compatibility**
- **Battle Force Interoperability (BFI)-** Cite Requirement
- **Contract Defect -** Address correction of defective specifications, unavailable Government Furnished Equipment (GFE), or unavailable Government Furnished Information (GFI). Cite Requirement: Enter contract number, Contract Line Item Number (CLIN), and problem to be corrected.
- **Environmental Requirement**- Cite requirement as applicable.
- **Legislated Regulatory Requirement** – Cite Legislation Requirement.
- **Mandatory Safety -** If safety analysis has been accomplished, cite reference.
- **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.
- **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.
- **QOL/QOS-** Quality of life and quality of service. Cite reference
- **Restoring Margins -** Restoring system capacity (weight and kilogram (kg); electrical system; heating, ventilation and air conditioning; etc). Explanation: Provide an explanation.
- **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 longstanding 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. Return on Investment (ROI) and Payback Period will be calculated in NDE using data provided in the Cost Benefit Analysis (CBA) forms.
- **Safety -** Item changes are required to eliminate hazards to ship personnel or components as officially documented by impact statement provided in block 10.
- **Statutory Requirement**- Cite requirement.
- **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.
- **Unavailable, Obsolete or Unreliable Equipment -** Changes that replace equipment or components no longer available or supportable.
- **War fighting Improvement Program (WIP)**
- **Other (Specify) -** Enter any other requirement not specified above.

m. **Distributive systems/other impacts (Block 13):** Identify elements listed that will be affected or changed (Check all that apply). No additional information is required for this phase. Definitions of items in this block may be found in the glossary. At least one block must be checked.

- ☐ AC Plants/Chilled Water
- ☐ Air Systems
- ☐ Certification Required
- ☐ Damage Control
- ☐ Dry Docking Required
- ☐ Electric Generation and Power Distribution Systems
- ☐ Electrical (400 Hz)
- ☐ Fiber Optic Cable Plant
- ☐ Firemain
- ☐ Fuel System
- ☐ HVAC
- ☐ Hangar Bay/Flight Deck Encroachment
- ☐ Human Systems Integration (HSI)
- ☐ Integrated Circuits (IC)
- ☐ IC Switchboard & Database Multiplex System
- ☐ Integrated Logistics Support (ILS)
- ☐ Networks
- ☐ Ordnance Handling/Storage
- ☐ Potable Water
- ☐ Prior/Concurrent/Conjunctive Alts
- ☐ SUBSAFE
- ☐ Ship/Aviation Integration
- ☐ Ships Characteristics Document Change Required
- ☐ Software
- ☐ Space Configuration
- ☐ Storage Requirements
- ☐ Topside Design/Mast Structure
- ☐ Weapons Systems
- ☐ Weight & Moment Change
- ☐ Other (Systems/Equipment/Sites):

n. **Alteration Figure of Merit (AFOM) information (Block 14):** Includes a list of the 61 Naval Capabilities as outlined in the NAVAL POWER 21 Transformation Roadmap. Submitter will select one or more of the applicable Naval Capabilities (In other words the definitions provided in the glossary (provided as a separate document).

If no Naval Capabilities are selected, NDE will provide the following alert "You must select at least one Naval Capability; for HM&E systems select a capability under SEA Base"

Once the SCD is complete and the submitters select "submit" or "send", NDE will provide the following prompt with regard to AFOM "Are all references and/or links to references provided in the comment block for TYCOM Reference and Assessment?" with a Yes/No select button; if No, the TYCOM may enter data, if YES, the SCD is locked from further manipulation until the next phase.

- All eleven Suitability Rating Scales will be embedded into the SCD under this section. Write permission will be given to the TYCOM points of contact. View permission will be given to the submitter.
- The TYCOM points of contact will enter the suggested ratings under the Suitability scales; an **"Accept and Reject"** button will be provided by each scale for the TYCOM to provide a final assessment on the suggested scale. If "Reject" is selected by the TYCOM, NDE will prompt the TYCOM with the following alert **"Please select a new index."** Once the index is selected, the option to **"Accept or Reject"** will be provided again for each scale.

- The Naval Capabilities that are selected in Phase 1 will remain selected for the remaining phases unless changed by the submitter. The submitter may change these selections in Phase 1 or 3, but a prompt shall be provided that states "Are you sure you wish to change the selected Naval Capabilities?" with a **"yes/no"** select button.

- Selected capabilities may not be changed once the SCD is submitted and/or assessed by the TYCOM.

