INSURV ANNUAL REPORT

1 March 2024

DISTRIBUTION STATEMENT A. Approved for public release.

Preface

The following is a report of the Board of Inspection and Survey (INSURV) findings from fiscal year 2023, including comparisons to previous years, and is provided in accordance with Title 10 USC Section 8674.

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For general information about INSURV, please visit our public web portal:

http://www.public.navy.mil/fltfor/insurv/

The estimated cost of this report for the Department of Defense (DoD) is approximately $3,200 for Fiscal Year (FY) 2023. This includes $0 in expenses, and $3,200 in DoD labor.

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1.0 Requirements

Title 10 US Code §8674 requires an annual report not later than March 1 each year setting forth an overall narrative summary of material readiness of Navy ships, the number and types of vessels inspected, and for in-service vessels, material readiness trends.

§8674. EXAMINATION OF NAVY VESSELS; STRIKING OF VESSELS FROM THE NAVAL VESSEL REGISTER

(a) Boards of Officers To Examine Naval Vessels.

(1) The Secretary of the Navy shall designate boards of naval officers to examine naval vessels, including unfinished vessels, for the purpose of making a recommendation to the Secretary as to which vessels, if any, should be stricken from the Naval Vessel Register. Each vessel shall be examined at least once every three years if practicable.

(2)(A) Except as provided in subparagraph (B), any naval vessel examined under this section on or after January 1, 2020, shall be examined with minimal notice provided to the crew of the vessel.

(B) Subparagraph (A) shall not apply to a vessel undergoing necessary trials before acceptance into the fleet.

(b) Actions by Board. A board designated under subsection (a) shall submit to the Secretary in writing its recommendations as to which vessels, if any, among those it examined should be stricken from the Naval Vessel Register.

(c) Action by Secretary. If the Secretary concurs with a recommendation by a board that a vessel should be stricken from the Naval Vessel Register, the Secretary shall strike the name of that vessel from the Naval Vessel Register.

(d) Annual Report.

(1) Not later than March 1 each year, the board designated under subsection (a) shall provide to the congressional defense committees a briefing and submit to such committees a report regarding the following:

(A) An overall narrative summary of the material readiness of Navy ships as compared to established material requirements standards.

(B) The overall number and types of vessels inspected during the preceding fiscal year.

(C) For in-service vessels, material readiness trends by inspected functional area as compared to the previous five years.

(2) Each report under this subsection shall be submitted in-

(A) a classified form; and

(B) an unclassified form that is releasable to the public without further redaction.

2.0 Executive Summary

The overall combatant Fleet material condition average declined slightly by 0.01 in FY 2023 (see Figure 2.1). All INSURV Figure of Merit (IFOM) scores and trends in this chart reflect material condition assessment scoring that closely adheres to the Joint Fleet Maintenance Manual (JFMM), Volume VI, Chapter 5, Appendix A Equipment Operation Capability (EOC) metrics of 0.0 (totally inoperative) to 1.0 (fully operable). JFMM IFOM scores do not include major system demonstrations and administrative program scores. The updated IFOM calculation generates a focused measure of overall equipment material condition. INSURV began JFMM scoring in FY 2021, and previous year's IFOM scores were mathematically adjusted to match the current scoring schema by INSURV and NSWC Corona data scientists.

