



July 2020

COAST GUARD

Actions Needed to Ensure Investments in Key Data System Meet Mission and User Needs

GAO Highlights

Highlights of [GAO-20-562](#), a report to congressional requesters

Why GAO Did This Study

The Coast Guard, within the Department of Homeland Security (DHS), is the principal federal agency responsible for maritime safety and security. The Coast Guard maintains and uses MISLE—a data system that tracks and reports results data for nearly all Coast Guard missions.

GAO was asked to review the status of MISLE and efforts to update it. This report examines (1) the extent to which MISLE supports Coast Guard operations and decision-making; (2) the extent to which the Coast Guard has policies, procedures, and training to ensure reliable MISLE data; and (3) Coast Guard efforts to enhance, upgrade, or replace MISLE since 2008. GAO reviewed Coast Guard plans and performance documents, policies and procedures related to MISLE data entry; select performance data for four missions from fiscal years 2014 through 2018, the most recent data available; and Coast Guard and DHS systems engineering life cycle and acquisition frameworks. GAO also interviewed Coast Guard field and headquarters MISLE users.

What GAO Recommends

GAO is making four recommendations, including that the Coast Guard (1) assess and address the causes of data errors and inconsistent data entries, (2) develop a mission needs statement, and (3) identify and analyze alternatives to select solutions to meet mission needs. The Coast Guard concurred with all recommendations and said it plans to replace MISLE.

View [GAO-20-562](#). For more information, contact Nathan Anderson at (206) 287-4804 or andersonn@gao.gov.

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What GAO Found

The U.S. Coast Guard's (Coast Guard) Marine Information for Safety and Law Enforcement (MISLE) system is generally able to support agency operations by tracking and aggregating mission activity data, such as commercial vessel inspection results. But the system has some capability gaps, and MISLE users GAO spoke to described numerous challenges with the system. For example, they reported:

- challenges using MISLE due to duplicate or incomplete records in the system, which can affect the ability of personnel to conduct activities such as vessel inspections. Users told GAO that duplicate or incomplete records can create a risk that Coast Guard personnel may not have full vessel histories when inspecting vessels to resolve prior safety deficiencies; and
- being unable to complete work in MISLE while conducting operational activities, since users can only access the system from a workstation connected to the Coast Guard network. Field personnel told GAO it can require rework when they return to their workstations to enter information into MISLE from paper records.

MISLE system managers stated they are aware of these challenges, have begun to address some of them, and agree that MISLE requires further investments to meet user needs.

The Coast Guard has policies, procedures, and training mechanisms to help ensure reliable data; however, GAO's analysis identified multiple data issues, including data errors, incomplete or missing records, and inconsistent data entry. For example, about 20 percent of the fiscal year 2018 records of search and rescue operations showed a negative response time, which Coast Guard officials attributed to data entry errors. The Coast Guard has not assessed the causes of such data errors, and its recent efforts to address certain data issues do not include plans for such an assessment. Such an assessment could help the Coast Guard identify how to ensure more reliable MISLE data.

The Coast Guard has taken steps to update MISLE since its 2001 release; however, it has not followed its own processes to manage subsequent investments. In its most recent upgrade to MISLE, which began in 2008, the Coast Guard did not follow key systems development processes nor deliver some planned functionalities, such as the ability to remediate duplicate vessel records and input data in mobile capacities. The Coast Guard has initiated further efforts to obtain or develop undelivered functionality since the release of the upgraded system in 2015. However, in its fiscal year 2019 operational analysis of MISLE, the Coast Guard identified additional major system deficiencies and user dissatisfaction that it reported require consideration as it pursues system enhancements. Yet, the agency has not taken steps to assess mission needs across the system. By developing an updated mission needs statement for MISLE as a whole, and by identifying and analyzing alternatives to objectively select solutions in accordance with departmental systems engineering guidance, the Coast Guard would be better positioned to address user needs and to more efficiently manage its various investments to improve MISLE.

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Abbreviations

CGBI	Coast Guard Business Intelligence
Coast Guard	U.S. Coast Guard
DHS	Department of Homeland Security
FORCECOM	Force Readiness Command
IT	Information technology
MISLE	Marine Information for Safety and Law Enforcement
OSC	Operations Systems Center
SDLC	Systems Development Life Cycle
SELC	Systems Engineering Life Cycle

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July 16, 2020

The Honorable Sam Graves
Ranking Member
Committee on Transportation and Infrastructure
House of Representatives

The Honorable John Garamendi
House of Representatives

The U.S. Coast Guard (Coast Guard), a multimission, maritime military service within the Department of Homeland Security (DHS), is the principal federal agency responsible for maritime safety, security, and environmental stewardship in U.S. ports and waterways. In addition, the Coast Guard acts as a first responder and provides humanitarian services that aid individuals in distress or those impacted by natural and man-made disasters, whether at sea or ashore. The Coast Guard is also a law enforcement and regulatory agency with broad legal authorities associated with maritime transportation, hazardous materials shipping, bridge administration, oil spill response, marine pilotage, and vessel construction and operation.

To support its mission efforts, the Coast Guard maintains and uses a key data system—Marine Information for Safety and Law Enforcement (MISLE)—that tracks and reports mission results data for nine of 11 Coast Guard missions, including marine safety and law enforcement. As the Coast Guard’s largest operational information system, MISLE contains information on about 650,000 domestic and foreign-flagged vessels, including nearly 80,000 commercial fishing vessels and about 3,400 shore facilities regulated under the Maritime Transportation Security Act of 2002, among other information.¹ According to the Coast Guard, MISLE has about 11,000 unique users and records more than 300,000 Coast Guard activities annually.

¹The Maritime Transportation Security Act of 2002 establishes requirements for various layers of maritime security, including a national security plan, area security plans, and facility and vessel security plans. Pub L. No. 107-295, 116 Stat. 2064. The act calls for various types of facilities to develop and implement a security plan, and it places federal responsibility for approving and overseeing these plans with DHS. DHS has placed lead responsibility for this and other Maritime Transportation Security Act requirements with the Coast Guard.

The Coast Guard first implemented MISLE in December 2001. In 2008, the Coast Guard initiated an upgrade and redesign of the MISLE system that, when completed in 2015, did not deliver on some planned capability and lost some capability that existed in the previous version. Since MISLE's original implementation, we have reported data reliability issues and deficiencies with how MISLE tracks compliance with regulatory requirements in the maritime environment.² Members of Congress have also raised questions about whether MISLE is able to provide the Coast Guard with complete and accurate information for mission support. In addition, the DHS Office of Inspector General identified deficiencies with the Coast Guard's governance of information technology (IT) investment projects in recent years.³

You requested that we review the status of MISLE, as well as the Coast Guard's efforts to ensure it has the data system needed to support its missions. This report examines (1) the extent to which MISLE supports Coast Guard operations and decision-making; (2) the extent to which the Coast Guard has implemented policies, procedures, and training to help ensure reliable MISLE data; and (3) the Coast Guard's efforts to enhance, upgrade, or replace MISLE since 2008.

To examine the extent to which MISLE supports Coast Guard operations and decision-making, we analyzed Coast Guard strategic planning and program performance reports to identify MISLE's role in achieving mission results, as well as any MISLE-specific challenges that the Coast Guard identified that hindered its achievement of results. We also visited several Coast Guard district, sector, and headquarters offices and interviewed personnel about the extent to which MISLE supports day-to-day field operations as well as management decisions. Specifically, we

²GAO, *Maritime Security: Coast Guard Inspections Identify and Correct Facility Deficiencies, but More Analysis Needed of Program's Staffing, Practices, and Data*, [GAO-08-12](#) (Washington, D.C.: Feb. 14, 2008); *Maritime Security: Coast Guard Should Conduct Required Inspections of Offshore Energy Infrastructure*, [GAO-12-37](#) (Washington, D.C.: Oct. 28, 2011); and *Commercial Fishing Vessels: More Information Needed to Improve Classification Implementation*, [GAO-18-16](#) (Washington, D.C.: Dec. 14, 2017). In these reports, we recommended that Coast Guard assess MISLE data entry for accuracy and completeness, as well as take actions to issue guidance on how Coast Guard personnel should enter data into MISLE. The Coast Guard has taken action to address all of these prior recommendations.

³U.S. Department of Homeland Security Office of Inspector General, *Coast Guard IT Investments Risk Failure Without Required Oversight*, [OIG-18-15](#) (Washington, D.C.: November 2017).

interviewed selected Coast Guard field users responsible for entering data into MISLE to understand (1) how they use MISLE to support mission activities, (2) benefits and challenges of using MISLE, and (3) training and validation processes for working with MISLE data.⁴ We also interviewed representatives from headquarters offices responsible for setting policy and reporting outcomes of Coast Guard missions supported by MISLE to understand how they use MISLE data to support decision-making, and the benefits and challenges of using MISLE data to report mission activities and outcomes.

To examine the extent to which the Coast Guard has implemented policies, procedures, and training to ensure reliable MISLE system data, we reviewed Coast Guard documentation, such as policies and guidance governing MISLE data entry and MISLE-specific training materials. We also collected and analyzed information on formal training Coast Guard personnel receive to carry out their mission duties. We interviewed the aforementioned Coast Guard headquarters and field users responsible for entering and validating MISLE data at headquarters and in field locations and reviewed agency documentation to determine what MISLE data validation steps were taken to ensure accurate and complete data entry. We also reviewed Coast Guard data quality inspection results and assessed the Coast Guard's plans to address results against standards for project management.⁵

To examine the effectiveness of the above MISLE data quality measures, we analyzed selected MISLE data documenting four Coast Guard mission activities for fiscal years 2014 through 2018.⁶ We selected these missions to obtain a cross section of Coast Guard mission activity data, including missions that represent homeland security and non-homeland security activities. As part of our analysis, we collected and analyzed MISLE data

⁴We interviewed representatives from one district office, three Coast Guard sectors (sectors are responsible for local operations within each district), five boat and air stations operating under the command of the sectors we visited, and two 87-foot patrol boat crews. Those we interviewed were involved in carrying out eight of nine Coast Guard missions supported by MISLE. Additional details are discussed later in this report.

⁵Project Management Institute, Inc., *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*, 6th Edition, 2017. PMBOK is a trademark of Project Management Institute, Inc.

⁶The four missions include Ports, Waterways, and Coastal Security (prevention activities); Marine Environmental Protection (response activities); Search and Rescue; and Other Law Enforcement. We chose fiscal years 2014 through 2018 to be able to obtain 5 years of recent Coast Guard MISLE data. At the time of our analysis, fiscal year 2018 data were the most recent data available from the Coast Guard.

the Coast Guard has used to calculate four performance measures included in its annual performance reports and attempted to recreate the Coast Guard's reported performance results based on the MISLE data. We focused on data used to calculate these performance measures also because they were the sole source for calculating the measures. We also tested MISLE data for erroneous data entries, or missing or incomplete records, and to determine the extent to which the data were uniform across the agency. We discussed our results with Coast Guard officials to obtain their perspectives on the results of our analyses. We also assessed Coast Guard data quality measures against the *Standards for Internal Control in the Federal Government*, which states that management should design control activities to achieve objectives, respond to risks, and design appropriate types of control activities in the entity's information system for coverage of information-processing objectives for operational processes.⁷

To examine Coast Guard efforts to enhance, upgrade, or replace MISLE since 2008, we reviewed departmental and agency requirements, policies, and systems engineering guidance designed to govern MISLE investments. Specifically, we assessed Coast Guard efforts against DHS's Systems Engineering Life Cycle (SEL) and the Coast Guard's Systems Development Life Cycle (SDLC) frameworks, which outline control mechanisms to guide systems engineering projects and maintenance of implemented systems. We also assessed Coast Guard resource allocation decisions against its Level 3 Non-Major Acquisitions Manual and its Financial Resources Management Manual, which provide guidance on how to fund investment projects. We chose 2008 as the starting point for our analysis of MISLE upgrades since it coincides with when the Coast Guard initiated a major project to update MISLE's underlying system architecture, among other enhancements. To determine how Coast Guard actions aligned with departmental and agency guidance, we reviewed Coast Guard documentary and testimonial evidence—including documentation necessary to demonstrate that the Coast Guard undertook risk assessment and quality control measures as

⁷GAO, *Standards for Internal Control in the Federal Government*, [GAO-14-704G](#) (Washington, D.C.: September 2014). Application controls, sometimes referred to as business process controls, are those controls that are incorporated directly into computer applications to achieve validity, completeness, accuracy, and confidentiality of transactions and data during application processing. Application controls include controls over input, processing, output, master file, interface, and data management system controls.

well as established communication with MISLE stakeholders.⁸ We also reviewed memorandums documenting Coast Guard decisions as well as the justification for such decisions. Additionally, as part of our analysis, we reviewed the Coast Guard's contract documents to determine the extent to which the Coast Guard approved and issued contracts for carrying out MISLE enhancements and upgrades since 2008.

Appendix I describes our objectives, scope, and methodology in more detail.

We conducted this performance audit from February 2019 to July 2020 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Coast Guard Missions and Organizational Structure

The Coast Guard has 11 statutory missions outlined in the Homeland Security Act of 2002, including both homeland security and non-homeland-security missions.⁹ The Coast Guard groups these missions across six mission programs.¹⁰ See table 1.

⁸These documents are known in policies and guidance as system development artifacts.

⁹6 U.S.C. § 468(a).

¹⁰Throughout this report, we refer to headquarters units representing Coast Guard mission programs as program offices. These program offices are responsible for setting policies and strategies for carrying out Coast Guard mission programs (as defined in table 1). For example, the Office of Commercial Vessel Compliance and the Office of Port and Facility Compliance are responsible for maintaining policy and direction to Coast Guard personnel carrying out maritime security inspections as part of the maritime prevention program. These offices are also responsible, in coordination with the Office of Performance Management and Assessment, for analyzing and reporting Coast Guard performance information, which can include data from MISLE.

Table 1: Information on the U.S. Coast Guard's Mission Programs and 11 Statutory Missions

Mission program	Statutory mission	Description
Maritime security operations	Ports, Waterways, and Coastal Security (response activities)	Ensure the security of the waters subject to the jurisdiction of the United States and the waterways, ports, and intermodal landside connections that comprise the marine transportation system, and protect those who live or work on the water or who use the maritime environment for recreation.
Maritime law enforcement	Migrant Interdiction	Stem the flow of undocumented alien migration and human smuggling activities via maritime routes.
	Drug Interdiction	Stem the flow of illegal drugs into the United States via maritime routes.
	Living Marine Resources	Enforce laws governing the conservation, management, and recovery of living marine resources, marine protected species, and national marine sanctuaries and monuments.
	Other Law Enforcement	Enforce international treaties, including the prevention of illegal fishing in international waters.
Maritime prevention	Ports, Waterways, and Coastal Security (prevention activities)	Ensure the security of the waters subject to the jurisdiction of the United States and the waterways, ports, and intermodal landside connections that comprise the marine transportation system, and protect those who live or work on the water or who use the maritime environment for recreation.
	Marine Safety	Enforce laws that prevent death, injury, and property loss in the marine environment.
	Marine Environmental Protection (prevention activities)	Enforce laws that deter the introduction of invasive species into the maritime environment, stop unauthorized ocean dumping, and prevent oil and chemical spills.
Maritime response	Search and Rescue	Search for, and provide aid to, people who are in distress or imminent danger in the maritime environment.
	Marine Environmental Protection (response activities)	Respond to oil and chemical spills.
Defense operations	Defense Readiness	Maintain the training and capability necessary to immediately integrate with Department of Defense forces in both peacetime operations and during times of war.
Marine transportation system management	Aids to Navigation	Mitigate the risk to safe navigation by providing and maintaining more than 51,000 buoys, beacons, lights, and other aids to mark channels and denote hazards.
	Ice Operations	Establish and maintain tracks for critical waterways, assist and escort vessels beset or stranded in ice, and remove navigational hazards created by ice in navigable waterways.

Source: GAO presentation of U.S. Coast Guard information. | GAO-20-562

The Coast Guard's field structure is organized under two area commands (Atlantic and Pacific). The two area commands oversee nine districts across the United States, which are further broken down across 37

sectors. Each Coast Guard area command, district, and sector¹¹ is responsible for managing its assets and accomplishing missions within its geographic area of responsibility and, for the purposes of this report, are collectively referred to as field units.

MISLE Operational Information System

MISLE is the primary system used to capture and report operational information in support of nine Coast Guard statutory missions and associated programs.¹² MISLE is designed to collect, store, and disseminate data on vessels, cargoes, facilities, waterways, individuals, and organizations, as well as Coast Guard activities involving all of these entities.¹³ Examples of information captured in MISLE include results from law enforcement boardings, marine inspections, marine safety investigations, pollution response actions, search and rescue operations, and port security efforts. The Coast Guard uses a separate system, Coast Guard Business Intelligence (CGBI) to aggregate and report operational data stored in MISLE. CGBI is a web-based data aggregation system designed to generate standardized reports from multiple Coast Guard information systems, including MISLE. According to Coast Guard officials, CGBI currently offers about 12 custom reports, known as cubes, which are used to analyze and report operational outcomes.¹⁴ Figure 1 provides an example of how Coast Guard personnel are to enter and use MISLE data to support a search and rescue case.

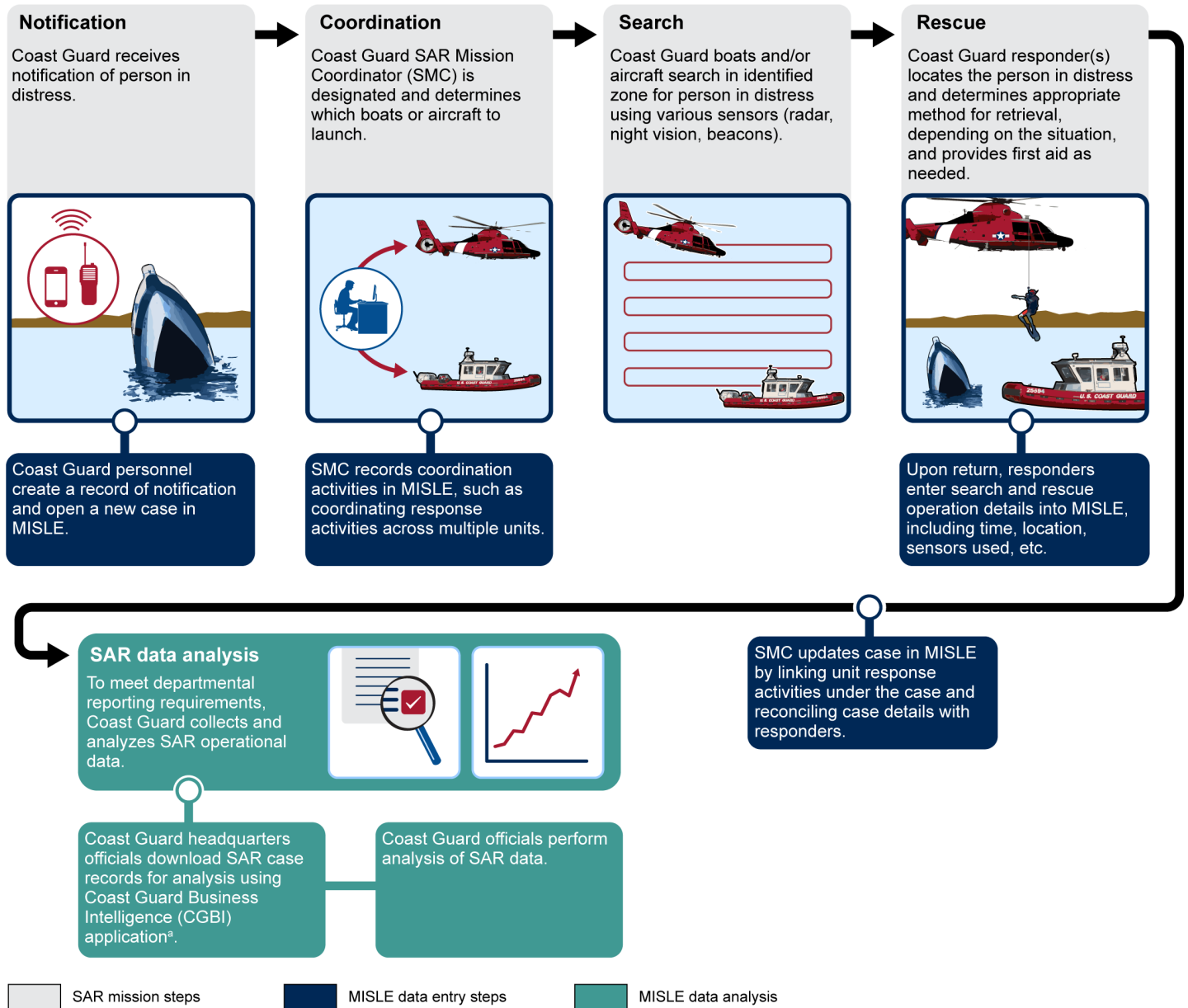
¹¹Subordinate local units under sector command include small boat stations, aids to navigation teams, marine safety units, marine safety detachments, and vessel traffic services.