- TYCOM points of contact are defined as COMNAVSURFOR, COMNAVAIRFOR and NAVNETWARCOM N6 & N43 (final codes TBD).

o. **Cost Benefit Analysis information (Block 15):** See Appendix A for instructions on completing the cost spreadsheets.

p. **Technical Assessment (Block 16):** Provides the required outputs from the technical assessment team (TAT) change manager and the TAT for review by the Ship Program Manager (SPM).

q. **Ship Program Manager (SPM) recommendation (Block 17):** This is a recommendation by the Ship Program Manager (SPM) and the Nuclear power directorate (as required). A **"not recommended by the SPM"** has no effect on the processing of this document. It is only a recommendation that can be ignored by the review boards.

r. **Alteration Figure of Merit (AFOM) Assignment (Block 18):** The AFOM assigned block will be checked and comments filled in by the appropriate TYCOM. All other portions of Block 18 are auto filled.

s. **Cost Business Analysis (CBA) Review (Block 19):** The CBA analysis complete block will be checked and comments filled in by the assigned lead review team members. All other portions of Block 19 are auto filled.

t. **SHIPMAIN Review & Notification (Block 20):** Block used to notify administrators that the SCD is completed and is ready to be assembled for the review boards.

u. **O-6 Modernization Review Board Approved to go to (Block 21):** Documents decisions made by the review boards that determine the status of the ship change.

2.2 SCD Phase 2

a. **List of applicable ships within 5-year decommissioning window (Block 1):** Identify associated ships that will decommission within 5 years. Identified ships will require an Assistant Secretary of the Navy (ASN) wavier to proceed.

b. **Distributive systems impact (Block 2):** Submitter shall check appropriate box for each distributed system.

	Net Increase	**Net Decrease**	**No Net Impact**	**Unknown**
AC Plants/Chilled Water				
Electric Generation and Power Distribution Systems				
Topside Design/Mast Structure				
Fiber Optic Cable Plant				
Firemain				
Weight & Moment Change				
IC Switchboard & Database Multiplex System				

c. **Other considerations (Block 3):** Submitter is to indicate (Y/N) whether or not accomplishment of the change is an impact. If yes, provide details (no more then 100 words) of the impact. Must include explanation for any system that was checked yes or incorrectly noted in Phase 1.

Topside: Yes No
Explanation**:**
Ship Characteristics Document change required: Yes No
Explanation**:**
Ship/Aviation Integration Impact: Yes No
Explanation**:**
Storage Requirements: Yes No
Explanation**:**
Dry Docking Required: Yes No
Explanation:
Certification Required: Yes No
Explanation (include responsible activity):
Submarine Safety (SUBSAFE) Impact: Yes No
Explanation**:**
Network Impact: Yes No
Explanation:
Fuel System Impact: Yes No
Explanation:
IC Circuits Impact: Yes No
Explanation:
MCS/DCS Impact: Yes No
Explanation:
Software Impact: Yes No
Explanation:
Weapons Systems Impact: Yes No
Explanation:
Space Configuration: Yes No
Explanation:
Hangar Bay/Flight Deck Impact: Yes No
Explanation:
Air Systems: Yes No
Explanation:
Ordnance Handling/Storage: Yes No
Explanation:
Other: List other system that may be impacted but not previously noted.
Explanation:

d. **Shock, Vibration and Electromagnetic Interference (EMI) requirements (Block 4):**

Shock Grade IAW GSO Section 072(check one): A__ B__ C__ N/A__

Note: 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 -Any category not previously defined

Compliant with MIL-STD-167 –1, Vibration Requirements (check one):
Yes__ No___ N/A___
Note: MIL-STD-167-1, 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___

Compliant with MIL-STD-464 EMI Requirements (check one):
Yes___ No___ Tailored (specifics appended____ N/A___

Note: TS-9090-210B Volume 2 SL720-AA-MAN-020 8/15/2003 Revision 2, Change 1

Compliant with OPNAVINST-2400.20E Radio Frequency (RF) Spectrum Management Requirements (check one): Yes__ No___ N/A___

Note: OPNAV Instruction 2400.20E is the Navy Management of the Radio Frequency Spectrum.

Compliant with HERO/HERP/HERF Requirements (check one):
Yes__ No___ N/A___

Note: DoDInst 6055.11 and OP 3565 Volume I.