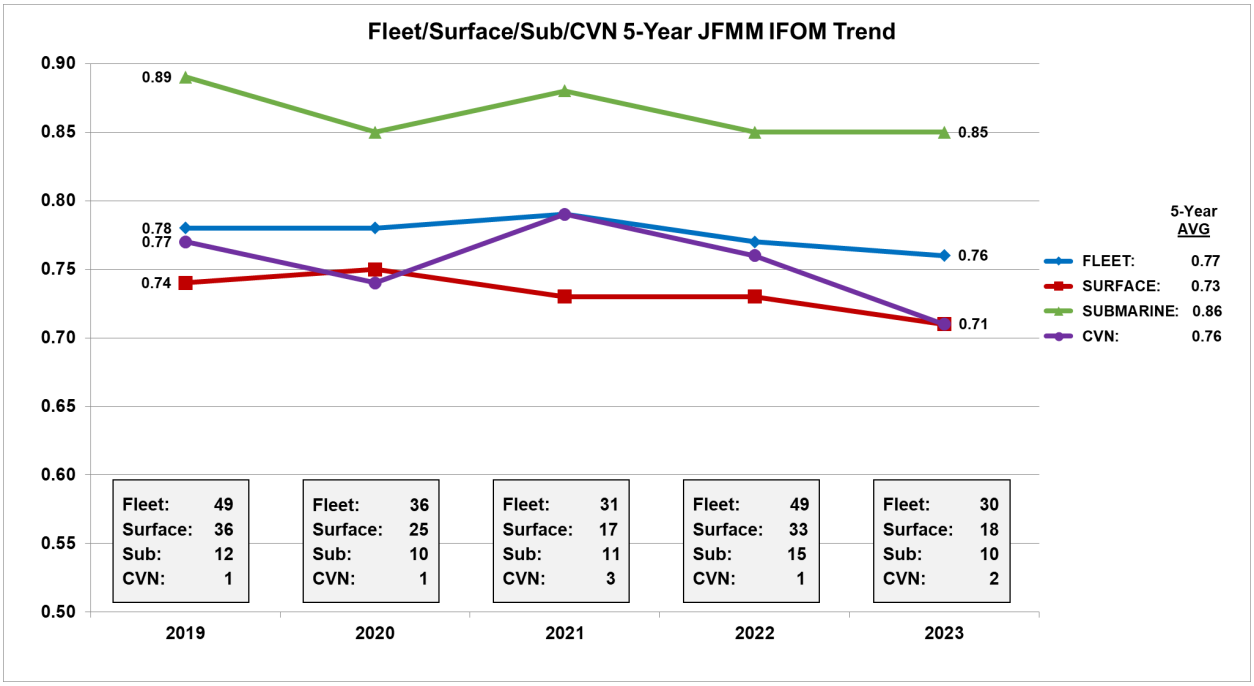

Figure 2.1 Fleet 5-Year JFMM IFOM Trends

In FY 2023, the surface ship average declined 0.02, the CVN average declined 0.05, and submarines remained steady.

Overall, several functional areas and subsystems remained degraded or showed declining trends, indicative of areas where material readiness is stressed.

Military Sealift Command (MSC) vessel average improved by .03 in FY 2023 and matched the 5-year average (Figure 2.2).

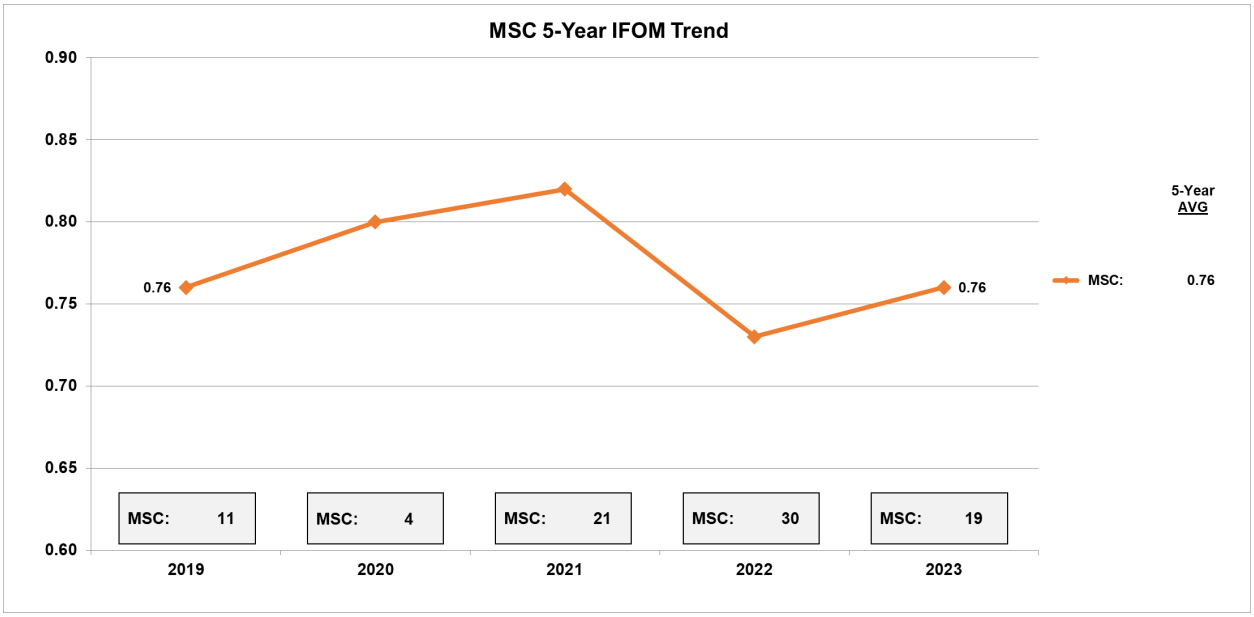

Figure 2.2 MSC 5-Year IFOM Trends

MSC vessels are assessed by MSC's Ships Material Assessment Readiness Test (SMART) team, which PRESINSURV has designated as a subordinate board, and are evaluated using a legacy scoring schema. Annual IFOM average scores are thus not compared with commissioned vessel averages. However, the SMART team is moving to JFFM scoring in FY 2024, so MSC ships will contribute to the Fleet average in the future.

For Trials, 9 of 13 ships/craft presented for Acceptance Trial (AT) had significant construction deficiencies that precluded acceptance. All nine ships conducting Final Contract Trials (FCT) required a Re-Trial (RT) because of failed or unperformed demonstrations, mission-degrading deficiencies, and/or pending system installations.

The FREEDOM variant LCS program resumed ship deliveries after the CNO lifted a delivery moratorium imposed in 2021 to address combining gear design deficiencies. One FREEDOM variant ship completed AT this fiscal year with successful results.

3.0 Responsibilities and Authorities

INSURV conducts a range of inspections to meet its Title 10 responsibilities. These inspections provide assurance to Congress, the Secretary of the Navy (SECNAV), the Chief of Naval Operations (CNO), Fleet Commanders, Systems Commanders (SYSCOM), Type Commanders (TYCOM), Immediate Superiors in Command (ISIC), and Commanding Officers (CO) that ships being introduced to the Fleet will be ready to meet their missions; that Fleet material readiness issues are being identified and addressed; and, when required that the material condition of ships scheduled for inactivation is documented. These inspections include new construction trials that

occur at the beginning of ships' lives, Material Inspections (MIs) that occur periodically while ships are in service, and surveys that occur at the end of ships' lives, when required.

