

INSURV ANNUAL REPORT

1 March 2022



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Preface

The following is a report of INSURV's findings from fiscal year 2021, as well as comparisons to previous years and is provided in accordance with U.S. Code Title 10 Section 8674.

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The estimated cost of this report for the Department of Defense (DoD) is approximately \$3,200 for the Fiscal Year (FY) 2021. This includes \$0 in expenses, and \$3,200 in DoD labor.

Table of Contents

Preface.....	i
1.0 Requirements	1
2.0 Executive Summary	2
3.0 Responsibilities and Authorities	2
3.1 INSURV Process	3
3.2 Scoring	3
3.3 The Schedule Process	4
4.0 Fiscal Year 2021 Inspections	4
4.1 Material Inspections.....	5
4.2 Ships Material Assessment and Readiness Test (SMART).....	5
4.3 Trials	5
5.0 Material Readiness Trends.....	6
5.1 Surface Ships	6
5.2 Submarines.....	7
5.3 CVNs.....	8
5.4 Military Sealift Command (MSC) ships.....	9
5.5 Trials	9
5.5.1 ARLEIGH BURKE Guided Missile Destroyer (DDG) Program.....	10
5.5.2 Expeditionary Fast Transport (EPF) Program	10
5.5.3 Littoral Combat Ship (LCS) Program – FREEDOM (LCS 1) Variant.....	10
5.5.4 Littoral Combat Ship (LCS) Program – INDEPENDENCE (LCS 2) Variant	11
5.5.5 GERALD R. FORD Aircraft Carrier (CVN) Program	11
5.5.6 ZUMWALT Guided Missile Destroyer (DDG) Program.....	11
5.5.7 AMERICA Amphibious Assault Ship (LHA(R)) Program	11
5.5.8 LEWIS B PULLER Expeditionary Support Base (ESB) Program.....	12
5.5.9 SHIP TO SHORE CONNECTOR (SSC) Program	12
5.5.10 VIRGINIA Class SSN Program.....	12
5.5.11 LEGEND Class National Security Cutter (WMSL) Program	12
5.5.12 VALIANT Class Yard Tug (YT) Program.....	12
5.5.13 Barracks Craft (APL) (Non-Self Propelled)	12

6.0 INSURV Changes 13
6.1 Title 10 Implementation..... 13
6.2 INSURV Manning 13
6.3 INSURV Scoring Changes 14

1.0 Requirements

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

SEC. 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 submit to the congressional defense committees a report setting forth 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 an unclassified form that is releasable to the public without further redaction.

2.0 Executive Summary

Overall Fleet material condition showed a positive trend for FY 2021, matching the 6-year average that reversed a steady negative trend seen over the previous three years (see Figure 2.1). Surface ship and submarine inspections drove this trend. FY 2021 CVN inspections slightly exceeded the 6-year CVN average. MSC inspections continued on a positive trend, with a significant increase in the number of inspections. Overall, some functional areas and subsystems remain degraded or show declining trends, indicative of areas where material readiness is stressed. All FY 2021 Material Inspections were conducted with minimal notice (30 days) given to the crews of the vessels. This is a substantive change from previous years. See section 6 for details.