Remarks: Provide additional information not annotated previously.

e. **Integrated logistics support (ILS) impacts (Block 5):** The Submitter is to check all boxes where installation of this alteration will affect the following Integrated Logistics Support (ILS) elements.
1. Technical Manuals
2. Provisioning
3. Planned Maintenance System (PMS)
4. Training/Personnel Qualification Standards (PQS)
5. Ship's Selected Records (SSR))
6. Operating Sequencing Systems (OSS)
7. Steam Plant Manual (SPM)
8. Test Equipment (TE)
9. Software Management
10. Specify software support activity:
11. Spares Affected (Includes Maintenance Assistance Modules (MAMs))
12. Specify responsible activity:
13. Commercial-of-the-Shelf (COTS)/Non-developmental Item (NDI)

14. Other (Specify)

f. **Human systems integration (HSI) impacts (Block 6):** Provide expected areas of Human Systems Integration (HSI) impact on Sailor Performance, Safety and Personnel Survivability as can currently be determined. Include any planned analysis such as Human Factors Engineering (HFE) tradeoffs, manning or workload analysis, usability testing, etc. The questions to be addressed are: Does the preliminary design take full advantage of the benefits of Human Systems Integration? Have Hardware, Software, and People been integrated into an efficiently operating Total System? Refer to DODI 5000.2 for more detailed requirements on HSI planning. Specific areas of input and representative questions are as follows:

Manpower /Workload Impact: Yes / No / Not Determined
Brief Description: (Is proposed change likely to impact workload or manpower? Will change require task/workload/manpower analysis?)
Personnel Impact: Yes / No / Not Determined
Brief Description: (Is change expected to require new or unusual personnel specialties?)
Training Impact: Yes / No / Not Determined
Brief Description: (Does change incorporate or integrate new training concepts? Does training currently exist?)
Human Factors Engineering (HFE): Yes / No / Not Determined
Brief Description: (Will change minimize excessive cognitive, physical skills and human errors?)
Habitability: Yes / No / Not Determined
Brief Description: (Identify if change will have positive and/or negative impacts on shipboard habitability, QOL or QOS)
Environment, Safety and Occupational Health (ESOH):
Yes / No / Not Determined
Brief Description: (Will change reduce or add to shipboard safety and health such as reduction/addition of hazard material (HAZMAT) ?)
Personnel Survivability: Yes / No / Not Determined
Brief Description: (Will change impact on fratricide, chemical Biological Radiological (CBR) or damage control procedures?)

g. **Critical Material (Block 7):** This data field will allow for the 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.

h. **Prior or concurrent change accomplishment (Block 8)**: The submitter is to list any prior or concurrent changes required for this ship change.

i. **Expanded Ship Work Breakdown Structure (ESWBS) (Block 9):** The 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).

j. **Detail Design Criteria (Block 10):** The Submitter checks all applicable boxes noting the design criteria to be used for the change.

- ❑ 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.

k. **Prototype Required (Block 11):** This is to ascertain that the intended purpose of the alteration is satisfied and to identify any deficiencies so that immediate corrective action can be initiated. This block shall be filled in for temporary changes, proofing changes, and prototypes.

l. **Alteration Figure of Merit (AFOM) information (Block 12):** Same definition as provided in Phase 1 question 13.

m. **Cost Benefit Analysis (CBA) information (Block 13):** See Appendix A for instructions on completing the cost spreadsheets.

n. **Approval Recommendations (Block 14):** Provides the required outputs for the TAT assessment, the electronic signature of the Ships Program Manager (SPM) and the Nuclear power directorate (as required).

2.3 SCD Phase 3

All blocks in the SCD Phase 3 should be completed as follows: (In the blocks in which no information is available or required, N/A or none should be entered.)

a. **System/Equipment Designation (Block 1):**

b. **Model No. (Block 2):**

c. **Cage Code (Block 3):**

d. **Detailed Description of Change (Block 4):** The Description field shall provide a brief description of the alteration to the extent necessary to begin detailed design. The description of the alteration shall indicate the spaces, systems and equipment impacted by the alteration and the extent of the impact. The description shall specifically address equipment to be added (Government or installing activity

furnished) and/or deleted and the impact (increase or decrease) on power (steam generation, electrical generation and/or distribution systems), fluids (water, hydraulic, dry air, lubricating oil, fuel oil, etc.), compressed gases (oxygen, nitrogen, etc.), firemain, ship's structure, interior communications circuits, habitability/ accommodations, stowage, heating, ventilation and air conditioning. The description shall also specifically address, by space name and compartment number, any impact (increase or decrease) in weight and heat dissipation. Alterations impacting SUBSAFE systems or equipment as defined in NAVSEA 0924-062-0010 (SUBSAFE Manual) shall include in the description field a statement identifying the systems and equipment as SUBSAFE. An explanation of how the SUBSAFE boundaries are impacted and how the SUBSAFE integrity will be maintained shall also be included in this field. Mandatory locations and interface requirements shall be supported by sketches and/or referenced documentation.