3.1 INSURV Process

INSURV only uses technically approved procedures to conduct inspections. Planned Maintenance System (PMS) cards are the principal documentation used to conduct inspections.

3.2 Scoring

INSURV introduced the IFOM in 2012 in order to more consistently score MI and Trials. The Navy's renewed focus on lethality and survivability drove INSURV to review its material condition metrics. Starting in FY 2022, INSURV officially implemented adjusted IFOM calculations to match the Equipment Operational Capability (EOC) definitions found in the JFMM, Volume VI, Chapter 5, Appendix A. FY 2021 Material Inspections were dual scored to capture both methodologies. Previous year's IFOM scores were mathematically adjusted to match the current scoring schema by INSURV and NSWC Corona data scientists.

To ensure objective and consistent material readiness metrics, INSURV scores ships based on a weighted average of the material condition of equipment in functional areas. During an MI, INSURV inspects up to 100,000 shipboard material configuration items. Depending upon the ship class, these items are functionally aligned into ~150 systems and ~550 sub-systems. Results from this alignment are then used to develop EOC Scores ranging from 0.0 (complete failure) to 1.0 (no deficiencies found). Sub-system scores are averaged into system scores and system EOC scores are further averaged into functional areas such as Aviation, Weapons, and Main Propulsion. The functional areas are then weighted based on their importance to the platform's primary missions with respect to lethality and/or survivability and averaged to form an overall IFOM score. This final IFOM score will be between 0.0 and 1.0 and can be used to assess both mission capability as well as the relative material readiness of a particular ship when compared to IFOM scores from other ships in its class. Additionally, INSURV conducts demonstrations to determine the effectiveness of integrated systems in an operational environment. While these demonstrations are graded, the scores are not factored into the ship's IFOM. However, deficiencies that arise from the demonstrations do affect the calculus of the associated functional areas. Finally, programmatic scores for safety, environmental protection, and medical programs are not factored into IFOM, but are scored and tracked separately.

3.3 The Schedule Process

Title 10 requires INSURV to inspect in-service ships once every three years, if practicable. On 01 October 2019, INSURV, per CNO direction, established inspection periodicity at three years for all vessels.

In July 2019, Fleet Commanders removed options for waivers and codified requirements for schedule changes. Ships will either be within 3-year periodicity or considered overdue. Schedule

changes requested within 90 days of the scheduled inspection date only occur with Fleet Commander authorization and are predicated on operational requirements, maintenance delays, or INSURV capacity limitations. As of 30 September 2023, there were 110 of 321 (34%) ships subject to inspection that exceeded a 3-year inspection periodicity.

4.0 Fiscal Year 2023 Inspections

INSURV conducted 33 Material Inspections (MI), 19 Ship's Material Readiness Test (SMART), 13 Acceptance Trials (AT), nine Final Contract Trials (FCT), one Guarantee Material Inspection (GMI), two Re-Trials (RT), one Special Trial (ST), eight surveys, and 148 craft inspections in fiscal year 2023. The breakdown is as follows:

(1) Material Inspections (33):

- 2 NIMITZ-class multipurpose aircraft carriers (CVN)
- 2 TICONDEROGA-class guided missile cruisers (CG)
- 12 ARLEIGH BURKE-class guided missile destroyers (DDG)
- 1 INDEPENDENCE-class littoral combat ship (LCS)
- 2 WASP-class amphibious assault ships (LHD)
- 1 SAN ANTONIO-class amphibious transport dock ship (LPD)
- 3 OHIO-class ballistic missile submarines (SSBN)
- 1 OHIO-class guided missile submarine (SSGN)
- 2 LOS ANGELES-class submarines (SSN 688)
- 4 VIRGINIA-class submarines (SSN 774)
- 2 THOMAS G. THOMPSON-class oceanographic research ships (AGOR)
- 1 SPRUANCE-class self-defense test ship (EDD)

(2) Ship's Material Assessment and Readiness Test (SMART) (19):

- 1 missile range instrumentation ship (T-AGM)
- 2 VICTORIOUS-class surveillance ships (T-AGOS)
- 3 oceanographic survey ships (T-AGS)
- 2 2ND LT JOHN P. BOBO-class cargo ships (T-AK)
- 3 LEWIS AND CLARK-class cargo ships (T-AKE)
- 1 HENRY J. KAISER-class fleet replenishment oiler (T-AO)
- 6 SPEARHEAD-class expeditionary fast transports (T-EPF)
- 1 BLUE RIDGE-class command ship (LCC)

(3) Trials (26):

Acceptance Trials (13):

- 3 ARLEIGH BURKE-class guided missile destroyers (DDG)
- 1 FREEDOM-class littoral combat ships (LCS)
- 1 INDEPENDENCE-class littoral combat ships (LCS)
- 1 AEGIS Ashore sight (HN)
- 1 JOHN LEWIS-class fleet replenishment oilers (T-AO)
- 1 LEWIS B. PULLER-class expeditionary sea base (ESB)
- 4 Landing craft, air cushioned (LCAC) combatant craft
- 1 LEGEND-class national security cutter (WMSL)

