THE FEDERAL RADIONAVIGATION PLAN; H.R. 1684, THE FOREIGN SPILL PROTECTION ACT OF 2015; AND H.R. ____, THE NATIONAL ICEBREAKER FUND ACT OF 2015

(114–26)

HEARING

BEFORE THE

SUBCOMMITTEE ON
COAST GUARD AND MARITIME TRANSPORTATION

OF THE

COMMITTEE ON
TRANSPORTATION AND
INFRASTRUCTURE
HOUSE OF REPRESENTATIVES

ONE HUNDRED FOURTEENTH CONGRESS

FIRST SESSION

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Committee on Transportation and Infrastructure
U.S. House of Representatives
Washington, DC 20515

Bill Shuster
Chairman

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Ranking Member

July 24, 2015

SUMMARY OF SUBJECT MATTER

TO: Members, Subcommittee on Coast Guard and Maritime Transportation
FROM: Staff, Subcommittee on Coast Guard and Maritime Transportation
RE: "A Hearing on the Federal Radionavigation Plan, H.R. 1684, the Foreign Spill Protection Act of 2015, and H.R. ----, the National Icebreaker Fund Act of 2015"

PURPOSE

On Tuesday, July 28, 2015, at 10:00 a.m., in 2253 Rayburn House Office Building, the Subcommittee on Coast Guard and Maritime Transportation will hold a hearing to examine the Federal Radionavigation Plan, H.R. 1684, the Foreign Spill Protection Act of 2015, and H.R. ----, the National Icebreaker Fund Act of 2015. The Subcommittee will hear from United States Coast Guard, United States Department of Transportation, and a private sector witness.

BACKGROUND

Federal Radionavigation Plan

The Federal Radionavigation Plan (FRP) is the federal government's primary policy and planning document for positioning, navigation, and timing (PNT) systems and data. The plan describes the federal government's role, responsibilities, and policies regarding PNT systems. It also highlights the importance of PNT systems and data in providing for safe transportation and enhanced commerce within the United States. The first version of the FRP was released in 1980 as part of a Presidential Report to Congress and is required by the National Defense Authorization Act for fiscal year 1998 (10 USC 2281 (c)). The FRP is updated every two years through the joint efforts of the Department of Defense (DOD), Department of Transportation (DOT), and the Department of Homeland Security (DHS). Each Department shares in the responsibility to implement and maintain PNT systems, track capability gaps, and take actions to close those gaps. PNT systems are integral to U.S. national security, the safe operation and reliability of critical infrastructure, and economic prosperity.

The document covers the policies and operating plans for the following PNT systems:

- Global Positioning System (GPS)
- Augmentations to GPS
- Instrument Landing System (ILS)
- Very High Frequency (VHF) Omnidirectional Range (VOR)
- Distance Measuring Equipment (DME)
- Tactical Air Navigation (TACAN)
- Aeronautical Nondirectional Beacon (NDB)
- Microwave Landing System (MLS)
- Internet Time Service (ITS)
- Radio Station WWVB signal
- Two-Way Satellite Time Transfer (TWSTT)
- Network Time Protocol (NTP)

Global Positioning System (GPS)

One of the most well-known PNT systems is the Global Positioning System (GPS). GPS is a space-based navigation system that provides position and timing information globally with a high degree of accuracy. Originally developed for the military, GPS was made available for civilian use by President Ronald Reagan in response to Korean Air Lines flight 007 being shot down for straying into Soviet airspace as result of imprecise navigation. In 1996, GPS became available for civilian use free of charge and at its intended accuracy level by Presidential Decision Directive NSTC-6.

PNT systems are operated by the federal government in an effort to ensure safe transportation and to support commerce within the United States. Today, much of the navigation and operation of transportation systems are dependent on GPS. In the maritime transportation system nearly all recreational, fishing, commercial, and foreign vessels rely on at least one, if not several, GPS based systems for navigation, collision avoidance, and safety of life at sea.

The United States Coast Guard (Coast Guard) also relies heavily on GPS data to successfully execute its daily operations. In addition to relying on GPS technologies as a primary means of safely navigating its aircraft, cutters, and small boats, the Coast Guard also maintains several GPS dependent technologies essential to search and rescue, environmental stewardship, drug and migrant interdiction, ice breaking, aids to navigation, ports and waterways security, and other missions. These technologies include:

1. *Automatic Identification System (AIS):* AIS is a very-high frequency (VHF) line-of-sight system required by federal law and international standards to be carried on most commercial vessels. It enables the Coast Guard to track the movement of the vessels and helps the vessels themselves avoid collision. It is dependent on position and timing information received by GPS satellites.

2. *Differential GPS (DGPS):* DGPS augments the GPS system used by the Coast Guard and vessel operators to more precisely ascertain position using GPS receivers. Most recreational boaters rely on the signal provided from this system to hand held GPS

devices to safely navigate. The Coast Guard uses the system for many of its operations including the setting of aids-to-navigation.

3. *Rescue 21*: Rescue 21 is the Coast Guard's primary maritime distress system. It allows the Coast Guard to focus search and rescue efforts by determining a vessel's location based on a distress call over the radio. The system utilizes Digital Selective Calling to receive GPS position transmissions from vessels in distress. As such, it is dependent on both position and timing information received from GPS satellites.

4. *Search and Rescue Satellite-aided Tracking (SARSAT)*: SARSAT is a system of satellites that transmit distress calls and GPS position data from devices such as Emergency Position Indicating Radio Beacons (EPIRB) to Coast Guard and other first responders. Most commercial vessels are required to carry an EPIRB under federal law.

5. *Vessel Management System (VMS)*: VMS is a satellite-based system used to track commercial fishing vessels and ensure their compliance with restrictions on fishing locations. It relies on GPS for position and timing information to guide enforcement actions.

6. *Electronic Navigation Systems*: Federal law and international standards require all large commercial vessels to be equipped with electronic navigation systems. These vessels, as well as smaller commercial vessels and a sizable portion of recreational vessels, navigate solely using electronic navigation systems. These systems typically include an electronic charting system coupled with a GPS feed that shows the vessel's location on the chart, the direction of its motion, and its speed. While the charting function will still work without GPS, it would only provide an estimate of a vessels position based on the last GPS signal received.

Back-up Plan

In September 2001, the Department of Transportation published the *Vulnerability Assessment of the Transportation Infrastructure Relying on the Global Positioning System* (commonly referred to as the "Volpe Report") to assess the vulnerabilities to critical infrastructure identified by *The President's Commission on Critical Infrastructure Protection* in 1997. One of the most significant vulnerabilities highlighted by the Commission and addressed in the "Volpe Report" was the government's plan to adopt the GPS as the sole basis for radionavigation data.

This report explained the vulnerability of GPS and similar Global Navigation Satellite Systems (GNSS) to disruptions from both intentional and unintentional interferences. It also described the degree to which the United States had begun to base its critical infrastructures on GPS. The report identified the terrestrial-based radionavigation system, known as Enhanced Long Range Aids to Navigation (eLORAN), as a possible solution to the growing problem. Providing accuracy, integrity, and continuity, eLORAN was expected to meet the requirements

for non-precision aviation approaches, and maritime harbor navigation, and provide timing and frequency backup capability to GPS.

Long-Range Aids to Navigation (LORAN)

Enhanced Long-Range Aids to Navigation, which was never developed, was designed to replace the legacy Long-Range Aids to Navigation (LORAN) system. LORAN was a VHF based position and timing system operated by the Coast Guard. It served as the primary means of electronic navigation for vessels and some aircraft from World War II until the advent of GPS, at which time it continued to operate as a back-up system. The fiscal year 2010 Department of Homeland Security Appropriations Act (P.L. 111-83) gave the Coast Guard authority to terminate the transmission of LORAN signals upon certification by the Commandant of the Coast Guard that termination of the signal would not adversely affect maritime safety and certification by the Secretary of DHS that LORAN infrastructure was not needed to house another system to act as a back-up to GPS. Those certifications were made and the signal was terminated on February 8, 2010.

With the termination of the LORAN signal, DHS initiated a study to determine whether a back-up system is needed for GPS. Section 219 of the Coast Guard Authorization Act of 2010 (P.L. 111-281) required the Department to complete its determination as to whether a back-up system is needed by April 10, 2011. On September 19, 2011, DHS published *An Analysis on Whether a Single Domestic Backup Navigation System is Needed for Global Positioning System (GPS).* The report concluded that adequate backup for position and navigation uses within maritime, aviation, and terrestrial navigation modes exist. However, the report found that not having a GPS backup system posed a significant problem due to the loss of timing data and services. DHS determined that further evaluation regarding a single, domestic backup was needed. In 2014, section 219 of the Howard Coble Coast Guard and Maritime Transportation Act of 2014 (P.L. 113-281) prohibited the Secretary of DHS from dismantling or disposing of infrastructure that supported the former LORAN system until the later of one year after the enactment of the law, or a determination is made that the infrastructure is not required to provide a positioning, navigation, and timing system to backup GPS in the event of a disruption. The Secretary has yet to make such a determination.

The San Diego Incident

The San Diego Incident is widely cited as a clear indication of the wide ranging impact a disruption in GPS can have in a short amount of time. The incident occurred in January, 2007 when Navy technicians in San Diego turned on a test signal which interfered with GPS reception. The unintentional interference affected GPS reception in San Diego harbor, in the downtown area, and the international airport. The maritime DGPS system and AIS were shut down causing ships and recreational boaters to lose navigation data including position information. The first responder pager network was shut down and upwards of 150 cellphone base stations were degraded or shut down. This situation was relatively minor, and the fix was simple once the cause was identified. It does, however, amplify the importance of a seamless GPS backup. Since the incident, GPS has become increasingly imbedded in the Nation's critical infrastructure.

H.R. 1684, the Foreign Spill Protection Act of 2015

The Oil Pollution Act of 1990 (OPA) was enacted in response to the 1989 T/V Exxon Valdez oil spill in Alaska. The Exxon Valdez incident highlighted the lack of federal funding available to respond to spills and the limits in federal law regarding damage payments. OPA established an oil spill prevention, response, liability, and compensation regime that partially uses Clean Water Act authorities. Prevention measures include double hulls for tankers, the use of towing vessels, and vessel communication systems, as well as liners for onshore facilities. Response measures are in the form of contingency planning, national response units, Coast Guard district response groups, and tank vessel and facility response plans. Liability measures define "Responsible Parties" as vessels, onshore and offshore facilities where the owner or operator are required to pay for removal costs and any damages created by a spill. Compensation allows an injured party to seek payment for spill damages occurring to natural resources, personal or real property, subsistence use, or loss of revenues. OPA also created the Oil Spill Liability Trust Fund (OSLTF) financed by a per barrel tax on oil, recovery costs from responsible parties, civil and criminal penalties, and interest income. The OSLTF is available to clean up spills, in the absence of a responsible party, or if the responsible party is unable or unwilling to fund clean-up measures.