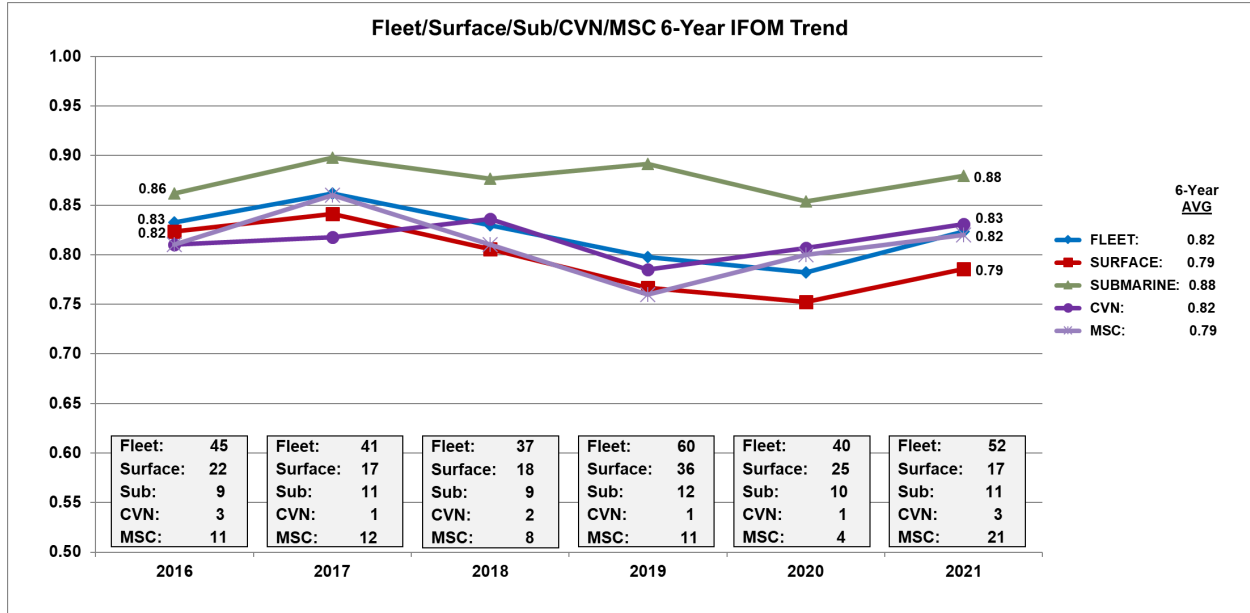


Figure 2.1 Fleet 6-Year IFOM Trends

New construction INDEPENDENCE-class LCS, SPEARHEAD-class EPF, and LEWIS B PULLER-class ESB programs performed well on trials. The remaining programs experienced significant deviations from OPNAV trials requirements, missed key program milestones, or had declining trial performance during this fiscal year.

3.0 Responsibilities and Authorities

The Board of Inspection and Survey (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), and Commanding Officers 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, 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 uses only technically approved procedures to conduct these inspections. Currently, Planned Maintenance System (PMS) cards are the principal documentation used to conduct inspections.

3.2 Scoring

Prior to 2000, INSURV employed a color-based scoring system for Functional Areas (FA) and Demonstrations. FAs include such areas as Main Propulsion, Weapons, Damage Control, etc., while demonstrations include events such as Full Power, Self-Defense Detect-to-Engage, Anchoring, etc. INSURV graded each element as Green (SAT), Yellow (DEGRADED), or Red (UNSAT) with no overall ship characterization other than Fit or Not Fit for further Naval service.

In 2000, INSURV adopted a scoring schema based on 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). Scoring remained at FA and Demonstration levels. In 2003, INSURV added scores at the sub-system level which included elements such as Main Engines, Main Battery Guns, SPY radar, etc.

In 2007, INSURV began characterizing whole ship Material Inspection results as Fit for Sustained Combat Operations at Sea, Degraded for Sustained Combat Operations at Sea, or Unfit for Sustained Combat Operations at Sea. These were later adjusted to SAT, DEGRADED, or UNSAT Material Condition. Overall characterizations did not result from scoring, but from assessed ability to adequately and safely conduct primary Required Operational Capabilities (ROC) from a material condition aspect.

In 2013, INSURV sunset the SAT/DEGRADED/UNSAT overall characterization in favor of an INSURV Figure of Merit (IFOM). IFOM was derived from a weighted average of all FAs and demonstrations. Weights were based on contributions to lethality or survivability. Over time, FA scoring evolved, was automated, and, in many cases, no longer matched JFMM-based EOC scoring definitions. Data was retrofitted back to 2007 for trending purposes.