The description shall be detailed enough to be used as a starting point for detailed design but need not be to the specific pipe/duct/cable level except in instances where this information is critical to the installation. Also, information as to equipment installation location should be detailed to an area of a compartment, not to a specific frame number or distance from the centerline, unless this level of detail is critical to the accomplishment of the change. If required, a separate Guidance Document shall be referenced which provides a detailed description of the change. The description of the change shall indicate the spaces, systems and equipment impacted and the extent of the impact. The description shall specifically address equipment to be added and/or deleted. The description shall also specifically address, by space name and compartment number.

e. **Distributive Systems Impact (Block 5):** Describe impacts on systems not detailed in the distributive systems impact section: power (steam generation, electrical generation and/or distribution systems), fluids (water, hydraulic, dry air, lubricating oil, fuel oil, etc.), compressed gases (oxygen, nitrogen, etc.), ship's structure, air systems, and interior communications circuits.

	Added	**Removed**
Air-conditioning A/C Plants/Chilled Water (CHW) Distributive System (Tons A/C)		
Electrical Generation and Power Distributive System (kilowatt (KW))		
Topside Design/Mast Structure (Weight in Tons)		
Fiber Optic Cable Plant (Yes/No)		
Firemain (GPM)		
Ship's Stability (Weight in Tons)		
Integrated Circuit Switch Board (SWBD) and Database Multiplex System (Loads)		

f. **Is there References/Supporting Documentation in addition to the Standard Requirements? (Block 6):**

g. **Estimated Weight and Moment (Block 7):** The Weight and Moment Impact field shall provide an estimate of any weight and moment change caused by the SHIPALT (increase or decrease), including loads (ammunitions, provisions, stores, fuel oil, water, etc.). Weight shall be estimated to the nearest +/- 0. 1 ton (the term "Negligible" shall not be used for the weight estimate); Vertical Center of Gravity (VCG) to the nearest foot, Longitudinal Center of Gravity (LCG) to the nearest foot forward or aft of the mid perpendicular of the ship, and the Transverse Center of Gravity (TCG) to the nearest foot port or starboard of the centerline. If the SHIPALT includes modification to a hull form or an appendage (bilge keel, sonar dome, etc.), a buoyancy impact of the weight of the displaced water volume shall also be estimated to the nearest +/- 0.1 ton.

WEIGHT	VCG	LCG	TCG
Stability Statement			

h. **Change Material/Software List (Block 8):**

ITEM NO.	DESCRIPTION	UNIT OF ISSUE	QUANTITY	PROCURING ACTIVITY

i. **Are there Quality Assurance Requirements in addition to the Standard Requirements? (Block 9):** The Quality Assurance field shall identify any special quality assurance requirements, which must be used to assure successful accomplishment of the change. Applicable testing that is required shall be specifically addressed (e.g., requirement to adjust firing cams, conduct Structural Test Firings (STF), testing in accordance with GSO and NSTMs etc.) Only unique requirements should be listed.

j. **Special Disposition Requirements for Removed Material (Block 10):** This field will contain a list of all removed material requiring special disposition, the disposition required and assignment of responsible activity.

MATERIAL	DISPOSITION

k. **Installation Support and Test Equipment (Block 11):** This field will list all the Support and Test Equipment (S&TE) that is required to support the installation of the alteration (Jigs, Alignment, I/D level TE) (The S&TE required for ships force to trouble-shoot and maintain the equipment is listed in the ILS Certification Form).

l. **Shipboard Stowage Details (Block 12):** This field is an indication (Y/N) whether or not installation of this alteration will require any use of shipboard Stowage.

m. **NAVSEA ship Installation Drawing (SID) Review Required (Block 12):** The Submitter shall indicate Yes or No if NAVSEA should review the initial SID Package.

n. **Special Industrial Stowage Requirements (Block 13):** This field will list all special stowage requirements at the industrial activity installing the change. This section should include but not be limited to requirements such as environmental or security stowage.

o. **Required Prior, Conjunctive, or Concurrent Changes (Block 14):** Submitter shall list any other changes that are affected by this change (if applicable) and there ship change number as appropriate.

p. **Other Systems Impacts (Block 15):**

q. **Installation Duration (Block 16):** Submitter shall enter an estimate for the length of time needed to install this change.

r. **Human Systems Integration (HSI) (Block 17):** Provide information on incorporation of the applicable aspects of Human Systems Integration (HSI) and the impact on Sailor Performance. The questions to be addressed are: Do the design specifications support effective implementation of Human Systems Integration? Will the modified systems be usable, enhance Sailor Performance, optimize manpower and training, and promote safety and personnel survivability when delivered to the Fleet? Refer to DODI 5000.2 for more detailed requirements on HSI. Specific areas of input and representative questions are as follows:

Manpower /Workload Impact: Yes / No
***brief description*:** (Does the Alt impact workload or manpower?)

Personnel Impact: Yes / No
***brief description*:** (Does the change require new or unusual personnel specialties?)