Section 1001 of OPA (definitions) paragraph (10) defines "foreign offshore unit" as a facility located in whole or part in the territorial sea or on the continental shelf of a foreign country and used to explore, drill, produce, store, handle, transfer, process, or transport oil. OPA Section 1002 (Elements of Liability) generally states that a responsible party for a vessel or facility where a spill occurs or poses a substantial threat of a discharge of oil in or upon navigable waters or adjoining shoreline of the U.S. is liable for damages and cleanup costs as a result of an incident. A "foreign offshore unit" is not referenced in section 1002.

OPA covers oil spills originating in the United States. It also allows foreign claimants to recover removal costs or damages if recovery is covered by a Treaty or agreement between the United States and the claimant's country or if there is a comparable remedy for U.S. claimants. When there is no responsible party for an oil spill originating in foreign waters that reach U.S. waters and shores, the OSLTF covers the costs of cleanup and damages. However, the OPA limits cleanup and claims from the OSLTF to $150 million and $850 million, respectively.

H.R. 1684 would amend OPA to add a new subsection (e) at the end of section 1002, (33 U.S.C. 2702). The new (e) would make a Foreign Offshore Unit liable for removal costs and damages for the purposes of OPA and would be treated as a responsible party in the same manner as an offshore facility.

H.R. 1684 would also amend the Clean Water Act to include a new paragraph (13) to section 311(b) (33 U.S.C. 1321(b)). This new paragraph would address discharges of oil from Foreign Offshore Units that reach navigable waters of the United States, adjoining shore lines or waters of the contiguous zone. Under paragraph 13, a Foreign Offshore Unit would be subject to section 311(b)(3) which prohibits discharges. The owner or operator of the unit would be subject to the penalties established under the subsection. The section also defines Foreign Offshore Unit as it is defined in section 1001 of OPA.

H.R. ----, the National Icebreaker Fund Act of 2015

The 11 missions of the Coast Guard include: ports, waterways, and coastal security; drug interdiction; aids to navigation, search and rescue; living marine resources; marine safety; defense readiness; migrant interdiction; marine environmental protection; ice operations; and other law enforcement. All but two missions (drug and migrant interdiction) have some level of polar icebreaker support and were noted as having mission gaps in the 2012 Coast Guard High Latitude Mission Analysis Report.

The Coast Guard icebreaker fleet includes two heavy ice breakers - Coast Guard Cutter (CGC) POLAR SEA (not operational) and CGC POLAR STAR as well as the CGC HEALY, a medium ice breaker. The table shows the status and capabilities of the vessels.

Platform	Year Commissioned	Service Life Design	Estimated End of Service Life	Icebreaking Capacity
POLAR STAR	1976	30	2020-2023	6 ft @3 knots (kts) / 21 ft back & ram
POLAR SEA	1978	30	2014 (inactive)	6 ft @3kts/ 21 ft back & ram
HEALY	2000	30	2030	4.5 ft @ 3kts/ 8 ft back and ram

U.S. Coast Guard Polar Icebreaker Preliminary Operational Requirements Document July 2014

The *Preliminary Operational Requirements Document (P-ORD) for the Polar Icebreaker Recapitalization Project* dated July 24, 2014, is described as the initial statement of operational performance requirements. The P-ORD is derived from the Polar Ice Breaker Mission Need Statement, the functional capabilities derived in the Polar Icebreaker Concept of Operations, early sponsor analysis, and historical baseline requirements. The P-ORD summary states it was developed by a 45 member, 11 agency integrated product team to describe the initial operating requirements that span the doctrine, organization, training, material, leadership, education, personnel and facilities spectrum needed to meet the mission performance gaps identified in the 2012 High Latitude Mission Analysis Report.

The P-ORD identifies the operational and mission support functional capabilities for a polar icebreaker. The functional capabilities include: breaking ice; maneuverability, sea keeping and navigation; escorting vessels; conducting boat and aviation operations; defense/offense operations; intelligence operations; sensors; boarding operations; search and rescue; damage control; towing vessels; marine environmental response; science and survey missions; command and control; communications; mission support; diving operations; underway refueling and replenishment; and heavy lifting.

Over the 2006-2013 period, the P-ORD showed the CGC HEALY operated at 106 percent of targeted operational capacity, the CGC POLAR SEA at 53 percent capacity due to mechanical problems, and the POLAR STAR was non-operational. The P-ORD recommends a polar icebreaker per year operation range between 3,300 operational hours (185 Days Away From Home Port or DAFHP) and 4,050 operational hours (225 DAFHP). In comparison to the P-ORD per year operation range, in 2013 CGC HEALY had 2,577 operational hours (145

DAFHP). After renovations the POLAR STAR was reactivated in December 2012. In 2013, the POLAR STAR went through ice trials and in 2014 it had 2,508 operational hours (189 DAFHP). The last year showing operational hours for CGC POLAR SEA was 2010 with 2,236 operational hours (115 DAFHP). Both CGC HEALY and CGC POLAR STAR are below the P-ORD recommended range for operational hours and the POLAR SEA is inactive. The inability to meet P-ORD hour targets creates mission gaps to meet all icebreaker mission activities.

With its last renovation, the POLAR STAR was reported to have a seven-to-ten year window of operation. In order to avoid additional mission gaps the Coast Guard has been urged by Congress to determine options and costs for reactivating the POLAR SEA for a similar seven-to-ten year span. Coast Guard estimated renovation costs in 2013 as $100 million for 3 years of repair work; with estimates increasing the longer the POLAR SEA remains inactive. The fiscal year (FY) 2016 Coast Guard budget request includes $6 million for the Material Condition Assessment (MCA) for the POLAR SEA to allow the Coast Guard to identify and assess the level of effort required should a decision be made to return the vessel to active service and extend its service life.

The Coast Guard Acquisition Directorate reported in May 2015 that the Coast Guard is in the analyze/select phase of acquiring a new polar icebreaker. The P-ORD notes the limitations facing the Coast Guard in acquiring a new polar icebreaker, mainly uncertainty in funding in the Acquisitions, Construction and Improvements (AC&I) account. The Coast Guard, in its FY13 budget, estimated a contract being awarded in five years and ship delivery within a decade. In FY14, however, the Coast Guard estimated four years to award a contract. The FY 2015 and FY 2016 budget requests refer only to initial acquisition activities and make no projections of future contract awards.

The Coast Guard received $7.6 million in FY 2013 and $2 million in FY 2014 for a total of $9.6 million for initial acquisition activities. No funding was appropriated in FY 2015 due to the slow obligation rate of appropriated funds. The House Committee on Appropriations recommends $4 million for FY 2016. The Committee's FY 2016 appropriations bill report notes the lack of a viable acquisition program for a new, polar icebreaker and expresses concern that existing funding requests by the Administration do not reflect Coast Guard requirements. The Committee also notes that it is unreasonable for the Coast Guard to bear the full cost burden for a new ice breaker when the vessel would support multiple executive branch agency missions, including icebreaker needs of the U.S. Navy.

The 2014 Howard Coble Coast Guard and Maritime Transportation Act restricted the use of Coast Guard icebreaker acquisition funds to the construction of an icebreaker that could carry out Coast Guard missions. Other executive branch agencies could contribute funds to support other capabilities for their additional missions.

H.R. ----, the National Icebreaker Fund Act of 2015, would provide an alternative funding process for alteration or renovation of Coast Guard icebreakers or the lease or charter of private icebreakers for the Coast Guard to reduce the potential for future mission gaps.

H.R. ---- would create a National Icebreaker Fund. The uses of the fund would include alteration or renovation of icebreakers, including design work for these actions, and lease or charter of icebreakers for the Coast Guard. New construction is not an eligible use of the Fund. Amounts in the fund would only be obligated or expended if authorized by law. The bill allows deposits into the Fund from appropriations, receipts from selling an ice breaker, unobligated fund transfers, and nonfederal contributions.

The bill sets out limitations on the amounts in the fund. It would not allow funds to be used to lease, charter, alter, or renovate any vessel built in a foreign shipyard, unless authorized by law. It would also require the use of U.S. shipyards for vessel alterations or renovations. In addition, expenditures of Department of Homeland Security funds would be restricted to the lease, charter, renovation, or alteration of icebreakers capable of conducting Coast Guard missions. The National Science Foundation and the Department of Defense would be allowed to use Fund monies for missions related to Antarctic research and resupply or national defense missions, respectively.

Budget requests submitted to Congress for the Fund would be required to specify the amount requested for programs, projects, and activities for icebreaker alterations and renovations and for programs, projects, and activities for icebreaker leases or charters.

The bill would also direct the Secretary of the department in which the Coast Guard is operating, in consultation with the Secretary of State and the Director of the National Science Foundation, to enter into an agreement with nations that operate facilities in Antarctica to establish a mechanism to provide icebreaking services necessary to supply those facilities by constructing, leasing or chartering, renovating, operating, or maintaining an icebreaker for that purpose.

WITNESSES

Mr. Gary C. Rasicot
Director of Marine Transportation Systems
United States Coast Guard

Ms. Mary E. Landry
Director of Incident Management and Preparedness
United States Coast Guard

Ms. Karen Van Dyke
Director of Positioning
Navigation and Timing & Spectrum Management
Office of the Assistant Secretary for Research and Technology
U.S. Department of Transportation

Mr. Martin Faga
Former CEO, MITRE Corporation
Former Assistant Secretary of the Air Force
accompanied by
Mr. Charles A. Schue
President and CEO
UrsaNav

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114TH CONGRESS
1ST SESSION

H. R. 1684

To amend the Oil Pollution Act of 1990 and the Federal Water Pollution Control Act to impose penalties and provide for the recovery of removal costs and damages in connection with certain discharges of oil from foreign offshore units, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

MARCH 26, 2015

Mr. CURBELO of Florida (for himself, Mr. MURPHY of Florida, Mr. YOUNG of Alaska, Mr. SIRES, and Ms. ROS-LEHTINEN) introduced the following bill; which was referred to the Committee on Transportation and Infrastructure

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A BILL

To amend the Oil Pollution Act of 1990 and the Federal Water Pollution Control Act to impose penalties and provide for the recovery of removal costs and damages in connection with certain discharges of oil from foreign offshore units, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Foreign Spill Protection Act of 2015".

SEC. 2. LIABILITY OF OWNERS AND OPERATORS OF FOREIGN OFFSHORE UNITS.