In FY 2018, CNO Richardson requested INSURV base scoring on ships' lethality and survivability. From 2019-2020 INSURV researched ways to best accomplish this objective and collaborated heavily with the Center for Naval Analysis (CNA) and the Naval Surface Warfare Center, Corona (NSWC Corona). In 2021, INSURV determined that returning to a strict adherence to JFMM-based scoring, in conjunction with lessons-learned and principles derived from CNA and NSWC Corona, would be the best approach to identify ships' degradations to lethality and survivability. FY 2021 inspections were scored using both JFMM-based and historic scoring to determine potential impacts and provide a basis for comparison. Results presented in this report reflect the historic basis for measurement. Section 6.3 provides greater detail.

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 either will be within 3-year periodicity or considered overdue. As of 30 September 2021, there were 185 of 362 (51.1%) vessels, subject to inspection, that exceeded a 3-year inspection periodicity. 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.

4.0 Fiscal Year 2021 Inspections

INSURV conducted 79 inspections in fiscal year 2021. This is a 19% increase in total inspections compared to the six-year average and is broken down as follows:

- (1) Material Inspections (32): Three NIMITZ-class multipurpose aircraft carriers (CVN), 11 ARLEIGH BURKE-class guided missile destroyers (DDG), one WASP-class amphibious assault ship (LHD), three SAN ANTONIO-class amphibious transport dock ships, two HARPERS FERRY-class dock landing ships (LSD 49), two OHIO-class ballistic missile submarines (SSBN), five LOS ANGELES-class submarines (SSN 688), and four VIRGINIA-class submarines (SSN 774). The AEGIS Ashore Romania site was also inspected using the MI process.
- (2) Ship's Material Assessment and Readiness Test (SMART) (21): Two offshore petroleum distribution ships (AG), four BLACK POWDER-class submarine escort ships (AGSE), seven LEWIS AND CLARK-class cargo ships (T-AKE), two WATSON-class vehicle cargo ships (T-AKR), four HENRY J. KAISER-class fleet replenishment oilers (T-AO), one NAVAJO-class fleet ocean tug (ATF), and one MONTFORD POINT-class expeditionary transport dock (T-ESD).
- (3) Trials (23): Three ARLEIGH BURKE-class guided missile destroyers (DDG 51), two SPEARHEAD-class expeditionary fast transports (EPF), one LEWIS B. PULLER-class expeditionary sea base (ESB), one landing craft, air cushioned (LCAC) combatant craft, four FREEDOM-class littoral combat ships (LCS 1), three INDEPENDENCE-class littoral combat ships (LCS 2), one AMERICA-class amphibious assault ship (LHA 6), one VIRGINIA-class submarines (SSN 774), two VALIANT-class yard tugs (YT), one barracks craft, and one LEGEND-class national security cutter (WMSL). Total includes three re-trial events; details in section 5.5.
- (4) Surveys (2): One WHIDBEY ISLAND-class dock landing ship (LSD), one FREEDOM-class littoral combat ship (LCS), and one INDEPENDENCE-class littoral combat ship (LCS).

Additionally, inspections occurred on 123 service craft, 99 combatant craft, and 4 boats (> 85').

4.1 Material Inspections

To ensure that Fleet material readiness issues are being identified and addressed, INSURV assesses the end-to-end 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, as well as a six-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 the Military Sealift Command (MSC), MSC conducts Material Inspections, called SMARTs, of ships under their purview. 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) per OPNAVINST 4730.5R to independently verify the readiness of ships, craft, and submarines for preliminary acceptance by the Navy. INSURV recommends to the Chief of Naval Operations (CNO) whether the Navy should accept a ship or if significant construction deficiencies exist which must be corrected or waived prior to acceptance ("starred deficiencies").

INSURV also conducts Final Contract Trials (FCT) on surface ships and Guarantee Material Inspections (GMI) on submarines during the post-delivery period to determine if additional deficiencies have developed since AT and/or to validate correction of significant AT deficiencies.

Finally, at the request of the CNO, INSURV may conduct Special Trials (ST) when significant ship systems or capabilities remain incomplete until after Post-Shakedown Availability (PSA), or Retrials (RT) 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 an improving trend in average IFOM, meeting the 6-year average. Significant improvements in demonstration scores drove this trend.