Training Impact: Yes / No
brief description: (Does change incorporate or integrate new training concepts? Does training currently exist?)
Human Factors Engineering (HFE): Yes / No
***brief description*:** (Does the change minimize excessive cognitive, physical skills and human errors?)
Habitability: Yes / No
brief description: (Does the change have positive and/or negative impacts on shipboard habitability, QOL or QOS)
Environment, Safety and Occupational Health (ESOH): Yes / No
brief description: (Will the change reduce or add to shipboard safety and health such as reduction/addition of HAZMAT?)
Personnel Survivability: Yes / No
brief description: (Will the change impact on fratricide CBR, or damage control procedures?)

s. **Certifications/Qualifications required (Block 18):** The certifications will be performed and date noted as required. If the certification is scheduled, a date will be provided for completion.

t. **Alteration Figure of Merit (AFOM) information (Block 20):** Same definition as provided in Phase 1 question 13.

u. **Cost Benefit Analysis (CBA) Information (Block 19):** See Appendix A for instructions on completing the cost spreadsheets, Phase 1.

v. **Approval Recommendations (Block 21):** Provides the required outputs for the TAT assessment, the electronic signature of the Ships Program Manager (SPM) and the Nuclear power directorate (as required).

2.4 SCD Phase 2(a)

SCD Phase 2(a) should be completed as follows:

a. **List of applicable(s) ships within 5-year decommissioning window:** Identify associated ships that will be decommissioned within 5 years. Identified ships will require an Assistant Secretary of the Navy (ASN) wavier to proceed.

b. **System/Equipment Designation:**

c. **Model No.:**

d. **Cage Code:**

e. **Detailed Description of Change:**

f. **ESWBS:** The 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).

g. **Prototype Required:** This is to ascertain that the intended purpose of the alteration is satisfied and to identify any deficiencies so that immediate corrective action can be initiated. This block shall be filled in for temporary changes, proofing changes, and prototypes.

h. **Distributive systems impact:** Submitter shall check appropriate box for each distributed system.

i. **Other considerations:** Submitter is to indicate (Y/N) whether or not accomplishment of the change has an impact. If yes, provide details (no more then 100 words) of the impact. Must include explanation for any system that was checked yes or incorrectly noted in Phase 1.

j. **Shock, vibration and electromagnetic interference (EMI) requirements:**

Shock Grade IAW GSO Section 072(check one) A__ B__ C__ N/A__
Note: 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 -Any category not previously defined

Compliant with MIL-STD-167 –1, Vibration Requirements (check one): Yes__ No___ N/A___
Note: MIL-STD-167-1, 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___

Compliant with MIL-STD-464 EMI Requirements (check one):
Yes___ No___ Tailored (specifics appended____ N/A___

Note: TS-9090-210B VOLUME 2 SL720-AA-MAN-020 8/15/2003 Revision 2, Change 18

Compliant with OPNAVINST-2400.20E Radio Frequency (RF) Spectrum Management Requirements (check one): Yes__ No___ N/A___

Note: OPNAV Instruction 2400.20E is the Navy Management of the RF Spectrum.

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

Yes__ No___ N/A___

Note: DoDINST 6055.11 and OP 3565 Volume I.

Remarks: Provide additional information not annotated previously.

k. **Integrated logistics support (ILS) impacts:** The Submitter is to check all boxes where installation of this alteration will affect the following Integrated Logistics Support (ILS) elements.

l. **Detail Design Criteria:** The Submitter checks all applicable boxes noting the design criteria to be used for the change.

m. **Are there Quality Assurance Requirements in addition to the Standard Requirements?** The Quality Assurance field shall identify any special quality assurance requirements, which must be used to assure successful accomplishment of the change. Applicable testing that is required shall be specifically addressed (e.g., requirement to adjust firing cams, conduct Structural Test Firings (STF), testing in accordance with GSO and NSTMs etc.) Only unique requirements should be listed.

n. **Is there References/Supporting Documentation in addition to the Standard Requirements?**

o. **Estimated Weight and Moment:** The Weight and Moment Impact field shall provide an estimate of any weight and moment change caused by the Ship Alterations (SHIPALT) (increase or decrease), including loads (ammunitions, provisions, stores, fuel oil, water, etc.). Weight shall be estimated to the nearest +/- 0. 1 ton (the term "Negligible" shall not be used for the weight estimate); Vertical Center of Gravity (VCG) to the nearest foot, Longitudinal Center of Gravity (LCG) to the nearest foot forward or aft of the mid perpendicular of the ship, and the Transverse Center of Gravity (TCG) to the nearest foot port or starboard of the centerline. If the SHIPALT includes modification to a hull form or an appendage (bilge keel, sonar dome, etc.), a buoyancy impact of the weight of the displaced water volume shall also be estimated to the nearest +/- 0.1 ton.