¹²The Defense Readiness mission does not use MISLE to record activities and, instead, relies on the Coast Guard Readiness and Assessment Evaluation system to report war-fighting readiness of unit personnel, equipment, supplies, and logistics. The Aids to Navigation mission is tangentially supported by MISLE and, instead, records its mission activities to the U.S. Aids to Navigation Information Management System.

¹³MISLE is intended to help the Coast Guard meet two legislative requirements: 46 U.S.C. § 3717, which requires the Coast Guard to operate a marine safety information system, and 46 U.S.C. § 12501, which requires the Coast Guard to establish a vessel identification system.

¹⁴Coast Guard officials also said that its information technology department is able to generate custom reports to meet additional reporting requests, such as congressional requests for information.

Figure 1: Example of How the U.S. Coast Guard's (Coast Guard) Marine Information for Safety and Law Enforcement (MISLE) Supports Search and Rescue (SAR) Operations

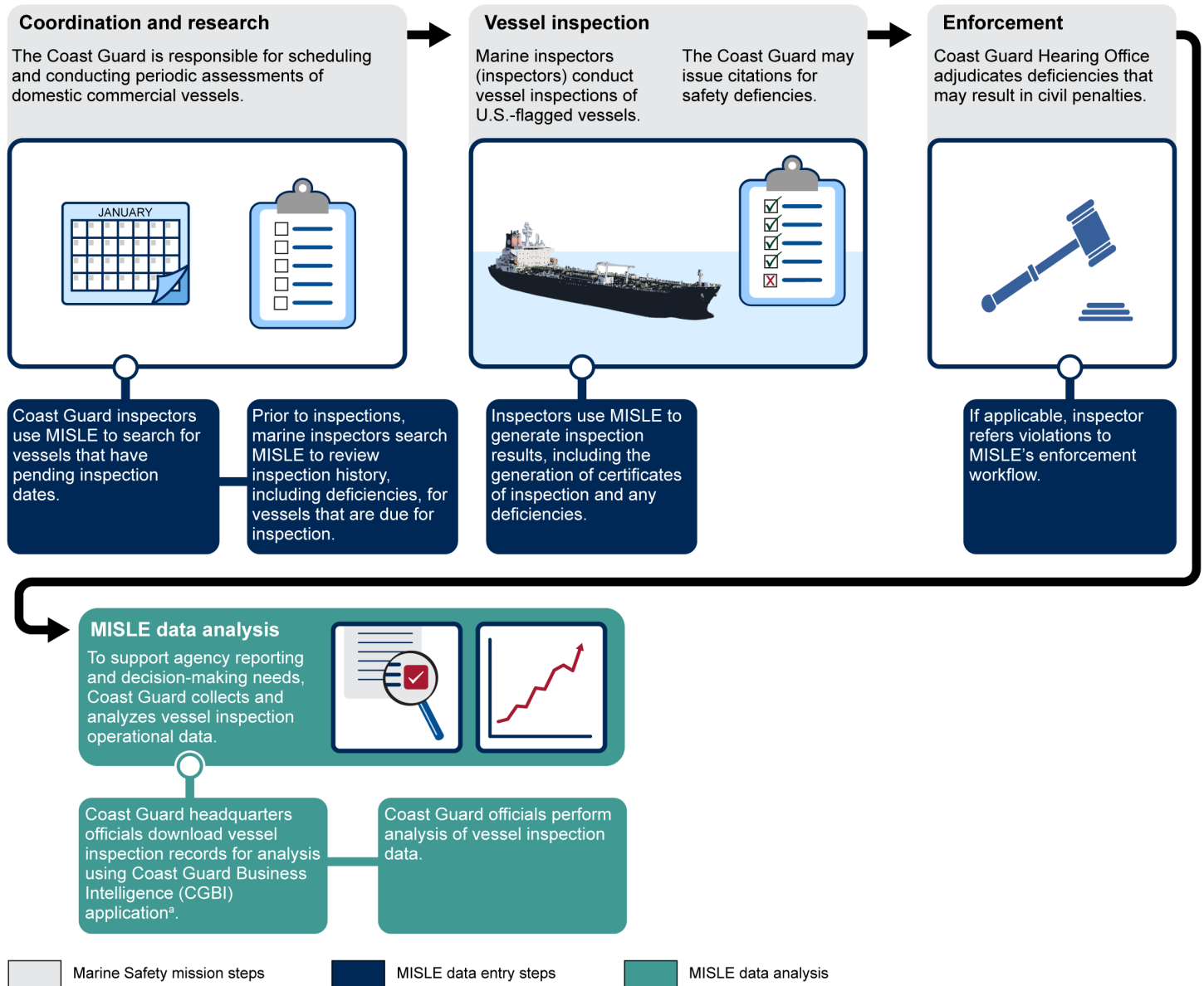


Source: GAO analysis of Coast Guard information. Coast Guard (adapted images). | GAO-20-562

^aCGBI is a web-based data aggregation system designed to generate custom reports from multiple Coast Guard information systems, including MISLE.

The Coast Guard also uses MISLE to assist with its regulatory duties, such as maritime vessel inspections (see fig. 2 for an example of how Coast Guard personnel enter and use MISLE data to conduct a vessel inspection).

Figure 2: Example of How the U.S. Coast Guard's (Coast Guard) Marine Information for Safety and Law Enforcement (MISLE) Supports Domestic Vessel Inspections



Source: GAO analysis of Coast Guard information. | GAO-20-562

^aCGBI is a web-based data aggregation system designed to generate custom reports from multiple Coast Guard information systems, including MISLE.

MISLE Management and Stakeholders

Two Coast Guard headquarters offices have primary responsibility for MISLE’s maintenance and operations—the Deputy Commandant for Mission Support and the Deputy Commandant for Operations. For the purposes of this report, we refer to their offices collectively as MISLE system managers. In addition, since MISLE’s inception, the Coast Guard’s Operations Systems Center (OSC) has served as the primary developer of the MISLE system. The Coast Guard’s Force Readiness Command (FORCECOM) is responsible for preparing, educating, and training the Coast Guard workforce, including on MISLE data entry.

MISLE also has over 30 internal stakeholder groups representing various Coast Guard programs, including the Office of Port and Facility Activities, Office of Shore Forces, Office of Search and Rescue, Office of Law Enforcement Policy, Office of Law Enforcement and Casualty Analysis, and the Office of Environmental Response Policy. Due to the sensitive nature of some MISLE data, including personally identifiable information, MISLE access is limited to Coast Guard personnel. Field users search data as well as enter data into MISLE to support mission activities. MISLE was designed to primarily support field operations. Program office personnel review, analyze, and report MISLE data to support Coast Guard planning and decision-making. The Coast Guard also provides indirect access, via a web-based portal known as the Coast Guard Maritime Information Exchange, to select MISLE data to third-party stakeholders, such as classification societies responsible for providing classification and compliance services to the maritime industry.¹⁵ See table 2 for more information on MISLE’s system managers and its various stakeholders.

Table 2: U.S. Coast Guard (Coast Guard) Offices Responsible for Overseeing Marine Information for Safety and Law Enforcement (MISLE) and Coast Guard MISLE Stakeholders

Office/role	Subunit (if applicable)	Responsibilities
MISLE system managers		
Deputy Commandant for Mission Support	Assistant Commandant for C4IT ^a	Responsible for the design, configuration, deployment, security, protection, and maintenance of MISLE.
Deputy Commandant for Operations	Assistant Commandant for Capability	Responsible for representing the Coast Guard’s internal stakeholders to establish MISLE goals and system requirements and acquire resources to support the system.

¹⁵Classification societies (1) establish and maintain standards for the construction and classification of vessels and offshore structures, (2) supervise construction in accordance with these standards, and (3) carry out regular surveys of vessels in service to ensure compliance with these standards.

Office/role	Subunit (if applicable)	Responsibilities
Other offices that support MISLE		
Operations Systems Center (OSC)		Agency-led, contractor-operated unit within the Coast Guard responsible for the design, development, and implementation of Coast Guard information technology systems, including MISLE.
Force Readiness Command (FORCECOM)		Responsible for preparing, educating, and training the Coast Guard workforce, including MISLE data entry. ^b
MISLE users and stakeholders		
Coast Guard field users		Field users search data as well as enter data into MISLE to support mission activities. MISLE was designed to primarily support field operations.
Coast Guard program offices and other stakeholders ^c		Program office personnel review, analyze, and report MISLE data to support Coast Guard planning and decision-making.
Third-party stakeholders		Third-party stakeholders, such as classification societies, ^d access MISLE data indirectly through a separate, web-based portal to support classification and compliance services for the maritime industry. ^e

Source: GAO analysis of Coast Guard documentation. | GAO-20-562

^aC4IT refers to the Coast Guard's agency-wide technology capabilities, known as Command, Control, Communications, Computers, and Information Technology.

^bFORCECOM trains Coast Guard personnel based on their roles, such as marine inspector, which may include training on entering inspection results in MISLE.

^cOther MISLE stakeholders within the Coast Guard include offices such as the offices of the Chief Administrative Law Judge, the Coast Guard's Judge Advocate General and Chief Counsel, Investigative Services, and Intelligence Coordination Center.

^dClassification societies (1) establish and maintain standards for the construction and classification of vessels and offshore structures, (2) supervise construction in accordance with these standards, and (3) carry out regular surveys of vessels in service to ensure compliance with these standards.

^eThird parties access MISLE data indirectly through a web portal known as the Coast Guard Maritime Information Exchange.

MISLE Development History

The Coast Guard first released MISLE in 2001 to replace the then-obsolete Marine Safety Information System. In developing MISLE, the Coast Guard initially contracted with the Computer Sciences Corporation in 1995 to begin development. However, OSC later took over its development from the contractor in 1999 after significant cost increases and schedule delays occurred.¹⁶

Since MISLE's release in 2001, the Coast Guard has expanded its scope to replace other business and operations information systems that shared similar data fields. Specifically, from 2001 to 2003, the Coast Guard added new functionality to MISLE and was able to replace the following

¹⁶The Coast Guard partially terminated its 1995 contract with the Computer Sciences Corporation, which initially cost \$26 million.

four information systems, two of which the Coast Guard deemed aging (or legacy)—Law Enforcement Information System, Search and Rescue Management Information System, Incident Management (Response Log), and Inland Rivers Vessel Movement Center.¹⁷

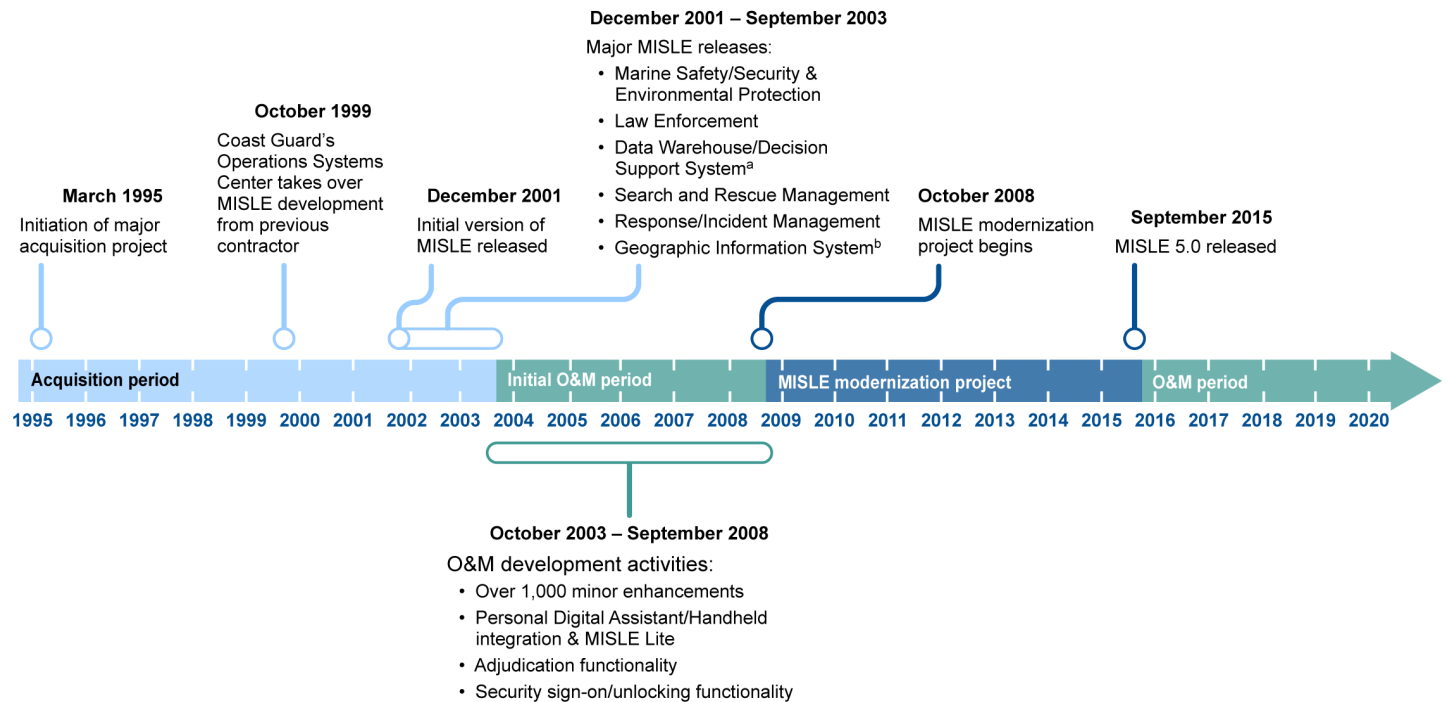
Additionally, through 2008, the Coast Guard made about 1,000 enhancements to MISLE to add functionalities, including the ability to record security assessments, operational summaries, incident action plans, and Coast Guard adjudication activities. (See fig. 3 for a time line of MISLE’s design, development, and enhancements.)

In 2008, the Coast Guard began a project to modernize MISLE’s software requirements and ensure its continued compatibility with other systems. This upgrade, called MISLE 5.0, was completed in 2015. Coast Guard officials stated they designated the upgrade project a technology refreshment, since the primary goal was to maintain existing functionality but keep the system compatible with the Coast Guard’s current IT environment.¹⁸ According to MISLE system managers, MISLE 5.0 introduced user interface changes and also divided the system into 20 subcomponents, known as activities, with the goal of improving the management of system changes. (See app. II for a list of MISLE subcomponents used to support different Coast Guard missions.)

¹⁷A large portion of the Inland Rivers Vessel Movement Center was integrated into MISLE, but some functionality is still separate.

¹⁸The Coast Guard’s September 2013 Financial Resources Management Manual defines “technology refreshment” as an action taken to apply a new technology to an existing system to improve reliability, maintainability and, if applicable, reduce maintenance costs. Technology refreshments typically occur when original items or replacement parts are no longer available for maintenance and when it is necessary to acquire similar available replacement items with the original system’s relevant characteristics.

Figure 3: Marine Information for Safety and Law Enforcement (MISLE) Development Time Line from the Acquisition Phase to Operations and Maintenance (O&M) Phase, 1995-Present



Source: GAO analysis of U.S. Coast Guard (Coast Guard) information. | GAO-20-562

^aNow known as Coast Guard Business Intelligence.

^bNow known as Enterprise Geographic Information System.

MISLE Generally Supports Mission Operations, but Selected Users Reported Numerous Challenges That Affected Decision-Making and Accuracy of Reporting

MISLE generally supports Coast Guard operations by allowing personnel to record, track, and analyze most mission activities, and users we interviewed at the field level stated that they are generally able to enter and use MISLE data to support mission operations. However, users also described system design challenges and technology limitations of MISLE, such as duplication in vessel records they used to support marine safety activities. Additionally, as designed, MISLE is unable to capture and collect various key data the Coast Guard needs to annually report performance measures, among other mission requirements. For example, for eight of the 10 performance metrics reported by the Office of Law Enforcement Policy, staff rely on other methods of data collection rather than MISLE, which is the official system of record.

The Coast Guard Uses MISLE Data to Support Mission Operations

The MISLE system generally supports Coast Guard operations by allowing personnel to record, track, and analyze most mission activities throughout the agency. At the field level, Coast Guard personnel use MISLE, as required by Coast Guard policy, to record the results of various operational activities, including commercial vessel inspections, search and rescue operations, and law enforcement incidents. MISLE enables these users to record detailed descriptions of day-to-day operational activities and capture activity outcomes. For example, according to a 2017 Coast Guard marine safety report, marine inspectors used MISLE to schedule and record marine safety compliance inspection results, generate official documents, and identify industry-wide safety risks.¹⁹

At the headquarters level, Coast Guard program offices use MISLE information for various purposes to support operations. Headquarters officials we spoke with had generally positive views about MISLE's structure and the value of the data in the system, especially compared to the limitations of the data system MISLE replaced. They cited the following benefits:

- **Integration of operational records across missions.** Officials stated that they use MISLE to capture and integrate activity data across various Coast Guard missions, as well as across Coast Guard units and program offices. This integration allows, for example, a commercial vessel's history to include inspection results (entered by Coast Guard personnel), as well as any chemical spill incident data involving the same vessel (entered by maritime response personnel). According to Coast Guard program office officials, because operational data stored in MISLE are aggregated in one place and are not separated by program, statutory mission, or field unit location, MISLE provides decision-makers access to information and supports situational awareness across the Coast Guard's missions better than the systems that it replaced.
- **Case management records repository.** Officials stated that they use MISLE as a record of Coast Guard regulatory actions, such as inspections of domestic and foreign vessels, for the purposes of case management. Specifically, MISLE collects various enforcement data, such as citations for noncompliance. Officials also stated that MISLE provides a record of each step of the process they use to carry out their regulatory responsibilities, and it provides the ability to link these

¹⁹MISLE was also used to help determine the scope of the inspections and to identify areas of perceived lower risk.

steps together. According to officials, this capacity is helpful for conducting inspections or developing a civil penalty case, for example.²⁰

- **Consistent reporting of information.** Officials said that they use MISLE to develop and report Coast Guard performance information in a consistent manner. Specifically, they said that MISLE data help to report consistent information in a repeatable manner about the effectiveness of Coast Guard policy and that MISLE is the only Coast Guard system that offers capabilities for analyzing data on mission activities across the agency. For example, headquarters program officials use MISLE data to support DHS reporting requirements established in response to the Government Performance and Results Act of 1993, as amended by the GPRM Modernization Act of 2010, as well as separate DHS reporting requirements.²¹ MISLE also provides the Coast Guard with the data needed to report on additional performance measures published in the Coast Guard’s annual performance report. For example, the Coast Guard reports its performance measure, “annual number of breaches at high-risk maritime facilities,” using maritime prevention data collected in MISLE.²²
- **Support for certain resource allocation decisions.** Officials stated that they use MISLE to support certain parts of the Coast Guard’s annual budget process by providing breakdowns of operational activities by areas, districts, sectors, and other units. Although MISLE does not cover all of the data elements required to determine personnel resource levels,²³ officials stated that it provides key data inputs for determining appropriate staffing levels for some Coast

²⁰One example includes the timeline of the Coast Guard’s activities and actions taken in response to a maritime pollution incident, including the original notification, the initial investigation, and any resulting enforcement actions taken against the offending party, if applicable.