Final Contract Trials (9):
- 2 ARLEIGH BURKE-class guided missile destroyers (DDG)
- 1 ZUMWALT-class guided missile destroyer (DDG)
- 2 FREEDOM-class littoral combat ships (LCS)
- 2 INDEPENDENCE-class littoral combat ships (LCS)
- 1 JOHN LEWIS-class fleet replenishment oilers (T-AO)
- 1 LEWIS B. PULLER-class expeditionary sea base (ESB)

Guarantee Material Inspection (1):
- 1 VIRGINIA-class submarine (SSN 774)

Re-Trials (2):
- 1 ARLEIGH BURKE-class guided missile destroyers (DDG)
- 1 INDEPENDENCE-class littoral combat ships (LCS)

Special Trial (1):
- 1 ZUMWALT-class guided missile destroyer (DDG)

(4) Surveys (7):
- 2 TICONDEROGA-class guided missile cruisers (CG)
- 1 WHIDBEY ISLAND-class dock landing ship (LSD)
- 2 FREEDOM-class littoral combat ships (LCS)
- 2 CYCLONE-class coastal patrol ships (PC).

4.1 Material Inspections

To ensure that Fleet material readiness issues are being identified and addressed, INSURV assesses the material readiness of all ships on the Naval Vessel Register. These MIs:

(1) Determine and report upon an individual ship's fitness for further service, with a five-year comparative view,
(2) Identify areas of degraded material readiness that impact a ship's ability to carry out assigned missions,
(3) Provide feedback to the Fleet Commanders, Systems Commanders, Type Commanders, ISICs, and ship COs on recommendations for improving material readiness.

4.2 Ships Material Assessment and Readiness Test (SMART)

Under a Memorandum of Understanding between INSURV and MSC, MSC conducts Material Inspections, called SMARTs, on ships under their purview. The SMART team is designated a subordinate board to INSURV and INSURV audits these inspections to ensure that they are carried out consistently, following standardized procedures.

4.3 Trials

INSURV conducts ATs, Combined Trials (CT) and Integrated Trials (IT) per OPNAVINST 4700.8L to independently verify the readiness of ships, craft, and submarines for preliminary acceptance by the Navy. INSURV acts as the Navy's designated representative to recommend acceptance of a ship under Navy contract. Negative recommendations specify which deficiencies are required to be corrected or have correction waived by the CNO prior to acceptance.

INSURV also conducts FCTs on surface ships and GMIs on submarines during the post-delivery period to determine if additional deficiencies have developed since AT, to validate correction of significant AT "mission degrading" deficiencies, and to provide an assessment of readiness for "Fleet Introduction".

Finally, with approval from the CNO, INSURV may conduct STs when significant ship systems or capabilities remain incomplete until after Post-Shakedown Availability, or RTs to address specific deficiencies for unsuccessful trial events.

5.0 Material Readiness Trends

5.1 Surface Ships

The surface force makes up the bulk of Fleet ships inspected each year. The surface force showed a slightly decreasing trend in average IFOM and the FY 2023 average IFOM was below the 5-year average.

Overall, for surface ships, 15 functional areas were evaluated as DEGRADED: Main Propulsion (MP), Communications (CC), Information Systems (IS), Aegis Weapon Systems (AW), Operations (OP), Weapons Systems (WP), Auxiliaries (AX), Damage Control (DC), Deck (DK), Aviation (AV), Preservation (PR), Ventilation (VT), Environmental Protection (EP), Supply (SP), and Navy Occupational Safety and Health (OH).

Figure 5.1 shows the five-year trend for surface functional area scores and the total number of ships inspected each year. These scores are based on the JFMM scoring methodology noted previously.

SURFACE							
Functional Areas (Ships Inspected)	2019 (36)	2020 (25)	2021 (17)	2022 (33)	2023 (18)	5-Year Average	2023 Comparison to 5-Year Avg
Main Propulsion	0.67	0.73	0.78	0.76	0.74	0.73	NEUTRAL
Anti-Sub Warfare	0.88	0.81	0.87	0.86	0.80	0.85	BELOW
Communications	0.75	0.77	0.75	0.74	0.68	0.74	BELOW
Information Systems	0.55	0.56	0.56	0.59	0.58	0.57	NEUTRAL
Aegis Weapon Systems	0.66	0.62	0.69	0.69	0.68	0.66	NEUTRAL
Mine Warfare	0.76	0.73	NA	0.78	NA	0.77	NA
Operations	0.78	0.77	0.71	0.74	0.71	0.75	BELOW
Weapons Systems	0.69	0.67	0.71	0.63	0.64	0.66	NEUTRAL
Auxiliaries	0.82	0.83	0.80	0.78	0.76	0.80	BELOW
Electrical	0.70	0.76	0.74	0.80	0.81	0.76	ABOVE
Damage Control	0.79	0.77	0.77	0.79	0.75	0.78	BELOW
Deck	0.76	0.69	0.75	0.78	0.75	0.75	NEUTRAL
Navigation	0.86	0.85	0.82	0.84	0.83	0.84	NEUTRAL
Aviation	0.49	0.48	0.61	0.45	0.50	0.52	NEUTRAL
Preservation	0.84	0.84	0.81	0.78	0.72	0.81	BELOW
Ventilation	0.77	0.78	0.61	0.69	0.61	0.71	BELOW
Environmental Protection	0.76	0.76	0.73	0.65	0.58	0.70	BELOW
Medical	0.91	0.92	0.93	0.95	0.93	0.93	NEUTRAL
Supply	0.80	0.80	0.83	0.80	0.77	0.80	BELOW
Habitability	0.78	0.78	0.74	0.80	0.83	0.79	ABOVE
NAVOSH	0.72	0.72	0.75	0.72	0.76	0.73	ABOVE
ABOVE: >0.02 of average, NEUTRAL: +/- 0.02 of average, BELOW <0.02 of average							