p. **Change Material/Software List**:

q. **Special Disposition Requirements for Removed Material:** This field will contain a list of all removed material requiring special disposition, the disposition required and assignment of responsible activity.

r. **Installation Support and Test Equipment (Block 11):** This field will list all the Support and Test Equipment (S&TE) that is required to support the installation of the alteration (Jigs, Alignment, I/D level TE) (The S&TE required for ships force to trouble-shoot and maintain the equipment is listed in the ILS Certification Form).

s. **Shipboard Stowage Details:** This field is an indication (Y/N) whether or not installation of this alteration will require any use of shipboard Stowage.

t. **NAVSEA Ship Installation Drawing (SID) Review Required:** The Submitter shall indicate Yes or No if NAVSEA should review the initial SID Package.

u. **Special Industrial Stowage Requirements:** This field will list all special stowage requirements at the industrial activity installing the change. This section should include but not be limited to requirements such as environmental or security stowage.

v. **Required Prior, Conjunctive, or Concurrent Changes (Block 14):** Submitter shall list any other changes that are affected by this change (if applicable) and there ship change number as appropriate.

w. **Installation Duration (Block 15):** Submitter shall enter an estimate for the length of time needed to install this change.

x. **Human Systems Integration (HSI) impacts:** Provide expected areas of HSI impact on Sailor Performance, Safety and Personnel Survivability as can currently be determined. Include any planned analysis such as HFE tradeoffs, manning or workload analysis, usability testing etc. The questions to be addressed are: Does the preliminary design take full advantage of the benefits of Human Systems Integration? Have Hardware, Software, and People been integrated into an efficiently operating Total System? Refer to DODI 5000.2 for more detailed requirements on HSI planning. Specific areas of input and representative questions are as follows:

Manpower /Workload Impact: Yes / No / Not Determined
Brief Description: (Is proposed change likely to impact workload or manpower? Will change require task/workload/manpower analysis?)

Personnel Impact: Yes / No / Not Determined
Brief Description: (Is change expected to require new or unusual personnel specialties?)
Training Impact: Yes / No / Not Determined
Brief Description: (Does change incorporate or integrate new training concepts? Does training currently exist?)
Human Factors Engineering (HFE): Yes / No / Not Determined
Brief Description: (Will change minimize excessive cognitive, physical skills and human errors?)
Habitability: Yes / No / Not Determined
Brief Description: (Identify if change will have positive and/or negative impacts on shipboard habitability, QOL or QOS)
Environment, Safety and Occupational Health (ESOH):
Yes / No / Not Determined
Brief Description: (Will change reduce or add to shipboard safety and health such as reduction/addition of HAZMAT?)
Personnel Survivability: Yes / No / Not Determined
Brief Description: (Will change impact on fratricide, CBR, or damage control procedures?)

y. **Certifications/Qualifications required:** The certifications will be performed and date noted as required. If the certification is scheduled, a date will be provided for completion.

z. **Alteration Figure of Merit (AFOM) information (Block 20):** Same definition as provided in Phase 1 question 13.

aa. **Cost Benefit Analysis (CBA) information (Block 19):** See Appendix A for instructions on completing the cost spreadsheets.

bb. **Approval Recommendations (Block 21):** Provides the required outputs for the TAT assessment, the electronic signature of the Ships Program Manager (SPM) and the Nuclear power directorate (as required).

COST BENEFIT ANAYLSIS
TECHNICAL INSTRUCTION GUIDE
PHASE 1

Note: The highlighted material below is applicable to the current version of the CBA in NDE. The un-highlighted material is for future upgrades to the CBA.

3.1 Introduction

This document is a Technical Instructional Guide (TIG), designed to provide the initiator/submitter with a step-by-step instruction for the preparation of the Cost Benefit Analysis (CBA) Cost Structure Worksheet (CSW) portion (Item 15) of the Ship Change Document (SCD). There is one CSW for each of the three phases of the SHIPMAIN process, where each subsequent phase requires increasingly detailed cost estimates for a Ship Change. This document is comprised of three TIGs; where each phase has its own stand-alone TIG. Each TIG can be used independently of the other documents.

The CBA CSW was originally created as a Microsoft Word EXCEL file, but now resides within the SCD on NDE. The CBA CSW can be opened and edited with estimated cost information for a ship change, such as: (1) investment cost by work breakdown structure element; (2) investment cost by appropriation and program element funding; (3) the projected savings and cost avoidance associated with the change; and (4) installation fielding plan data. Throughout the SHIPMAIN process, these areas become more refined, requiring more accurate cost estimates.

To supplement this TIG, please reference the CBA CSW Glossary of terms or the CFT4 SHIPMAIN Glossary of terms.

