

INSURV ANNUAL REPORT

1 March 2025



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Preface

The following is a report of the Board of Inspection and Survey (INSURV) findings from fiscal year 2024, including comparisons to previous years, and is provided in accordance with Title 10 USC Section 8674.

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<https://www.insurv.usff.navy.mil/>

The estimated cost of this report for the Department of Defense (DoD) is approximately \$6,600 for Fiscal Year (FY) 2024 and 2025. This includes \$0 in expenses, and \$6,600 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 Fleet material condition average declined slightly by 0.02 in FY 2024 (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 or administrative program scores. The JFMM IFOM calculation is 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. Military Sealift Command (MSC) began JFMM scoring in FY 2024, and previous year's IFOM scores were mathematically adjusted to match the current scoring schema.

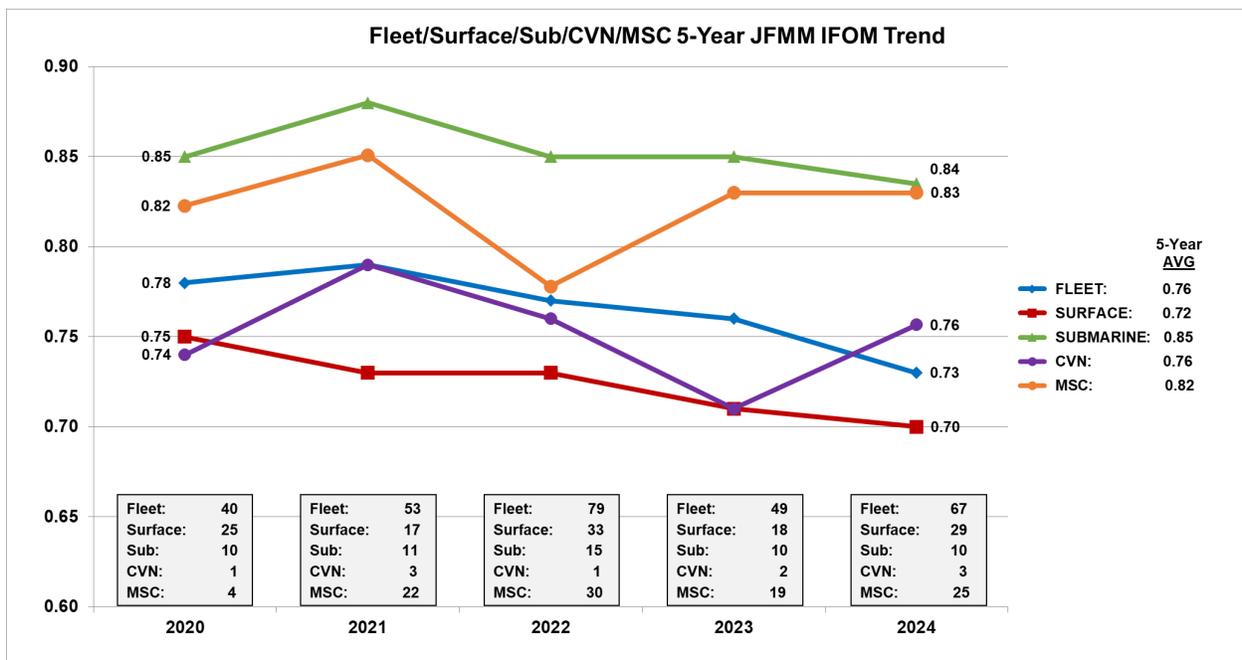


Figure 2.1 Fleet/Surface/Sub/CVN/MSC 5-Year IFOM Trends

In FY 2024, the surface ship average declined by 0.01, the CVN average increased by 0.05, the submarine average declined by 0.01, and the MSC average remained steady. MSC scores are not included in the Fleet average because of different inspection standards. Additionally, INSURV excluded four Material Inspection (MI) IFOM scores from FY 2024 averages: one TICONDEROGA-class Guided Missile Cruiser and one WASP-class Amphibious Assault Ship (LHD) that were conducted using a trial format following extended repair availabilities and two THOMAS G. THOMPSON-class oceanographic research ships (AGOR) that are listed on the NVR but not part of the operational Fleet.