Figure 5.1 5-Year Surface Functional Area Scores

5.2 Submarines

Submarine average IFOM remained steady compared to FY 2022 and was just below the 5-year average. Three functional areas were evaluated as DEGRADED: Auxiliaries (AX), Deck (DK), and Navy Occupational Safety and Health (OH).

SUBMARINE							
Functional Areas (Boats Inspected)	2019 (12)	2020 (10)	2021 (11)	2022 (15)	2023 (10)	5-Year Average	2023 Comparison to 5-Year Avg
Main Propulsion	0.85	0.83	0.86	0.86	0.85	0.84	NEUTRAL
Auxiliaries	0.78	0.70	0.81	0.80	0.76	0.77	NEUTRAL
Electrical	0.88	0.86	0.86	0.81	0.82	0.84	NEUTRAL
Damage Control	0.85	0.88	0.85	0.86	0.86	0.86	NEUTRAL
Combat Systems	0.83	0.76	0.86	0.81	0.84	0.82	NEUTRAL
Navigation	0.89	0.90	0.89	0.89	0.90	0.89	NEUTRAL
Operations	0.91	0.84	0.89	0.89	0.89	0.89	NEUTRAL
Information Systems	0.90	0.86	0.81	0.87	0.92	0.88	ABOVE
Deck	0.89	0.83	0.81	0.73	0.75	0.80	BELOW
Supply	0.87	0.86	0.92	0.86	0.83	0.86	BELOW
Habitability	0.89	0.88	0.90	0.91	0.94	0.90	ABOVE
NAVOSH	0.80	0.81	0.80	0.78	0.74	0.78	BELOW
Survivability/Escape	0.90	0.89	0.82	0.82	0.84	0.85	NEUTRAL
Medical	0.92	0.92	0.90	0.85	0.89	0.89	NEUTRAL
Preservation	0.92	0.92	0.86	0.88	0.89	0.90	NEUTRAL
Strategic Systems	0.95	0.96	0.96	0.94	0.95	0.95	NEUTRAL
ABOVE: >0.02 of average, NEUTRAL: +/- 0.02 of average, BELOW <0.02 of average							

Figure 5.2 5-Year Submarine Functional Area Scores

5.3 CVNs

INSURV groups aircraft carrier data to achieve a sufficient sample size for analysis compared to the population of CVNs. CVN IFOM from FYs 2022 and 2023 (3 ships) was 0.73 a decline of .06 from FY 2021 (3 ships), and the results and were .03 below the 5-year average.

Results of three CVN inspections over fiscal years 2022 and 2023 showed 13 functional areas evaluated as DEGRADED: Damage Control (DC), Auxiliaries (AX), Communications (CC), Information Systems (IS), Operations (OP), Weapons Systems (WP), Aviation (AV), Navy Occupational Safety and Health (OH), Ventilation (VT), Environmental Protection (EP), Supply (SP), Habitability (HB), and Preservation (PR).

CVN					
Functional Area (Ships Inspected)	2019-2020 (2)	2021 (3)	2022-2023 (3)	5-Year Average	2022 – 2023 Comparison to 5-Year Average
Damage Control	0.69	0.75	0.69	0.71	NEUTRAL
Deck	0.62	0.76	0.82	0.75	ABOVE
Auxiliaries	0.79	0.84	0.70	0.78	BELOW
Electrical	0.72	0.74	0.82	0.77	ABOVE
Propulsion	0.89	0.90	0.87	0.88	NEUTRAL
Communications	0.86	0.81	0.63	0.75	BELOW
Information Systems	0.64	0.60	0.60	0.61	NEUTRAL
Navigation	0.87	0.80	0.80	0.82	NEUTRAL
Operations	0.72	0.73	0.66	0.70	BELOW
Weapons	0.67	0.78	0.71	0.72	NEUTRAL
Aviation	0.68	0.90	0.67	0.76	BELOW
NAVOSH	0.52	0.72	0.50	0.59	BELOW
Ventilation	0.87	0.67	0.70	0.73	BELOW
Environmental Protection	0.75	0.78	0.63	0.71	BELOW
Supply	0.73	0.73	0.56	0.67	BELOW
Habitability	0.70	0.78	0.75	0.75	NEUTRAL
Medical	0.97	0.96	0.91	0.94	BELOW
Preservation	0.77	0.81	0.76	0.78	NEUTRAL
ABOVE: >0.02 of average, NEUTRAL: +/- 0.02 of average, BELOW <0.02 of average					

Figure 5.3 5-Year CVN Functional Area Scores

5.4 Military Sealift Command (MSC) ships

A significant increase in the number of SMART inspections beginning in FY 2021 provides greater insight into the material condition of the MSC fleet. Each SMART inspection is broken into two areas, Mission Areas and Underway Demonstrations. Mission Areas include Main Propulsion, Auxiliaries, Electrical, Damage Control, Deck, Communications, Aviation, Supply/Habitability, Environmental Protection, Medical, and Safety/NAVOSH.