²¹Pub. L. No. 111-352, 124 Stat. 3866 (2011). The GPRM Modernization Act of 2010 amends the Government Performance and Results Act of 1993, Pub. L. No. 103-62, 107 Stat. 285 (1993).

²²The Coast Guard documents its response to reported incidents in which a facility’s security measures have been circumvented, eluded, or violated in MISLE as a “Breach of Security Investigation.”

²³We discuss these limitations in MISLE data later in this report.

Guard units as part of the Coast Guard's Sector Staffing Model process.²⁴

MISLE Users We Interviewed Reported Numerous System Challenges

While Coast Guard field users we spoke with stated that they are generally able to enter and use MISLE data to support mission operations, they also described challenges with (1) the system's design and (2) other technological limitations. Users we spoke with stated these challenges affected their ability to accurately, efficiently, and timely enter some mission data.

System Design Contributes to Data Errors and Inefficiencies. Some Coast Guard users we spoke with stated that for certain mission activities, such as pollution response, MISLE automatically populates date and time stamps that correspond to the current time when the user enters the activity information into MISLE rather than allowing the user to enter the time when the activity was conducted. These users said that the auto-population of the current time can result in data errors (such as mischaracterizing the date and time of Coast Guard actions), reducing the reliability of recorded data. Further, officials from the Office of Performance Management and Assessment said that, in some cases, these types of data errors required the Coast Guard to exclude some records from mission analysis reviews.²⁵

Marine Environmental Response program officials in both headquarters and in field unit locations stated that although they are required to use MISLE, it was not designed to capture pollution response activities. As a result, many of the data fields for marine environmental response activities are not relevant to the mission. However, to be able to save the overall record in MISLE, the system requires users to enter information

²⁴According to Coast Guard documentation, the Sector Staffing Model is a staffing analysis tool designed to align sectors and subordinate field units with the requirements of mission activities. It also provides Coast Guard leadership with an understanding of program requirements and, through its outputs, quantifies the human resource demand of missions analyzed. The model is accredited to (1) evaluate field unit staffing for the purposes of informing resource proposals; (2) serve as a quantifiable, traceable, and repeatable basis for personnel reallocation across represented units; (3) enable senior leadership and program managers to evaluate proposed policy changes for staffing implications; (4) forecast future needs based on projected activity and mission trends; and (5) collect, codify, and evaluate programmatic business rules that affect the sector staffing process.

²⁵We discuss the effect such system errors have on the reliability of MISLE data later in the report.

for all data fields, even if those may not be relevant to the incident. Some field users we spoke with stated that this was wasted data entry time that they could spend investigating pollution response events. These users also stated that, in other instances, they must enter the same data in multiple places within MISLE. For example, investigators reported having to enter title, location, people involved, and narrative description in multiple places within a record for the same incident, which they characterized as redundant and time-consuming. Other users we met with also stated that when notified about incidents outside of their jurisdiction, they sometimes had to spend 30 minutes entering pollution cases in MISLE, because the system has a single set of required data fields regardless of the type of incident in question. Users told us that in these instances, system requirements for entering extraneous information was not a productive use of their time.

Coast Guard personnel from multiple units we spoke with also noted that MISLE does not have system controls to prevent incomplete or duplicate entries, which can affect their ability to conduct certain tasks. For example, Coast Guard field personnel stated that when searching and entering vessel information following a pollution event or other incident, or when searching for vessel operator information, they often encountered incomplete information on vessel operators and other persons entered by other MISLE users. Information on vessels and vessel operators are key data for Coast Guard staff when issuing warnings or notices of violations, according to Coast Guard investigators we interviewed. These investigators said that they had to balance the decision of whether to enter a new individual into the system and risk duplicating a record or to add new information to an existing incomplete record that may or may not be the person of interest, which could result in combining data from different individuals and reduce the reliability of the data in the system.²⁶ As another example, marine inspectors said that duplicate vessel and operator records in MISLE make it challenging to search for and plan inspection activities because pertinent inspection histories can be located

²⁶During a site visit to one sector, we observed investigators working to manage this issue. Investigators spent time and effort trying to determine whether an individual responsible for a pollution incident in California was the same individual in MISLE, for whom the system also listed a vessel registered on the East Coast. The existing MISLE entry had only minimal details, and investigators spent time trying to call the person of interest and relevant third parties, such as the local harbor master and marine offices, to determine if they should create a new entry.

under duplicate or multiple vessel records.²⁷ These users told us that if they do not find and open each duplicate vessel record, they may not have full or accurate information to review on prior safety deficiencies before conducting vessel inspections. Headquarters officials said that some enforcement actions may be reliant on prior enforcement actions against a vessel or party. As a result, if a MISLE user creates a duplicate entry, then it may be unclear if the Coast Guard took a prior enforcement action or if they imposed prior penalties because such entries are located in different records.

Technology Limitations Affect Data Use and Efficiencies. Coast Guard users can only access MISLE from a workstation connected to the Coast Guard's network, which users from multiple units we spoke with said limits their use of or ability to enter data into MISLE while conducting mission activities such as a vessel inspection or law enforcement boarding. In fiscal year 2017, the Coast Guard's Marine Safety Mission Analysis report²⁸ stated that when personnel return to their offices after an inspection, they are required to input their collected inspection and investigation case data into MISLE. The report also said that this may involve several hours of work beyond the time spent on the inspection or investigation and any associated travel time. Program office officials stated that the transfer of paper records to MISLE increased a lag time between the actual examination or investigation and the time the inspector or investigator enters the data in MISLE. This lag time can increase in instances when Coast Guard personnel have completed a large number of exams in short period of time. Further, law enforcement personnel from multiple units said that they must complete paper forms during law enforcement boardings and inspections to capture operational data and then manually input the data into MISLE once they return to their workstations.²⁹ These Coast Guard law enforcement staff said this

²⁷Users we spoke to did not specify how often this occurred. However, according to a fiscal year 2019 study conducted by MISLE system managers, the MISLE system has roughly 9,800 duplicate entries.

²⁸U.S. Coast Guard Office of Performance Management and Assessment, *Mission Analysis Examination of Commercial Compliance Activities within the Marine Safety Mission*, (Washington, D.C.: March 2017). The Coast Guard published the report to assist decision-makers by examining the current and projected marine safety program capabilities, identifying current and future performance gaps, and evaluating alternatives for closing such gaps.

²⁹Some field personnel we spoke with said that this rework can take a considerable amount of time per MISLE entry, depending on the complexity of the mission activity. For example, encounters that have violations take longer, and documenting some activities can take as long as 90 minutes.

approach is time-consuming and duplicative of paper processes. Users from multiple Coast Guard units also stated that while conducting mission activities in the field, such as law enforcement boardings, they lack situational awareness as a result of not being able to access MISLE while underway. They also stated that being able to access vessel and operator records within MISLE histories, which can contain valuable intelligence, would better prepare them for a timely boarding that does not require them to contact shore personnel.

While MISLE allows for exchanges of data between MISLE and other Coast Guard databases, such as the Asset Logistics Management Information System, some Coast Guard users we spoke with stated that these data exchanges are not fully integrated. As a result, these users reported that they must reenter the same information into MISLE that already exists in other Coast Guard information systems. These users also stated that such data exchange limitations affect the usefulness of data exchanges across systems, which would otherwise help reduce data entry requirements in MISLE.³⁰ For example, users from one unit we spoke with said that the lack of data exchange capability requires users to retrieve information, such as vessel registration details from the Vessel Identification System outside of MISLE, and reenter these details to create vessel records within MISLE.

**System Limitations
Reduce the Effectiveness
of MISLE**

As designed, according to Coast Guard documentation and user testimony, MISLE is unable to capture and collect various Coast Guard data that are needed to more accurately determine staffing needs and report on annual DHS-required performance measures, among other mission requirements.

**MISLE Does Not Capture Key
Data That Could Affect
Resource Allocation for Marine
Safety Activities**

MISLE does not capture data for Coast Guard marine inspection activities that could impact the accuracy of information used for a key resource allocation process. Specifically, while MISLE captures inspection time, it is unable to capture transit time as Coast Guard field personnel travel to other locations to conduct inspections and other marine safety and

³⁰According to MISLE system managers, MISLE has the ability to exchange data with certain Coast Guard data systems, such as the Asset Logistics Management Information System, which provides a one-way transfer of Coast Guard vessel data to MISLE from the Asset Logistics Management Information System.

security activities.³¹ According to field unit personnel we interviewed, transit time is important when making decisions about staffing levels, crew fatigue, and budget decisions, particularly for field units with larger geographic areas of responsibility where travel time may be greater.³² The Coast Guard has also reported similar challenges with accounting for their travel time to conduct Coast Guard incident investigations.

Given that MISLE does not allow for field unit personnel to record transit times, some field units have developed methods for recording these data elsewhere, such as in local spreadsheets. MISLE system managers told us that MISLE was designed to capture mission activities and outcomes and that travel time does not fall within these categories. However, in a fiscal year 2017 marine safety mission analysis report, the Coast Guard reported that the ability to capture the time needed to conduct marine safety activities would allow for a clear determination of the impacts of marine safety scoping decisions in the field.³³

To help account for transit time outside of MISLE, the Coast Guard's Office of Shore Forces, which is responsible for resource allocation analyses for certain field units, captures estimated marine inspection travel time across the Coast Guard based on annual survey estimates

³¹Other Coast Guard missions, such as search and rescue and law enforcement, use surface and air assets such as small boats and helicopters, and their resource hours are tracked in another Coast Guard information system, the Asset Logistics Management Information System. However, inspections and investigations generally do not use such assets but instead use other Coast Guard resources such as ground vehicles, which are not tracked in the Asset Logistics Management Information System.

³²For example, in 2018, Sector Los Angeles/Long Beach reported a 110-minute average travel time to conduct facility inspections. In contrast, Sector Puget Sound reported a 240-minute average travel time to conduct facility inspections.

³³In its fiscal year 2017 marine safety mission analysis report, the Coast Guard reported marine inspectors had been descoping certain types of inspection activities (i.e., inspectors choosing the level of depth of an inspection) as a response to scheduling or personnel resource deficiencies needed to meet regulatory demands. However, the report also stated that it was difficult to measure the effect of these decisions quantitatively since MISLE records the number of activities completed and not how long it took to complete the activity. Specifically, they stated that the loss of data fields as a result of the MISLE 5.0 upgrade reduced the Coast Guard's ability to track the number, duration, and scope of marine inspections and investigations conducted.

MISLE Does Not Capture Key Law Enforcement Data for Analysis and Departmental Reporting Requirements

and incorporates the data into its sector staffing model process.³⁴ However, the Coast Guard's sector staffing model guidance states that the collection of enterprise data is a more reliable source of information than surveys when entering information into its personnel resource allocation model. Further, while sector personnel may collect data successfully in some locations, they may be less able to do so in others. For example, officials in one sector told us their records were largely anecdotal and that their confidence in the fidelity of the travel time data was low.

MISLE does not capture migrant interdiction data used to meet departmental reporting requirements. According to Coast Guard maritime law enforcement officials, the Coast Guard is responsible for tracking 20 discrete migrant interdiction data elements used for departmental reporting, including for DHS's Blue Campaign.³⁵ However, according to these officials, they are only able to easily aggregate two of the 20 required data elements from MISLE—date and location of interdiction event—because MISLE captures the other data elements in user-created narrative entries that are not easily searched. To obtain information for all of the required data elements, officials told us they must use data from the Drug and Migrant Interdiction Division, which collects such information through daily situation reports it receives from the field to track and report Coast Guard migrant interdiction outcomes. (See app. III for a full listing and definition of the 20 data elements that the Coast Guard uses to track and report on its migrant interdiction activities and outcomes.) Coast Guard headquarters officials stated that this current workaround is time-consuming and estimated they spend 1 hour per day compiling data manually, which does not include time spent on the monthly reconciling process. In contrast, officials stated that if the data were readily available in MISLE, they would be able to compile information in a manner of seconds through the Coast Guard's agency-wide data analysis tool and

³⁴The Office of Shore Forces sends the sector survey to all 97 shore forces units, which includes 37 sectors, two activities, 16 marine safety units, 31 marine safety detachments, 10 sector field offices, and one marine inspection detachment. The survey collects estimated travel time in minutes, on average, in 1 calendar year for the following inspection activity types: barge, dry dock, hull, machinery, mobile offshore drilling unit, offshore service vessel, t-boat, k-boat, commercial fishing vessel, towing vessels, port state control (all vessel types), floating offshore installation, fixed platforms, facilities, and investigators.

³⁵DHS's Blue Campaign is a national public awareness campaign about human trafficking. The campaign is designed to educate the public, law enforcement, and other industry partners to identify and respond to indicators of such trafficking.

allow maritime law enforcement personnel to allocate time and effort on other data analysis activities.

In addition, the Coast Guard Living Marine Resources and Marine Protected Species Enforcement Division is required to report on its performance measures every year in an annual report. However, according to Coast Guard officials, MISLE does not allow for the division to capture information needed for these performance measures—which include the number of detected incursions of foreign fishing vessels violating U.S. waters and the interdiction rate of foreign fishing vessels violating U.S. waters. Specifically, division officials said they cannot analyze the number of interdictions made of foreign flag vessels violating U.S. waters because MISLE does not allow users to differentiate between two activities—“detections” and “interceptions”—without reviewing narrative descriptions of each law enforcement activity. Instead, MISLE only allows users to record both types as “sightings” of foreign vessels.³⁶ Division personnel said that due to this MISLE data limitation, they collect and report living marine resource and other law enforcement data through a separate spreadsheet outside of MISLE.

The Coast Guard Maritime Law Enforcement Manual states that MISLE is intended to serve as the system of record for all law enforcement activities, including those associated with the migrant interdiction and other law enforcement missions. Coast Guard officials clarified that much of the required information for mission activity reporting is located in MISLE, as required, but also acknowledged that the information is often embedded in long-form narratives that are not readily searchable or reportable without a lengthy review process.

We reviewed 10 performance measures that the Office of Law Enforcement Policy reported on in the Coast Guard’s fiscal year 2018 annual performance report. We found that eight of the 10 metrics were

³⁶This is significant, because the Coast Guard’s annual performance report identifies two measures associated with foreign fishing vessel activity. A sighting is a law enforcement activity that captures an incident in which the Coast Guard was not able to board a suspect or offending vessel. However, with respect to foreign fishing vessels in U.S. waters, a sighting is further broken down into a detected incursion and an intercepted incursion. A detected incursion is the detection of a foreign fishing vessel illegally fishing inside the U.S. Exclusive Economic Zone. It can include detection via electronic means, through airborne or surface assets, or through the detection of unattended fishing gear suspected to have been placed by a foreign fishing vessel. An intercepted incursion is distinguished from a detection by the arrival of a Coast Guard air or surface asset in position to document an illegal foreign fishing vessel incursion into the U.S. Exclusive Economic Zone.

not sourced from data recorded in MISLE and aggregated by CGBI. (See table 3 below.)

Table 3: U.S. Coast Guard (Coast Guard) Maritime Law Enforcement Performance Measures and Primary Data Sources for Fiscal Year 2018

Performance measure	Primary reporting source ^a	
	MISLE ^b	Other data collection method ^c
Number of undocumented migrants attempting to enter U.S. by maritime routes	X	✓
Number of undocumented migrants attempting to enter U.S. by maritime routes interdicted	X	✓
Migrant interdiction effectiveness in the maritime environment	X	✓
Percent undocumented migrants attempting to enter U.S. by maritime routes interdicted by Coast Guard	X	✓
Metric tons of cocaine removed	X	✓
Removal rate for cocaine from noncommercial vessels in maritime transit zone	X	✓
Fishing regulation compliance rate ^d	✓	✓
Percent of federal fisheries found in compliance with laws and regulations ^e	✓	✓
Number of detected incursions of foreign fishing vessels violating U.S. waters	X	✓
Interdiction rate of foreign fishing vessels violating U.S. waters	X	✓

Legend:

✓ Yes

X No

Source: GAO analysis of Coast Guard documentation. | GAO-20-562

^aFor the purposes of this report, we refer to primary data reporting sources as those data used to aggregate and report performance information. According to the Coast Guard, both data sources listed in the table are corroborated against one another and in many cases contain the same information. However, the primary data reporting source is the data aggregation and reporting method used to directly calculate the performance measure.

^bField units enter data into the law enforcement activity module into the Marine Information for Safety and Law Enforcement (MISLE) system, which is then aggregated by the Coast Guard's information technology business intelligence tool known as the Coast Guard Business Intelligence (CGBI) tool. The Coast Guard has validation processes associated with this dataset to help ensure reliability.

^cAccording to maritime law enforcement officials, the Office of Law Enforcement Policy maintains spreadsheets tracking maritime law enforcement operations and outcomes independent of MISLE. This information may include information from MISLE but also includes the following: summaries of field unit activities compiled and validated by district personnel; daily operational summaries from field units consolidated by headquarters personnel; and data from the Office of National Drug Control Policy's Consolidated Counter-Drug Database, among others. The Coast Guard has validation processes associated with these spreadsheets to ensure reliability.

^dAccording to maritime law enforcement officials, this measure uses in equal measure other data collection methods and MISLE data. Specifically, MISLE data are validated against law enforcement activity summaries provided to headquarters by district personnel.

^eThis measure uses in equal measure other data collection methods and MISLE data. Specifically, one data point, the number of active U.S. fisheries, is tracked in a spreadsheet outside of MISLE. The other, the number of annual domestic fishing violations, is calculated based on MISLE data. Maritime law enforcement officials then use both figures to calculate the measure.

MISLE system managers stated they are aware of these issues and that they agree that MISLE requires further investments to meet user needs. Officials told us that they work to prioritize changes to the system as they are able through the MISLE Configuration Control Board.³⁷ MISLE system managers also currently have some ongoing efforts to continue updating MISLE, some of which aim to address some of these identified issues. We examine the Coast Guard's efforts to identify and manage such investments in MISLE in more detail later in the report.

The Coast Guard Has Implemented Policies, Training, and Validation Processes for MISLE Data Entry, but Concerns with Data Accuracy and Completeness Exist

The Coast Guard has implemented policies, training, and data entry validation processes to help ensure timely and accurate data entry in MISLE; however, we identified several data issues in selected Coast Guard operational records in MISLE. Coast Guard officials acknowledged these issues and noted some early-stage initiatives to address some MISLE data entry issues at Coast Guard command centers.

The Coast Guard Has Implemented Policies, Training, and Validation Processes to Better Ensure MISLE Data Quality

The Coast Guard has implemented a number of different mechanisms to better ensure MISLE data quality, such as documented policies and guidance for MISLE data entry, formal and on-the-job training programs, and processes for reviewing and validating MISLE data entry.

MISLE Policies and Guidance

The Coast Guard has implemented policies and other guidance and resources, such as user instructions to guide field personnel completing data entry into MISLE. This documentation has been largely developed and maintained by headquarters program offices and is designed to align with Coast Guard mission activities and the role of the personnel conducting the data entry, such as facility inspectors or boarding officers. Policies from the various program offices include information on the type of regulatory or other activity that Coast Guard personnel are to conduct,

³⁷The MISLE Configuration Control Board is a group of MISLE stakeholders led by MISLE system managers to review, evaluate, and direct changes to MISLE.

as well as the type of information to be entered into MISLE. For example, the Coast Guard's Maritime Law Enforcement Manual identifies what type of information law enforcement personnel should enter into MISLE. In addition, OSC has also developed user guides, which contain the Coast Guard's specific procedural guidance for how to enter such data into MISLE.³⁸ The Coast Guard has developed 35 user guides that are generally organized by MISLE function and user role.³⁹ Coast Guard headquarters has also developed eight quick reference card job aids, which serve as instructional guides for users completing MISLE entries.