Overall, for surface ships, twelve functional areas were evaluated as DEGRADED (one more than 2020 and 3 more than the 6-year average): Main Propulsion (MP), Auxiliaries (AX), Electrical (EL), Damage Control (DC), Deck (DK), Operations (OP), Weapons Systems (WP), Aviation (AV), Navy Occupational Safety and Health (OH), Ventilation (VT), Environmental Protection (EP) and Preservation (PR).

SURFACE							
Functional Areas (Ships Inspected)	2016 (22)	2017 (17)	2018 (18)	2019 (36)	2020 (25)	2021 (17)	2021 Comparison to 6-Year Avg
Main Propulsion	0.76	0.78	0.76	0.64	0.70	0.73	ABOVE
Auxiliaries	0.82	0.83	0.83	0.81	0.82	0.79	BELOW
Electrical	0.79	0.73	0.69	0.70	0.75	0.73	NEUTRAL
Damage Control	0.78	0.80	0.79	0.78	0.76	0.76	BELOW
Deck	0.80	0.83	0.78	0.76	0.69	0.74	BELOW
Mine Warfare	NA	0.98	0.85	0.83	0.80	NA	NA
Anti-Sub Warfare	0.88	0.92	0.81	0.84	0.77	0.85	NEUTRAL
Operations	0.86	0.88	0.83	0.80	0.79	0.73	BELOW
Navigation	0.92	0.92	0.92	0.92	0.90	0.86	BELOW
Weapons Systems	0.85	0.85	0.78	0.74	0.72	0.77	BELOW
Aegis Weapon Systems	0.86	0.88	0.81	0.77	0.73	0.80	NEUTRAL
Communications	0.85	0.87	0.84	0.80	0.83	0.81	BELOW
Information Systems	0.90	0.89	0.91	0.83	0.85	0.85	BELOW
Aviation	0.72	0.75	0.78	0.68	0.70	0.69	BELOW
Supply	0.78	0.77	0.78	0.80	0.81	0.81	ABOVE
Habitability	0.81	0.80	0.80	0.80	0.81	0.80	NEUTRAL
NAVOSH	0.88	0.88	0.81	0.81	0.82	0.79	BELOW
Ventilation	0.79	0.78	0.78	0.78	0.79	0.63	BELOW
Environmental Protection	0.84	0.84	0.81	0.76	0.76	0.71	BELOW
Medical	0.97	0.97	0.96	0.95	0.95	0.94	BELOW
Preservation	0.83	0.82	0.80	0.83	0.82	0.78	BELOW

Figure 5.1 6-Year Surface Ship Functional Area Scores

Figure 5.1 shows the six-year trend for surface functional area scores and the total number of ships inspected each year. Statistically, scores did not deviate significantly this past fiscal year.

5.2 Submarines

Submarine average IFOM showed an improvement from FY 2020, meeting the 6-year average. Overall one functional area was evaluated as DEGRADED (a decrease of one from 2020 and one more than the six year average): Navy Occupational Safety and Health (OH).

SUBMARINE							
Functional Areas (Boats Inspected)	2016 (9)	2017 (11)	2018 (9)	2019 (12)	2020 (10)	2021 (11)	2021 Comparison to 6-Year Avg
Main Propulsion	0.90	0.94	0.90	0.94	0.92	0.91	BELOW
Auxiliaries	0.84	0.88	0.82	0.85	0.79	0.89	ABOVE
Electrical	0.83	0.88	0.87	0.90	0.88	0.86	BELOW
Damage Control	0.87	0.88	0.89	0.89	0.91	0.88	NEUTRAL
Combat Systems	0.80	0.88	0.85	0.84	0.78	0.88	ABOVE
Navigation	0.90	0.90	0.89	0.89	0.90	0.90	NEUTRAL
Operations	0.84	0.89	0.92	0.91	0.83	0.87	NEUTRAL
Information Systems	0.89	0.92	0.95	0.92	0.88	0.85	BELOW
Deck	0.88	0.90	0.87	0.90	0.85	0.83	BELOW
Supply	0.92	0.91	0.87	0.89	0.87	0.90	NEUTRAL
Habitability	0.93	0.93	0.89	0.89	0.88	0.88	BELOW
NAVOSH	0.91	0.88	0.88	0.80	0.81	0.79	BELOW
Environmental Protection	0.94	0.91	0.91	0.85	0.87	0.88	NEUTRAL
Survivability/Escape	0.85	0.85	0.84	0.90	0.88	0.81	BELOW
Medical	0.94	0.95	0.94	0.92	0.92	0.90	BELOW
Preservation	0.87	0.91	0.88	0.92	0.93	0.87	BELOW
Strategic Systems	0.97	0.96	0.96	0.97	0.98	0.96	NEUTRAL