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

For Trials, 10 of 14 ships/craft presented for Acceptance Trial (AT), Integrated Trial (IT), or Combined Trial (CT) had significant construction deficiencies that precluded acceptance. Of the five ships presented for Final Contract Trials (FCT), four had significant deficiencies, incomplete trial events, or unfinished system installations that required a Retrial (RT) prior to Fleet Introduction. Of the nine ships presented for RTs, six finished with new or existing deficiencies and/or incomplete system installations that required Type Commander and Program Executive Office coordination to resolve prior to Fleet Introduction. One ship (DDG 1001) did not complete a RT prior to Fleet Introduction.

The ZUMWALT-class DDG, SAN ANTONIO-class Amphibious Transport Dock (LPD), FREEDOM-class littoral combat ship (LCS), SPEARHEAD-class Expeditionary Fast Transport (EPF), and Ship to Shore Connector (LCAC 100) programs experienced production and material challenges that delayed their trials, required extensive retrials, earned low IFOM scores, and/or had uncorrected significant deficiencies at Fleet Introduction. Specific issues are described in program sections below.

The GERALD R FORD-class Aircraft Carrier (CVN), AMERICA-class Amphibious Assault Ship (LHA), Barracks Barge (APL), and LEGEND-class National Security Cutter (NSC) programs conducted no trials this year pending completion of ships under construction.

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 to more consistently score MIs and Trials, and the Navy's renewed focus on lethality and survivability drove INSURV to review its material condition metrics. Starting in FY 2022, INSURV officially adjusted IFOM calculations to match the

Equipment Operational Capability (EOC) definitions found in the JFMM, Volume VI, Chapter 5, Appendix A. FY 2021 MIs were dual scored to capture both methodologies. Previous year's IFOM scores were mathematically adjusted to match the current scoring schema by INSURV and NSWCCG 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 on 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 compiled into system scores and system EOC scores are further compiled 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 used to compute 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 and 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. Per CNO direction INSURV, established inspection periodicity at three years for all vessels on 1 October 2019,

In July 2019, Fleet Commanders removed options for waivers and codified requirements for schedule changes. Ships will either be within 3-year inspection 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 2024, there were 94 of 305 (31%) ships subject to inspection that exceeded a 3-year inspection periodicity.

4.0 Fiscal Year 2024 Inspections

INSURV conducted 46 Material Inspections (MI), 25 Ship's Material Readiness Tests (SMART), ten Acceptance Trials (AT), two Combined Trials (CT), two Integrated Trials (IT), five Final Contract Trials (FCT), nine Re-Trials (RT), one survey, and 164 boat and craft inspections in fiscal year 2024. The breakdown is as follows:

(1) Material Inspections (46):

- 3 NIMITZ-class Multipurpose Aircraft Carriers (CVN)
- 1 TICONDEROGA-class Guided Missile Cruisers (CG)
- 22 ARLEIGH BURKE-class Guided Missile Destroyers (DDG)
- 2 AVENGER-class Mine Countermeasures Ships (MCM)
- 3 INDEPENDENCE-variant Littoral Combat Ship (LCS)
- 1 WASP-class Amphibious Assault Ship (LHD)
- 1 WHIDBEY ISLAND-class Dock Landing Ship (LSD)
- 3 OHIO-class Ballistic Missile Submarines (SSBN)
- 2 LOS ANGELES-class Submarines (SSN 688)
- 5 VIRGINIA-class Submarines (SSN 774)
- 1 BLUE RIDGE-class Command Ship (LCC)
- 2 THOMAS G. THOMPSON-class Oceanographic Research Ships (AGOR)

(2) Ship's Material Assessment and Readiness Test (SMART) (25):

- 2 Offshore Petroleum Distribution System Ships (T-AG)
- 2 VICTORIOUS-class Surveillance Ships (T-AGOS)
- 1 PATHFINDER-class Surveying Ship (T-AGS)
- 4 BLACK POWDER-class Submarine Escort Ships (T-AGSE)
- 1 2ND LT JOHN P. BOBO-class Cargo Ships (T-AK)
- 4 LEWIS AND CLARK-class cargo ships (T-AKE)
- 3 WATSON-class Vehicle Cargo Ships (T-AKR)
- 4 HENRY J. KAISER-class Fleet Replenishment Oilers (T-AO)
- 1 SUPPLY-class Fast Combat Support Ship (T-AOE)
- 1 SAFEGUARD-class Salvage Ship (T-ARS)
- 2 SPEARHEAD-class Expeditionary Fast Transports (T-EPF)

(3) Trials (28):