3.2 CBA CSW Input for SHIPMAIN SCD – Phase 1

General Guidance

This guidance refers to the Cost Benefit Analysis (CBA) Cost Structure Worksheet (CSW) for the SHIPMAIN Ship Change Document (SCD) "Concept Development Cost Information" section (Item 15) for Phase 1. There are four sections of the CSW that are addressed in the SCD for each of the three phases: (1) investment cost by workbreakdown structure element; (2) investment cost by appropriation and program element funding; (3) projected savings and cost avoidance associated with the change; and (4) installation fielding plan data. In the first phase of the SHIPMAIN process, these cost estimates are broad, high-level cost estimates that may become summary level categories comprised of sub-categories later in the SHIPMAIN process. To learn more about a section, particularly a row item, click the red triangle for the row item in question. A definition for the item will appear in a separate window. Definitions and explanations for all row items are provided in the CBA CSW Glossary of terms. This document is available as a supplement to this TIG.

Portions of the CBA CSW will be locked. Data entry cells are colored orange or green, and are the only cells that can be edited. Orange cells require generic data entry (i.e., cost estimate or projected savings, or production units), where cost entries are in thousands of dollars. References in this document made to "*FYXX*" apply to any and/or all columns ranging from *FY05* through *FY14* in *Then Year Dollars (TY$)* column of the CSW. Green cells are the *To complete (Constant Year dollars)* column, which is an inflation correction column, also in

thousands of dollars. These estimates are required ONLY when funds for a ship change extend beyond FY14 in the *To complete (Then Year dollars)* column (orange cells). The initiator/submitter (herein referred to as "user") must confirm this estimate is necessary. If any funds in years beyond FY14 are required for the ship change, the user must group the estimates together into a lump sum and a separate calculation must be done for correcting inflation effects. This value is entered in the *To complete (Constant Year dollars)* column (green cells). Most cells will be filled in with estimated cost value, and text entry cells are identified in this document when required. In order to calculate or recalculate estimated cost value cells and save information at any time, click the "Save" button in NDE.

Any sections (i.e., rows or columns of data) that are not applicable to the Ship Change should remain blank. A check box is provided for each section for verification that it has been completed. When this check box is "checked", any cell left blank will result in a null value upon submittal to NDE. NDE may reject the SCD submission if the user fails to check all check boxes. Instructional "Notes" appear above cost sections to help the user. These notes are colored dark orange. There are also "error" cells, which appear in white cells next to, above, or below cells, rows, or columns in question (i.e., where an incorrect value is entered). Concise explanations appear in nearby cells to explain the error and provide guidance to correct the problem. However, in order to receive a consistent level of information sequentially (i.e., from top to bottom), this guide is provided to help the user to better understand what cost values are required in each block and provide a more thorough explanation of any error.

Section 1—Investment Costs

3.3 System/Equipment Cost

1. Enter estimated cost value for *Concept development* row in applicable *FYXX* and *To complete (Then Year dollars)* columns. The estimated cost value is a Then-year dollar value calculated by taking the cost estimate and dividing by the corresponding FY inflation factor. This manual calculation must be done for every applicable FYXX. If funds extend beyond FY14, it is necessary to calculate and enter an inflation-adjusted cost estimate in *To complete (Constant year dollars)* column (green cells). Consult current Navy Financial Management and Budget (FMB) guidance to determine appropriate inflation factors.
2. Enter estimated cost value for *Preliminary Engineering* row in applicable *FYXX* and *To complete (Then Year dollars)* columns. If funds extend beyond FY14, it is necessary to calculate and enter an inflation-adjusted cost estimate in *To complete (Constant year dollars)* column (green cells). Consult current Navy FMB guidance to determine appropriate inflation factors.
3. Enter estimated cost value for *Design Development* row in applicable *FYXX* and *To complete (Then Year dollars)* columns. If funds extend beyond FY14, it is necessary to calculate and enter an inflation-adjusted cost estimate in *To complete (Constant year dollars)* column (green cells). Consult current Navy FMB guidance to determine appropriate inflation factors.
4. Check the check box to verify this section is completed.
5. Click "Save" to save changes in NDE.

3.4 System/Equipment Procurement Cost

6. Enter estimated cost value for *System/Equipment Procurement Cost* row in applicable *FYXX* and *To complete (Then Year dollars)* columns. If funds extend beyond FY14, it is necessary to calculate and enter an inflation-adjusted cost estimate in *To complete (Constant year dollars)* column (green cells). Consult current Navy FMB guidance to determine appropriate inflation factors.
7. Check the check box to verify this section is completed.
8. Click "Save" to save changes in NDE.