In addition to user guides, MISLE contains embedded help functions designed to assist users in navigating various input screens and workflows. MISLE system managers also developed a separate training version of MISLE designed to help new users navigate the system. According to Coast Guard officials, this training environment also allows users to practice entering data without having to worry about corrupting the underlying data in the database.

Field unit personnel we met with said that they use these policies and guidance to varying degrees. For example, marine inspectors stated that they use policy documentation regularly, while field personnel in multiple locations stated that they did not regularly use policy documents, MISLE guides, or quick reference job aids. Some boat station personnel stated that instead they relied on their colleagues for assistance with MISLE. In addition, investigators at one sector said that they had developed their own hard-copy guide for entering data into MISLE, which they said included a combination of policy documentation and MISLE data entry guidance at a more detailed level than provided across the agency. They said that they developed their guidance to mirror agency-wide policies, but supplemented it to provide additional guidance and assistance in areas that they said were not clear in agency-wide documentation.

MISLE Training

The Coast Guard conducts formal, in-person training for its personnel, but users we spoke to said that they primarily learn MISLE data entry through on-the-job training. FORCECOM personnel said that there is no training course focused solely on MISLE, since MISLE training is specific to the

³⁸OSC developed MISLE user guides as part of a development contract for MISLE 5.0. MISLE system managers were the contracting party for the training materials.

³⁹MISLE user guides are designed to provide step-by-step instructions to guide users on how to complete a function in MISLE and incorporate screenshots whenever possible. The guides are to provide data input requirements for each respective function and are to be made available to all users via the Coast Guard's MISLE web portal.

role and responsibilities of the user and is incorporated into their respective training curriculum. Formal, MISLE-specific training is incorporated to varying degrees into broader Coast Guard training programs depending on the training course. According to FORCECOM, the Coast Guard has eight formal courses associated with nine specific Coast Guard job titles, known as specialist schools, which FORCECOM developed with guidance and approval from Coast Guard program offices.⁴⁰ According to FORCECOM personnel, its training unit works very closely with program offices to develop course curriculum around the duties and responsibilities of a particular job title and associated function, which can include MISLE data entry.

Our analysis of Coast Guard course outline information found that for most formal training courses, planned MISLE training varied by Coast Guard duty and function and comprised a small portion of overall training time. For example, the agenda for the Pollution Incident Response Course consists of 75 hours of training, of which 8 hours were to be specifically devoted to MISLE training.⁴¹ In comparison, the Marine Inspector Course consists of 195 hours of training, of which just over 2 hours were to be devoted to MISLE data entry.⁴² Table 4 provides a complete list of Coast Guard specialist school courses and their MISLE-related components, as of October 2019.

Table 4: U.S. Coast Guard Specialist School Courses and GAO Analysis of Training Hours Devoted to Data Entry in the Marine Information for Safety and Law Enforcement (MISLE) System, as of October 2019

Specialist school course name	Planned training hours	Planned MISLE-specific training hours ^a
Maritime Search and Rescue Planning	143	5
Command Center Watchstander ^b	113	5

⁴⁰These courses generally take place at the U.S. Coast Guard Training Center in Yorktown, Virginia. FORCECOM also manages the Maritime Law Enforcement Academy, which trains Coast Guard personnel for law enforcement activities, including vessel boardings, which are documented in MISLE. However, the academy does not have any specific training devoted to MISLE data entry and instead provides job aids for students to use on the job.

⁴¹The Pollution Incident Response Course is designed to train personnel to respond to oil and hazardous material incidents and to conduct basic investigation procedures.

⁴²The Marine Inspector Course is designed to provide personnel in apprentice and journeyman marine inspector billets with the entry-level training needed to carry out their responsibilities for protecting the safety of life, property, and the maritime environment.

Specialist school course name	Planned training hours	Planned MISLE-specific training hours ^a
Pollution Incident Response	75	8
Investigating Officer	134	40
Marine Inspector	195	2
Intelligence Officer	525	Not quantified ^c
Port State Control Officer	113	3
Suspension and Revocation	113	29

Source: GAO analysis of U.S. Coast Guard documentation. | GAO-20-562

^aOur analysis of training documentation focused on course units that were primarily focused on MISLE data entry or those in which MISLE entry was listed as a core component of training objectives. We encountered instances in which MISLE was listed as a component of the training objectives but was not a core component of the course unit. In these cases, we did not quantify the time devoted to MISLE in that training unit. For example, training in which the final action involved documentation of operational activity in MISLE (as opposed to data entry being the basis of the training unit) was not included.

^bThe command center watchstander position receives notifications for Coast Guard response actions, such as distress calls for search and rescue operations or notifications of pollution events. For coastal incidents, the watchstander then directs personnel at sector, boat, or air stations to respond to the reported incident.

^cMISLE is included as a subset of one module in this course—which focuses on a student’s ability to demonstrate the use of MISLE data when conducting a search—but the time spent on this training is not quantified.

Based on interviews with personnel at various Coast Guard sectors, the type and level of MISLE training varies depending on the user’s role, the extent to which the individual might use MISLE, and the training instructor. Personnel at multiple field units said that instructors minimally addressed MISLE-specific training at specialist schools in favor of other topics. Coast Guard personnel from one unit said that their instructor skipped hands-on training for MISLE altogether because of system reliability issues with the MISLE training module. Additionally, at multiple field units we visited, Coast Guard personnel said that their primary method for learning how to properly enter data into MISLE came from on-the-job training. For example, personnel at one boat station stated that they found on-the-job training to be the most effective way to learn MISLE data entry, but they also stated that such training can be inconsistent, since data entry proficiency is largely based on the practices and knowledge of the on-the-job trainer.

MISLE Data Validation Processes

The Coast Guard also has implemented data validation processes for supervisory oversight at its sector, district, and headquarters levels to help ensure MISLE data quality. These validation processes can vary by mission and mission policies. For example, in search and rescue operations, unit watchstanders responsible for mission coordination are to

review search and rescue cases and associated sorties in MISLE for completeness.⁴³ Cases are then submitted to the command duty officer for review. At one sector we visited, unit watchstanders and command duty officers are required to sign and certify that they had performed a quality assurance check of the data entered into MISLE and reviewed the steps outlined in a data validation checklist. Representatives we interviewed from district offices, which oversee sector operations, stated they also review selected cases periodically to ensure the information in them complies with Coast Guard policy.

Regarding entry of law enforcement activity data in MISLE, according to Coast Guard officials, these data are generally reviewed locally by senior unit personnel, with the exception of reported law enforcement violations, which are submitted to the Coast Guard's Violations Case Coordination Center for review. Officials said that the center is to review these activities for completeness and return incomplete entries to users for revision.⁴⁴ Further, officials from the Coast Guard's Office of Investigations and Casualty Analysis stated that district officials are to review and validate all Coast Guard-recorded investigations, due to the legal implications of such activities.

Select MISLE Data Reflect Some Accuracy and Completeness Problems

In our analysis of selected Coast Guard records entered into MISLE and aggregated through CGBI, we identified several data issues.⁴⁵ We reviewed data entered into MISLE from fiscal years 2014 through 2018 for four Coast Guard missions in which staff had manually entered the data into MISLE. We found three types of issues to varying degrees: (1) data errors, (2) incomplete or missing records, and (3) inconsistent data entry. Coast Guard officials from the Office of Performance Management

⁴³The command center watchstander position receives notifications for Coast Guard response actions, such as distress calls for search and rescue operations or notifications of pollution events. For coastal incidents, the watchstander then directs personnel at sector, boat or air stations to respond to the reported incident. A response activity by a single boat or air unit is called a sortie.

⁴⁴The Violations Case Coordination Center is the Coast Guard unit responsible for processing a law enforcement violation for civil penalty.

⁴⁵We assessed data supporting performance measures for four Coast Guard missions: Search and Rescue; Marine Environment Protection; Ports, Waterways, and Coastal Security (prevention activities); and Other Law Enforcement. We also assessed other data in the dataset, such as location and operational details. See app. I for a full description of the data we assessed.

and Assessment acknowledged these issues and also identified concerns about data quality and the underreporting of certain mission outcomes.

Data Errors

Our analysis of selected MISLE data from fiscal years 2014 through 2018 showed that the MISLE data that the Coast Guard has used to calculate its performance measures and supporting data fields contained a relatively small number of data errors.⁴⁶ For example, some search and rescue case data contained recorded response times outside of the range that the Coast Guard considers accurate—such as those greater than 4,320 minutes. We found instances of these data errors in less than 5 percent of search and rescue records for each fiscal year. Officials from the Office of Performance Management and Assessment stated that they recognize that these errors exist in the data, so they manually purge them when calculating performance data, such as the average annual response time to distress calls.

Incomplete or Missing Entries

Throughout the datasets we reviewed, we found instances of missing and incomplete MISLE data records. For example, MISLE law enforcement activity data used to record the Coast Guard’s interdiction rate of foreign fishing vessels violating U.S. waters contained a number of records from 2014 to 2016 that were listed as open and in progress years after they were initiated. According to MISLE training documentation, a status of “open and in progress” is an indication that a record has either not been fully completed or reviewed. However, the number of open and in progress activities dropped to less than 1 percent for data recorded in fiscal years 2017 and 2018, indicating that the Coast Guard had addressed the issue but had not updated records from previous years. As of December 2019, the percentage of open and in progress activities initiated in 2015 was 35 percent, and officials could not provide an explanation for why these records had not been closed. An official from the Coast Guard’s Maritime Law Enforcement program office said that headquarters officials do not rely on MISLE to track whether activities such as interdictions have been completed. However, the official said that

⁴⁶The data we received was considered final data, that is, it had gone through required validation steps. As such, our analysis may not include data entry errors made during the initial data entry steps, which, according to Coast Guard officials, can include a significant amount of errors that require correction. For example, officials from the marine environmental response unit stated that initial data entry in MISLE contains error rates of around 30 percent.

district personnel have a process for reviewing the activities and validating recorded results in separate tracking systems.⁴⁷

In addition, the Coast Guard has reported in its 2018 and 2019 strategic planning direction reports its determination that search and rescue data may not accurately reflect true workloads at sector command centers, a situation that may be explained in part by sector command centers not completing required data entry for certain search and rescue incidents. According to Coast Guard policy, search and rescue cases should be entered into MISLE regardless of the extent of the Coast Guard's involvement. However, the Coast Guard's fiscal year 2019 strategic planning direction report stated that, due to data entry challenges, Coast Guard watchstanders may be deterred from creating MISLE search and rescue cases for minor incidents that come to the attention of field units but require minimal investigative work and response coordination.⁴⁸ The effect of such data entry challenges on search and rescue results data can be significant. Headquarters officials stated that MISLE-reported annual caseloads had dropped by 48 percent from 2005 through 2019, from about 30,000 reported cases per year to about 15,600.⁴⁹ Our review of MISLE data confirmed that recorded search and rescue cases had dropped during the period of analysis. Our analysis, for fiscal years 2014 through 2018, showed a reduction of 11 percent. Coast Guard officials agreed with our results, stating that they believed the largest drop in reported search and rescue cases had occurred prior to 2014. According to Coast Guard planning documentation, underreporting Coast Guard activities understates mission demand and potentially puts operational

⁴⁷As stated earlier in this report, foreign fishing vessel interdictions and other performance data are not tabulated and reported based on MISLE data; but instead, according to maritime law enforcement officials, the data are tracked on a separate spreadsheet based on data collected from other sources, including district summaries of field unit activities.

⁴⁸We describe search and rescue data entry challenges later in this report in our discussion of the Coast Guard's early-stage efforts to respond to certain MISLE data issues.

⁴⁹Coast Guard officials stated that, while they are concerned with underreporting of search and rescue cases, they also believe that the decrease in recorded cases may reflect an actual reduction in distress calls to the Coast Guard. Officials stated that other possible factors contributing to the decreased volume of recorded search and rescue cases may include Coast Guard successes in preventing accidents through boardings and inspections, growth in commercial maritime support options to respond to boaters in distress, better communications and technology on vessels that reduce the reliance on the Coast Guard for maritime incidents, and an overall decrease in boating activities.

commanders at risk of being underresourced to meet actual mission demands.

Inconsistent Data Entry

Using record-level MISLE data compiled in CGBI, we attempted to recreate selected Coast Guard performance measures using the Coast Guard's methodology and were generally able to do so. However, our analysis of search and rescue data used to report performance found a high volume of inconsistencies that may affect the reliability of the data.⁵⁰ (See app. IV for information on Coast Guard performance measures and our analysis.) Coast Guard officials from the Office of Performance Management and Assessment confirmed our findings, stating that they are unable to use large portions of search and rescue-related data for analysis and reporting due to data reliability concerns.

Specifically, we were generally able to recreate the Coast Guard's search and rescue performance measure indicating the rate at which Coast Guard assets were able to arrive on scene within 2 hours from the time they were requested to respond by Coast Guard personnel, which is the method of calculation specified in Coast Guard documentation.⁵¹ However, we found that additional key data elements the Coast Guard collected to track search and rescue cases, while not used in performance measure calculations, revealed a large quantity of inconsistent data entry. For example, we found that the data element indicating the time and date that the Coast Guard had received notification of a person in distress for search and rescue cases was not consistent with other data elements in the sequence of events. Specifically, in large numbers of cases annually, personnel recorded

⁵⁰We found minor discrepancies between our results and Coast Guard-reported measures that we were unable to reconcile with Coast Guard officials in all but one dataset we reviewed. The exception to these findings was the maritime prevention performance measure, "Annual MTSA [Maritime Transportation Security Act] facility compliance rate with transportation worker ID credential regulations." In this instance we were able to reconcile our analysis with Coast Guard officials.

⁵¹According to the Coast Guard's fiscal year 2018 annual performance report, the performance measure is calculated as the percentage of all maritime distress incidents in which a Coast Guard surface or air asset arrives on scene in less than or equal to 2 hours. The recorded date and time of the first Coast Guard surface or air asset on scene is subtracted from the recorded date and time that the first surface or air asset is requested for all incidents, which are judged by operational commanders as valid enough to order a response. Time on scene is the earliest time a search and rescue unit is requested to proceed until the earliest time of an arrival on scene. It includes preparation time required for engine warm-up; underway checklist; risk management evaluation; mission planning, etc.; and transit time from departure to arrival on scene.

being notified of a search and rescue incident at a time that was after the recorded time of the request for a Coast Guard unit to respond to the incident. MISLE data reflected such inconsistent entries in 26 to 35 percent of recorded cases between fiscal years 2014 and 2018. In addition, we also found inconsistencies when comparing recorded notification times and the recorded date and time a Coast Guard asset arrived on scene for each case. In these instances, the case would have resulted in a negative response time, which would render the data unreliable. In fiscal year 2018, about 20 percent of search and rescue MISLE case data contained such inconsistencies.

The Coast Guard's search and rescue MISLE data entry guidance states that notification date and time reflects the first step in the search and rescue case time line.⁵² Further, according to Coast Guard search and rescue policy, the recorded notification time and date is an important step in search and rescue case documentation and is the basis for the standard 2-hour response time window in Coast Guard policy documentation.⁵³ According to Coast Guard headquarters officials from the Office of Search and Rescue Policy and the Office of Performance Management and Assessment, the likely cause of inconsistent data entries, such as those with recorded notification times out of sequence, is user error. Officials said that while they had reasonable confidence in search and rescue case data recorded in MISLE that directly inform Coast Guard performance measures, they had less confidence in other search and rescue data elements. For example, one official stated that the Coast Guard does not use activity data recorded by surface and air assets in response to search and rescue incidents, known as resource sorties, for the purposes of planning and performance because the Coast

⁵²U.S. Coast Guard, *U.S. Coast Guard Addendum to the United States National Search and Rescue Supplement to the International Aeronautical and Maritime Search and Rescue Manual*, COMDTINST M16130.2F (Washington, D.C.: January 2013).

⁵³According to the Coast Guard's search and rescue addendum, the siting, basing or staging of search and rescue units should provide for no greater than a 2-hour total response time for any one surface or air search and rescue within that sector or unit's area of responsibility to arrive at any location within the area of responsibility. This time is calculated from the time of notification of the Coast Guard until the time of arrival on scene of an search and rescue unit, based on moderate environmental conditions that allow for operation of the search and rescue units at their top cruise speeds, and including 30 minutes of preparation time (i.e., a total of 90 minutes from underway to on scene).

Guard considers such data unreliable.⁵⁴ Such a volume of errors calls into question the reliability of search and rescue MISLE data elements, including those the Coast Guard has used to report performance measures. Without addressing inconsistencies, such as accurately recording search and rescue activities in the correct sequence, the Coast Guard does not have the information it needs to identify potential deficiencies in response times and to take corrective actions as needed.

According to Coast Guard documentation and in discussions with Coast Guard officials, the MISLE data issues we found are not limited to search and rescue records. For example, the Office of Marine Environmental Response Policy reported in the fiscal year 2019 strategic planning direction that continued data integrity issues in MISLE are affecting the validity of pollution response activity reports.⁵⁵ In addition, officials from the Office of Maritime Law Enforcement, Living Marine Resources and Marine Protected Species Division, stated that they have identified error rates in MISLE ranging from 9 to 35 percent over the last 5 years.⁵⁶

The Coast Guard's fiscal year 2020-2025 IT strategic direction document states that a principle of its approach is to position the Coast Guard to manage, use, and value information as a strategic asset.⁵⁷ Further, the *Standards for Internal Control* provide that management should design control activities to achieve objectives and respond to risks. Management designs control activities in response to the entity's objectives and risks to achieve an effective internal control system. Management also designs appropriate types of control activities in the entity's information system for

⁵⁴The official stated that, as an additional consideration, the Coast Guard does not use resource sortie data because of the risk of overcounting key performance metrics, such as lives saved, due to instances in which multiple Coast Guard assets are launched as part of a single case. Officials said that case data, which aggregates all activities associated with a particular incident, do not pose such overcounting risks.

⁵⁵The report further stated that accurate data entry and documentation of different marine environmental response data entries in MISLE are essential to predict and evaluate mission performance, assess the efficacy of existing response and preparedness policy, and equitably distribute limited resources based on existing staffing models.

⁵⁶Officials stated that they make corrections to these errors on a monthly basis.

⁵⁷U.S. Coast Guard, *Command and Control, Communications, Computers, Cyber and Intelligence (C5I) Strategic Direction, FY2020-2025* (Washington, D.C.: April 2018).

coverage of information-processing objectives for operational processes.⁵⁸

Coast Guard officials could not confirm why data errors, such as those we identified above involving issues of incompleteness and inconsistency were occurring, as they have not assessed the causes of these issues. In addition, officials expressed varying opinions about the type of solutions that may be needed to address data issues. For example, one group of officials told us that logic checks or data validation prompts could potentially help address erroneous data entries and reduce the time spent conducting data entry reviews or catch errors missed during review processes. These officials suggested that MISLE could be programmed to include data validation and logic checks to prevent users from accidentally entering values such as inaccurate time and date information that result in negative time frames. Coast Guard headquarters officials also said that data quality could be improved by programming automated prompts into MISLE that notify a user about possible erroneous data during data entry. However, other headquarters officials stated that while such automated controls may provide benefits to MISLE data consumers, they could be more burdensome for those entering data into the system.⁵⁹ In the field, users stated that they are not able to move through MISLE workflows without entering certain data elements, which they said can result in frustrating data entry experiences.⁶⁰ By assessing the causes of data errors against the various measures it takes to ensure quality data, the Coast Guard may be better equipped to address such errors and enable it to report reliable MISLE data without having its personnel

⁵⁸Application controls, sometimes referred to as business process controls, are those controls that are incorporated directly into computer applications to achieve validity, completeness, accuracy, and confidentiality of transactions and data during application processing. Application controls include controls over input, processing, output, master file, interface, and data management system controls. GAO, *Standards for Internal Control in the Federal Government*, [GAO-14-704G](#) (Washington, D.C.: September 2014).