Acceptance Trials (10):

- 1 ARLEIGH BURKE-class Guided Missile Destroyer (DDG)
- 2 FREEDOM-variant Littoral Combat Ships (LCS)
- 1 INDEPENDENCE-variant Littoral Combat Ship (LCS)
- 1 SAN ANTONIO-class Amphibious Transport Dock (LPD)
- 1 SPEARHEAD-class Expeditionary Fast Transport (T-EPF)
- 2 Ship to Shore Connectors (LCAC)
- 1 Barracks Craft (APL)
- 1 Repair, Berthing, and Messing Barge (YRBM)

Combined Trials (2):

- 2 VIRGINIA-class Submarines (SSN 774)

Integrated Trials (2):

- 1 LEWIS B PULLER-class Expeditionary Sea Base (ESB)
- 1 JOHN LEWIS-class Fleet Replenishment Oiler (T-AO)

Final Contract Trials (5):

- 2 ARLEIGH BURKE-class Guided Missile Destroyers (DDG)
- 1 FREEDOM-variant Littoral Combat Ship (LCS)
- 1 INDEPENDENCE-variant Littoral Combat Ship (LCS)
- 1 SAN ANTONIO-class Amphibious Transport Dock (LPD)

Re-Trials (9):

- 1 ZUMWALT -class Guided Missile Destroyer (DDG)
- 1 ARLEIGH BURKE-class Guided Missile Destroyer (DDG)
- 1 FREEDOM-variant Littoral Combat Ship (LCS)
- 1 INDEPENDENCE-variant Littoral Combat Ship (LCS)
- 1 SAN ANTONIO-class Amphibious Transport Dock (LPD)
- 1 LEWIS B PULLER-class Expeditionary Sea Base (ESB)
- 1 JOHN LEWIS-class Fleet Replenishment Oiler (T-AO)
- 2 Ship to Shore Connectors (LCAC)

(4) Surveys (1):

- 1 FREEDOM-variant Littoral Combat Ship (LCS).

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. While a SMART inspection is very similar to an INSURV MI, inspection standards may be different due to different maintenance processes between US Navy ships and US Naval Service ships. 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 Acceptance Trials (AT), Combined Trials (CT) and Integrated Trials (IT) in accordance with 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. Upon completion of AT, IT or CT of a new construction ship, PRESINSURV submits a report to the CNO which includes a recommendation on whether to accept the ship and a description of any starred deficiencies. Starred deficiencies significantly degrade a ship's ability to perform an assigned primary or secondary required operational capability or represent general safety, navigational safety, security, firefighting, habitability, or maintainability deficiencies. Starred deficiencies must be corrected or waived by the CNO prior to delivery.

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 starred deficiencies, and to provide an assessment of readiness for fleet introduction.

Finally, when directed by the CNO, INSURV conducts Special Trials (ST) when significant ship systems or capabilities remain incomplete until after Post-Shakedown Availability or RTs to address specific deficiencies for unsuccessful trial events.

4.4 Surveys

INSURV conducts surveys in accordance with OPNAVINST 4770.5J. This instruction requires surveys on vessels that are scheduled to inactivate and be kept in an Out of Commission; In Reserve (OCIR) or Out of Service; In Reserve (OSIR) status. Surveys may also be conducted on vessels scheduled for transfer based on coordination with OPNAV N9I, COMNAVSEASYS COM, and applicable TYCOMs. Finally, surveys may be required in advance of Foreign Military Sales.

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 2024 average IFOM was below the 5-year average.

Figure 5.1 shows the 5-year trend for surface functional area scores and the total number of ships inspected each year. Overall, for surface ships, one functional area was evaluated as UNSATISFACTORY: Aviation. Additionally, 14 functional areas were evaluated as DEGRADED: Main Propulsion, Communications, Information Systems, Aegis Weapon Systems, Mine Warfare, Operations, Weapons Systems, Auxiliaries, Damage Control, Deck, Preservation, Ventilation, Environmental Protection, and Supply.

2 of 21 FY 2024 functional area averages were > 0.03 above the 5-year average and 11 of 21 functional area averages were within +/- 0.03 of the 5-year average. 8 of 21 functional area averages were more than 0.03 below the 5-year average, indicating possible material condition challenges.