The FY 2023 MSC IFOM average was slightly higher than the 5-year average as noted in Figure 2.2. Figure 5.4 shows MSC's Functional Area scores for the past five fiscal years. It shows two functional areas were DEGRADED in FY 2023: Damage Control and Deck. Damage Control consistently averaged DEGRADED, beginning in FY 2019.

MSC (All Classes)							
Functional Areas (Ships inspected)	2019 (11)	2020 (4)	2021 (21) (7) 1.0 (14) 2.0	2022 (30) (4) 1.0 (26) 2.0	2023 (19) (2) 1.0 (17) 2.0	5-Year Average	2023 Comparison to 5-Year Avg
Main Propulsion	0.72	0.83	0.82	0.76	0.82	0.78	ABOVE
Auxiliaries	0.81	0.85	0.80	0.76	0.80	0.79	NEUTRAL
Electrical	0.84	0.80	0.87	0.77	0.87	0.83	ABOVE
Damage Control	0.74	0.74	0.73	0.65	0.65	0.69	BELOW
Deck	0.77	0.76	0.84	0.77	0.79	0.79	NEUTRAL
Communications	0.94	0.86	0.95	0.96	0.97	0.95	NEUTRAL
Aviation	0.84	0.89	0.84	0.74	0.85	0.81	ABOVE
Supply/Habitability	0.89	0.86	0.95	0.88	0.91	0.90	NEUTRAL
Environmental Protection	0.90	0.94	0.92	0.86	0.87	0.88	NEUTRAL
Medical	0.95	0.93	0.95	0.92	0.95	0.94	NEUTRAL
Safety/NAVOSH	0.80	0.85	0.89	0.89	0.88	0.87	NEUTRAL
ABOVE: >0.02 of average, NEUTRAL: +/- 0.02 of average, BELOW <0.02 of average							

Figure 5.4. 5-Year MSC Functional Area Scores

5.5 Trials

INSURV conducted 26 trials in FY 2023: 13 ATs, 9 FCTs, 1 GMI, 2 RTs, and 1 ST on 16 surface ships, 1 submarine, and 4 combatant craft.

9 of 13 ships/craft presented for AT had significant construction deficiencies that precluded an acceptance recommendation.

All nine ships conducting FCTs required a RT because of failed or unperformed demonstrations, mission-degrading deficiencies, and/or pending system installations. Two of these RTs were completed in FY 2023; seven remain pending in FY 2024.

The FREEDOM variant LCS program resumed ship deliveries after the CNO lifted a delivery moratorium imposed in 2021 to address combining gear design deficiencies. One FREEDOM variant ship completed AT this fiscal year with successful results.

Aircraft carriers, amphibious assault ships (LHD/LHA) and barracks barge (APL) programs conducted no trials this year pending completion of ships under construction. Amphibious transport dock (LPD) and expeditionary fast transport (EPF) programs conducted no trials this year because of production delays and deficiency corrections.

5.5.1 GERALD R FORD (CVN 78) Aircraft Carrier Program

The GERALD R FORD-class program did not schedule any trials in FY 2023.

5.5.2 ARLEIGH BURKE Guided Missile Destroyer (DDG) Program

DDG 51 class ships are built by HII/Ingalls Shipbuilding in Pascagoula, Mississippi and General Dynamics/Bath Iron Works (GD/BIW) in Bath, Maine. The program office is PEO Ships/PMS 400D. The program conducted six trials in FY2023: three ATs (USS CARL M LEVIN (DDG 120), USS JACK H LUCAS (DDG 125), and USS LENAH H. SUTCLIFFE HIGBEE (DDG 123)), two FCTs (USS FRANK E. PETERSEN, JR. (DDG 121), USS LENAH H. SUTCLIFFE HIGBEE (DDG 123)), and one RT (USS FRANK E. PETERSEN, JR. (DDG 121)).

The DDG 51 program's performance was consistent with recent DDG trials, however; several deficiencies noted at FCT precluded positive Fleet Introduction recommendations.

5.5.3 ZUMWALT Guided Missile Destroyer (DDG) Program

ZUMWALT class ships are built by General Dynamics/Bath Iron Works (GD/BIW) in Bath, Maine. The program performed a ST on USS ZUMWALT (DDG 1000) and a FCT on USS MICHAEL MONSOOR (DDG 1001). The program achieved compliance with OPNAV trials policy with DDG 1001; its FCT was performed prior to the Obligation Work Limiting Date (OWLD) unlike DDG 1000. Both ships exhibited systemic material problems resulting from design, procurement, and sustainment decisions. The program's final ship, the future USS LYNDON B JOHNSON (DDG 1002), is under construction at HII/Ingalls Shipbuilding. This

ship's acquisition process did not employ the split-delivery strategy employed on the first two ships. After construction at BIW, the ship sailed to HII/Ingalls Shipbuilding for mission systems installation.

5.5.4 Littoral Combat Ship (LCS) Program – FREEDOM (LCS 1) Variant

FREEDOM variant ships are under contract with Lockheed Martin and built by Fincantieri Marinette Marine in Marinette, Wisconsin. The program office is PEO Unmanned and Small Combatants (USC)/PMS 501. The program conducted three trials: one AT (USS MARINETTE (LCS 25)) and two FCTs (USS MINNEAPOLIS-ST PAUL (LCS 21), USS COOPERSTOWN (LCS 23)).