3.5 Installation/Checkout Cost

9. Enter estimated cost value for *Installation/Checkout Cost* row in applicable *FYXX* and *To complete (Then Year dollars)* columns. If funds extend beyond FY14, it is necessary to calculate and enter an inflation-adjusted cost estimate in *To complete (Constant year dollars)* column (green cells). Consult current Navy FMB guidance to determine appropriate inflation factors.
10. Check the check box to verify this section is completed.
11. Click "Save" to save changes in NDE.

NOTE: Error messages will appear after completing the *Investment Costs* section. The reason for this error message is because the *Subtotal* row for *Investment Costs* (Section 1) must equal the *Subtotal* row for *Appropriation/Program Element Funding Plan* (Section 2) for each *FYXX* column, which has not been completed yet. Continue to Section 2, and revisit errors in the *Appropriation/Program Element Funding Plan* section.

3.6 Section 2—Appropriation/Program Element Funding Plan

3.6 Phase 1 - Preliminary Engineering

1. Enter estimated cost value for:
   a. *APPN:* Click "Add" to select the appropriation
   b. *Sponsor:* Enter sponsor information as text
   c. *BLI:* Enter Budget Line Item (BLI) information as text
   d. *PE:* Enter Program Element (PE) information as text
   e. Enter estimated cost value for applicable *FYXX* and *To complete (Then Year dollars)* columns.
   f. If funds extend beyond FY14, it is necessary to calculate and enter an inflation-adjusted cost estimate in *To complete (Constant year dollars)* column (green cells). Consult current Navy FMB guidance to determine appropriate inflation factors.
      - NOTE: Repeat steps a. thru f. for other remaining funding lines as required
   g. Repeat steps a. thru f. for Phase 2 (Design Development), Phase 3 (Procurement Design Development), and Phase 4 (Installation).

2. Identify any error messages that remain in *Appropriation/Program Element Funding Plan* (Section 2) of the CSW and locate which rows are unequal. Address errors for applicable *FYXX*, *To complete (Then Year dollars)*, and *To complete (Constant Year dollars)* columns by adjusting values in either *Investment Cost* (Section 1) or *Appropriation/Program Element Funding Plan* (Section 2) so *Subtotal* rows contain accurate estimates and equal. Section 2 is complete when all error messages for Section 1 and Section 2 *Subtotal* rows disappear.
3. Check the check box to verify this section is completed.
4. Click "Save" to save changes in NDE.

3.7 Section 3—Projected Savings and Cost Avoidance

Savings should be represented by positive values in this section. Errors will occur if negative values are used. A savings or cost avoidance can be calculated only if a baseline comparison is possible. This section may not be skipped if a baseline comparison can be made. If a new system is being called for by the ship change, skip this section by checking the check box for "no baseline comparison". Doing so denotes that no baseline comparison is feasible.

1. Enter estimated cost value for *Development Phase* row in applicable *FYXX* and *To complete (Then Year dollars)* columns.
2. Enter estimated cost value for *Production Phase* row in applicable *FYXX* and *To complete (Then Year dollars)* columns.
3. Enter estimated cost value for *Operating and Support* row in applicable *FYXX* and *To complete (Then Year dollars)* columns.
4. Identify and address any errors that may exist in *Projected Savings and Cost Avoidance* (Section 3).
5. Check the check box to verify this section is completed.
6. Click "Save" to save changes in NDE.

3.8 Section 4—Installation Fielding Plan Data

In general, production units procured must be equal to the total number of installations. An error message will appear if *Ship and shore total* does not equal *Total Production Units*.

1. Enter estimated values for *Total Production Units* row in applicable *Prior*, *FYXX* and *To complete* columns for *Number of Units*.
2. Skip *Ship and shore total.*
3. Enter value for *Ship quantity* row, if applicable. Applicable ship classes for this change should only be listed.
    a. Enter values in applicable *Prior*, *FYXX* and *To complete* columns for *Number of Units*.

    NOTE: Repeat step 3 for all ship class installations as required
4. Enter value for *Shore quantity*, if applicable. Applicable ship classes for this change should only be listed.

a. Adjust values in applicable *Prior*, *FYXX* and *To complete* columns for *Number of Units* from Phase 1 values. Enter new values.

NOTE: Repeat step 4 for all shore installations as required

5. Identify and address any errors that may exist in *Installation Fielding Plan Data* (Section 4). *Ship and shore total* must equal *Total Production Units*.
6. Check the check box to verify this section is completed.
7. Click "Save" to save changes in NDE.

NOTE: For descriptive purposes only, the *Total investment cost for the ship change (in thousands)* has been provided for the user. This overall investment cost of the ship change is the total investment cost estimated per ship for one hull (subtotal from Section 1) multiplied by the total TPU (Section 4).

3.7 Conclusion

Phase 1 of the CSW is now complete. Continue to Item 16 of the SCD.