SURFACE							
Functional Areas (Ships Inspected)	2020 (25)	2021 (17)	2022 (33)	2023 (18)	2024 (31)	5-Year Average	2024 Comparison to 5-Year Avg
Main Propulsion	0.73	0.78	0.76	0.74	0.61	0.72	BELOW
Anti-Sub Warfare	0.81	0.87	0.86	0.80	0.83	0.83	NEUTRAL
Communications	0.77	0.75	0.74	0.68	0.63	0.71	BELOW
Information Systems	0.56	0.56	0.59	0.58	0.52	0.56	BELOW
Aegis Weapon Systems	0.62	0.69	0.69	0.68	0.70	0.68	NEUTRAL
Mine Warfare	0.73	NA	0.78	NA	0.77	0.77	NEUTRAL
Operations	0.77	0.71	0.74	0.71	0.66	0.72	BELOW
Weapons Systems	0.67	0.71	0.63	0.64	0.68	0.66	NEUTRAL
Auxiliaries	0.83	0.80	0.78	0.76	0.74	0.78	BELOW
Electrical	0.76	0.74	0.80	0.81	0.83	0.79	ABOVE
Damage Control	0.77	0.77	0.79	0.75	0.75	0.77	NEUTRAL
Deck	0.69	0.75	0.78	0.75	0.76	0.75	NEUTRAL
Navigation	0.85	0.82	0.84	0.83	0.85	0.84	NEUTRAL
Aviation	0.48	0.61	0.45	0.50	0.38	0.47	BELOW
Preservation	0.84	0.81	0.78	0.72	0.76	0.78	NEUTRAL
Ventilation	0.78	0.61	0.69	0.61	0.58	0.66	BELOW
Environmental Protection	0.76	0.73	0.65	0.58	0.61	0.66	BELOW
Medical	0.92	0.93	0.95	0.93	0.91	0.93	NEUTRAL
Supply	0.80	0.83	0.80	0.77	0.79	0.80	NEUTRAL
Habitability	0.78	0.74	0.80	0.83	0.81	0.80	NEUTRAL
NAVOSH	0.72	0.75	0.72	0.76	0.83	0.76	ABOVE

0.00 – 0.49 ■ UNSAT 0.50 – 0.79 ■ DEGRADED 0.80 – 1.00 ■ SAT

Figure 5.1 Surface Ship Functional Area Trends

5.2 Submarines

Submarine average IFOM declined slightly compared to FY 2024 and was just below the 5-year average. Figure 5.2 shows the 5-year trend for submarine functional area scores and the total number of ships inspected each year. Two functional areas were evaluated as DEGRADED: Auxiliaries and Navy Occupational Safety and Health. 2 of 16 FY 2024 functional area averages were > 0.03 above the 5-year average and 9 of 16 functional area averages were within +/- 0.03 of the 5-year average. 5 of 16 functional area averages were more than 0.03 below the 5-year average, indicating possible material condition challenges.

SUBMARINE							
Functional Areas (Boats Inspected)	2020 (10)	2021 (11)	2022 (15)	2023 (10)	2024 (10)	5-Year Average	2024 Comparison to 5-Year Avg
Combat Systems	0.76	0.86	0.81	0.84	0.83	0.82	NEUTRAL
Main Propulsion	0.83	0.86	0.86	0.85	0.80	0.84	BELOW
Damage Control	0.88	0.85	0.86	0.86	0.82	0.86	BELOW
Auxiliaries	0.70	0.81	0.80	0.76	0.76	0.77	NEUTRAL
Electrical	0.86	0.86	0.81	0.82	0.80	0.83	BELOW
Operations	0.84	0.89	0.89	0.89	0.88	0.89	NEUTRAL
Navigation	0.90	0.89	0.89	0.90	0.89	0.89	NEUTRAL
Supply	0.86	0.92	0.86	0.83	0.88	0.87	NEUTRAL
Deck	0.83	0.81	0.73	0.75	0.80	0.78	NEUTRAL
Information Systems	0.86	0.81	0.87	0.92	0.92	0.88	ABOVE
Preservation	0.92	0.86	0.88	0.89	0.80	0.87	BELOW
Habitability	0.88	0.90	0.91	0.94	0.95	0.91	ABOVE
Survivability/Escape	0.89	0.82	0.82	0.84	0.85	0.84	NEUTRAL
NAVOSH	0.81	0.80	0.78	0.74	0.66	0.76	BELOW
Medical	0.92	0.90	0.85	0.89	0.89	0.89	NEUTRAL
Strategic Systems	0.96	0.96	0.94	0.95	0.94	0.95	NEUTRAL

0.00 – 0.49 ■ UNSAT 0.50 – 0.79 ■ DEGRADED 0.80 – 1.00 ■ SAT

Figure 5.2 Submarine Functional Area Trends

5.3 CVNs

INSURV groups aircraft carrier data to achieve a sufficient sample size for analysis compared to the small population of CVNs. CVN IFOM from FYs 2024 (3 ships) was 0.76, an increase of 0.05 from FY 2022 (2 ships), and the results and were 0.01 above the 5-year average.