Section 1002 of the Oil Pollution Act of 1990 (33 U.S.C. 2702) is amended by adding at the end the following:

"(e) FOREIGN OFFSHORE UNITS.—In any case in which there is a discharge, or substantial threat of discharge, of oil from a foreign offshore unit that reaches or threatens to reach the navigable waters or adjoining shorelines or the exclusive economic zone, the owner or operator of the facility—

"(1) is liable for the removal costs and damages specified in subsection (b) that result from such incident; and

"(2) shall be treated as a responsible party with respect to the incident for the purposes of this Act in the same manner as a responsible party for an offshore facility.".

SEC. 3. PENALTIES FOR DISCHARGE OF OIL FROM FOREIGN OFFSHORE UNITS.

Section 311(b) of the Federal Water Pollution Control Act (33 U.S.C. 1321(b)) is amended by adding at the end the following:

"(13) FOREIGN OFFSHORE UNITS.—

"(A) DISCHARGES OF OIL REACHING NAVIGABLE WATERS.—In any case in which there is

a discharge of oil from a foreign offshore unit that reaches the navigable waters of the United States, adjoining shorelines, or waters of the contiguous zone—

"(i) the discharge shall be subject to the prohibition in paragraph (3); and

"(ii) the owner or operator of the unit shall be subject to the penalties established under this subsection.

"(B) FOREIGN OFFSHORE UNIT DEFINED.—In this paragraph, the term 'foreign offshore unit' has the meaning given that term in section 1001 of the Oil Pollution Act of 1990 (33 U.S.C. 2701).".

SEC. 4. APPLICABILITY.

The amendments made by this Act shall apply with respect to a discharge, or substantial threat of discharge, of oil occurring after the date of enactment of this Act.

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[DISCUSSION DRAFT]

114TH CONGRESS
1ST SESSION

H. R. _____

To amend title 14, United States Code, to establish the National Icebreaker Fund to pay the costs of construction, alteration, renovation, lease, or charter of icebreakers for the Coast Guard, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

M__. _____ introduced the following bill; which was referred to the Committee on _____

A BILL

To amend title 14, United States Code, to establish the National Icebreaker Fund to pay the costs of construction, alteration, renovation, lease, or charter of icebreakers for the Coast Guard, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "National Icebreaker Fund Act of 2015".

SEC. 2. NATIONAL ICEBREAKER FUND.

(a) ESTABLISHMENT OF FUND.—Chapter 15 of title 14, United States Code, is amended—

(1) by redesignating subchapter III as subchapter IV;

(2) by redesignating section 581 as section 591; and

(3) by inserting after chapter II the following:

"SUBCHAPTER III—ICEBREAKERS

"§ 581. National Icebreaker Fund

"(a) ESTABLISHMENT.—There is established in the Treasury of the United States a fund to be known as the 'National Icebreaker Fund'.

"(b) USE.—

"(1) AUTHORIZED PURPOSES.—Amounts in the Fund shall be available for obligation and expenditure by the Secretary only for the following purposes:

"(A) Construction, alteration, and renovation of icebreakers for the Coast Guard, including design work related to construction, alteration, and renovation.

"(B) Lease or charter of icebreakers for the Coast Guard.

"(2) AUTHORIZATION REQUIRED.—Amounts in the Fund may be obligated or expended only in amounts authorized by law.

"(c) DEPOSITS.—There shall be deposited in the Fund the following:

"(1) All funds appropriated to the department in which the Coast Guard is operating for—

"(A) construction, alteration, and renovation of icebreakers, including design work related to construction, alteration, and renovation; or

"(B) lease or charter of icebreakers.

"(2) All receipts from the disposition of icebreakers by the Federal Government.

"(3) Unobligated funds that are transferred to the Fund under subsection (d).

"(4) Contributions of money, and proceeds of other contributions, accepted under subsection (e).

"(5) All funds appropriated to the Department of Defense or any other Federal agency for—

"(A) construction, alteration, and renovation of icebreakers, including design work related to construction, alteration, and renovation; or

"(B) lease or charter of icebreakers.

"(d) TRANSFERS.—At the end of any fiscal year, the Secretary may transfer to the Fund any unobligated funds remaining from funds under the administrative control of the Secretary.

"(e) ACCEPTANCE OF SUPPORT.—

"(1) IN GENERAL.—The Secretary may accept from any person, foreign government, or international organization any contribution of money, personal property, or assistance in-kind for support of icebreaking in the polar regions.

"(2) USE.—Any contribution accepted under paragraph (1) may be retained and used by the Secretary of the department in which the Coast Guard is operating or disposed of in accordance with procedures prescribed by the Secretary, subject to the limitations in subsection (f) and paragraph (3) of this subsection.

"(f) LIMITATIONS ON USE OF FUNDS.—

"(1) FOREIGN VESSELS.—Amounts in the Fund may not be used to lease, charter, construct, alter, renovate, or in any other way acquire any vessel built in a shipyard located in a foreign country, unless specifically authorized by law.

"(2) CONSTRUCTION, ALTERATION, AND RENOVATION IN UNITED STATES; VESSEL DESIGN RE-

QUIREMENTS.—Amounts in the Fund may not be used to construct, alter, or renovate a vessel in any shipyard other than a shipyard in the United States.

"(3) PURPOSE OF EXPENDITURES.—The Secretary may—

"(A) expend from the Fund amounts deposited under paragraphs (1), (2), and (3) of subsection (c), only for the lease, charter, construction, alteration, or renovation of icebreakers capable of search and rescue, saving of life at sea, maritime safety and security, drug and migrant interdiction, fisheries law enforcement, and environmental response in the Arctic; and

"(B) expend from the Fund the amounts deposited under paragraphs (4) and (5) of subsection (c), for—

"(i) activities described in subparagraph (A); or

"(ii) additional capabilities that are—

"(I) necessary to carry out national defense missions; or

"(II) for missions related to research and resupply in the Antarctic.

"(g) EXPIRATION OF APPROPRIATED FUNDS AFTER 10 YEARS.—No part of an appropriation that is deposited in the Fund under subsection (c)(1) shall remain available for obligation more than 10 years after the end of fiscal year for which appropriated, except to the extent specifically provided by law.

"(h) BUDGET REQUESTS.—Budget requests submitted to Congress for the Fund shall separately identify—

"(1) the amount requested for programs, projects, and activities for construction, alteration, and renovation of icebreakers; and

"(2) the amount requested for programs, projects, and activities for lease or charter of icebreakers;

"(i) DEFINITIONS.—In this section:

"(1) The term 'Fund' means the National Icebreaker Fund established by subsection (a).

"(2) The term 'icebreaker' means an icebreaker capable of operations in polar regions.".

(b) CLERICAL AMENDMENT.—The analysis for such chapter is amended by striking the items relating to subchapter III and inserting the following:

"SUBCHAPTER III—ICEBREAKERS

"Sec. 581. National Icebreaker Fund

"SUBCHAPTER IV-DEFINITIONS

"Sec. 591.Definitions.".

SEC. 3. INTERNATIONAL AGREEMENT.

The Secretary of the department in which the Coast Guard is operating, in consultation with the Secretary of State and the Director of the National Science Foundation, shall enter into an agreement with nations that operate facilities in Antarctica to establish a mechanism to provide icebreaking services necessary to supply those facilities by constructing, leasing or chartering, renovating, operating, or maintaining an icebreaker capable of performing such services.

THE FEDERAL RADIONAVIGATION PLAN; H.R. 1684, THE FOREIGN SPILL PROTECTION ACT OF 2015; AND H.R. _____, THE NATIONAL ICEBREAKER FUND ACT OF 2015

TUESDAY, JULY 28, 2015

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON COAST GUARD AND
MARITIME TRANSPORTATION,
COMMITTEE ON TRANSPORTATION,
Washington, DC.

The subcommittee met, pursuant to notice, at 10:02 a.m., in room 2253, Rayburn House Office Building, Hon. Duncan Hunter (Chairman of the subcommittee) presiding.

Mr. HUNTER. The committee will come to order. The subcommittee is meeting today to review three topics, the Federal Radionavigation Plan, the Foreign Spill Protection Act that Mr. Curbelo is bringing, and the National Icebreaker Fund Act of 2015.

The first item for consideration is the Federal Radionavigation Plan, or FRP, which is the Federal Government's primary policy and planning document for positioning, navigation, and timing, commonly referred to as PNT. The plan describes the Government's role, responsibilities, and policies regarding PNT systems and data and is updated every 2 years through the joint efforts of the Departments of Defense, Transportation, and Homeland Security.

The Global Positioning System, or GPS, is the most recognized PNT system and is vital to U.S. national security, the safe operation and reliability of critical infrastructure, and economic prosperity. GPS signals have been incorporated into virtually every technology, from cell phones to financial systems, the power grid, and information systems. Marine transportation systems are also highly dependent on GPS.

The vast majority of the millions of recreational vessels, fishing vessels, commercial vessels, and foreign vessels that call on U.S. ports rely on at least one, if not many, GPS-based systems for safe navigation, collision avoidance, and emergency procedures. With a growing dependency on GPS in this Nation, it is concerning that the Department of Homeland Security officials have called GPS "a single point of failure for critical infrastructure."

In 2004, the Department of Transportation began working with DHS [Department of Homeland Security] to acquire a backup system for GPS under a directive from President George W. Bush. President Obama continued the directive, and in the 2008 edition of the FRP, the signatory agencies outlined a plan to develop a

GPS backup system. However, the next two editions of the FRP failed to provide a backup system.

The ranking member and I sent a letter last year to the Secretaries of Transportation, Homeland Security, and Defense asking that the 2014 version of the FRP outline the Government's plan for addressing the problem. The 2014 edition of the plan was released in May and does not identify what action will be taken or the lead agency. It has been 11 years since acknowledgment of this problem, and we need to move beyond discussing GPS vulnerability and start addressing the issue of how to fix it.

The second item for consideration is Mr. Curbelo's bill, H.R. 1684, the Foreign Spill Protection Act of 2015. The bill would include foreign offshore units where there is a discharge or the substantial threat of oil discharge reaching U.S. waters or shores within the liability section of the Oil Pollution Act. The foreign offshore units would be a responsible party liable for removal costs and damages in the same manner as a U.S. offshore facility.

The 2010 BP *Deepwater Horizon* oil spill in the Gulf of Mexico showed that technology can fail and that existing response policies can be inadequate. The impacts of that spill are still being felt in the region. BP costs for the spill damages are currently over $50 billion. The size, scope, and cost of that spill raise concerns about foreign deepwater oil drilling operations that could impact U.S. waters and shorelines.

The subcommittee held a hearing in January 2012 to review "Offshore Drilling in Cuba and the Bahamas: The U.S. Coast Guard's Oil Spill Readiness and Response Planning." At the hearing, the Coast Guard discussed how through international conventions and frameworks the Coast Guard is working with Caribbean nations, including Cuba and the Bahamas, to coordinate to combat spill events.