⁵⁹These officials said that data issues could be better addressed by simplifying the MISLE user interface.

⁶⁰Field users said that they are sometimes working with incomplete information and that it would be helpful to populate MISLE with the information they do know and return later to complete the rest. However, since each page requires the population of all required fields before moving to the next page, they cannot move forward and must wait until they have all information recorded for each page before entering other data. In addition, users said system errors and crashes can result in lost data entry if these occur before they can research, enter, and save their information for each page.

complete time-consuming validation processes and data cleanup on a regular basis.

The Coast Guard Has Initiated Early-Stage Efforts to Investigate MISLE Data Quality Issues but Has Not Developed an Implementation Plan

To address some of the above MISLE data issues, Coast Guard officials described some early-stage initiatives it is undertaking, including efforts to address recommendations that the Coast Guard's FORCECOM Command Center Standardization Team identified during its fiscal year 2019 assessment of Coast Guard command centers detailed below. However, the Coast Guard was unable to provide documentation showing progress made on these new initiatives or a plan for implementing the identified recommendations.

In 2019, the Standardization Team conducted an internal inspection to assess field unit preparedness and performance across the Coast Guard through site visits, evaluating 21 units and 603 personnel as part of its annual assessment process. Its resulting 2019 assessment report included a specific MISLE component indicating that they had reviewed 88 search and rescue cases associated with the evaluated command centers. For search and rescue activities, the team found a 77 percent compliance rate with data entry requirements across the command centers it evaluated. According to FORCECOM officials, the Standardization Teams provided guidance to command centers on improving MISLE entry compliance rates based on best practices during their site visits. In addition, the report stated that changes were needed to MISLE to streamline the process flow in order to significantly improve data accuracy and quality.

The 2019 report also made several specific recommendations to improve MISLE data accuracy and quality, including

- **streamline workflows** so that MISLE's design reflects the realities of command center operator workloads. For example, moving all required data to a single page of MISLE would reduce the time it takes for command center personnel to load, locate, and enter required information into multiple tabs in MISLE since they would be consolidated in one place;⁶¹

⁶¹The Standardization Team found that the Incident Management Activity has 13 different tabs, some with only one dropdown field. When navigating Incident Management Activity tabs, each takes several seconds to load, and watchstanders have to search for required data fields.

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- **analyze required information** to eliminate redundant entries of information;
 - **revise data fields** to auto-populate data elements already available in other systems, such as weather and surface or air asset information, rather than manually entering them; and
 - **make system updates more responsive** to reflect current mission requirements, such as updating the risk management data fields in MISLE to reflect the revised risk management program that had been updated in 2018.

The 2019 report also identified several recommendations for the search and rescue program office and the Deputy Commandant for Operations to review case documentation policies to alleviate excessive documentation requirements and assuage the administrative burden on command center personnel.⁶² Some of the recommendations included actions to

- **reduce the number of data elements required** for documenting minor cases to only those needed for data collection, as current policy calls for them to have the same level of documentation as major cases;⁶³
- **review the triggers for entering Coast Guard sorties** versus Other Governmental Agency sorties, and identify if the same documentation requirements are necessary and feasible when a non-Coast-Guard government asset responds;⁶⁴ and
- **establish formal training for MISLE** and require it for personnel working in command centers, as well as the aviation and boat forces communities, which together make up one of the largest population subsets of MISLE users.

Officials from FORCECOM stated that they established a Standardization Team initiative, which they said is in its early phases, to review the 2019 assessment and determine what actions need to be taken in response to

⁶²Notably, the summary identified these recommendations and noted that they would be in addition to system upgrades.

⁶³According to the report, this approach could save significant work hours spent documenting individual cases, since roughly 65 percent of cases were minor in fiscal year 2019.

⁶⁴Evaluators further noted that only 12 percent of required Other Governmental Agency sorties are entered into MISLE currently, which made a direct comparison with Coast Guard sorties difficult.

its recommendations.⁶⁵ However, as of March 2020, the Coast Guard was unable to provide documentation or further detail on the team’s progress—such as a schedule, plan, charter, or timeframes for addressing the Standardization Team’s recommendations. Standards for project management call for developing a plan with specific actions and time frames.⁶⁶ Developing and implementing a plan to ensure that the Coast Guard implements the standardization team assessment recommendations would help the agency to have greater assurance that it is taking action to respond to known MISLE data issues.

The Coast Guard Completed Major System Changes in 2015 and Has Plans for Further Enhancements, but It Has Not Followed Key Steps to Address System and User Needs

The Coast Guard completed major system changes to MISLE in 2015 through the implementation of the MISLE 5.0 project; however, it did not follow key systems development processes or deliver all planned functionality as part of the project. MISLE system managers have recently identified system deficiencies and potential needs for further system changes, but they have not followed key steps to address system and user needs as they pursue new and ongoing investments in MISLE.

The Coast Guard Completed Major Changes to MISLE in 2015, but Did Not Follow Key IT Systems Development Processes or Deliver All Planned Functionalities

In 2015, the Coast Guard implemented the current version of MISLE—MISLE 5.0—through a project known as MISLE Modernization, in which it completed major changes to the system, including the replacement of the underlying system architecture. However, MISLE system managers did not follow key systems development processes when redesigning the system to ensure that they effectively managed the project and that the end-state system met user requirements.

⁶⁵Officials also said that this particular intervention is new for the Coast Guard, as past assessments have been used to revise FORCECOM course curricula. In this case, however, the goal of the assessment is to provide timely, actionable feedback to MISLE users and system managers.

⁶⁶Project Management Institute, Inc., *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*, 6th Edition, 2017.

MISLE system managers first initiated the MISLE 5.0 project in 2008. The stated purpose of the project was primarily to replace MISLE's underlying system architecture, which was facing obsolescence and risked becoming incompatible with future versions of Microsoft-based operating systems used to run Coast Guard computers.⁶⁷ In addition, the project's initial scope included other large- and small-scale changes to modernize the overall system. For example, the 2008 conceptual plan for MISLE 5.0 provided for large-scale changes to the system, in addition to the primary purpose of replacing MISLE's underlying system architecture, including upgrades to the graphical user interface and other functionality improvements.⁶⁸ The plan further included dozens of changes to existing system functionality. Examples of additional proposed changes for MISLE 5.0 included

- defining and implementing improved user workflows to guide users while documenting their operational activities in the field, such as vessel safety inspections and law enforcement events;
- adding new functionality to capture operations and business practices that changed since MISLE's original delivery in 2001; and
- adding new functionality to merge records of duplicate vessels and persons created by users in MISLE's referential database.⁶⁹

Coast Guard officials told us they initially processed the project as a maintenance effort because the intent of the project was to replace the underlying system architecture and maintain the existing system capabilities; thus, the project followed less-rigorous project management and oversight practices than a new system acquisition or major system

⁶⁷The version prior to MISLE 5.0 used a software language called Visual Basic 6.0 Active X. Visual Basic 6.0 was released in August 1998, but support for the technology expired in April 2008. Similarly, the technology the Coast Guard employed to access and store MISLE data had not been updated since 2000.

⁶⁸The Coast Guard's 2008 conceptual plan, known as the Concept of Operations, provides a listing of proposed changes for the initial MISLE upgrade. Coast Guard officials could not confirm exactly which items were implemented as part of MISLE 5.0 but said that many were attempted and, in some cases, implemented. However, we were unable to verify these statements through Coast Guard documentation.

⁶⁹As described earlier in the report, MISLE contains information on vessels and individuals in order for Coast Guard personnel to carry out regulatory responsibilities. These data are, for the most part, populated by MISLE users. Coast Guard guidance states that MISLE users should populate such information to the extent possible to document the activity or regulatory action but does not require complete vessel or party information such as those that exist in other national databases, including those used by the Federal Bureau of Investigation's Criminal Justice Information Services for background checks.

modification would have had to follow. However, midway through the development of the project in 2012, MISLE system managers began following the Coast Guard's Systems Development Life Cycle (SDLC) framework to manage the effort.

The SDLC, which was a systems development framework in effect at the time of project development, outlined a process of phases and milestone reviews that were intended to help ensure IT projects were managed effectively and that end-state solutions met user requirements. This framework established required practices for developing and managing Coast Guard IT system solutions through all phases of system development—conceptual planning, planning and requirements definition; design, development, and testing; implementation; operations and maintenance; and disposal of the system. According to the SDLC guidance, when major changes to a system were needed, the Coast Guard was required to follow the SDLC life cycle process from the planning phase to the implementation phase and develop or update SDLC system documentation in support of the changes. These SDLC activities would have included:

- creating or updating the project management plan to define project roles and responsibilities;
- creating or updating the business case for the system that addresses changes in funding that may impact a cost/benefit analysis, changes to the requirements that may impact the system justification or need, and possible alternative solutions for development;
- creating or updating a functional requirements document that explains the system's expected capabilities; and
- holding review sessions with the user community that include participation from support and training communities to ensure that all functional requirements were sufficiently met by the design.

In September 2009, MISLE system managers coordinated with the Coast Guard's OSC to work on the MISLE 5.0 project under the operations and maintenance phase of the SDLC.⁷⁰ OSC provided an initial time line of 2 years for project completion and independently developed a framework and methodology for the project. The framework and schedule were

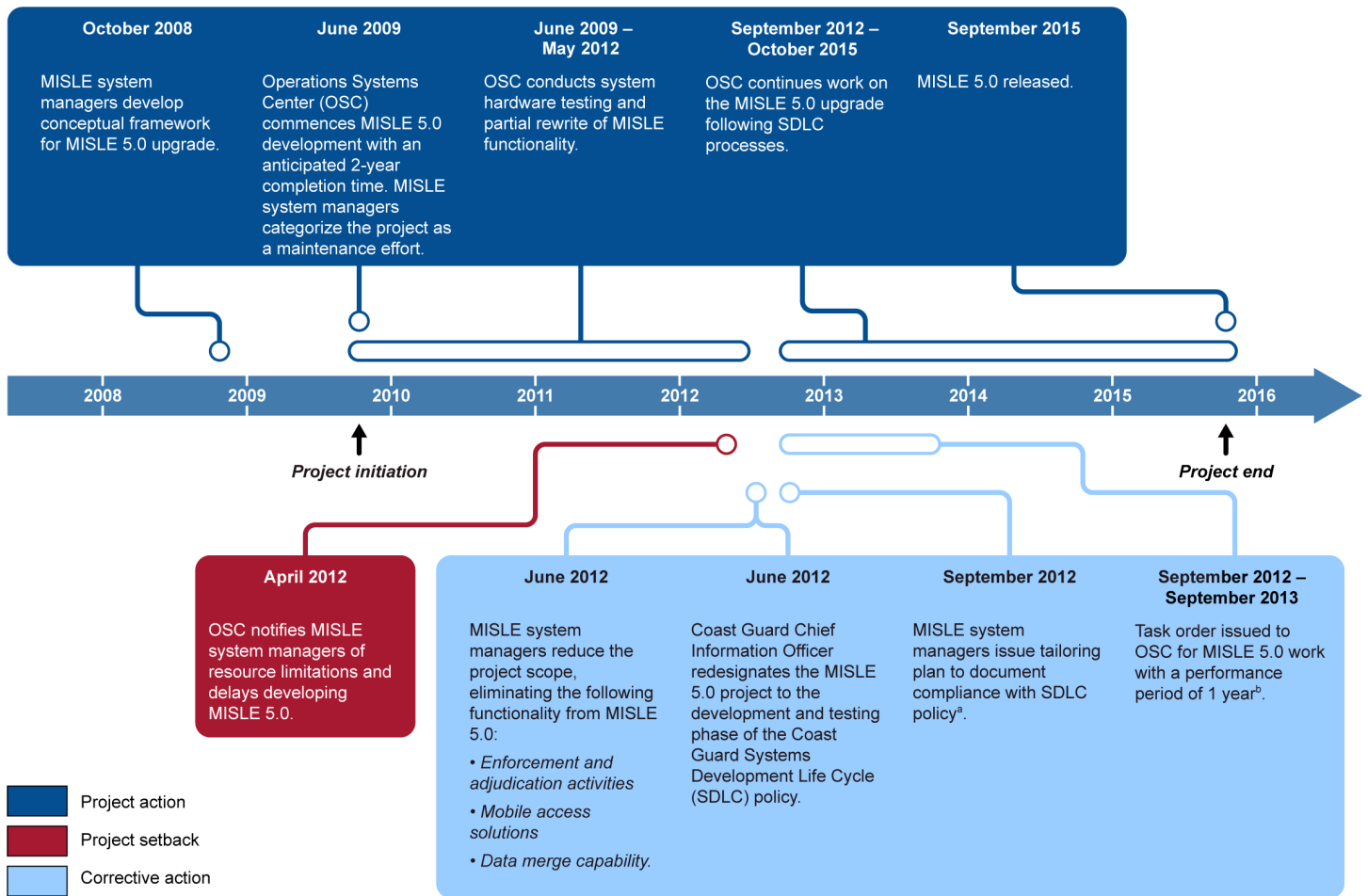
⁷⁰We say "coordinated" rather than "contracted" with OSC because the Coast Guard was not able to provide specific task orders related to the MISLE project from 2009 to 2012. MISLE system managers stated they were not present during the early phases of the project but they believed that officials at the time used an existing contract to initiate work on MISLE 5.0.

based on OSC's assumption that its personnel had sufficient knowledge to duplicate and reengineer the system's functionality without external subject matter expert assistance and that changes to the existing system would be minimal during the rewrite of the system. However, according to an OSC memorandum from May 2012, OSC had determined in May 2010 that this project approach presented high levels of risk, given MISLE's complexity and undocumented workflow processes in the existing system. According to the same memorandum, OSC had tested system hardware and made significant progress rewriting programming code from 2009 to 2012. However, the same memorandum provided that in April 2012, OSC told MISLE system managers that it continued to face obstacles completing the upgrade on time, given the significant scope of work and OSC's resource constraints.^{71,72} (See fig. 4 for a time line of events.)

⁷¹OSC and MISLE system managers stated that they were in periodic contact during the initial development period, which is when system managers may have first been alerted to possible delays.

⁷²In its memorandum, OSC described the complexity of the project, stating that it required the rewriting of over 1.27 million lines of code. OSC also described difficulties with reverse engineering and validating MISLE's original functional requirements with the Coast Guard's operational departments, and challenges completing the work with limited software development personnel.

Figure 4: Time Line of Key U.S. Coast Guard (Coast Guard) Actions Associated with the Development of the Marine Information for Safety and Law Enforcement (MISLE) 5.0 Upgrade



Source: GAO analysis of Coast Guard information. | GAO-20-562

^aEach nonmajor Command, Control, Communications, Computers and Information Technology (C4&IT) system project was required to follow the Coast Guard Systems Development Life Cycle (SDLC) Policy and Practice. The SDLC practice required each project to include a tailoring plan detailing how it addressed all SDLC requirements, including responsibilities, products to be produced, and events to be conducted. The tailoring plan provided project managers with the flexibility to address unique project variations, such as solution approaches and trade-offs in costs, scope, and quality. This flexibility was to be balanced against a requirement to support Department of Homeland Security and Coast Guard development standards.

^bThe 2012 task order was the only MISLE 5.0-specific task order that MISLE program managers and OSC were able to provide to us. Officials stated that, prior to 2012, the Coast Guard relied on an existing contract for MISLE 5.0 project activities, but were not able to locate specific task orders from that time period.

As a result, in the May 2012 memorandum to MISLE system managers, OSC extended the timeframe for MISLE 5.0 development to April 2013, citing the project's scale, OSC's resource limitations, and necessary external coordination as reasons for delayed delivery. To meet the April 2013 project completion date, OSC's memorandum further recommended reducing the scope of the project. MISLE system managers concurred with this approach and removed from the project existing MISLE functionalities and some of the planned enhancements, with the expectation that they would be developed and released in a future version of MISLE. The existing functionalities that were removed included mobile solutions to capture law enforcement activities and MISLE components for enforcement processing and adjudication. System enhancements removed from the project scope to a future MISLE release included the functionality to merge duplicate vessel records. The functionalities removed from the MISLE 5.0 project reflect some of the ongoing user challenges described earlier in the report, such as the inability to input data into MISLE while conducting operations in the field and the existence of duplicate vessel records that marine safety inspectors have to review prior to conducting vessel inspections.

In June 2012, over 2-and-a-half years into MISLE 5.0 development, MISLE system managers made corrective actions in an effort to avoid further project delays, and requested approval for a redesignation of the project from the operations and maintenance phase to the development and testing phase of the SDLC. Coast Guard documentation states that this redesignation was to mitigate future project risks. The Coast Guard's Chief Information Officer formally redesignated the MISLE 5.0 project to the development and testing phase in a memorandum in June 2012.⁷³ As a result, MISLE system managers began retroactively developing some of the required SDLC documentation, such as a tailoring plan and project management plan, to comply with SDLC requirements that would have applied if the project had followed the SDLC process from the beginning. OSC completed MISLE 5.0 in September 2015 with the reduced scope.

However, as detailed in the MISLE 5.0 SDLC Tailoring Plan, issued in September 2012, the Coast Guard had not conducted many SDLC processes nor created key documents—at the beginning of project or as the system was redesigned and developed. Such processes and activities

⁷³The Coast Guard's Command, Control, Communications, Computers and Information Technology (C4&IT) System Development Life Cycle Policy stated that its development of all C4&IT systems should include the completion of products and activities outlined in the Systems Development Life Cycle guidance.

under the SDLC were intended to help ensure that projects were managed effectively and that end-users needs were met by the delivered system. The tailoring plan estimated that the project had completed approximately 75 percent of the development and testing phase when the Chief Information Officer redesignated it.

While MISLE system managers followed the SDLC to guide the remainder of the project and retroactively created some SDLC documents, they had already bypassed key project planning, design, and development processes outlined in earlier SDLC phases. Following these processes from the beginning would have included the development of a business case with a cost/benefit analysis, an evaluation of alternatives to guide project design and development, and functional requirements and system design documents built on user needs. Following these steps could have helped the Coast Guard to better address needed system functionality and improved the design of the system. Furthermore, the MISLE 5.0 project would have been subject to SDLC milestone reviews typically completed in the earlier project phases, which would have provided oversight of the system design, budget, resources, and project scope through the approval of SDLC documentation. The Coast Guard released MISLE 5.0 in September 2015, and it remains in operation without some of its intended functionalities.

The Coast Guard Has Ongoing Investments to Enhance MISLE, but It Has Not Followed Key Steps to Address System and User Needs

MISLE system managers have near-term plans to complete additional MISLE enhancements but have not fully considered already-identified system performance problems as they pursue these investments. Beginning in 2016, the Coast Guard initiated efforts to provide MISLE functionality that it was unable to complete during the MISLE 5.0 upgrade. These investments included steps to incorporate the Enforcement and Adjudication Modules into the MISLE 5.0 software environment, a proof-of-concept project to restore mobile capabilities for some MISLE modules, and a contract to analyze potential solutions to issues of duplicate vessel and vessel operator data in MISLE. According to MISLE system managers, some of the investments, such as the upgrade of the MISLE enforcement and adjudication modules, have experienced setbacks. Overall, however, these ongoing investments are positive steps toward improving MISLE functionality and the Coast Guard user experience. Yet, in the fiscal year 2019 operational analysis of the system, MISLE system managers identified system performance issues and user challenges with the existing system that they noted require further consideration, as specified by the Systems Engineering Life Cycle (SELC) framework.