Figure 5.3 shows the 5-year trend for aircraft carrier functional area scores and the total number of ships inspected each year. Results of three CVN inspections in 2024 showed 9 functional areas evaluated as DEGRADED: Damage Control, Communications, Information Systems, Operations, Weapons Systems, Ventilation, Environmental Protection, Supply, and Preservation.

9 of 18 FY 2024 functional area averages were > 0.03 above the 5-year average and 6 of 18 functional area averages were within +/- 0.03 of the 5-year average. 3 of 18 functional area averages were more than 0.03 below the 5-year average, indicating possible material condition challenges.

CVN					
Functional Area (Ships Inspected)	2020-2021 (4)	2022-2023 (3)	2024 (3)	5-Year Average	2024 Comparison to 5-Year Average
Aviation	0.70	0.67	0.82	0.72	ABOVE
Communications	0.80	0.63	0.68	0.71	NEUTRAL
Propulsion	0.88	0.87	0.82	0.86	BELOW
Deck	0.70	0.82	0.81	0.77	ABOVE
Information Systems	0.61	0.60	0.55	0.59	BELOW
Auxiliaries	0.82	0.70	0.82	0.78	ABOVE
Damage Control	0.72	0.69	0.79	0.73	ABOVE
Electrical	0.76	0.82	0.89	0.82	ABOVE
Navigation	0.78	0.80	0.85	0.81	ABOVE
Operations	0.70	0.66	0.63	0.67	NEUTRAL
Weapons	0.68	0.71	0.65	0.68	NEUTRAL
Medical	0.96	0.91	0.93	0.94	NEUTRAL
Preservation	0.80	0.76	0.77	0.78	NEUTRAL
Environmental Protection	0.77	0.63	0.71	0.71	NEUTRAL
Ventilation	0.79	0.70	0.59	0.70	BELOW
Habitability	0.70	0.75	0.81	0.75	ABOVE
NAVOSH	0.73	0.50	0.83	0.69	ABOVE
Supply	0.73	0.56	0.72	0.68	ABOVE

0.00 – 0.49 UNSAT 0.50 – 0.79 DEGRADED 0.80 – 1.00 SAT

Figure 5.3 Aircraft Carrier Functional Area Trends

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 2024 MSC IFOM average was slightly higher than the 5-year average as noted in Figure 2.1. MSC began using JFMM scoring for all inspections in FY 2024. INSURV and MSC mathematically adjusted scores for FY 2023 and prior to calculate the averages presented below.

Figure 5.4 shows MSC’s Functional Area scores for the past five fiscal years. Two functional areas were DEGRADED in FY 2024 under JFMM scoring: Main Propulsion and Aviation.

MSC (All Classes)							
Functional Areas (Ships inspected)	2020 (4)	2021 (21)	2022 (30)	2023 (19)	2024 (25)	5-Year Average	2024 Comparison to 5-Year Avg
Main Propulsion	0.83	0.82	0.76	0.82	0.75	0.78	BELOW
Auxiliaries	0.85	0.80	0.76	0.80	0.80	0.79	ABOVE
Electrical	0.80	0.87	0.77	0.87	0.84	0.83	ABOVE
Damage Control	0.74	0.73	0.65	0.65	0.82	0.71	ABOVE
Deck	0.76	0.84	0.77	0.79	0.88	0.82	ABOVE
Communications	0.86	0.95	0.96	0.97	0.93	0.95	BELOW
Aviation	0.89	0.84	0.74	0.85	0.58	0.76	BELOW
Supply/Habitability	0.86	0.95	0.88	0.91	0.90	0.90	NEUTRAL
Environmental Protection	0.94	0.92	0.86	0.87	0.90	0.89	ABOVE
Medical	0.93	0.95	0.92	0.95	0.95	0.94	NEUTRAL
Safety/NAVOSH	0.85	0.89	0.89	0.88	0.91	0.89	ABOVE

0.00 – 0.49 ■ UNSAT 0.50 – 0.79 ■ DEGRADED 0.80 – 1.00 ■ SAT

Figure 5.4 MSC Ship Functional Area Trends

5.5 Trials

INSURV conducted 28 trials in FY 2024: 10 ATs, 2 CTs, 2 ITs, 5 FCTs, and 9 RTs on 19 surface ships, 2 submarines, 2 combatant craft, and 2 service craft.