Figure 5.2 6-Year Submarine Functional Area Scores

5.3 CVNs

Aircraft carrier data has been historically difficult to trend due the small sample sizes that result when a population of ten to eleven CVNs is inspected an average of once every five to six years. In order to expand that sample to make the trends more relevant, we have expanded the overall time period of the trend (12 years) and grouped the CVNs into multi-year periods. This data set expansion yields a sample of 40-60% of the total force in each period.

As Figure 5.3 illustrates, the number of CVN DEGRADED areas has been reduced since 2010 from eleven in 2010-2012, to the current nine in 2018-2021. The nine areas that scored as DEGRADED: Damage Control (DC), Deck (DK), Electrical (EL), Operations (OP), Weapons (WP), Navy Occupational Safety and Health (OH), Ventilation (VT), Environmental Protections (EP), and Supply (SP).

Functional Area (Ships Inspected)	CVN			2018 – 2021 Comparison to 12-Year Average
	2010-2012 (6)	2013-2017 (7)	2018-2021 (7)	
Damage Control	0.66	0.69	0.73	ABOVE
Deck	0.68	0.84	0.76	NEUTRAL
Auxiliaries	0.77	0.80	0.84	ABOVE
Electrical	0.79	0.73	0.72	BELOW
Propulsion	0.78	0.81	0.89	ABOVE
Communications	0.75	0.84	0.82	ABOVE
Information Systems	0.84	0.72	0.87	ABOVE
Navigation	0.82	0.90	0.87	NEUTRAL
Operations	0.82	0.81	0.78	BELOW
Weapons	0.79	0.85	0.79	BELOW
Aviation	0.87	0.82	0.85	NEUTRAL
NAVOSH	0.80	0.74	0.70	BELOW
Ventilation	0.69	0.83	0.75	BELOW
Environmental Protection	0.77	0.89	0.79	BELOW
Supply	0.78	0.71	0.71	BELOW
Habitability	0.83	0.80	0.80	BELOW
Medical	0.89	0.95	0.95	ABOVE
Preservation	0.75	0.81	0.81	ABOVE

Figure 5.3 12-Year CVN Functional Area Scores

5.4 Military Sealift Command (MSC) ships

A significant increase in the number of Ships Material Assessment Readiness Test (SMART) inspections on Military Sealift Command (MSC) ships provides insight into the material condition of the MSC fleet. The FY 2021 MSC IFOM average was higher than the 6-year average.

MSC (All Classes)					
Functional Areas (Ships inspected)	2017 (12)	2018 (8)	2019 (11)	2020 (4)	2021 (21)
Main Propulsion	0.89	0.81	0.72	0.83	0.82
Auxiliaries	0.88	0.80	0.81	0.85	0.80
Electrical	0.86	0.84	0.84	0.80	0.87
Damage Control	0.83	0.69	0.74	0.74	0.73
Deck	0.83	0.76	0.77	0.76	0.84
Communications	0.92	0.92	0.94	0.86	0.95
Aviation	0.80	0.69	0.84	0.89	0.84
Supply/Habitability	0.86	0.84	0.89	0.86	0.95
Environmental Protection	0.92	0.85	0.90	0.94	0.92
Medical	0.94	0.91	0.95	0.93	0.95
Safety/NAVOSH	0.87	0.80	0.80	0.85	0.89

Figure 5.4. 5-Year MSC Functional Area Scores

Figure 5.4 shows one MSC ship Functional Areas assessed as DEGRADED in FY2021: Damage Control. Damage Control was assessed as DEGRADED since FY 2018. Assessing trends between based on FY 2020 data should be avoided due to the small (four ship) sample size of inspections.