MISLE Enforcement and Adjudication Modules

Although MISLE system managers have taken steps to incorporate additional functionality into the MISLE 5.0 environment to ensure the reliability and availability of related data, they have not identified viable solutions. Specifically, since January 2017, the enforcement and adjudication modules, which assist in the issuance of violations and disposition of the resulting enforcement actions, have not been compatible with Coast Guard desktop computers.⁷⁴ As a result, users entering or using data from the modules must use a legacy version of MISLE through a portal on the Coast Guard server.⁷⁵ In addition, Coast Guard officials stated that these two modules are at risk of failure, since they still reside in a legacy version of MISLE. System managers have pursued several different options to upgrade these functionalities, but after several delays and planning setbacks, in February 2020, Coast Guard officials stated they are abandoning these efforts in favor of an in-house upgrade and redesign for the enforcement module (similar to actions taken during MISLE 5.0 development) and reverting to paper processes for adjudication processing.

In 2017, MISLE system managers characterized the upgrade of the enforcement and adjudication modules as a maintenance effort and completed a functional requirements document specifically for the two modules, with the intention to complete the functionality scoped out of the MISLE 5.0 project. The Coast Guard provided funds to OSC through its Resource Council to begin work on the two modules in fiscal years 2016 and 2017, and OSC completed development of the functional requirements for the modules but did not begin development of the project during those years. In fiscal year 2017, MISLE system managers contracted with a third-party contractor to complete an analysis of alternatives to determine the best course of action.⁷⁶ With guidance from

⁷⁴The enforcement module in MISLE provides the Coast Guard with key capability to enter data during detection and response activities, which authorized Coast Guard personnel use to follow up on necessary investigation and enforcement actions. The MISLE adjudication module collects Coast Guard incident or activity information for specific types of enforcement or regulatory activities, which the Coast Guard Administrative Law Judge can then adjudicate.

⁷⁵Since these modules are not compatible with Coast Guard desktop computers, which currently run on the Microsoft Windows 10 operating system, users must connect to a server that houses the applications virtually.

⁷⁶The analysis of alternatives followed an adopt-buy-create model, which prioritizes the adoption of existing technology solutions over buying a new technology solution and establishes in-house creation of a solution as a third-best option. The approach the Coast Guard used considered adopting technologies from other military organizations, DHS and component agencies, and other government agencies.

the contractor, MISLE system managers initially decided to pursue a contract for a solution through a cloud-based software service managed by DHS. However, MISLE system managers stated they subsequently found that the existing contract could not meet its technological requirements and decided to develop its own similar cloud-based solution. As a result, the project experienced delays, and officials stated that MISLE system managers were then unable to secure a contract in time to use \$2.1 million in maintenance funding that had been designated for the project in fiscal year 2019.

As of February 2020, Coast Guard officials said that they no longer had funding for this project in fiscal year 2020, as the fiscal year 2019 funding was no longer available. Instead, officials told us that the Coast Guard intends to write custom code for the enforcement module as it did for other components of MISLE 5.0 and remove the adjudication functions from the legacy version of MISLE to revert it to paper processes. However, MISLE system managers could not provide details on this latest approach, such as the staff and funding resources needed, including estimated time frames for completion and how reverting to a paper process might impact the ability of staff to carry out their adjudication tasks. System managers stated that stakeholders had asked for enforcement functionality to be migrated to the MISLE 5.0 environment by April 2020, but a firm date for completion had not been established, as of February 2020.

MISLE Mobile Solution

In October 2019, the Coast Guard concluded a 7-month contract to develop and test a proof-of-concept for a limited mobile solution to MISLE, which would allow marine inspectors to access and operate MISLE from a mobile device.⁷⁷ Coast Guard officials stated that the proof-of-concept will serve as a test case for Coast Guard-wide mobile application development efforts rather than serve to provide an exclusive MISLE mobile solution. The contract provided technical design considerations and requirements for a potential solution. MISLE system managers stated that the contractor was able to implement the mobile application proof-of-concept but with varying degrees of success for all functionality. As of February 2020, Coast Guard officials stated that they did not have a proposed date to incorporate this functionality MISLE-wide or to other specific subsets of MISLE users, such as boarding officers.

⁷⁷Coast Guard officials told us that MISLE is not the primary focus of the proof-of-concept effort. Instead, they said that the goal is to enhance mobile capability across the Coast Guard, to include MISLE.

MISLE Merge Functionality

The Coast Guard also directed the contractor to complete an analysis of duplicate data within MISLE and to develop a strategy and recommendations for merging duplicate entries for vessels and persons as part of the MISLE mobile effort. The contractor's recommendations outline the level of effort, costs, and remediation schedule for a future effort to complete this "merge" functionality within MISLE. In its analysis, the contractor proposed a multipronged solution, which included remediation of existing duplicate entries, preventative measures to reduce the number of new duplicates users can create, and continuously monitoring the system to remediate newly created duplicates. The analysis also outlined a schedule for implementation within 290 days of project commencement. MISLE system managers stated that they were reviewing the contractor's recommendations and, as of February 2020, had not made a determination about how to proceed.

Fiscal Year 2019 Operational Analysis Results

MISLE system managers identified performance problems and user dissatisfaction with the existing system in their fiscal year 2019 operational analysis report, but they have not taken steps to address these deficiencies. MISLE system managers stated that they use an annual MISLE assessment process, known as the operational analysis, to determine the extent to which MISLE is meeting system performance targets, including the extent to which the system is meeting user needs. In the fiscal year 2019 operational analysis report, MISLE system managers reported system performance issues they had identified through a redesign of the existing user assessment process. Specifically, MISLE system managers stated that they had redesigned their user feedback process in fiscal year 2019 to obtain more in-depth feedback from a selection of frequent MISLE users representing all Coast Guard missions. Based on the more detailed results from the new user assessment, MISLE system managers determined that MISLE has issues that require resources to address; some of these issues mirror those we heard in our discussions with MISLE users detailed earlier in this report. Specifically, the operational analysis report stated that MISLE users did not find the system intuitive, that they experienced challenges following system workflows, and that entering data into the system involved repetitive and duplicative data entry. In addition, the report said that users experienced slow MISLE access times or freezing of the system due to limited bandwidth. The report also stated that the system is becoming outdated, which will require technology improvements. The report further established that MISLE does not meet three of five key performance parameters established by the Coast Guard for its information technology systems. Based on the results of the analysis, the report stated that the

findings helped them build and plan 5-year roadmaps for MISLE and plan for future investments.

MISLE system managers had previously solicited limited information from users through an email-based survey. Specifically, this survey consisted of one yes-or-no question, which asked if the user was satisfied with MISLE. In fiscal year 2017, the last year the Coast Guard had conducted its email-based survey, MISLE users reported a satisfaction rate of 68 percent,⁷⁸ which surpassed the Coast Guard's target of 60 percent. However, while the survey did not provide an option for responses beyond a yes or no, MISLE system managers stated they received narrative responses explaining a lack of satisfaction with the system from five users surveyed.⁷⁹ (For a summary of MISLE user assessment results from fiscal years 2015 to 2019, see app. V.)

Despite the progress that MISLE system managers have made in obtaining more detailed feedback from users, the fiscal year 2019 operational analysis report does not specify any plans for next steps or discuss the extent to which new investment requirements will affect ongoing work to enhance MISLE.⁸⁰

The Coast Guard has identified MISLE as a nonmajor acquisition program and, as such, the Coast Guard's Level 3 Non-Major Acquisition

⁷⁸In fiscal year 2017, the Coast Guard solicited feedback from the MISLE user community through an email-based survey, submitted to almost 1,000 randomly-selected users, to guide priorities and changes to the system. According to Coast Guard officials, the selected users for the annual survey are a representative sample of the Coast Guard's MISLE population, which is roughly 10,000 users.

⁷⁹MISLE system managers could not identify how they derived the 60 percent user satisfaction target, but stated that the user satisfaction rate prior to the release of the 2015 MISLE 5.0 upgrade was much lower, so the 60 percent target was seen as an improvement. Officials also said they had expected user satisfaction to increase over time as system managers addressed the remaining bugs in the system and users became more accustomed to the new system interface. Additionally, the survey response rate was 22 percent, which did not meet the MISLE system managers' target response rate of about 58 percent to obtain a statistically reliable sample for fiscal year 2017. Officials said that they did not follow up to obtain a higher response rate and did not perform a nonresponse bias analysis to assess whether their sample was representative of the MISLE community.

⁸⁰The report states that its findings provide an opportunity to begin the conversation between program stakeholders as to whether more efficient and cost-effective alternatives should be considered to improve the functionality of the capabilities delivered by this program.

Program manual requires the system to be managed in accordance with the SELC framework, which outlines specific steps for the efficient and effective delivery of capabilities to users. During the operations and maintenance stage of the system life cycle—which MISLE is currently in—system managers are to measure the performance, effectiveness, and suitability of a system through operational analyses. The results of operational analyses are to influence and inform acquisition needs activities for future capabilities. Specifically, if the operational analysis results identify that the system is encountering performance or cost problems, program managers may be required to take corrective actions to modernize, redesign, terminate, or propose a solution to replace the current one.⁸¹ In such instances, system managers are to conduct an analysis of mission needs, develop a new or modified mission needs statement, and analyze and select solutions for the next increment or release of a system.

After the release of MISLE 5.0 in 2015, the Coast Guard focused on developing or acquiring functionality scoped out from the MISLE 5.0 project and told us they have not created a specific plan to make further investments in MISLE or replace the entire system at this time.⁸² MISLE system managers also stated in testimony and in report documentation that the MISLE program has experienced funding shortfalls that limit the extent to which MISLE system managers are able to respond to all outstanding user needs and system requirements. Yet the performance problems outlined in the operational analysis indicate that critical improvements to the system are necessary to support users and operations, and the SELC framework guidance calls for the Coast Guard

⁸¹Any major enhancements to the system identified during the operations and maintenance phase are to be treated as new projects and undergo evaluation in accordance with the acquisition and SELC frameworks, which would include the creation of or updates to SELC-related documents and completion of SELC milestone reviews, including a mission needs statement that defines the identified system capability gaps and needed improvements to the system. Additional steps would include the creation or update of an operational requirements document that describes the top-level user needs and mission, objectives, and capabilities desired from the proposed solution and a concept of operations that outlines high-level business and mission operations that allows stakeholders to visualize how a proposed solution would support them.

⁸²In fiscal year 2015, MISLE system managers reported in the MISLE operational analysis report that MISLE 5.0 was expected to have a remaining operational life of 10 years after they completed the remaining items previously scoped out of the upgrade project and the estimated disposition date of MISLE would be 2026. However, in subsequent reports, managers shifted the disposition date to 2028 to account for delays in delivering remaining functionality. In these reports, MISLE system managers also stated that they have not developed plans for MISLE 5.0's replacement.

to take corrective action to remediate the deficiencies. By following the processes outlined in the SELC and taking action on the results of the fiscal year 2019 operational analysis, such as developing a mission needs statement to address the identified system performance issues and capability gaps, the Coast Guard would be better positioned to address system and user needs, including the challenges we have outlined in this report. Additionally, by identifying and analyzing alternatives that address the overall needs of the system, the Coast Guard would be better positioned to manage its ongoing investments within the context of its overall plan for MISLE and thereby more efficiently expend resources to improve the system. Furthermore, with better-defined capability gaps and mission needs, the Coast Guard could better articulate the resources necessary to acquire or develop new MISLE functionalities.

Conclusions

Developing and improving MISLE has been a long and challenging effort for the Coast Guard. First used in 2001, the system that the Coast Guard put in place has had to be updated numerous times to respond to new and changing missions and responsibilities. As MISLE is the primary system for tracking mission activities and measuring and reporting performance, the Coast Guard relies on MISLE for information for resource use and effectiveness, which it communicates to Coast Guard senior leaders and Congress. Nevertheless, we identified data reliability problems that may affect the accuracy of reporting on certain missions, such as search and rescue and maritime law enforcement. Coast Guard officials did not know why some of the errors and missing data were occurring because they had not assessed these issues and their causes. Such an analysis would position the Coast Guard to determine the best steps to better ensuring quality data across Coast Guard mission activities. Furthermore, developing a plan for how the Coast Guard intends to address the results of its 2019 Standardization Team assessment could also help guide Coast Guard efforts to incorporate the recommended actions to improve the quality of MISLE data.

The Coast Guard has enhanced and updated MISLE numerous times in its nearly 2 decades of use. However, over that time, the system has continued to have capability gaps that limited the Coast Guard's ability to collect, analyze, and use MISLE data for resource allocation decisions or to report agency performance. Its limitations have also hindered the ability of users to enter data efficiently and effectively. Further, by not following its systems development requirements, the Coast Guard's most recent upgrade bypassed crucial steps for project planning, design, and development. Following such steps would have put the Coast Guard in a position to understand user needs and gaps in functionality, which may

have allowed it to develop a system more aligned with user needs and operational requirements. Instead, the Coast Guard has been focused on completing enhancements originally conceived in 2008, while users have identified new challenges and capability gaps that will require resources to address. Given ongoing and newly identified required investments in MISLE, the Coast Guard would be better positioned to respond to such needs by following the SELC framework, which includes developing a mission needs statement reflecting such needs and capability gaps. Following such steps would also include identifying and analyzing alternatives, which could inform the Coast Guard as to whether new or ongoing enhancements would be the preferred solution for existing challenges or whether a new acquisition would be a more cost-effective solution in the long run. Without performing these steps, the Coast Guard lacks reasonable assurance that its current efforts address long-standing challenges or that its continued investments in MISLE are more cost-effective than other options.

Recommendations for Executive Action

We are making the following four recommendations to the Coast Guard.

- The Commandant of the Coast Guard should ensure that the Deputy Commandant for Mission Support assesses and addresses the causes of data errors and inconsistent entries in MISLE as identified by program offices and MISLE users, including reviewing MISLE training and data validation processes. (Recommendation 1).
- The Commandant of the Coast Guard should ensure that the Deputy Commandant for Mission Support uses the results of its 2019 Standardization Team assessment of command centers to develop a plan for improving the consistency and accuracy of MISLE data identified in its report. (Recommendation 2)
- The Commandant of the Coast Guard should ensure that the Deputy Commandant for Mission Support and the Deputy Commandant for Operations use the processes outlined in the SELC to identify needed enhancements across the MISLE system by developing an updated mission needs statement. (Recommendation 3)
- The Commandant of the Coast Guard should ensure that the Deputy Commandant for Mission Support and the Deputy Commandant for Operations use the processes outlined in the SELC to identify and analyze alternatives, and objectively select the preferred solution for MISLE to meet approved mission needs. (Recommendation 4)

Agency Comments

We provided a draft of this report to DHS for review and comment. In its comments, reproduced in full in appendix VI, DHS concurred with our four recommendations and described actions planned to address them. DHS also provided technical comments, which we incorporated as appropriate.

With regard to our first recommendation, DHS stated that the Coast Guard MISLE Sustainment Program Manager will assess the data errors and inconsistencies reported by program offices and users to address their causes in the short-term and correct them in the long-term. DHS further stated that the assessment will include reviewing data validation processes and training, among other factors. Current plans for MISLE also include addressing duplicate record entries (vessels, parties, and facilities), and the MISLE Sustainment Program Manager expects to complete its review of data validation processes and training by March 31, 2021. DHS estimated the completion date for these actions on this recommendation to be December 31, 2021.

With regard to our second recommendation, DHS stated that the MISLE Sustainment Program Manager and MISLE Sponsor's Representative are reviewing the standardization team's assessment and recommendations for MISLE. DHS also stated that it will consider short-term modifications to MISLE to improve data consistency and accuracy, while also considering the cost, schedule, and performance trade-offs. DHS stated that in the long-term, the Coast Guard will replace MISLE with a solution that meets its case management needs and can ensure more consistency and accuracy of MISLE data. DHS also stated it will likely take several years for the new system to be operational, pending its budgeting process and cost, schedule, and performance trade-offs. DHS stated the Coast Guard anticipates preparing an implementation plan for selected standardization team recommendations by March 31, 2021, but it is too early to estimate when the new system will be operational, so that timeframe is still to be determined.

With regard to our third and fourth recommendations, DHS stated that the Coast Guard had determined in May 2020 that MISLE needs to be replaced. According to DHS, the Coast Guard's Office of Command, Control, Communications, Computer, Cyber, and Intelligence Capabilities directed the establishment of an integrated product team. This team will be responsible for performing the analysis necessary to identifying mission requirements, capability gaps, mission needs, and operational requirements of the replacement system and will provide these requirements, including a Mission Needs Statement, to the DHS Joint Requirements Council for evaluation as DHS requires. The estimated

completion date for this effort is June 30, 2021. DHS also stated that as part of its processes for reviewing new IT systems, the Coast Guard will also be required to generate detailed documentation, including an Analysis of Alternatives, for review by the DHS Joint Requirements Council. DHS stated that the Coast Guard anticipates this action will be completed by September 30, 2021, followed by a methodical process to replace MISLE under a timeframe that is not yet determined.

We are sending copies of this report to the appropriate congressional committees, the Secretary of Homeland Security, and other interested parties. In addition, the report is available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (206) 287-4804 or AndersonN@gao.gov. Contacts points for the Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix VII.



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Director, Homeland Security and Justice

Appendix I: Objectives, Scope, and Methodology

This report examines (1) the extent to which the Marine System for Safety and Law Enforcement (MISLE) supports U.S. Coast Guard (Coast Guard) operations and decision-making; (2) the extent to which the Coast Guard has implemented policies, procedures, and training to help ensure reliable MISLE data; and (3) the Coast Guard's efforts to enhance, upgrade, or replace the MISLE system since 2008.

To examine the extent to which MISLE supports Coast Guard operations and decision-making we analyzed Coast Guard strategic planning and program performance reports to identify MISLE's role in achieving mission results, as well as any MISLE-specific issues that the Coast Guard identified that hindered its achievement of results. We focused our assessment of MISLE on its current operational environment, which we defined as the state of the MISLE system after the Coast Guard completed a technology upgrade in September 2015. Further, we analyzed Coast Guard annual operational analysis reports and spoke to Coast Guard offices responsible for overseeing MISLE to understand the Coast Guard's efforts to obtain MISLE user feedback as well as to identify areas of potential investment in MISLE to meet user-identified system issues or capability gaps.

We also met with several Coast Guard field and headquarters personnel to determine the extent to which MISLE supports day-to-day field operations as well as management decisions. Specifically, we interviewed select Coast Guard field users responsible for entering data into MISLE to understand (1) how they use MISLE to support mission activities, (2) the benefits and challenges of using MISLE, and (3) the training and validation processes for working with MISLE data.¹ The individuals we spoke to provided us with illustrative examples of how they use MISLE to support a variety of mission-related activities as well as their specific experiences with MISLE; however, these responses are not representative of all experiences across the Coast Guard. We also

¹We interviewed field representatives from one district office, three Coast Guard sectors (sectors are responsible for local operations within each district), five boat and air stations operating under the command of the sectors we visited, and two 87-foot patrol boat crews. Those we interviewed were involved in carrying out eight of the nine Coast Guard missions. This includes Ports, Waterways, and Coastal Security; Migrant Interdiction; Drug Interdiction; Living Marine Resources; Other Law Enforcement; Marine Safety; Marine Environmental Protection; and Search and Rescue. We primarily selected these units to obtain a diverse makeup of mission activities. However, as a secondary consideration, we chose sectors from three different geographic areas, one on the East Coast and two on the West Coast, to obtain perspectives from geographically distinct units.

interviewed representatives from headquarters offices responsible for setting policy and reporting outcomes of all Coast Guard missions supported by MISLE to understand how they use MISLE data to support decision-making, and the benefits and challenges of using MISLE data to report mission activities and outcomes.² We compiled select user statements from field and headquarters personnel highlighting specific MISLE-related challenges and limitations into a spreadsheet and coded responses to group similarly themed challenges and limitations together. To establish our categories, two analysts worked independently to develop a list of themes. Once we had established our initial list of themes, two analysts independently coded a sample of user-reported challenges and limitations, using themes identified, and then reconciled the differences. From there, the two analysts collaborated and reduced the challenges and limitations into four categories: system design (data errors), system design (time-consuming processes), technological limitations, and training. See table 5 for definitions of each theme. Finally, one analyst coded a further selection of user-reported challenges and limitations, and the second analyst validated the coding decisions of the first. We selected at least one example of each theme for inclusion in the report.