10 of 14 ships/craft presented for AT/IT/CT had significant construction deficiencies that precluded an acceptance recommendation.

5.5.1 ARLEIGH BURKE Guided Missile Destroyer (DDG) Program

ARLEIGH BURKE class ships are built by Huntington Ingalls Industries (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 four trials in FY 2024: one AT, two FCTs, and one RT.

The program produced generally good results this year. GD/BIW delivered DDG 122 in good material condition notwithstanding one starred deficiency. DDG 125 completed FCT with a considerably improved performance over AT, completing all air and missile defense demonstrations. DDG 120 completed FCT ready for Fleet Introduction. DDG 123 completed a RT with mixed results; her Mk 45 Light Weight Gun did not pass testing or live fire events during all three of her trials and her underwater fire control system could not initiate torpedo firings.

5.5.2 ZUMWALT Guided Missile Destroyer (DDG) Program

ZUMWALT-class ships are built by GD/BIW in Bath, Maine. The program office is PEO Ships/PMS 500. The program conducted one trial in FY 2024: a RT on DDG 1001.

Overall, the program has struggled to meet trial milestones. DDG 1001 completed an unsuccessful FCT and required a RT to permit assessment of its underway operational capabilities. DDG 1001 completed a partial RT with one uncorrected mission-degrading deficiency; INSURV referred this issue to the program office and Type Commander for resolution.

The program's final ship, the future USS LYNDON B JOHNSON (DDG 1002), is undergoing mission systems installation, including Conventional Prompt Strike (CPS) weapon system integration, at HII/Ingalls Shipbuilding.

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

FREEDOM-variant littoral combat ships are built by Lockheed Martine/Fincantieri Marinette Marine (FMM) in Marinette, Wisconsin. The program office is PEO Unmanned and Small Combatants (USC)/PMS 501. The program conducted four trials: two ATs, one FCT, and one RT.

The program office purchased the final three ships (LCS 27–31) under a new production contract that included significant changes to replace obsolescent systems and introduce technical updates. The ships' full navigation suite was replaced, as was the gas turbine starting system. Integration

of these new systems, combined with shipbuilder manning and performance challenges, resulted in LCS 27 and 29 earning low AT IFOM scores compared to class average.

LCS 25 completed an FCT but was not recommended for Fleet Introduction because of mission-degrading deficiencies and incomplete trial events as described below. LCS 23 and 25 have outstanding RTs scheduled in FY 2025. LCS 21 completed a partial RT with one uncorrected mission-degrading deficiency; INSURV referred this issue to the program office and Type Commander for resolution.

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

INDEPENDENCE variant littoral combat ships are built by Austal USA in Mobile, Alabama. The program office is PEO USC/PMS 501. The program completed three trials: one AT, one FCT, and one RT. While the newest ship had a successful AT, both in-service ships had multiple significant deficiencies during their respective trials that severely impacted their mission capability. LCS 34 completed FCT in July 2024; her RT is scheduled for FY 2025. LCS 32 completed all trials but developed structural cracking that restricted her operations.

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

SAN ANTONIO-class ships are built by HII/Ingalls Shipbuilding in Pascagoula, Mississippi. The program office is PEO Ships/PMS 377. The program conducted three trials in FY 2024: one AT, one FCT, and one RT. LPD 28 and LPD 29 are designated “transition” ships to the first LPD Flight II ship (LPD 30). Both ships finished their trials with several mission-degrading deficiencies.

LPD 28 completed FCT in December 2023. PRESINSURV did not recommend the ship for Fleet Introduction because of nine significant deficiencies in various areas, five uncompleted trial events, and four pending new system installations. The CNO directed a partial RT to assess these concerns.

LPD 28 completed RT in August 2024. All trial events were completed, but three significant deficiencies were not corrected and three of the new systems either failed or did not support testing. INSURV referred the uncorrected deficiencies and incomplete installations to the Type Commander and Program Executive Office for correction.