The Coast Guard also discussed its National Contingency Plan and the work of the National Response Teams and their planning and preparedness efforts with State and local communities. I am interested to hear today about what agreements the Coast Guard has with its international partners, what prevention actions are being adopted to prevent more spills in the future, and in the event that a spill occurs, what type of international response and coordination we can expect.

The ranking member is here. That is always special for us.

H.R. 1684 gets at a specific issue, that there be a responsible party to pay for cleanup and damages for a foreign sourced oil spill that impacts U.S. waters and adjacent shorelines. While the Oil Spill Liability Trust Fund could be used when there is no responsible party, it limits all costs to $1 billion. Any spill even near the scope of the *Deepwater Horizon* spill would quickly overwhelm the fund.

The U.S. taxpayer should not be on the hook for any costs not covered by the fund for a spill that originates outside of the U.S., especially if the foreign offshore unit has a known owner or operator. I understand the Coast Guard may have concerns with the legislation and look forward to talking and getting their take on it and talking about the bill today.

The last item for consideration today is a draft bill, the National Icebreaker Fund Act. The bill would create a funding source that could be used for the alteration or renovation of icebreakers and the lease or charter of private icebreakers.

The *Polar Sea*, currently inactive, and the *Polar Star* are both beyond their original 30-year service life. The *Polar Star* was recently renovated and is working within an estimated 7- to 10-year service life extension. The *Healy* will reach its estimated end-of-service life in 2030. This conservatively puts us 5 to 15 years away from end-of-service life for the two active icebreakers and for the *Polar Sea*, if it gets a 7- to 10-year extension in the coming years.

The operational status—more accurately, the nonoperational status—of the icebreakers is creating mission gaps. The older the icebreakers get, the longer it takes the administration to come up with a replacement plan, the closer we are to end-of-service life for the icebreakers, or, worst-case scenario, where we find ourselves without icebreakers. Years are passing with no progress on the acquisition or charter/leasing of an icebreaker or on decisions to reactivate the *Polar Sea*.

Congress has restricted the use of Coast Guard acquisition funds to the construction of an icebreaker that can carry out Coast Guard missions. U.S. icebreakers have supported numerous executive agency missions, and the Coast Guard should not bear the burden of the full cost of building an icebreaker because they simply cannot pay for an icebreaker.

The draft bill, the National Icebreaker Fund Act, would provide funding for long- or short-term solutions for renovating the aging icebreakers or chartering or leasing an icebreaker to alleviate, to the extent possible, mission gaps. In addition, through further discussion and bipartisan cooperation, the bill has been modified to include construction as a use of the fund. The bill should be viewed as part of a broader solution for the Coast Guard and its icebreakers.

I look forward to talking about that today, the icebreakers in general. No one is doing this yet, meaning this is the only and the first shot we have done on actually trying to get something built or leased or anything. And that is what Mr. Garamendi and I have been working on. So hopefully it will at least go somewhere or gets the ball rolling in the right direction.

And with that, I yield to Mr. Garamendi. This is what happens when you have three different topics for a hearing. The intro is too long.

[Laughter.]

Mr. HUNTER. I yield to the ranking member.

Mr. GARAMENDI. Well, I can shorten mine and really come down to two different types of time. One is real time, which I suppose the GPS and the e-loran [enhanced long-range navigation] system would accomplish.

The other is Federal time. Federal time seems to be the forever time, and we have at least two great examples of Federal time here, one the e-loran system, which was identified as a backup to the GPS system, gee whiz, almost 20 years ago—well, 15 years ago, anyway. And here we are, Federal time, making time, and not yet

done. And the other is icebreaker, which is also operating on Federal time, which seems to be forever. We ought to get it done.

I am going to submit my testimony for the record. But if we continue working on Federal time, we are going to have a very serious problem. And so my intention, together with you, Mr. Chairman, is to operate on real time and get something done. It has been way past time.

We absolutely have to have a backup system. The GPS is vulnerable. I think we all know that for a variety of reasons, all of which are going to be discussed today. And if we do not get off the dime and get down to real time and get this thing done, there is going to be a world of hurt for this Nation and others.

The icebreaker is similar. We could ponder and ponder, and eventually somebody is going to get stuck in the ice, and then somebody is going to wonder why was it not done. And the reason it was not done is that your United States Congress, House and Senate, together with the administration, was operating on Federal time—in other words, forever. So let's get it done.

Without objection, I would like to have my written statement in the record.

Mr. HUNTER. So ordered.

OK. Let's introduce our witnesses today. First, we have—I am sorry. Mr. DeFazio? To the full committee ranking member, I yield.

Mr. DEFAZIO. Thanks, Mr. Chairman. Mr. Chairman, thanks very much for holding this hearing. I think the introduction of the bill on the replacement of the icebreaker is absolutely critical. We need to move ahead. I have made known to the chairman and others my potential preferred alternative, which is after they haul the *Polar Sea* and *Polar Star* and take a look at the hull integrity, that the gutting stuff option holds a lot of attractiveness. And we will cede the cost-benefit analysis.

And I have got to give Congressman Garamendi a lot of credit. He came to me I think it was a year ago or more on the radionavigation idea, the single point of failure, GPS. Incredible vulnerability for the United States of America and all of our national security and commerce in this country. So we need to move forward—no more delay—with a plan to have a backup system.

Mr. GARAMENDI. Just $40 million and we can do it.

Mr. DEFAZIO. $40 million? Yes. We can find that under a couch cushion. I mean, if Paul Ryan can find $8 billion under a couch cushion, there has got to be $40 million somewhere still under there.

Thank you. Thank you, Mr. Chairman.

Mr. HUNTER. I thank the ranking member. No, it is funny. My uncle, who is a scientist, said, "Somebody called me and said, hey, do not get rid of GPS. It is really important." I said, "We are not getting rid of GPS. We just want to make sure it is backed up so if it goes away"——

Mr. GARAMENDI. Get the right message out.

Mr. HUNTER. Right. Our witnesses today, we have Mr. Gary Rasicot, Director of Marine Transportation Systems with the Coast Guard. We have Ms. Mary Landry, Director of Incident Management and Preparedness Policy with the Coast Guard; Ms. Karen Van Dyke, Director of Positioning, Navigation, and Timing, and

Spectrum Management, Office of the Assistant Secretary for Research and Technology, U.S. Department of Transportation; and our last witness and the gentleman who has accompanying him, Mr. Martin Faga, and he is accompanied by Mr. Charles Schue—which is Charles? There we go—Mr. Charles Schue, president and CEO of UrsaNav. He will be available to answer any Member questions we have.

So I would like to thank all the witnesses for being here today, and first yield to Mr. Gary Rasicot, Director of Marine Transportation Systems for the Coast Guard.

TESTIMONY OF GARY C. RASICOT, DIRECTOR OF MARINE TRANSPORTATION SYSTEMS, U.S. COAST GUARD; MARY E. LANDRY, DIRECTOR OF INCIDENT MANAGEMENT AND PREPAREDNESS POLICY, U.S. COAST GUARD; KAREN L. VAN DYKE, DIRECTOR OF POSITIONING, NAVIGATION, AND TIMING, AND SPECTRUM MANAGEMENT, OFFICE OF THE ASSISTANT SECRETARY FOR RESEARCH AND TECHNOLOGY, U.S. DEPARTMENT OF TRANSPORTATION; AND MARTIN FAGA, FORMER CHIEF EXECUTIVE OFFICER, MITRE CORPORATION, AND FORMER ASSISTANT SECRETARY OF THE AIR FORCE, ACCOMPANIED BY CHARLES A. SCHUE, PRESIDENT AND CHIEF EXECUTIVE OFFICER, URSANAV

Mr. RASICOT. Chairman Hunter, Ranking Member Garamendi, members of the subcommittee, thank you for the opportunity to testify today on the Nation's icebreaking needs and the Federal Radionavigation Plan. My complete statement has been provided to the subcommittee, and I ask that it be entered into the record and that I be allowed to summarize my remarks.

Mr. HUNTER. Without objection.

Mr. RASICOT. Thank you, sir. Mr. Chairman, as you just discussed, the ability to operate safely and reliably in the polar regions is critical to the Nation's security and economic interests. We greatly appreciate your generous time and interest you have invested in our existing icebreakers. Our only heavy icebreaker, *Polar Star*, has had a very busy year. The crew has been away from home for nearly 250 days.

As the ranking member saw firsthand, *Polar Star* is 40 years old and being maintained only by the dedicated efforts of her crew and shore support team. Having one heavy icebreaker for polar deployments means that extensive maintenance activities must occur on *Polar Star* upon her return to the United States if the cutter is to be ready for the following year's deployment on Operation Deep Freeze and the breakout of McMurdo Station near the South Pole.

Regarding *Polar Sea*, we recently signed a memorandum of agreement and provided funds to the Maritime Administration to initiate a preservation drydock on *Polar Sea* before the end of this fiscal year. This work will slow the deterioration of the hull and machinery and preserve the vessel for layup work, which is necessary regardless of how we do the disposition.

In conjunction with this drydock, we have also taken initial steps in preparation for a full material condition assessment, as requested in the fiscal year 2016 President's budget. Most recently, a preliminary evaluation of the project was completed last month

in Seattle by the Naval Sea Systems Command. This critical work must be done prior to making a final determination on whether to reactivate or decommission the ship.

Regardless of the final determination on *Polar Sea*'s future, reactivation is only viable as a bridging strategy and it does not mitigate the need for recapitalization of the Nation's polar fleet.

Regarding the Coast Guard's ongoing acquisition project, in January we completed the preliminary operations requirements document for the new polar icebreaker. We anticipate finalizing these operational requirements among all of our interagency stakeholders by the end of calendar year 2015. We are also in the process of finalizing an alternatives analysis, which we are on schedule to deliver to Congress this year.

While the Coast Guard is the sole Federal agency operating the Nation's polar icebreaking program, the Federal Radionavigation Plan is jointly executed and reflects the official positioning, navigation, and timing policy for the Federal Government, and is prepared by the Departments of Defense, Homeland Security, and Transportation. In support of DHS, the Coast Guard defines the need for and provides aids to navigation and facilities required for the safe and efficient maritime navigation.

As previously noted, the majority of today's maritime navigation is dependent on GPS positioning, navigation, and timing signal for their primary navigation. In addition, the Coast Guard provides a robust system of physical aids to navigation which mariners use in conjunction with their electronics to safely navigate coastal and inland waters.

The Coast Guard continues to leverage technology to enhance mariners' situational awareness. We have aggressively worked with our maritime stakeholders to establish electronic aids to navigation around the country. To date, we have almost 200 in place that enhance the current U.S. ATON [Aids to Navigation] system. We are also working steadily towards transmitting maritime safety information to the mariner for real-time display on his electronic charting system.