Table 5: Themes Used to Organize U.S. Coast Guard (Coast Guard) Marine Information for Safety and Law Enforcement (MISLE) User-Reported Challenges and Limitations

Themes used to group MISLE user-reported challenges and limitations	Explanation of theme
System design (data errors)	The system design (data error) theme includes any reported challenge entering or tabulating MISLE data due to missing, incomplete, or incorrect functionality in the MISLE system that may lead to data errors.
System design (time-consuming processes)	The system design (time-consuming process) theme is one in which Coast Guard personnel reported having to record information in more than one format or in which the data entry or tabulation requires what the individual characterized as duplicative steps due to MISLE's system configuration. The theme may also include statements characterizing unnecessarily lengthy or time-consuming processes.
Technological limitations	The technological limitation theme includes any reported challenge that originates from a missing technological capability, such as slow network speeds or MISLE access limitations.
Training challenges	A training challenge is one in which Coast Guard personnel reported a gap in data entry or data tabulation training.

Source: GAO analysis of Coast Guard information. | GAO-20-562

²We interviewed headquarters officials representing all Coast Guard missions supported by MISLE.

To examine the extent to which the Coast Guard has policies, procedures, and training to ensure reliable MISLE system data, we reviewed Coast Guard documentation, such as policies and guidance governing MISLE data entry and MISLE-specific training materials. We also collected information on formal training that Coast Guard personnel receive to prepare for carrying out mission duties to determine the extent to which MISLE training is included. To determine the amount of time Coast Guard personnel spend learning how to use the MISLE system during formal training mechanisms, we reviewed course curriculum documentation for each of the eight Coast Guard specialist courses.³ Our search criteria focused on any course units in which the primary objective was to enter data into MISLE.⁴ Specifically, we applied the following inclusion criteria to our search:

1. MISLE is listed at the sole function of the training unit.
2. Where MISLE is not the sole component, we looked to see whether
 - a. MISLE was listed in the training unit description, or
 - b. MISLE is listed as a core component of the enabling objectives listed below the training unit description.⁵

We interviewed the aforementioned Coast Guard field and headquarters users responsible for entering and validating MISLE data and reviewed

³In order to present our findings in a consistent format—training hours—we converted planned training days for Coast Guard formal courses into hours. We did this because the length of formal Coast Guard training courses is listed in days in Coast Guard documentation, while discrete training units within each course are listed in hours. To convert total course training days into hours, we counted all unit activities in a sample of three Coast Guard courses and divided the total unit hours by the reported training days. Based on these calculations, we determined that each training day was about 7.5 hours. We then multiplied training days by our conversion factor (7.5 hours) to obtain total training hours for each course analyzed.

⁴We encountered instances in which MISLE training is listed as a component of the enabling objectives but, based on the criteria above, does not constitute a core component of the training unit. In these cases, we acknowledge below that MISLE is listed as a component of the training unit, but since it is not a core component, we do not attempt to quantify the time devoted to MISLE in that training unit. Examples include training in which the final action involves documentation of operational activity in MISLE (as opposed to data entry being the basis of the training unit).

⁵By core component, we mean that the enabling objectives focus on data entry in MISLE and that any attendant actions included in the enabling objectives are dependent on MISLE data entry.

agency documentation from various levels to determine what MISLE data validation steps are taken to ensure accurate and complete data entry. We also reviewed Coast Guard data quality inspection results and assessed the Coast Guard's plans to address results against standards for project management.⁶

To examine the effectiveness of the above MISLE data quality measures, we analyzed select MISLE data representing four Coast Guard mission activities for fiscal years 2014 through 2018 to understand the extent to which MISLE contained accurate and complete data for the Coast Guard's stated purposes—in this particular case, for the purposes of performance measurement.⁷ We selected these years because they were the most recent Coast Guard data available. We assessed the Coast Guard's data quality measures against the Standards for Internal Control in the Federal Government, which states that management should design control activities to achieve objectives, respond to risks, and design appropriate types of control activities in the entity's information system for coverage of information processing objectives for operational processes.⁸ To examine the extent to which the Coast Guard is able to use MISLE data for performance reporting, we collected MISLE data used to calculate four performance measures in the Coast Guard's annual performance report and attempted to recreate the Coast Guard's reported performance results based on MISLE data. See table 6 for a description of Coast Guard performance measures and associated methodology for calculation. We also tested MISLE data for erroneous data entries, or missing or incomplete records, and to determine the extent to which the

⁶Project Management Institute, Inc., *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*, 6th Ed., 2017.

⁷The four missions include Ports, Waterways, and Coastal Security (prevention activities); Marine Environmental Protection (response activities); Search and Rescue; and Other Law Enforcement. We primarily selected these missions to obtain a cross-section of Coast Guard mission activity data, including missions that represent homeland security and non-homeland-security activities. We also prioritized mission data that were the sole source for calculating Coast Guard performance measures.

⁸GAO, *Standards for Internal Control in the Federal Government*, [GAO-14-704G](#) (Washington, D.C.: September 2014). Application controls, sometimes referred to as business process controls, are those controls that are incorporated directly into computer applications to achieve validity, completeness, accuracy, and confidentiality of transactions and data during application processing. Application controls include controls over input, processing, output, master file, interface, and data management system controls.

data were uniform across the agency. We discussed our results with Coast Guard officials to verify our findings.

Table 6: U.S. Coast Guard (Coast Guard) Annual Performance Measures Assessed Using Marine Information for Safety and Law Enforcement (MISLE) Data, Fiscal Years 2014-2018

Coast Guard annual performance measure	Performance measure calculation approach
Maritime prevention	
Annual Maritime Transportation Security Act (MTSA) facility compliance rate with Transportation Worker Identification Credential regulations	We collected record-level data from the MISLE system and used the Coast Guard's stated methodology for calculating the performance measure. In this instance, we tabulated the number of violations or civil penalties for Transportation Worker Identification Card infractions each fiscal year, expressed as a percentage of the total number of MTSA inspections conducted that year.
Annual number of chemical discharge incidents	We collected record-level data from the MISLE system and used the Coast Guard's stated methodology for calculating the performance measure. In this instance, we tabulated the number of applicable chemical discharge incident activities each fiscal year where a reportable quantity of a hazardous substance is discharged into navigable waters of the United States.
Maritime law enforcement	
Interdiction rate of foreign fishing vessels violating U.S. waters	We collected record-level data from the MISLE system and used the Coast Guard's stated methodology for calculating the performance measure. In this instance, we tabulated the number of Coast Guard interdictions of foreign fishing vessels violating U.S. waters as a percentage of overall law enforcement activities involving foreign fishing vessels.
Maritime response	
Percent of time rescue assets are on scene within 2 hours	We collected record-level data from the MISLE system and used the Coast Guard's stated methodology for calculating the performance measure. In this instance, we tabulated the number of distress incidents where the "First Sortie On-Scene Time" minus the "First Resource Requested Time" is less than or equal to 2 hours, expressed as a percentage all maritime distress incidents reported to the Coast Guard.

Source: Coast Guard MISLE data and annual performance reports. | GAO-20-562

To examine the Coast Guard's efforts to enhance, upgrade, or replace MISLE since 2008, we reviewed departmental and agency requirements, policies, and systems engineering guidance designed to govern MISLE investments. Specifically, we assessed Coast Guard efforts against the Department of Homeland Security's (DHS) Systems Engineering Life Cycle (SELC) and the Coast Guard's Systems Development Life Cycle (SDLC) frameworks, which outline control mechanisms to guide systems engineering projects and maintenance of implemented systems. We also assessed Coast Guard resource allocation decisions against its Level 3 Non-Major Acquisitions Manual and Financial Resources Management Manual, which provide guidance on how to fund investment projects. We chose 2008 as the starting point for our analysis of MISLE upgrades since it coincides with the date that the Coast Guard initiated a major upgrade

project to update MISLE's underlying system architecture, among other enhancements. To determine how Coast Guard's actions aligned with these control mechanisms, we reviewed Coast Guard documentary and testimonial evidence. The documents included documentation required to demonstrate that the Coast Guard undertook risk assessment and quality control measures as well as established communication with MISLE stakeholders. These documents are known in policies and guidance as system development artifacts. The documents also included Coast Guard memorandums documenting Coast Guard decisions as well as the justification for such decisions. When we were unable to obtain documentation from the Coast Guard regarding how its actions aligned with policies and guidance, or documentation explaining their rationale for making a specific investment decision, we used Coast Guard testimony to understand decisions made by the Coast Guard and note in our report when we were unable to obtain such documentation.⁹ Additionally, as part of our analysis, we reviewed the Coast Guard's contract documents to determine the extent to which the Coast Guard approved and issued contracts for carrying out MISLE enhancements and upgrades since 2008.

We conducted this performance audit from February 2019 to July 2020 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

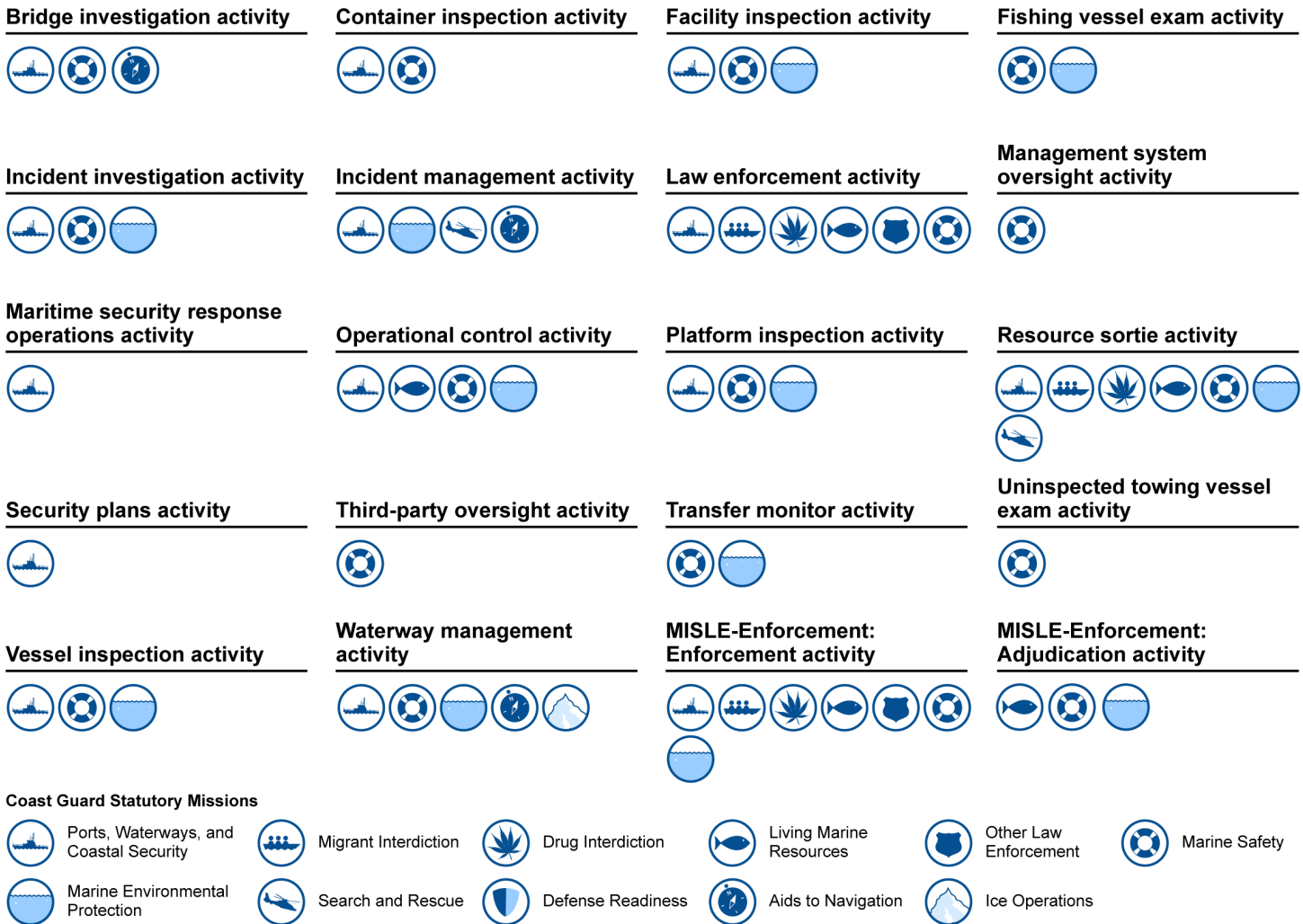
⁹In general, in such cases Coast Guard officials stated to us that they were unable to locate such documentation due to staff turnover as well as the length of time between our request and the requested documentation. For example, Coast Guard officials had difficulty locating documents published before 2012.

Appendix II: Marine Information for Safety and Law Enforcement Activities and U.S. Coast Guard Missions

In 2015, the U.S. Coast Guard (Coast Guard) released an upgrade to the Marine Information for Safety and Law Enforcement (MISLE) system that was primarily designed to keep the system compatible with its current and future information technology operating environment. The upgrade was known as MISLE 5.0. However, MISLE system managers stated that the technology used to upgrade MISLE also allowed them to divide MISLE into 20 subcomponents that align with specific functions in the system, such as documenting a facility inspection or a law enforcement action. System managers stated that dividing MISLE into subcomponents, known as activities, allowed them to make changes to one component in isolation without having to make changes across the system, thereby saving time and resources. See figure 5 for a list of MISLE activities and Coast Guard missions supported by each activity. Table 7 shows the same information, organized by Coast Guard mission.

Appendix II: Marine Information for Safety and Law Enforcement Activities and U.S. Coast Guard Missions

Figure 5: Marine Information for Safety and Law Enforcement (MISLE) Activities and the U.S. Coast Guard Statutory Missions Supported by MISLE Activities



Source: GAO analysis of U.S. Coast Guard documentation. | GAO-20-562

Note: MISLE is a U.S. Coast Guard information technology system used to track safety and law enforcement actions. MISLE is used to store data on marine accidents, pollution incidents, search and rescue cases, law enforcement activities, and vessel and facility inspections. According to MISLE system managers, the Coast Guard divided MISLE into 20 subcomponents, known as activities, in 2015 to improve the system change process.

Appendix II: Marine Information for Safety and Law Enforcement Activities and U.S. Coast Guard Missions

Table 7: U.S. Coast Guard Statutory Missions and Marine Information for Safety and Law Enforcement (MISLE) Activities Used by Each Mission

Statutory mission	MISLE Activities (subcomponents of MISLE)
Ports, Waterways, and Coastal Security	Bridge Investigation, Container Inspection, Facility Inspection, Incident Investigation, Incident Management, Law Enforcement, Maritime Security Response Operations, Operational Control, Platform Inspection, Resource Sortie, Security Plans, Vessel Inspection, Waterway Management, Enforcement
Migrant Interdiction	Enforcement, Law Enforcement, Resource Sortie
Drug Interdiction	Enforcement, Law Enforcement, Resource Sortie
Living Marine Resources	Adjudication, Enforcement, Law Enforcement, Operational Control, Resource Sortie
Other Law Enforcement	Law Enforcement, Enforcement
Marine Safety	Adjudication, Bridge Investigation, Container Inspection, Enforcement, Facility Inspection, Fishing Vessel Exam, Incident Investigation, Law Enforcement, Management System Oversight, Operational Control, Platform Inspection, Resource Sortie, Third Party Oversight, Transfer Monitor, Uninspected Towing Vessel Exam, Vessel Inspection, Waterway Management
Marine Environmental Protection	Adjudication, Enforcement, Facility Inspection, Fishing Vessel Exam, Incident Investigation, Incident Management, Operational Control, Platform Inspection, Resource Sortie, Transfer Monitor, Vessel Inspection, Waterway Management
Search and Rescue	Incident Management, Resource Sortie
Defense Readiness	Not supported by MISLE ^a
Aids to Navigation	Bridge Investigation, Incident Management, Waterway Management ^b
Ice Operations	Waterway Management

Source: GAO analysis of U.S. Coast Guard information. | GAO-20-562

^aThe Defense Readiness mission uses the Coast Guard Readiness and Assessment Evaluation system to report the war-fighting readiness of unit personnel, equipment, supplies, and logistics.

^bThe three activity types listed in the table, Bridge Investigation, Incident Management and Waterway Management, support the Aids to Navigation mission in limited ways. The Aids to Navigation mission is primarily supported by the U.S. Aids to Navigation Information Management System.

Appendix III: U.S. Coast Guard Data Elements Collected to Track Migrant Interdiction Mission Activities and Outcomes

The Office of Maritime Law Enforcement has established 20 data elements to document, track, and report U.S. Coast Guard (Coast Guard) migrant interdiction mission activities and outcomes. These data are currently captured at the unit level and collected by Coast Guard program officials from the Office of Maritime Law Enforcement. These data come from multiple sources, including case management data from the Marine Information for Safety and Law Enforcement (MISLE) system, law enforcement daily or case-specific situation reports, email summaries, or solicited on a case-by-case basis between duty and staff officers (see table 8).

Table 8: U.S. Coast Guard Data Elements Collected to Track Migrant Interdiction Mission Activities and Outcomes

Data element used for reporting	Data element definition	Data entry type
Days aboard Coast Guard asset	Number of days the migrant was held aboard U.S. Coast Guard assets prior to final disposition.	Numerical value
Disposition	Disposition of migrant interdicted during an event.	Free text ^a
Credible fear	Migrant found to have credible fear of persecution or torture at the conclusion of a U.S. Citizenship and Immigration Services Refugee Affairs Division screening.	Binary selection (yes/no)
Number of credible fear	Of those that manifested fear in an event, the number that had a credible fear of return.	Numerical value
Event date	The year, month, and day that the event occurred.	Data (DD/Month/YY)
Event type	Whether the migrant was successful in the interdiction attempt.	Multiple selections ^b
Human trafficker	Person involved in the recruitment, transportation, transfer, harboring, or receipt of another person for the purpose of exploitation through force, fraud, or coercion.	Binary selection (yes/no)
Human trafficking victim	A human trafficking victim is categorized separately from migrants. Aboard commercial vessels (fishing and motor tankers), workers who fit the trafficking parameters are being “controlled” or “coerced” into the situation against their will. ^c	Binary selection (yes/no)
Interdicting asset	Agency and asset of interdicting agency.	Multiple selections
Injury	Injuries noted on the migrant (self-inflicted or other).	Binary selection (yes/no)
Manifestation of fear	Operational crews identified a fear of persecution or torture by a flag state where the migrant would be returned.	Binary selection (yes/no)
Number of manifestation of fear	Of those migrants interdicted in an event, the number who manifested fear of return.	Numerical value
Migrants	Number of migrants. ^d	Numerical value
Nationality	The country of origin of the individual interdicted, if determined.	Multiple selections
Unaccompanied alien child	Migrant under the age of 18 traveling without a parent or guardian with no legal status in the U.S. ^e	Binary selection (yes/no)
Use of Force / Non-Compliant	The use of force beyond officer presence was required in the interdiction.	Binary selection (yes/no)

**Appendix III: U.S. Coast Guard Data Elements
Collected to Track Migrant Interdiction Mission
Activities and Outcomes**

Data element used for reporting	Data element definition	Data entry type
Vector	Location in which the interdiction occurred.	Multiple selections
Vessel type	Vessel used in the maritime migration effort.	Unspecified
Well-founded fear	Credible fear found to be well founded following a U.S. Citizenship and Immigration Services Refugee Affairs Division well-founded fear interview.	Binary selection (yes/no)
Well-founded fear number	Of those who were determined by U.S. Citizenship and Immigration Services to have a credible fear in an event, the number that had a well-founded fear of return.	Numerical value

Source: GAO analysis of U.S Coast Guard documentation. | GAO-20-562

^aFree text means that Coast Guard personnel may enter activity details with no specified limitations or parameters.