5.5 Trials

INSURV conducted 23 trials in FY 2021: 9 ATs, 1 GMI, 9 FCTs, and 1 Special Trial (ST) on 14 surface ships, 1 submarine, 1 combatant craft, one National Security Cutter, and 3 service craft. Additionally, five of these vessels required Retrials, but only three were conducted. Based on these trials results, INSURV assessed that the following programs performed well on trials:

- INDEPENDENCE Littoral Combat Ship (LCS 2)
- SPEARHEAD Expeditionary Fast Transport (EPF)
- LEWIS B PULLER Expeditionary Support Base (ESB)
- VALIANT Yard Tug (YT)

The remaining programs experienced significant deviations from OPNAV trials requirements or declining trial performance during this fiscal year. Three ships (CVN 78, DDG 1000, LCS 15)

were unable to complete FCT requirements prior to their obligation work limiting date (OWLD). The VIRGINIA submarine program did not present any boats for CT in FY21 even though five boats, scheduled for delivery since 2019, have yet to be delivered. One craft (APL 67) had an unsuccessful AT and required a Retrial prior to delivery. Four additional vessels (LCS 17, LCS 19, LCS 22, and DDG 119) required Retrials because they had significant incomplete capabilities, uncorrected deficiencies, or unperformed demonstrations during FCT; two of these trials (LCS 17, 19) were not conducted. The LCS 1 program ceased new ship deliveries after LCS 23 because of a combining gear design flaw. The Ship to Shore Connector craft had propeller and cushion vane design flaws that limit its amphibious warfare capability. The DDG 51 program had continuing design concerns with its anchor windlass. The National Security Cutter program delivered a ship without two warfighting systems because of procurement delays. Details are contained in the individual program sections below.

5.5.1 ARLEIGH BURKE Guided Missile Destroyer (DDG) Program

DDG 51 class ships are built by Ingalls Shipbuilding in Pascagoula, Mississippi and Bath Iron Works in Bath, Maine. The program completed four trials in FY 2020: ATs on USS DANIEL INOUE (DDG 118) and USS FRANK E. PETERSON JR (DDG 121), and a FCT and Retrial on USS DELBERT D BLACK (DDG 119).

The DDG 51 program's AT performance was consistent with recent DDG trials. Both ships completed AT with at least one starred deficiency and about average IFOM scores. FCT performance declined. DDG 119 had a relatively low IFOM score and several uncorrected mission-degrading deficiencies. Several of these were not corrected for the ship's RT.

The Anchor Windlass brake system remained a concern on DDG 51 trials. The approved brake band contact specification does not consistently permit the windlass to free-fall. The program office has frequently authorized modified specifications during a trial to achieve successful operation. On the DDG 121 AT, these modifications did not permit successful free-fall operation. Further troubleshooting is required to provide the Fleet a reliable anchor system.

5.5.2 Expeditionary Fast Transport (EPF) Program

EPF class ships are built by Austal USA in Mobile Alabama. The program completed two FCTs in FY2021 on USNS PUERTO RICO (T-EPF 11) and USNS NEWPORT (T-EPF 12). Both ships performed well on these trials.

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

FREEDOM variant ships are built by Fincantieri Marinette Marine in Marinette, Wisconsin. The program completed four trials in FY 2021: an AT on USS COOPERSTOWN (LCS 23), FCTs on USS INDIANAPOLIS (LCS 17) and USS ST LOUIS (LCS 19), and a Special Trial (ST) on USS BILLINGS (LCS 15). An additional trial to address outstanding deficiencies on USS INDIANAPOLIS (LCS 17) was not practicable because there was insufficient time for deficiency correction and trial prior to the ship's OWLD. An additional trial on USS ST LOUIS (LCS 19) was not conducted because the primary material deficiency was not corrected prior to OWLD.