In closing, the Coast Guard is striving to meet the Nation's polar icebreaking and maritime navigation needs, and we are committed to working with the committee and the interagency on these fronts.

Thank you for the opportunity to testify today and for all you do for the men and women of the United States Coast Guard. I look forward to your questions.

Mr. HUNTER. Thank you very much.

Our second witness today is Ms. Mary Landry, Director of Incident Management and Preparedness Policy with the Coast Guard.

Ms. LANDRY. Chairman Hunter, Ranking Member Garamendi, members of the subcommittee, thank you for the opportunity to testify today on the Coast Guard's oil spill response capability, and thank you for your strong support of the Coast Guard.

I have also submitted a complete statement to the subcommittee. I ask that it be entered into the record and I be allowed to summarize my remarks.

Mr. HUNTER. Without objection.

Ms. LANDRY. Thank you. Mr. Chairman, the Coast Guard is committed to proactive oil spill prevention, preparedness, and response

as the predesignated Federal On-Scene Coordinator for the Coastal Zone and the authority that originates from the Clean Water Act, as amended by the Oil Pollution Act of 1990, and also by regulation in the National Oil and Hazardous Substance Pollution Contingency Plan.

Our preparedness and response efforts involve coordination with numerous State and Federal agencies as well as international partners, private sector, nongovernmental organizations, science institutions, and academia. This collaboration ensures Government and industry have the necessary oil spill response equipment, capability, and contingency plans to address worst-case scenario discharges.

In anticipation of increased maritime activities both domestically and internationally, we have focused recent efforts on the Caribbean and Arctic regions to mitigate the potential risks associated with oil exploration and production. Specifically, the May 2013 Agreement on Cooperation on Marine Oil Polution, Preparedness and Response in the Arctic, as signed by the members of the Arctic Council, focuses on Arctic-wide cooperation, coordination, and mutual assistance among parties on oil pollution, preparedness, and response.

In March 2014, the development of the Wider Caribbean Region Multilateral Technical Operating Procedures for Offshore Oil Pollution Response, called MTOP, for offshore oil pollution response outlined a responder-to-responder network and framework between the U.S., Cuba, the Bahamas, Jamaica, and Mexico. This framework is for participating nations to work effectively in response to large spills threatening more than one participating nation's waters.

Additionally, arrangements are in place with the U.S. Department of the Treasury, Office of Foreign Asset Control, and the U.S. Department of Commerce, Bureau of Industry and Security, to enable U.S. commercial oil spill removal organizations, or OSROs, to conduct oil spill response in foreign waters. This authorization is granted in the form of licenses, both general and specific, and are primarily utilized to enable responses to assist nations on which the U.S. has imposed economic and export sanctions.

I also want to emphasize that the U.S. Government can directly support foreign governments by providing response experts or technical advisors to spill sites. A recent example of this: In January 2015, the U.S. Coast Guard and NOAA, the National Oceanographic and Atmospheric Administration, provided several oil spill cleanup professionals to the USAID mission in Bangladesh in response to an oil spill covering an estimated 3900 square miles.

Here at home the national response system has proven its resilience through its 45 years of service. In 2010, the *Deepwater Horizon* incident pushed the limits of the system as we fought to save an ecosystem and a way of life along the gulf coast.

As a result of the lessons learned from the *Deepwater Horizon*, the Coast Guard has taken a number of actions to enhance our spill preparedness and response posture, including working more closely with local communities through our area committees to better integrate their capabilities into our response.

The Coast Guard also established a full-time deployable national Incident Management Assistance Team as well as civilian Incident Management Preparedness Advisors in each of the Coast Guard districts. These advisors serve as Regional Response Team cochairs in their respective regions. And in addition, the Coast Guard has instituted a Federal On-Scene Coordinators course that provides junior incident commanders with the applied knowledge for directing smaller oil spills while enhancing major oil spill response readiness.

The Coast Guard also conducts annual Spills of National Significance [SONS] exercises, which highlight responses requiring high-level coordination and leadership across DHS, the Coast Guard, and the 15 National Response Team [NRT} agencies. Lessons learned from these seminars, including the recent last three sessions of SONS which focused on the Arctic, serve to establish critical guidance and policy for future spills. In 2016, the Coast Guard will support the EPA, our cochair to the NRT, as we focus the SONS exercise on an inland crude-by-rail incident to address this emerging threat.

The oil spill preparedness and response mission area remains extremely diverse, and it includes a unique blend of authorities and capabilities that span across multiple Coast Guard mission sets. We have made substantial improvements in environmental stewardship through our interagency international partnerships, work to close gaps in personnel competencies, and increased sufficiencies across the entire mission area.

As we move into the Coast Guard's 225th year of operation, we will continue to explore every opportunity to improve on lessons learned from past incidents and further solidify and enhance our spill prevention and response activities.

Thank you for the opportunity to testify before you today and for all you do for the men and women of the U.S. Coast Guard. I look forward to your questions. Thank you.

Mr. HUNTER. Thank you, Ms. Landry.

Our next witness today is Ms. Karen Van Dyke, Director of Positioning, Navigation, and Timing, and Spectrum Management, Office of the Assistant Secretary for Research and Technology, U.S. Department of Transportation.

Ms. VAN DYKE. Chairman Hunter, Ranking Member Garamendi, and members of the subcommittee, thank you for the opportunity to appear before you today to discuss the Federal Radionavigation Plan and the importance of positioning, navigation, and timing systems to America's national, homeland, and economic security and efficiency.

Positioning, navigation, and timing, PNT, is critical for transportation safety, efficiency, and capacity-increasing programs, including major initiatives such as the Federal Aviation Administration's air traffic control mission, Intelligent Transportation Systems, and Positive Train Control.

The Global Positioning System in particular is used for every mode of transportation, and there are numerous safety and efficiency applications of this enabling technology to provide tremendous benefit to America's transportation infrastructure. GPS is a key technology for vehicle collision warning and crash avoidance

systems while enabling shorter routes, increased time and fuel savings, and reduced traffic delays across all modes of transportation.

As designated by the 2004 National Security Presidential Directive, NSPD–39, the Department of Transportation has the lead responsibility for the development of GPS requirements for civil applications for all United States Government civil departments and agencies. In addition to the transportation applications, GPS is essential for the safe and efficient operations of first responders, search and rescue, resource management, weather forecasting, earthquake monitoring, surveying and mapping, precision agriculture, telecommunications, and financial transactions.

The Deputy Secretary of Defense and Deputy Secretary of Transportation cochair the National Executive Committee for Space-Based PNT, known as the PNT EXCOM, which includes representatives from seven cabinet agencies, the National Aeronautics and Space Administration, and the Joint Chiefs of Staff.

Since 1980, the Federal Radionavigation Plan, the FRP, has been the official source of positioning, navigation, and timing strategy and planning for the Federal Government. It is jointly developed biennially by the Departments of Transportation, Defense, and Homeland Security.

Section 5.1.2 of the FRP recognizes the need to mitigate disruptions to GPS. Like all radio-based services, GPS is subject to interference from both natural and human-made sources. A loss of GPS service due to either intentional or unintentional interference, in the absence of any other means of navigation, would have very negative effects on operations.

As stated in the FRP, the U.S. Government encourages all GPS users to be aware of the impacts of GPS interference and incorporate or integrate alternative PNT sources where needed to ensure continued operations. The Federal Aviation Administration, for instance, currently maintains a ground-based navigation infrastructure for aviation.

GPS enables the safe and efficient movement of waterborne commerce along the U.S. marine transportation system, and is especially critical as ports become increasingly congested with larger container ships, tankers, and passenger vessels.

In the event of a GPS disruption, methods of conventional navigation may help maintain the flow of commerce along waterways and in ports. However, ports may have to reduce the number of allowed vessel movements, and port congestion may become even more problematic and costly, in addition to increasing the risk of maritime accidents.

Service transportation agencies are working with industry to ensure that the safety-critical systems that use GPS and its augmentations consider the loss of these PNT services and are able to mitigate the effects. The Federal Railroad Administration encourages an integrated approach to technology by railroads that incorporate systems that are interoperable, synergistic, and redundant to ensure the safe and efficient operation of the railroad system during the loss or disruption of GPS.

Signal availability from GPS may not be adequate for surface users experiencing canopy or urban canyon obstructions. The integration of complementary and/or alternate systems that support

continued operations in the event of degradation to the GPS signal will be employed in a multisensor configuration.

The PNT EXCOM is currently investigating use of an e-loran system to serve as the backup PNT capability to GPS. In March of 2015, the Department of Transportation invited comment from the public and industry regarding consideration of an e-loran system as a backup PNT capability to GPS.

There are approximately 200 responses to the Federal Register notice. Most responses were not application-specific, other than for maritime use. Discussion of a PNT backup capability is planned for the next meeting of the National Space-Based PNT Executive Committee in September.

Thank you, and I look forward to answering your questions.

Mr. HUNTER. Thank you very much.

Mr. Faga is now recognized.

Mr. FAGA. Mr. Chairman, thank you very much, and thanks for the opportunity to speak with you today about the need for a complement capability for our Global Positioning System.

I have been involved with GPS for many years in the Air Force, at MITRE, and as a congressional staff member. I serve on the National Space-Based Positioning, Navigation, and Timing Advisory Board, but I am not here as a representative. I am here on my own behalf. I am accompanied by Charles Schue, who is a former Coast Guard officer and is CEO of UrsaNav, which is a manufacturer of navigation and other equipment.

Since becoming an operational system in 1995, we have seen GPS grow to be a major international public utility, and we have all experienced GPS navigation personally. What is less well-known is that GPS has become a vital source of precision timing information for homework systems of all kinds—telephone, financial, other networks, including the Internet itself, require timing information, often accurate to one one-millionth of a second.

GPS is the most practical and inexpensive way for network operators to get such accurate timing, and so of course they have used it and become dependent on it over these 20 years. This makes sense, but the risk is that disruption of GPS would cause disruption to many elements of our modern society.

DHS reports that 13 of the 16 critical infrastructures of the United States are critically dependent on GPS, in many cases because of timing. Disruption to GPS could occur from a wide range of sources, including solar storms, errors by humans or software that operates the system, physical attack, or jamming.

It is the very success of GPS which creates a call for a complementary system to reinforce it. Senior officials at the Department of Homeland Security have recently called our reliance on GPS and its vulnerabilities "a single point of failure for critical infrastructure."

As you noted, Mr. Chairman, the importance of our dependence on GPS has been recognized by three Presidents since 1998. In 2008, all of the concerned departments and agencies across the Federal Government identified a terrestrial system called enhanced loran as one that could be such a complementary system. The Government has never acted to build the system.