LCS 25 completed a successful AT with no significant construction deficiencies and earning the program's highest IFOM score in five years. However, both ships conducting FCTs performed poorly, earning the program's lowest IFOM scores over the last 5 years and requiring RTs on both ships to validate correction of deficiencies and/or completion of underway events.

5.5.5 Littoral Combat Ship (LCS) Program – INDEPENDENCE (LCS 2) Variant

INDEPENDENCE variant ships are built by Austal USA in Mobile, Alabama. The program office is PEO USC/PMS 501. The program completed four trials in FY 2022: one AT (USS AUGUSTA (LCS 34)), two FCTs (USS CANBERRA (LCS 30), USS SANTA BARBARA (LCS 32)), and one RT (USS CANBERRA (LCS 30)). All three ships had slightly below average results and at least one inoperative major warfighting system that limited their operational capability.

5.5.6 AMERICA Amphibious Assault Ship (LHA(R)) Program

The AMERICA-class program did not schedule any trials in FY 2023.

5.5.7 SAN ANTONIO Amphibious Transport Dock (LPD) Flight II Program

The SAN ANTONIO (LPD 17) program delivered its eleventh ship (LPD 27) in FY 2017. In FY 2014, the Secretary of the Navy determined that a derivative of the LPD 17 Class would meet the Amphibious Ship Replacement operational requirements to replace the LSD 41/49 Dock Landing Ships. LPD 28 and LPD 29, as transition ships, included early implementation of Amphibious Ship Replacement affordability efforts and design changes. In 2018, LPD 30 was designated as the lead ship in a second flight of the LPD 17 Class ships and the Amphibious Ship Replacement was subsumed into the LPD 17 Class. The program did not complete any trials in FY23. The program's first ship, USS FORT LAUDERDALE (LPD 28), completed AT in January 2022; the program office conducted its FCT in November 2023. The program office has shifted RICHARD M MCCOOL JR's (LPD 29) AT from Q4FY2023 to Q2FY2024.

5.5.8 VIRGINIA Class SSN Program

VIRGINIA class SSNs are built jointly by General Dynamics/Electric Boat (GD/EB) and Huntington Ingalls Industries/Newport News Shipbuilding (HII/NNS). There were no VIRGINIA Class submarines delivered in FY23. A planned Combined Trial (CT) on USS HYMAN G

RICKOVER (SSN 795) was scheduled for FY 2023 but deferred until October 2023 because of production delays. The program completed one event in FY 2023: a Guarantee Material Inspection (GMI) on USS OREGON (SSN 793) prior to her Post-Shakedown Availability (PSA).

The SSN program typically presents fully complete boats that perform well on CT.

5.5.9 Aegis Ashore Missile Defense System (AAMDS) Program

Under an agreement with the Missile Defense Agency, INSURV performs ATs for AAMDS sites prior to custody transfer to the U.S. Navy. INSURV inspected the AAMDS Poland located at Naval Support Facility Redzikowa, Poland. INSURV previously inspected AAMDS Romania in 2015. This trial is similar in scope to a ship AT, focusing on the facility's Aegis combat system and mission critical support systems, e.g., electrical generation/distribution, air conditioning, information systems, damage control systems, etc. The Poland site was significantly improved over the Romania site. No additional sites are under construction.

5.5.10 LEWIS B PULLER Expeditionary Support Base (ESB) Program

LEWIS B PULLER-class ships are built by General Dynamics/NASSCO in San Diego, California. The program office is PEO Ships/PMS 385. The program conducted two trials: an Integrated Trial (IT) and FCT on USNS JOHN L. CANLEY (T-ESB 6).

T-ESB 6 successfully completed IT with no significant construction deficiencies. The subsequent FCT revealed deficiencies that, along with two uninstalled system require a RT.

5.5.11 JOHN LEWIS Fleet Replenishment Oiler (T-AO) Program

JOHN LEWIS-class ships are built by GD/NASSCO in San Diego, California. The program office is PEO Ships/PMS 325. The program completed two trials: one AT (USS HARVEY MILK (T-AO 206)) and one FCT (USS JOHN LEWIS (T-AO 205)).

The program overcame significant problems with two critical systems that appeared both during initial construction and while in-service.

5.5.12 SPEARHEAD (T-EPF 1) Expeditionary Fast Transport Program

The SPEARHEAD-class program did not complete any trials in FY 2023.

5.5.13 SHIP TO SHORE CONNECTOR (SSC) Program

The LCAC 100 craft are built by Textron Marine and Land Systems in New Orleans, Louisiana. The program office is PEO Ships/PMS 317. The program completed four trials in FY 2023: ATs of LCACs 105, 106, 107, and 108. Contractor limitations slowed the delivery rate of these craft. Additionally, the trials duration extended to four days vice the notional three days because of work force limitations. The craft generally perform well on underway demonstrations following all pierside deficiency corrections.

5.5.14 Barracks Craft (APL) (Non-Self Propelled)

The APL craft program did not schedule any trials in FY 2023.