The program's AT performance was consistent with recent FREEDOM ATs. LCS 23 completed AT with no starred deficiencies and the highest IFOM score in program history. However, the

program's FCT performance declined in FY 2021. The ships presented for FCT scored below the IFOM average with a number of mission degrading deficiencies.

Contributing to the program's declining FCT performance were two class-wide material deficiencies that significantly impacted ship mission capability. The Navy suspended acceptance of FREEDOM variant ships in January 2021 and has not presented a ship for AT since LCS 23 in December 2020; the next planned AT is scheduled for May 2022.

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

INDEPENDENCE variant ships are built by Austal USA in Mobile, Alabama. The program completed four trials in FY 2021: an AT of USS SAVANNAH (LCS 28), FCTs of USS KANSAS CITY (LCS 22) and USS OAKLAND (LCS 24), and a Retrial of USS KANSAS CITY (LCS 22).

The program's AT performance was generally strong. LCS 28 performed well with a high IFOM and no starred deficiencies. The program's FCT performance was also consistent with its past strong performance. LCS 22 was unable to perform two demonstrations because of operational factors during her FCT; however, the ship successfully performed both during a subsequent Retrial.

5.5.5 GERALD R. FORD Aircraft Carrier (CVN) Program

CVN 78 class ships are built by Newport News Shipbuilding in Newport News, Virginia. USS GERALD R FORD (CVN 78) completed AT in May 2017. The ship was unfinished and had significant deficiencies affecting many mission-critical systems. The program office planned to conduct a Special Trial in FY 2021. However, in August 2020, PEO Aircraft Carriers informed the OPNAV 09P the ship would be unable to complete this trial prior to the ship's OWLD. The PEO requested a waiver to have the Type Commander present the ship for ST after the ship's OWLD in CY 2022. A final decision is pending as of this writing.

5.5.6 ZUMWALT Guided Missile Destroyer (DDG) Program

DDG 1000 class ships are built by Bath Iron Works (BIW) in Bath, Maine. The program has delivered two ships since 2016, USS ZUMWALT and USS MICHAEL MONSOOR. These ships are undergoing mission systems installation and post-delivery testing. The program office planned to present DDG 1000 for a mission systems trial in FY 2021. However, in July 2021, PEO Ships requested a waiver to cancel this trial to permit the ship the opportunity to complete other requirements by the ship's OWLD of 31 December 2021. The CNO approved this waiver in October 2021. The waiver indicated the Type Commander will present the ship for a comprehensive INSURV Material Inspection in mid-CY 2022.

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

The LHA(R) program ships are built by Ingalls Shipbuilding in Pascagoula, Mississippi. The program completed one trial in FY 2021, an FCT on USS TRIPOLI (LHA 7). The ship earned a program high IFOM score, however INSURV identified three uncorrected starred deficiencies from AT, five additional uncorrected mission-degrading deficiencies, and a number of incomplete or uninstalled systems. The CNO authorized a Special Trial following post shakedown availability (PSA) to assess these items in early CY 2022.

5.5.8 LEWIS B PULLER Expeditionary Support Base (ESB) Program

ESB class ships are built by General Dynamics/NASSCO in San Diego, California. The program completed one trial in FY 2021: an FCT on USNS MIGUEL KEITH (T-ESB 5). Although the ship earned a program high IFOM score, INSURV identified several uncorrected mission-degrading deficiencies during the trial.

5.5.9 SHIP TO SHORE CONNECTOR (SSC) Program

The LCAC 100 program builds the LCAC Replacement craft at Textron Marine and Land Systems in New Orleans, Louisiana. The program completed one trial in FY 2021, an AT of LCAC 102. The craft performed better than the two preceding craft, but had starred deficiencies on its propeller blades and cushion vane actuators. The program office incorporated a revised propeller blade design that was somewhat less susceptible to damage during operation, obtained OPNAV approval to reduce the craft's payload requirement, and operated the craft using revised NAVSEA operating guidance to limit engine operation. However, blade erosion and cushion vane operation were still deficient. Additional design and component improvement are required before the craft can meet its Amphibious Warfare mission requirements.