Loran stands for long-range navigation, and it has existed in various forms since World War II, and operated in the United States until 2010. It uses very powerful radio transmitters at very low frequency to transmit signals that receivers use to triangulate position and to get time. Like GPS, it provides timing accurate enough to operate networks. It is difficult to disrupt, and it has different failure modes than GPS, so the two would be a great pairing.

The modern version, enhanced loran, is commercially available. A complete system of 19 stations in the United States would cost on the order of $300 million and $20 million a year, really big money. But we spend $1 billion a year on GPS.

Perhaps more important and more practical is that a basic e-loran system of four stations, costing about $40 million, including the use of existing towers and equipment, would provide nationwide timing for all fixed users, which is most users that require precision timing.

The system could be a source of revenue. If a contract was properly structured, an e-loran system could generate enough income to pay for itself over 10 years. While not exact parallels, the FAA's Automatic Dependent Surveillance-Broadcast system, where the Government and industry cooperate to build a system, generates revenue, and both FAA and the system provider share the income generated. In my written statement, I have offered some further thoughts on this.

So first the administration must do two very important things. It must commit to addressing this important problem, and it must identify and empower a single Federal agent who can work with Government agencies and industry to implement a solution.

Thank you for the opportunity to testify, and I look forward to your questions.

Mr. HUNTER. Thank you, Mr. Faga. Thank all of you for your testimony.

I am going to start—I am going to skip myself and recognize Mr. Curbelo, if he is ready. The gentleman from Florida is recognized.

Mr. CURBELO. Thank you, Mr. Chairman. And I want to start by thanking you for affording the committee the opportunity to consider my legislation, the Foreign Spill Protection Act of 2015, or H.R. 1684.

Prior to the BP *Deepwater Horizon* disaster in 2010, which by the way I was a congressional staffer and I saw firsthand the wonderful work done by the Coast Guard, the costliest oil spill in the history of the gulf was the Ixtoc I spill off the coast of Mexico in 1979. It took 9 months to cap. Oil polluted the shores of southern Texas and the Mexican-owned oil company agreed to pay $100 million to avoid litigation in U.S. courts.

Following the *Exxon Valdez* disaster in 1989, Congress passed the Oil Pollution Act of 1990, or OPA. The basic premise of OPA is that the party responsible for the spill is responsible for all the costs of cleaning up the mess. Under OPA, and I will paraphrase, an offshore facility is defined as any facility located in the navigable waters of the United States, and any facility of any kind which is subject to the jurisdiction of the United States and is located in any other waters, other than a vessel or public vessel.

However, because offshore facilities are limited only to the navigable waters of the United States under OPA, foreign rigs cannot be designated as responsible parties. Therefore, if there were to be a repeat of Ixtoc I, the most a responsible party would have to pay to clean up American waters and shores is $150 million.

This issue is of particular concern to Gulf States. Mexico, Cuba, and the Bahamas are actively looking at expanding their offshore drilling operations. Of particular concern is Mexico, which is looking into ultra-deep wells exceeding 6,000 feet in depth. In 2012, Mexico's top oil regulator said they were not prepared to handle a serious accident or major oil spill.

But it is not just the Gulf States that could be negatively affected by a spill. On the Canadian side of Lake Erie, offshore energy exploration is being conducted for natural gas. While Canadian law prohibits oil extraction from the Great Lakes, the risk of a spill persists while drilling for natural gas. Again, under current law, the most the responsible party would have to pay for any cleanup is $150 million.

In response to these concerns, my friend from Florida, Representative Patrick Murphy, and I introduced the Foreign Spill Protection Act, H.R. 1684. This important legislation would ensure that the responsible party, regardless of origin, pays for all American cleanup costs by applying OPA. Furthermore, the bill would apply Clean Water Act penalties on the responsible foreign party.

I am proud that this legislation has broad bipartisan support and has been endorsed by environmental, fishing, and other groups that depend on the water for their livelihoods. Our coastal communities need peace of mind that if they are affected by a foreign spill, resources are available to clean up their shores and help them recover. American taxpayers should not have to foot the bill to bail out foreign companies.

Again, Mr. Chairman, thank you for this opportunity, and I look forward to further discussing the issue with all of you.

Mr. HUNTER. I thank the gentleman from Florida.

I would like to recognize the ranking member, Mr. Garamendi.

Mr. GARAMENDI. Thank you, Mr. Chairman. I would like to focus on the e-loran system and see if we can get this thing moving along.

Mr. Faga and Mr. Schue, a few questions, probably with rather straightforward answers, just so we can get this stuff on the record. If I understand your testimony correctly, the former loran-C infrastructure could be rather easily repurposed to support e-loran. Is that correct?

Mr. FAGA. I would probably have to argue with "easily," but it could certainly be done. Of course, the existing infrastructure, which has not been operated since 2010, is decaying. So the Coast Guard would have to look hard at what it is going to take to bring it back. But what e-loran does is go from loran-C to more modern electronics, fundamentally.

Mr. GARAMENDI. OK. The technology, the greatest benefit of e-loran, is it would provide a backup timing signal, which is then essential for the positioning and navigation. So if there are multiple towers, you would have both timing, position, and navigation.

Mr. FAGA. It takes more towers to do the navigation job. But I think, as Ms. Van Dyke pointed out, there are better backups for navigation and position than there are for timing. I have been in a number of meetings in the last few months with infrastructure providers, some of whom are surprised to learn that they have a dependence on GPS timing because they are getting it from a supplier who is dependent on it. Therefore, they are dependent on it, which is why DHS says 13 of our 16 critical infrastructures are dependent.

Mr. GARAMENDI. So just four towers could give us nationwide timing?

Mr. FAGA. Timing for fixed items. Moving objects would not be able to educe timing with that few number of stations.

Mr. GARAMENDI. And what would be necessary to provide for moving?

Mr. FAGA. Nineteen stations would give complete PNT coverage of the United States, and so some significant portion of that, 10 or 12, would move toward that goal.

Mr. GARAMENDI. The number $40 million has been tossed around today. That would be for the four stations for timing only?

Mr. FAGA. And makes the assumption that some of the towers and stations and equipment would be used in the short term.

Mr. GARAMENDI. I understand one such station is up and operating in Mr. LoBiondo's district.

Mr. FAGA. In Wildwood, New Jersey. Yes, sir.

Mr. GARAMENDI. New Jersey. Are there any problems with that operation?

Mr. FAGA. Chuck is actually involved with that, so I will invite him to respond.

Mr. SCHUE. Mr. Garamendi, the station is operating. It would be fully autonomous and unmanned in its fully operational capability. We have a caretaker that comes in and turns it on and turns it off. It is not set up to operate continuously 24/7 right now because it has been off since 2010, but it is fully capable of making that transition with a small investment.

Mr. GARAMENDI. I did see a demonstration of that system at the Naval Observatory last week, and rather impressive.

My next question goes to Ms. Van Dyke. Your testimony is interesting, but it reminds me of so much testimony I heard: We are studying it. Could you be a little more precise in the timing of the study and the timing of when you intend to actually deal with this since this problem was actually noticed in 1998, and in 2008 the executive branch of Government made a decision that e-loran was the solution? So where are we now 7 years later?

Ms. VAN DYKE. Yes. Thank you for your question, and perhaps Mr. Rasicot also wants to chime in. We are working with our partners in DHS and in DOD as part of a complementary PNT Tiger Team. That was associated with the Federal Register notice that we issued earlier this year, to have public and industry feedback.

And as I mentioned in my testimony, we do have a Space-Based PNT Executive Committee coming up in September, which will discuss this topic. This will be one of the primary topics on the agenda with the Deputy Secretary of Defense and Deputy Secretary of Transportation.

Mr. GARAMENDI. Do you consider this to be a significant national security issue, that we could lose GPS, single point of failure?

Ms. VAN DYKE. I do. I was involved back in 2001 with the Volpe National Transportation Systems Center study on the vulnerability of GPS for transportation, so I have been well aware for a long time of the vulnerabilities of GPS and our significant dependence not only for transportation but also for the other critical infrastructure that has been mentioned. And I do think it is a problem that we need to address and resolve.

Mr. GARAMENDI. When would it be addressed, if it is critical? So you have a study coming up. You have a meeting coming up in September to discuss what was discussed 7 years ago.

Ms. VAN DYKE. The complementary PNT Tiger Team has really been looking at what has changed in the past 7 years, from increased dependency on GPS, to other technologies that have been developed, as well as increased threats to the GPS system. Again, this will be a major subject of discussion at that meeting with all of the information that we have collected.

Mr. GARAMENDI. You just had a meeting. What was the outcome of that meeting? We should meet again? Was that the outcome?

Ms. VAN DYKE. I am not sure which meeting you are referring to.

Mr. GARAMENDI. Well, I think in your testimony you said you had a request for information that came out. Two hundred people responded.

Ms. VAN DYKE. Right.

Mr. GARAMENDI. And the result was, let's meet?

Ms. VAN DYKE. We have a scheduled executive committee meeting in September that will talk about the results from the Federal Register notice, as well as the evaluation of technologies that have been developed.

Mr. GARAMENDI. Mr. Rasicot, your comments on this issue that I raised?

Mr. RASICOT. Sir, we are moving forward. I mean, as Karen outlined——

Mr. GARAMENDI. Yes. Well, the Earth is turning, too.

Mr. RASICOT. Yes, sir. But we are taking some important steps to determine what has literally changed since we last looked at this. One of the things that was never looked at previously was the users' input, the folks that actually will receive the signal. And that is what the DOT notice in the Federal Register asked.

It is almost from a Kevin Costner thing: If we build it, will you come? Because one of the things that I think is important to notice is that even if we got the signal in the air tomorrow, it really would not change anything because the receivers are not there to receive it. And we are working through those issues. And that is what we are asking people: Is this a critical issue to you?

Mr. GARAMENDI. Mr. Schue, are the receivers available?

Mr. SCHUE. Yes, sir. The receivers are available today.

Mr. RASICOT. No, no. I understand that, sir, but——

Mr. GARAMENDI. That is not what you said. You said they are not available. Are they available or not available?

Mr. RASICOT. They are available, sir, but most people do not have them.

Mr. GARAMENDI. Because there is no e-loran signal.

Mr. RASICOT. They are available in Europe and other places where they are used.

Mr. GARAMENDI. Oh, what are the other places? Europe? Russia? China?

Mr. RASICOT. I am not sure of all of them.

Mr. GARAMENDI. They are available in Europe, Russia, and China. Is that correct, Mr. Faga?

Mr. FAGA. Yes. And I think the Japanese are also building out.

Mr. GARAMENDI. Oh, yes. The Japanese, too. U.S. maritime says they want the system. You are aware of that, I suppose?

Mr. RASICOT. Yes, sir.