LPD 29 completed AT in March 2024 with 15 starred deficiencies in various functional areas. The ship’s performance declined relative to LPD 28 AT.

5.5.6 VIRGINIA Class SSN Program

VIRGINIA-class SSNs are built jointly by GD/Electric Boat and HII/Newport News Shipbuilding. The program completed two CTs in FY 2024.

The SSN program typically presents fully complete boats that perform well on CT. However, the program experienced difficulty maintaining its delivery schedule and is significantly behind the planned production rate.

SSN 795 completed a CT in October 2024. The ship performed well, earning an average AT IFOM, but had one starred deficiency. SSN 796 successfully completed CT April 2024 with no starred deficiencies.

5.5.7 LEWIS B PULLER Expeditionary Support Base (ESB) Program

LEWIS B PULLER class ships are built by GD/NASSCO in San Diego, California. The program office is PEO Ships/PMS 385. The program conducted two trials: one IT and one RT.

ESB 7 successfully completed IT with no starred deficiencies. ESB 6 completed a partial RT but had one remaining incomplete system installation. INSURV referred the incomplete installation to the Type Commander and program office for correction.

5.5.8 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 IT and one RT.

T-AO 207 completed an IT in March 2024. The ship earned an above average AT IFOM score, but PRESINSURV did not recommend the CNO accept the ship because it had two starred deficiencies. T-AO 205 completed a RT in June 2024 to assess two uncorrected starred deficiencies, four significant FCT deficiencies, and five uncompleted FCT events. INSURV referred the uncorrected deficiency to the Type Commander and program office for resolution.

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

EPF class ships are built by Austal USA in Mobile, Alabama. The program office is PEO Ships/PMS 385. The program completed one AT in FY 2024.

EPF 14 was the first EPF Flight II ship configured to provide Role 2 Enhanced medical facility capabilities. The trials for EPF 13 and 14 FCT were delayed by repair efforts to address main reduction gear damage, structural hull cracking, and Military Sealift Command's crew manpower shortages.

EPF 14 successfully completed AT in November 2023 with no starred deficiencies.

5.5.10 Ship to Shore CONNECTOR (LCAC 100) Program

The LCAC 100 craft are built by Textron Marine and Land Systems in New Orleans Louisiana. The program office is PEO USC/PMS 317. The program completed four trials in FY 2024: 2 ATs and 2 RTs.

LCAC 109 conducted an unsuccessful AT in February 2024. After two RTs in March and May 2024, the craft met material criteria for acceptance.

LCAC 110 successfully completed AT in June 2024 with no starred deficiencies.

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

APL craft are built at Bollinger Mississippi LLC in Pascagoula, Mississippi. The program office is PEO USC/PMS 300. This program completed one AT in FY 2024.

APL 71 successfully completed AT in November 2023 with no starred deficiencies.

5.5.12 Repair, Berthing, and Messing Barge (YRBM)

YRBM craft are built at Conrad Amelia Shipyard, in Morgan City, Mississippi. The program office is PEO USC/PMS 300. This program completed one AT in FY 2024. This was the program's first trial.

YRBM 57 successfully completed AT in September 2024 with three starred deficiencies.

5.6 Surveys

INSURV conducted one survey in FY 2024. USS ST LOUIS (LCS 19) completed a survey in January 2024 prior to a planned decommissioning and transfer to OCIR status. The ship was not decommissioned and remains active on the NVR.

6.0 INSURV Changes

6.1 Title 10 Implementation

As cited in Section 1, on 1 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 to prioritize scheduling of overdue vessels. Additionally, INSURV developed multi-ship simultaneous inspections in FY24 to temporarily increase inspection throughput; INSURV manning growth in FY25-26 will enable more inspections per year and greatly reduce the backlog of overdue vessels.

6.2 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 and in FY 2023 Trials began 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 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.

Another notable calculation change is the removal of Demonstrations from the overall IFOM score. This resulted in lower averages for FY 2020 and prior following conversion for previous ships that received higher Demonstration scores.

MSC began JFMM scoring in FY 2024 and dual scored SMARTs in FY 2024 to provide a basis for comparison. The significant changes associated with the shift to JFMM scoring included removing demonstrations from the IFOM calculation and determining mission-related functional area weights to calculate IFOM as a weighted average. MSC uses a similar, hierarchical construct to determine functional area scores.