^bMultiple selections means that Coast Guard personnel may enter activity details limited to a finite, specified number of text-based entries. For example, for the data element "interdicting agency," personnel responses are limited to 10 values representing possible interdicting agencies, such as Coast Guard, international law enforcement agencies, or local law enforcement.

^cAccording to Coast Guard documentation, the Coast Guard considers individuals aboard vessels migrants because they have consented to the act of illegal migration. They are not usually considered trafficking victims until after the fact, when they are tricked into situations for commercial gain by their smugglers once they have reached their destination. Although it is possible to encounter human trafficking victims aboard a migrant vessel, it is unlikely. Smuggling is a crime against a border, and trafficking is a crime against a person.

^dFor Coast Guard purposes, a migrant is a person using maritime means to attempt to enter the United States (or another country) outside of required legal immigration channels.

^e6 U.S.C. § 279(g)(2).

Appendix IV: Analysis of Select Performance Results Data from the Marine Information for Safety and Law Enforcement System

Maritime Prevention

We analyzed record-level Marine Information for Safety and Law Enforcement (MISLE) data to calculate two Coast Guard maritime prevention program performance measures: Annual MTSA (Maritime Transportation Security Act of 2002) Facility Compliance Rate with Transportation Worker Identification Credential Regulations and Annual Number of Chemical Discharge Incidents. (See tables 9 and 10 for a full description of each performance measure). In both cases we were generally able to recreate the Coast Guard’s reported performance measures.

Table 9: U.S. Coast Guard Annual Performance Measure Results, “Annual MTSA Facility Compliance Rate with Transportation Worker Identification Credential Regulations,” Fiscal Years 2014-2018^a

	2014	2015	2016	2017	2018
Coast Guard reported performance measure results ^b	99	99	99	99	99
Our calculation of Coast Guard performance measure using MISLE data ^c	99	99 ^d	99	99	99

Source: GAO analysis of U.S. Coast Guard (Coast Guard) performance reports and Marine Information for Safety and Law Enforcement (MISLE) data. | GAO-20-562

^aThe Coast Guard’s full description of the measure is as follows: The percentage of the more than 3,400 maritime facilities subject to Maritime Transportation Security Act of 2002 (MTSA) regulations that are determined to be in compliance with Transportation Worker Identification Credential regulations.

^bData reported in *United States Coast Guard Annual Performance Report Fiscal Year 2018*.

^cWe collected record-level data from the MISLE system and used the Coast Guard’s stated methodology for calculating the performance measures. In this instance, we tabulated the number of violations or civil penalties for Transportation Worker Identification Credential infractions each fiscal year, expressed as a percentage of the total number of MTSA inspections conducted that year.

^dAlthough we report 99 percent, some of our figures were higher, such as 99.77 percent compliance in fiscal year 2016. However, Coast Guard officials stated that they generally round down instead of up in such cases to avoid the perception that they had zero violations in a given year. We reported our measures in the same way.

Our calculation of annual chemical discharge incidents were consistently lower than Coast Guard reported measures, but the differences were minor. (See table 10.) Coast Guard officials provided a number of explanations for the differences in our calculations.¹

¹Officials stated that our data may not include records that are missing certain data elements, such as “Involved Subject Type,” which may be excluded from data queries in the Coast Guard’s business intelligence tool. Officials said that a custom query that accounts for blank entries yields a more accurate assessment. Additionally, officials said it is possible for there to be multiple spills within one activity, which was not part of our calculation approach.

Appendix IV: Analysis of Select Performance Results Data from the Marine Information for Safety and Law Enforcement System

Table 10: U.S. Coast Guard (Coast Guard) Annual Performance Measure Results, “Annual Number of Chemical Discharge Incidents,” Fiscal Years 2014-2018^a

	2014	2015	2016	2017	2018
Coast Guard reported performance measure results ^b	45	13	16	15	15
Our calculation of Coast Guard performance measure using MISLE data ^c	41	12	13	15	13

Source: GAO analysis of Coast Guard performance reports and Marine Information for Safety and Law Enforcement (MISLE) data. | GAO-20-562

^aThe Coast Guard’s full description of the measure is as follows: The annual number of chemical discharge incidents where a reportable quantity of a hazardous substance is discharged into navigable waters of the United States.

^bData reported in *United States Coast Guard Annual Performance Report Fiscal Year 2018*.

^cWe collected record-level data from the MISLE system and used the Coast Guard’s stated methodology for calculating performance measures. In this instance, we tabulated the number of applicable chemical discharge incident activities each fiscal year, where a reportable quantity of a hazardous substance was discharged into navigable waters of the United States.

Maritime Law Enforcement

We analyzed record-level MISLE data to calculate one Coast Guard maritime law enforcement program performance measure: Interdiction Rate of Foreign Fishing Vessels Violating U.S. Waters.² We were generally able to recreate the Coast Guard’s performance measures but found variations as high as 9 percent between our calculations. (See table 11.) Coast Guard officials stated that the primary reason our figures are different is that our calculations came from MISLE data, while the Coast Guard’s calculations came from an internally managed spreadsheet that includes data from multiple sources, including MISLE.³ Further, as we reported earlier, officials from the Coast Guard’s Office of Law Enforcement Policy, Living Marine Resources and Marine Protected Species Enforcement Division, said that MISLE does not allow the Coast Guard to differentiate between detections and interceptions of foreign

²The Coast Guard’s full description of the measure is as follows: the percentage of incursions into the U.S. Exclusive Economic Zone by foreign fishing vessels detected by the Coast Guard, or reported by other sources and judged by operational commanders as valid enough to order a response.

³Officials stated that the primary data for calculating the measures come from Living Marine Resource enforcement summaries, which are compiled based on periodic reports from district personnel. However, officials said that they also use data recorded in MISLE.

Appendix IV: Analysis of Select Performance Results Data from the Marine Information for Safety and Law Enforcement System

fishing vessels, which is a key distinction in the Coast Guard’s calculation of this performance measure.⁴

Table 11: U.S. Coast Guard (Coast Guard) Annual Performance Measure Results, “Interdiction Rate of Foreign Fishing Vessels Violating U.S. Waters,” Fiscal Years 2014-2018^a

	2014	2015	2016	2017	2018
Coast Guard reported performance measure results ^b	17	17	26	23	31
Our calculation of Coast Guard performance measure using MISLE data ^c	16	17	31	32	36

Source: GAO analysis of Coast Guard performance reports and Marine Information for Safety and Law Enforcement (MISLE) data. | GAO-20-562

^aThe Coast Guard’s full description of the measure is as follows: the percentage of incursions into the U.S. Exclusive Economic Zone by foreign fishing vessels detected by the Coast Guard, or reported by other sources and judged by operational commanders as valid enough to order a response.

^bData reported in *United States Coast Guard Annual Performance Report Fiscal Year 2018*.

^cWe collected record-level data from the MISLE system and used the Coast Guard’s stated methodology for calculating performance measures. In this instance, we tabulated the number of Coast Guard interdictions of foreign fishing vessels violating U.S. waters as a percentage of overall law enforcement activities involving foreign fishing vessels.

Maritime Response

We analyzed record-level MISLE data to calculate one Coast Guard maritime response program performance measure: Percent of Time Rescue Assets are on Scene within Two Hours.⁵ We were generally able to recreate the Coast Guard’s performance measures using the Coast Guard’s stated methodology, with slight differences that were never greater than 3 percent. (See table 12.) However, as we reported earlier, the Coast Guard’s stated methodology is not consistent with Coast Guard

⁴In MISLE, both detections and interceptions are reporting as a sighting. A sighting is a law enforcement activity that captures an incident in which the Coast Guard was not able to board a suspect or offending vessel. However, with respect to foreign fishing vessels in U.S. waters, the Coast Guard further breaks down sightings into a detected incursion or an intercepted incursion. A detected incursion is the detection of a foreign fishing vessel illegally fishing inside the U.S. Exclusive Economic Zone. It can include detection via electronic means, through airborne or surface assets, or through the detection of unattended fishing gear suspected to have been placed by a foreign fishing vessel. An intercepted incursion is distinguished from a detection by the arrival of a Coast Guard air or surface asset in position to document an illegal foreign fishing vessel incursion into the U.S. Exclusive Economic Zone.

⁵The Coast Guard’s full description of the measure is as follows: the percent of all maritime distress incidents reported to the Coast Guard where a search and rescue unit arrives on scene within two hours.

Appendix IV: Analysis of Select Performance Results Data from the Marine Information for Safety and Law Enforcement System

policy,⁶ and when we assessed Coast Guard data that more closely align with its policy, our results were much lower than the Coast Guard's measures.

Table 12: U.S. Coast Guard (Coast Guard) Annual Performance Measure Results, "Percent of Time Rescue Assets are on Scene within Two Hours," Fiscal Years 2014-2018^a

	2014	2015	2016	2017	2018
Coast Guard reported performance measure results ^b	95	96	90	91	93
Our calculation of Coast Guard performance measure using MISLE data ^c	93	93	92	92	93

Source: GAO analysis of Coast Guard performance reports and Marine Information for Safety and Law Enforcement (MISLE) data. | GAO-20-562

^aThe Coast Guard's full description of the measure is as follows: the percent of all maritime distress incidents reported to the Coast Guard where a search and rescue unit arrives on scene within two hours.

^bData reported in *United States Coast Guard Annual Performance Report Fiscal Year 2018*.

^cWe collected record-level data from the MISLE system and used the Coast Guard's stated methodology for calculating performance measures. In this instance, we tabulated the number of distress incidents where the "First Sortie On-Scene Time" minus the "First Resource Requested Time" is less than or equal to 2 hours, expressed as a percentage of all maritime distress incidents reported to the Coast Guard.

⁶U.S. Coast Guard, *U.S. Coast Guard Addendum to the United States National Search and Rescue Supplement to the International Aeronautical and Maritime Search and Rescue Manual*, COMDTINST M16130.2F (Washington, D.C.: January 2013). The search and rescue addendum states that the siting, basing or staging of search and rescue units should provide for no greater than a 2-hour total response time for any one surface or air search and rescue within that sector or unit's area of responsibility to arrive at any location within the area of responsibility. This time is calculated from time of notification of the Coast Guard until the time of arrival on scene of an search and rescue unit, based on moderate environmental conditions that allow for operation of the search and rescue units at their top cruise speeds, and including 30 minutes of preparation time (i.e., a total of 90 minutes from underway to on scene).

Appendix V: User Feedback Efforts and Results for the Marine Information for Safety and Law Enforcement System

System managers produce an annual operational assessment for the Marine Information for Safety and Law Enforcement (MISLE) information system, as specified in U.S. Coast Guard policy.¹ The purpose of the operational assessment is to assess the performance and cost of MISLE against baselines, identify areas of system deficiencies, and determine how operational objectives can be more efficiently and effectively achieved. One aspect of this process is a user feedback mechanism to understand the extent to which MISLE is meeting user needs. Over the past years, MISLE system managers have used a number of different outreach methods, which have yielded varying results, as shown in table 13.

Table 13: U.S. Coast Guard (Coast Guard) Operational Assessment User Feedback Efforts and Results for the Marine Information for Safety and Law Enforcement (MISLE) System, 2015-2019

Fiscal year	User feedback effort ^a	User satisfaction results and response rate	Met target (yes/no)
2015	MISLE system managers contacted the 30 Coast Guard program offices that are MISLE stakeholders. They sent a survey to a random sample of MISLE users, using Microsoft Outlook every 6 months.	Qualitative: users generally satisfied, and MISLE meeting business requirements, with some exceptions. ^b Response rate unspecified.	Target not specified.
2016	Survey to 967 randomly selected active MISLE users from a specified population of 10,000 users. Survey contained yes/no question regarding user satisfaction.	Quantitative: 44% user satisfaction rate. Response rate: unspecified.	No (target 75% user satisfaction rate)
2017	Semiannual survey to 967 randomly-selected active MISLE users from a specified population of 10,000 users. Survey contained yes/no question regarding user satisfaction.	Quantitative: 61% and 68% user satisfaction rates. ^c Response rate: unspecified. ^d	Yes (target 60% user satisfaction rate)
2018	The Coast Guard did not perform MISLE operational analysis in fiscal year 2018. ^e		
2019	Questionnaire submitted to select MISLE users followed by interviews with responders. ^f Questionnaire contained eight open-ended questions about MISLE use and the extent to which MISLE met user requirements.	Qualitative: MISLE issues that require resources to address. Response rate: unspecified.	No target specified.

Source: GAO analysis of U.S. Coast Guard MISLE operational assessment reports. | GAO-20-562

^aFor all years in which an operational analysis report was published, MISLE system managers assessed MISLE user satisfaction as part of its annual MISLE operational assessment process. The purpose of the operational assessment is to assess the performance and cost of MISLE against baselines, identify areas of system deficiencies, and determine how operational objectives can be more efficiently and effectively achieved.

¹Department of Homeland Security, *Systems Engineering Life Cycle Guidebook* (Washington, D.C.: Apr. 18, 2016).

**Appendix V: User Feedback Efforts and
Results for the Marine Information for Safety
and Law Enforcement System**

^bSpecifically, respondents reported frustration over the inability to make changes to the system over the past 6 years to keep up with business requirements, which the report attributed to limited funding and an ongoing project to rewrite the MISLE user interface. MISLE system managers told us that during that time configuration changes to MISLE were frozen, except for statutory changes, to maintain system characteristics during the upgrade project.

^cMISLE system managers conducted two surveys in fiscal year 2017. The survey conducted on December 31, 2016 recorded a 61 percent user satisfaction result. The survey conducted on June 30, 2017 recorded a 68 percent user satisfaction result.

^dAlthough the response rate was not specified in the report, we followed up with MISLE system managers to learn more about the fiscal year 2017 survey methodology and learned that the response rate for the June 30, 2017 survey was 22 percent. In addition, five respondents who answered that they were not satisfied provided open-ended responses characterizing their concerns with MISLE. Examples include user interface challenges, a confusing workflow in the system, and system speed and performance issues.

^eMISLE system managers stated that they did not complete an operational analysis report in fiscal year 2018 because they were in the process of revising their overall reporting process for information systems. Specifically, officials said that they do not have the resources to complete an operational analysis for all systems, so they revised the process in fiscal year 2019 to group similar information systems together and solicit feedback from users based on overall mission needs rather than individual system experiences.

^fMISLE system managers contacted MISLE users at Sector Miami, Sector New Orleans, District Seven, District Eight, and the National Vessel Documentation Center.

Appendix VI: Comments from the Department of Homeland Security

U.S. Department of Homeland Security
Washington, DC 20528



**Homeland
Security**

June 26, 2020

Nathan J. Anderson
Director, Homeland Security and Justice
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Re: Management Response to Draft Report GAO-20-562, "COAST GUARD: Actions Needed to Ensure Investments in Key Data System Meet Mission and User Needs"

Dear Mr. Anderson:

Thank you for the opportunity to comment on this draft report. The U.S. Department of Homeland Security (DHS) appreciates the U.S. Government Accountability Office's (GAO) work in planning and conducting its review and issuing this report.

The Department is pleased to note GAO's acknowledgment that the Coast Guard's Marine Information for Safety and Law Enforcement (MISLE) system is generally able to support agency operations and that policies, training, and data validation processes were already implemented to help ensure accurate data entry. The Coast Guard remains committed to further identification and resolution of known system data reliability issues, as well as implementing enterprise system solutions to better address user needs across the Service.

The draft report contained four recommendations with which the Department concurs. Attached find our detailed response to each recommendation. DHS previously submitted technical comments under a separate cover for GAO's consideration.

Again, thank you for the opportunity to review and comment on this draft report. Please feel free to contact me if you have any questions. We look forward to working with you again in the future.

Sincerely,

JIM H
CRUMPACKER

Digitally signed by JIM H
CRUMPACKER
Date: 2020.06.26 08:36:53
-0400'

JIM H. CRUMPACKER, CIA, CFE
Director
Departmental GAO-OIG Liaison Office

Attachment

**Attachment: Management Response to Recommendations
Contained in GAO-20-562**

GAO recommended that the Commandant of the Coast Guard ensure that the Deputy Commandant of Mission Support:

Recommendation 1: Assess and address the causes of data errors and inconsistent entries in MISLE as identified by program offices and MISLE users, including reviewing MISLE training and data validation processes.

Response: Concur. The MISLE Sustainment Program Manager will assess the data errors and inconsistencies reported by Program Offices and users to address the cause of both in the short-term, or as a long-term strategy for correction. The assessment will include reviewing data validation processes and training, among other factors, to address the errors and inconsistencies. The Coast Guard's current plans for the MISLE database include addressing duplicate record entries (vessels, parties, and facilities), and the MISLE Sustainment Program Manager expects to complete review of data validation processes and training by March 31, 2021. Estimated Completion Date (ECD): December 31, 2021.

Recommendation 2: Use the results of its 2019 standardization team assessment of command centers to develop a plan for improving the consistency and accuracy of MISLE data identified in its report.

Response: Concur. The MISLE Sustainment Program Manager and MISLE Sponsor's Representative are reviewing the standardization team's assessment and recommendations for MISLE. Short-term changes will be considered for modification to MISLE to improve data consistency and accuracy, while also considering the cost, schedule, and performance trade-offs. For the long-term, the Coast Guard will replace MISLE with a Mission Case Management and Work Flow (MCMWF) solution that meets the operational case management needs for the enterprise and will also incorporate mechanisms to ensure more consistency and accuracy of data than the current state of MISLE. It is too early to estimate when MCMWF will be operational, but will likely take several years following the Planning, Programming, Budget, and Execution process. Implementation of any change, short-term or long-term, is subject to cost/schedule/performance trade-offs. The Coast Guard anticipates preparation of an implementation plan for selected standardization team recommendations by March 31, 2021. ECD: To Be Determined (TBD).

Recommendation 3: Use the processes outlined in the [Systems Engineering Life Cycle] SELC to identify needed enhancements across the MISLE system by developing an updated mission needs statement.

Response: Concur. In May 2020, the Coast Guard determined that MISLE needs to be replaced. Consequently, in the same May 2020 timeframe, the Office of Command, Control,

**Appendix VI: Comments from the Department
of Homeland Security**

Communications, Computer, Cyber, and Intelligence (C5I) Capabilities directed the establishment of an integrated product team (IPT) for the development of a Mission Case Management system. The IPT will be responsible for performing the analysis necessary to identify mission requirements, capability gaps, mission needs, and operational requirements of the replacement system. The IPT will also provide the identified capability requirements, including a Mission Needs Statement for the replacement system, to the DHS Joint Requirements Council for evaluation as required by DHS. This methodical process ensures objectivity and analyzes potential alternatives. ECD: June 30, 2021.

Recommendation 4: Use the processes outlined in the SELC to identify and analyze alternatives, and objectively select the preferred solution for MISLE to meet approved mission needs.

Response: Concur. As the Coast Guard determined that MISLE needs to be replaced, the Office of C5I Capabilities directed the establishment of an IPT for the development of a Mission Case Management system. DHS components are required to generate detailed documentation on new IT systems to be reviewed by the DHS Joint Requirements Council. This methodical process ensures objectivity and includes an Analysis of Alternatives, which the Coast Guard anticipates will be completed by September 30, 2021 and followed by a methodical process to replace this critical enterprise system. ECD: TBD.

Appendix VII: GAO Contact and Staff Acknowledgments

GAO Contact

Nathan J. Anderson at (206) 287-4804 or AndersonN@gao.gov

Staff Acknowledgments

In addition to the contact named above, Dawn Hoff (Assistant Director), Adrian Pavia (Analyst-in-Charge), Rick Cederholm, Benjamin Crossley, Michele Fejfar, Susan Hsu, Nicole Jarvis, Jeff Love, and Grant Mallie made key contributions to this report.

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