Mr. GARAMENDI. Why are we getting the runaround here? Mr. Rasicot, why are we getting the runaround?

Mr. RASICOT. I do not have a good answer for that, sir. But I will tell you that the administration is pushing forward, and we are working through the Space-Based PNT Executive Committee to come up with the correct solution, and we hope to move forward on that. We look forward to the results.

Mr. GARAMENDI. God help us, another committee.

Mr. RASICOT. Sir, as established under the Federal Radionavigation Plan.

Mr. GARAMENDI. Can you give me some estimate of when a decision would be made by that committee?

Mr. RASICOT. I will tell you that the next meeting of that committee is in September. I cannot speak for the leadership of that committee.

Mr. GARAMENDI. Who are the leaders of the committee?

Mr. RASICOT. It is chaired by the Deputy Secretary of Defense and the Deputy Secretary of Transportation, as per the Federal Radionavigation Plan.

Mr. GARAMENDI. Ms. Van Dyke, are they expected to attend the meeting?

Ms. VAN DYKE. Yes, they are.

Mr. GARAMENDI. What day in September?

Ms. VAN DYKE. September 3rd.

Mr. GARAMENDI. I yield back.

Mr. HUNTER. I thank the ranking member. We will get back to that, too.

Mr. Gibbs is recognized, the gentleman from Ohio.

Mr. GIBBS. Thank you, Mr. Chairman.

Ms. Van Dyke, in your testimony you mentioned the possibility of backups at ports and increased access if the GPS technology is disrupted. Have we had any occurrences of backups, of our GPS shutting down? Can you give us what the situation was, the status? Can you tell me if we have had the incidents happen or how critical they were?

Ms. VAN DYKE. Most of the incidents of GPS interference that we have had are actually testing the Department of Defense conducts. And for aviation, if you are a pilot, you will see a Notice to Airmen of areas of airspace where GPS is deemed unreliable due to the military testing, which again is why the FAA has maintained its ground-based navigation aid infrastructure.

There have been other unintentional incidents. There was one in San Diego with a Navy ship that caused interference in the Port of San Diego. And then on a lower power level, there are GPS jammers that plug into cigarette lighters and cause a smaller radius of interference. That certainly has been most notably experienced at Newark International Airport.

Mr. GIBBS. So we need to have a backup complementary system.

Ms. VAN DYKE. We do.

Mr. GIBBS. Mr. Faga, I am just curious. Maybe this is not the right question. But we hear so much about spectrum. Is spectrum an issue with trying to develop this e-loran system or not?

Mr. FAGA. Spectrum is an issue in that there are more and more demands to use spectrum. There are interests in providing similar services with more spectrum, including spectrum that is close to where GPS operates. If some of these proposals are actually implemented, we may see effects on GPS service.

To come back also to the question you asked a moment ago of Karen, there are thousands of events per day. But they are small. They are mostly these little jammers. There was a famous case of Newark Airport having a problem with the effects of a jammer. Finally, a person was caught and fined $32,000 for the violations. But that was day after day.

These are people who are trying to hide their own movement, perhaps, from their own employer or what have you. They buy devices that claim they have a range of only 10 meters, and in fact have a range of 2 or 3 miles.

Mr. GIBBS. So drug interdiction could be——

Mr. FAGA. Criminal activity, smuggling. Right. These are when these things get used.

Mr. GIBBS. So the e-loran system would be harder to compromise or not?

Mr. FAGA. I am sorry?

Mr. GIBBS. The other system, the e-loran system, would it be harder——

Mr. FAGA. Oh, it would be much harder to disrupt because instead of generating 100 watts from 11,000 miles, it generates 300,000 watts from 1,000 miles or less.

Mr. GIBBS. Mr. Rasicot—I hope I said your name right—the icebreakers in the polar caps, I am just curious if some represent the Great Lakes area. Can you tell me the status of icebreakers in the Great Lakes?

Mr. RASICOT. Yes, sir. We have the 140-foot icebreakers and the *Mackinaw* up there working. And as you know, we have had some record ice years up there, and we have an agreement with the Canadians where we partner with them to use their heavy icebreakers when necessary. And in fact, we used two of them to keep the waterways open.

We experienced minimal delays this year. I think it is accurate to say that we are at capacity for normal icebreaking years. When you get record years, we do work with the Canadians to bring their heavies in, and that works very well.

Mr. GIBBS. What is the age of our icebreaker ships?

Mr. RASICOT. The 140-foot icebreakers were built in the 1980s, and they are currently undergoing a service life extension program,

the first ones in there. And we have got them scheduled over the next few years.

Mr. GIBBS. Thank you, Mr. Chairman. I yield back.

Mr. HUNTER. I thank the gentleman.

The gentleman from North Carolina is recognized.

Mr. ROUZER. Thank you, Mr. Chairman.

I want to talk a little bit about drilling for oil, and particularly as it relates to offshore drilling. I have seen press reports that state the Coast Guard's response to a spill in Cuban waters would take 14 days. Is that accurate?

Ms. LANDRY. Without knowing the—Congressman Rouzer, I am not sure what you are referring to in terms of how long it would take us to respond. If there were a spill in Cuban waters, we would immediately react to whatever threat we might have to our exclusive economic zone.

Mr. ROUZER. Sure. Tell me how that works when there is a spill. What transpires, exactly?

Ms. LANDRY. For domestic or for foreign?

Mr. ROUZER. Domestic.

Ms. LANDRY. For domestic, we get an immediate notification through the National Response Center of a spill, and we launch assets from whatever location could be impacted.

Mr. ROUZER. For example, the *Deepwater Horizon* spill, walk through that. What was the timeline there?

Ms. LANDRY. The timeline there was an immediate call in to our command center in the Eighth District, where we initiated a search and rescue case, anticipated a potential pollution case, and also a marine casualty investigation because this was an explosion in an offshore rig in our waters. So it was an immediate notification and an immediate response to three areas of our responsibility, search and rescue, pollution response, and marine casualty investigation.

Mr. ROUZER. Specific to the bill that has been introduced, the Foreign Spill Protection Act of 2015, have you all had an opportunity to take a look at that or have any preliminary thoughts on it?

Ms. LANDRY. I know that some of our staff have looked at it. Our lawyers and our National Pollution Funds Center folks have looked at it. Yes, sir. We would love to give you a briefing on the existing structure of our laws. The National Pollution Funds Center would love to come and give you great detail on how we are structured to respond.

If we have a spill in Cuban waters, in Arctic waters, from another country that could threaten our EEZ [exclusive economic zone], we have our fund to respond immediately. It does have limitations. It has the caps that we are all aware of. And we would have to work with Congress, absolutely, to continue with that response.

Mr. ROUZER. So who is drilling off the coast of Cuba now? I have read reports from time to time where foreign entities are going through Cuba and using the fracking technology to come closer into our oil reserves, what I would consider off the coast of the United States. What do we know about that?

Ms. LANDRY. I am not aware of current drilling in Cuban waters. I am aware a few years ago there was drilling, and we were very

involved in assisting, at the request of the company and the country, through the Department of State, to inspect the rig that was going to be drilling. And we work continuously in the Caribbean region on preparedness to respond. And we were able to do that through our existing treaties and agreements.

Mr. ROUZER. Talk to me about the Oil Spill Liability Trust Fund. I happened to read about that this morning. Give me the rundown on that. How much money is in it? How quickly would that be depleted? Who is eligible for it? Et cetera.

Ms. LANDRY. All right. So there we worked for years with the oil pollution fund and OPA 1990. It is a great piece of legislation in terms of improving our preparedness to respond and our ability to respond, and it really has served us well, even in *Deepwater Horizon*, which was beyond the scale and scope of what might have been envisioned for what we would need. But it proved to be very valuable.

We have a Pollution Funds Center set up. We have a fund that has approximately over $4 billion right now, but there are caps. In an immediate response, we have a $50 million emergency fund if there is no responsible party to attach to. So we can access that fund. Once the responsible party is determined, we can then work with the responsible party to begin paying for the response.

Mr. ROUZER. Thank you. Thank you, Mr. Chairman.

Mr. HUNTER. I thank the gentleman.

Let's get back on the e-loran thing. You know who Brad Parkinson is?

Mr. FAGA. Yes.

Mr. HUNTER. Who is Brad Parkinson?

Mr. FAGA. Often called the father of e-loran.

Mr. HUNTER. The father of GPS.

Mr. FAGA. I am sorry. The GPS.

Mr. HUNTER. GPS. Here is what he said. "E-loran is the only cost-effective backup for national needs. It is completely interoperable with and independent of GPS, with different propagation and failure mechanisms plus significantly superior robustness to radio frequency interference and jamming. It is a seamless backup, and its use will deter threats to U.S. national and economic security by disrupting GPS reception."

Do you know who Brad Parkinson is? So he is going to be at this meeting on September 3rd? Do you think you will hear anything different than what I just said? Do you think he has changed his mind on e-loran?

Ms. VAN DYKE. No. Dr. Parkinson is also heavily involved with the Space-Based PNT Advisory Board, serving as one of the vice chairs, and certainly has advocated for e-loran, as you have mentioned.

Mr. HUNTER. Are there any dissenters? Who is arguing that we do not need a backup system to GPS? I am guessing, because you are having the meeting, that there has got to be opposition, one side versus another side, different papers, different studies, different research. So who is on the side arguing that we do not need an e-loran system, that GPS is fine?

Ms. VAN DYKE. I am not aware of that argument. I think it is really assessing which technology is right as a single national

backup to GPS, and again, going to the user needs in terms of user adoption of equipment as a backup to GPS.

Mr. HUNTER. So what alternatives are you guys going to be discussing to GPS, then, besides e-loran? What are the other alternatives out there?

Ms. VAN DYKE. There certainly are commercial techniques, local RF-ranging techniques. There are private companies that offer those services.

Mr. HUNTER. You are saying there are alternatives for a national positioning system, ground-based, that does not involve satellites? And they are what, again?

Ms. VAN DYKE. Yes. One of the challenges is looking at how to extend some of these local systems into a national system and what the cost tradeoff of doing that is. Also, it is looking at, again, what users will adopt. So that was really what we wanted to focus on in the Federal Register notice and have feedback. Right now, the Federal Aviation Administration operates over 1,000 VOR DMEs and 1,200 instrument landing systems, so the commercial aviators are equipped to use those systems.

Mr. HUNTER. Let me ask you again. If you do not have GPS—let's say that it goes down—what are the alternatives to GPS?

Ms. VAN DYKE. They really vary in terms of positioning techniques and timing techniques.

Mr. HUNTER. So what other system can do everything that GPS or e-loran does? Put it that way. If they all vary, which ones are as good as GPS and e-loran?