5.5.10 VIRGINIA Class SSN Program

VIRGINIA class SSNs are built jointly by General Dynamics and Huntington Ingalls Industries. The program completed one trial in FY 2021: a GMI of USS VERMONT (SSN 792). Five boats were scheduled for delivery since 2019 but have not been presented for CT.

5.5.11 LEGEND Class National Security Cutter (WMSL) Program

The National Security Cutters (NSC), also known as the Maritime Security Cutter (Large) (WMSL), are built by Ingalls Shipbuilding in Pascagoula, Mississippi. The program completed one trial in FY 2021, an AT of USCGC STONE (WMSL 758). The ship had the lowest IFOM score among NSC trials conducted over the last five years and was presented without two mission critical systems because of procurement and funding shortfalls.

5.5.12 VALIANT Class Yard Tug (YT) Program

YT craft are built by Dakota Creek Industries in Anacortes, Washington. The program completed two trials in FY 2021: ATs on YT 809 and 811. Both craft were well-constructed and completed trial without starred deficiencies.

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

APL craft are built at VT Halter Marine in Pascagoula, Mississippi. This program plans to deliver six APLs. The first AT was unsuccessful because the construction and testing of the craft's ventilation system was not complete. The craft had three additional starred deficiencies. INSURV requested a partial Retrial to complete its assessment of the ventilation system once production work was complete. The program office presented the craft for Retrial in July 2021 and INSURV identified no additional significant deficiencies.

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 material inspections 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 combined with busy Fleet operational schedules. INSURV implemented scheduling procedures with Numbered Fleet and TYCOM schedulers that prioritize scheduling of vessels considered overdue per updated guidance.

6.2 INSURV Manning

INSURV manning derives from inspection periodicity requirements. Prior to FY 2019, inspection periodicity generated a requirement for approximately 60 inspection events (MIs/Trials/Surveys) per year. INSURV possessed insufficient funded billets to perform all inspection elements, especially the most specialized, specific technical requirements. This manning gap was 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 ship inspection events 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. INSURV is working with Navy resource sponsors and USFF to obtain funding and hiring authorities to achieve the validated billet numbers. This effort is expected to take several years. 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 4.5 years. This average is expected to remain steady until INSURV is fully manned.

6.3 INSURV Scoring Changes

As noted in paragraph 3.2, from 2007 to present INSURV scores are based on a scale from 0.00 to 1.00. Characterizations of Functional Area EOC and demonstration scores are broken down as UNSAT (0.00 – 0.59), DEGRADED (0.60 – 0.79), and SATISFACTORY (0.80 – 1.00). IFOM is not similarly characterized; it is used solely for comparison purposes across and between ship classes.

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. INSURV began using JFMM-based scoring at the component level in FY 2019, refined measures in FY 2020, and dual-scored FY 2021 inspections.

Using JFMM-based scoring required an update to IFOM. As noted in paragraph 3.2, historical IFOM is a weighted average of FAs and Demonstrations. Based on the operational impact definitions contained in the JFMM, demonstrations and some programmatic subsystems do not align very well to characterization using the JFMM-based model. INSURV updated the IFOM calculation to only include FAs, and adjusted weights for FAs with programmatic subsystems. Demonstrations are still conducted and programs are still evaluated; their scores are noted separately in the final MI report.

INSURV briefed these changes, along with comparisons to historic scoring, to Navy stakeholders. The recommended changes were favorably received and approved by Navy leadership. Moving forward, INSURV will score and report FY 2022 inspections using JFMM-based scoring. This change provides repeatable and more consistent results over time and between inspectors. It also provides more meaningful operational impact characterizations of material condition deficiencies and creates an easier path to discern material lethality and survivability challenges.

To support robust trend analysis, INSURV plans to continue scoring MI events using both JFMM-based and historical rubrics throughout FY 2022, and is working with NSWC Corona to retrofit old data into JFMM-based scoring metrics to re-establish relevant trends. Additionally, INSURV will score trials using legacy IFOM metrics, while also scoring events using the JFMM-based model to provide relevant comparative data to Program Executive Offices in support of a future transition.