5.5.15 LEGEND Class National Security Cutter (WMSL) Program

The National Security Cutters, also known as the Maritime Security Cutter (Large) (WMSL), are built by HII/Ingalls Shipbuilding in Pascagoula, Mississippi. Under an agreement with U.S. Coast Guard, INSURV conducts ATs on these ships. The program completed one trial in FY 2023: an AT on USCGC CALHOUN (WMSL 759). The program experienced difficulty integrating U.S. Navy combat systems prior to AT.

6.0 INSURV Changes

6.1 Title 10 Implementation

As cited in Section 1, on 01 October 2019 INSURV implemented minimal notice inspections per Title 10 USC Section 8674 and established inspection periodicity at three years for all vessels on the Naval Vessel Register. Minimal notice was defined and established as 30 days prior to MI start date.

Achieving three-year periodicity requires INSURV to perform approximately 84 MIs per year. This constitutes an 80% increase in material inspections over the 6-year average number of inspections prior to FY 2020. Implementation of COVID 19 restrictions created a backlog of required material inspections. INSURV expects this backlog to continue for the foreseeable future based on current staffing levels and high Fleet operating tempo. INSURV implemented scheduling procedures with Numbered Fleet and TYCOM schedulers that prioritize scheduling of overdue vessels.

6.2 INSURV Manning

INSURV manning derives from inspection periodicity requirements. Prior to FY 2019, inspection periodicity generated a requirement for approximately 60 total inspection events (MIs/Trials/Surveys) per year. INSURV does not possess sufficient funded billets to perform all inspection elements, especially the most specialized, specific technical requirements. INSURV bridged the capacity/capability gap by using Regional Maintenance Center technicians as inspectors, along with inherent scheduling authorities. In FY 2015, the U.S. Fleet Forces Command Manpower Analysis Team (USFF CMAT) validated 56 billets to address the gap using the Shore Manpower Requirements Determination (SMRD) process. 40 of these billets were funded and filled in FY 2019 – FY 2020, the remaining billets are either funded in future years or remain unfunded.

Congressional emphasis on, and the CNO's commitment to, meeting Title 10 periodicity requirements beginning in FY 2020 generated a requirement for approximately 102 total ship inspection events (MIs/Trials/Surveys) per year. This requirement generated a situation similar to what INSURV experienced leading to the FY 2015 SMRD. USFF CMAT returned to INSURV in early FY 2020 to conduct a Management Analysis Study (MAS, a focused SMRD), to specifically define manning requirements to meet increased periodicity. This study validated an additional 99 billets consisting of 20 Officer requirements, 52 Senior Enlisted requirements, 24

civil service requirements, and 3 specialized engineering requirements aligned to Norfolk Naval Shipyard. In July 2022, INSURV was authorized to hire all 40 unfunded civilian billets. 55 military billets are currently programmed for funding in FY 2025. INSURV expects the remaining billet requirements to take several years to realize. In the interim, INSURV is pursuing a contract vehicle to hire inspectors under the cognizance of INSURV to bridge the capacity gap.

This capacity gap negatively impacts INSURV's ability to meet a 3-year inspection periodicity. Under current manning, average inspection periodicity is approximately 4.7 years. This average is expected to remain steady until INSURV is fully manned.

6.3 INSURV Scoring Changes

As noted in paragraph 3.2, alignment of inspection scoring to the JFMM-based model improves data granularity. Previously, INSURV used four levels of indenture (IFOM/FA/Subsystem/Component), effectively scoring only the top three. The JFMM-based model includes an additional level of indenture (IFOM/FA/System/Subsystem/Component), with scoring at all levels.

The additional granularity provides INSURV and stakeholders improved visibility of challenged systems and the ability to rapidly isolate root causes. Starting in FY 2022, all Material Inspections conducted by INSURV were scored using JFMM scoring. INSURV scored FY 2023 Trials using JFMM scoring.

In order to maintain a basis for trends and trend analysis, INSURV collaborated with NSWC Corona to create several mathematical models to convert INSURV legacy EOC scores to JFMM EOC scores from FY 2016 - 2020. Data collected from dual-scored MIs in FY 2021 were used to formulate mathematical models for each functional area in the ship classes. Mathematical models were created using an Anderson Darling Goodness-of-Fit test and the Akaike Information Criterion to determine the best distribution of the data per functional area in each ship class. Once the distribution was determined, a mathematical formula was derived to convert legacy scores to JFMM scores. These models were tested with an R^2 correlation coefficient to determine how well the mathematical formula described the dataset. All Material Inspection trend data for FY 2019 and FY 2020 in this report is derived from this conversion.

A notable impact of JFMM scoring are general changes to annual functional area averages from previous year's reports. This is due to adherence to operational impact definitions in assigning numerical scores.

This is especially highlighted in the Surface Aviation functional area. Due to the strict requirements of Aviation Facilities Bulletins (AVFACBUL) and Naval Air Training and Operating Procedures Standardization (NATOPS), singular but critical deficiencies are cause to recommend the partial or full suspension of flight operations. Under INSURV's legacy scoring schema, deficiencies that required partial suspension of flight operations generated maximum scores of 0.79, while deficiencies that required full suspension of flight operations generated maximum

scores of 0.59. JFMM scoring definitions align partial suspension of flight operations with a maximum score of 0.40 and full suspension of flight operations with a score of 0.20. This significant change in maximum scores resulted in lower averages for FY 2020 and prior following conversion.