Ms. VAN DYKE. They vary in terms of their performance characteristics. There is nothing——

Mr. HUNTER. Ms. Van Dyke, when you say "they," I am just trying to get you to tell me exactly what you mean by "they."

Ms. VAN DYKE. Nothing is as good as GPS. GPS is a three-dimensional, highly accurate system. If there were another alternative——

Mr. HUNTER. Not underwater. Not inside buildings. Right? Does GPS extend underwater?

Ms. VAN DYKE. No.

Mr. HUNTER. No. So what do subs use?

Ms. VAN DYKE. Inertial navigation systems. Sonar [sound navigation ranging].

Mr. HUNTER. And it does not go into buildings, either. Right? GPS does not?

Ms. VAN DYKE. That is correct.

Mr. HUNTER. So you have GPS. That is one. You have e-loran. That is another system. Right? Then what is the next system that would be competing against those two?

Ms. VAN DYKE. There are local RF-ranging systems that can be deployed and have been deployed. The question is whether they make sense for a nationwide backup. There are inertial navigation systems that work with accelerometers and gyros that need to be calibrated but are very accurate systems.

For autonomous vehicles, we are looking at the integration of inertial with lidar [light detection and ranging], so laser-ranging cameras, matching technology. There are integrated multisensor

capabilities. So again, it is looking at what the performance requirements are that the users need.

Mr. HUNTER. How many e-loran ground systems already exist?

Ms. VAN DYKE. I will defer to the Coast Guard on that.

Mr. RASICOT. There are eight remaining towers.

Mr. HUNTER. Eight?

Mr. RASICOT. Eight remaining towers.

Mr. HUNTER. Eight remaining towers.

Mr. RASICOT. We have the one that we have a cooperative research and development with UrsaNav, which they are working out of Wildwood to——

Mr. HUNTER. So it would take 16 to cover everything?

Mr. RASICOT. Those were his words.

Mr. HUNTER. Or 19?

Mr. FAGA. Nineteen for nationwide coverage, including navigation. Four for a minimal system that would provide only timing.

Mr. HUNTER. So we have the minimal system now?

Mr. FAGA. No, we do not.

Mr. HUNTER. We do not?

Mr. FAGA. There are no stations operating other than Wildwood on a test basis.

Mr. HUNTER. Got you.

I yield to the ranking member.

Mr. GARAMENDI. Thank you, Mr. Chairman. I see the Ice Man has arrived here, so we will get to icebreakers in a few moments.

[Laughter.]

Mr. GARAMENDI. But Ms. Van Dyke, I hear your testimony, and I am going, here we go again. Yes, there are undoubtedly alternative systems. But all of them are localized, and then coordinating all of those together is going to require some sort of overarching system. You know that. I think everybody who is interested in this has known this for at least 15 years.

And you have just very well stated why there is a thing called Federal time. Maybe if we study this a little longer, we will be able to find some alternative. You talked about internal systems. Somebody can develop an internal cesium system that you can carry around with you that keeps times. Not likely to solve the underlying problem.

I have had it. Several of us sit on the Armed Services Committee also. And I will tell you, this is a very significant national security issue that cannot be delayed any longer. There is a very good reason why Russia, Europe, and I suppose now Japan have decided they need an e-loran system of some sort.

And it is high time for this Nation to put one in place because if we don't, GPS is going to go down. And when it goes down, there is going to be a significant national security issue, to say nothing of a significant economic issue for this Nation.

For $40 million we could set up a national timing system—not navigation, but at least timing, which is integral, absolutely essential, for the continued operation of our electrical grid, our financial systems, transportation systems including those FAA issues where there are probably several dozen companies that would like to sell us a new shake and bake opportunity for navigation.

But without an e-loran system in place ASAP, this country is in serious, serious jeopardy. And I am really interested in hearing what is going to go on on September 3rd. I am telling you now that if you guys don't get your act together, then we must pass legislation that designates a specific Federal agency to get this done with a specific timeframe.

Now, listen carefully to what I am saying. I don't intend to back off. And so this is a message to the deputies, of which I happen to have been one in my past, and I understand full good and well the Federal time system. Let us study this but again.

This goes to the Coast Guard also. You have had the original responsibility, and frankly, I think you have failed in that responsibility. You have gone round and round, and I happen to know that there are some folks at OMB who are a major problem in this. And I know who they are, and I am going to have a discussion with them. And if they happen to be in the audience, then maybe we can have that discussion right away. You put this Nation at risk.

Now, do we need a single Federal agency responsible to get this done and a timeframe to get it done? Or are we going to have multiple agencies who are going to kick the ball back and forth? Mr. Rasicot?

Mr. RASICOT. Sir, I think we await the results of our PNT EXCOM. That is the group that is designated to do this work, and I think they are moving towards a solution.

Mr. GARAMENDI. So we do not need a single Federal agency; we need multiple agencies?

Mr. RASICOT. Sir, I yield to the EXCOM as to how to best implement the system.

Mr. GARAMENDI. Oh, you are good.

[Laughter.]

Mr. GARAMENDI. I guess that is what you get paid for, obfuscation.

Ms. Van Dyke, do we need a single Federal agency?

Ms. VAN DYKE. We are working closely with the interagency on the way forward. And again, as Mr. Rasicot said, we do not want to presuppose the outcome of the EXCOM, which is cochaired by DOD and DOT. So we already are in a multiagency arrangement for GPS.

Mr. GARAMENDI. Mr. Faga, how long have you been involved in this issue?

Mr. FAGA. I have been involved in GPS since the 1980s.

Mr. GARAMENDI. PNT?

Mr. FAGA. PNT.

Mr. GARAMENDI. Do we need a single Federal agency responsible for getting this done?

Mr. FAGA. We will. And I think what will happen is once there is a determination to actually move forward, the interagency will decide who has to take the lead role and work with all the agencies and actually get it done, deal with the industry, work out a financing arrangement, and so on.

Mr. GARAMENDI. We have not spent much time on a public-private partnership. There has been some discussion of the commercial application of e-loran, a brief discussion of public-private part-

nerships. And I think we had better ice this thing and talk about icebreakers. A public-private partnership.

Mr. FAGA. Right. The idea there is that a private provider builds the system but has a federally provided funding mechanism available to pay it back. I will give you an example.

I am on the board of a company called DigitalGlobe, which flies commercial imaging satellites. It built these satellites at private expense, but it operates half of them on behalf of the U.S. Government and gets an annual payment. So all the financing, construction, launch, the whole thing, was private, and the Government pays back with essentially a user payment. Imagine a similar situation here.

Mr. GARAMENDI. Thank you. I yield back, Mr. Chairman.

Mr. HUNTER. I yield to the Ice Man.

[Laughter.]

Mr. YOUNG. Thank you, Mr. Chairman. I would like to ask unanimous consent to submit records for changes to alternative planning criteria used in Alaska to meet oil pollution and response requirements. There are some things up there that I will submit questions for, with your permission.

I yield back.

Mr. HUNTER. I thank the gentleman.

Let me get this straight, too. So Transportation and Defense are the two agencies working this. Right? It is Transportation and Defense, and the Coast Guard is kind of in the middle? Is that right? Those are the two agencies?

Ms. VAN DYKE. The Space-Based PNT Executive Committee is cochaired by the Deputy Secretaries of Defense and Transportation. The complementary PNT program, we are working very closely with DHS. So it is a tri-led effort to determine a backup to GPS.

Mr. HUNTER. So it is the space-based PNT. But we are not talking space-based stuff. Right? We are talking e-loran, which is ground-based. Does it matter? Are they all-encompassing?

Ms. VAN DYKE. NSPD–39, which I mentioned in my testimony, does discuss a backup to GPS. So that is covered under the Space-Based PNT Executive Committee policy.

Mr. HUNTER. OK. I am just trying to think. Is this a transportation issue? Obviously it has been going back and forth in Department of Transportation forever. So maybe it is not a transportation issue. Maybe it is a pure DOD issue. We just have them do it, and we tell them what to do, and we just get it done. Then you will not have multiple agencies discussing things forever, which is what seems like is happening right now.

I do not have any more questions on this. Do you want to talk icebreakers? I yield to the gentleman from California.

Mr. GARAMENDI. The icebreaker thing has gone round and round, and I think a lot of the problem really lies here in Congress, where we have been unable to find the money to either buy a new icebreaker, build a new one, or repair the present one.

My question, I think, is mostly a Coast Guard here question, Mr. Rasicot. A study is underway. Presumably we are going to take the *Polar Star* out of the water, look at it. You have described this. Could you go into a little bit more detail about the timing, when the study is going to be done and the scope of the study, so that

we can be prepared to pounce on whatever solution the Coast Guard finds?

Mr. RASICOT. Yes, sir. There are actually two things going on. One is the preservation drydock, which will commence before the end of this fiscal year, and that is where we will pull the *Polar Sea* out of the water and take care of all the things that have been decaying and preserve what has been going on over the last 3 or 4 years while she has been out of service.

The next thing, which will start when we get the money from—it is in the fiscal year 2016 President's budget—is what we call a material condition analysis or assessment. And we are going to go stem to stern on that ship and see what shape she is in.

She has been sitting there for a while. She has been inactive. We need to know what systems are workable, what is still there. Many of these systems are actually obsolete. I was actually just talking to the skipper of the *Polar Star* this week, and believe it or not, they have to buy some of the fuses for their main generators and switchboards on eBay because they are not manufactured.

Well, that is the same equipment that is on *Polar Sea*. So we need to take a look. We really cannot make any credible decision on reactivation/decommissioning until we get a good sense of what is really there and what the condition of that is.

Mr. GARAMENDI. The ranking member, Mr. DeFazio, raised the issue of gut and fill, I guess is what it means, basically using the hull. Will that also be studied?

Mr. RASICOT. Yes, sir. We will take a look at all—what we will look at is what is the condition and what is the viability of that ship. I have to go back to both the written statement and my oral statement, though. We only see the *Polar Sea* or *Polar Star* as a gap filler between now and the new icebreaker. We need to think about recapitalizing the icebreaker fleet as opposed to using 40-year-old ships.

Mr. GARAMENDI. Have you made any progress on working with the other Federal agencies and I suppose private agencies that are likely to use the new and the existing heavy icebreaker for their research? Any discussions about those agencies participating in the payment?

Mr. RASICOT. Well, we certainly have a multiagency and multidisciplinary approach to developing the requirements for the icebreaker, as it is a national asset that serves many agencies. However, we have not had discussions regarding the payment structure or the funding structure between agencies. No, sir.

Mr. GARAMENDI. The chairman is about to introduce a piece of legislation that would set up a fund similar to the submarine fund in the Department of Defense where money can be collected to construct a new icebreaker, to refurbish one of the existing ones, extend the life of them. Does the Coast Guard have a position on that legislation?

Mr. RASICOT. Well, sir, I think it is fair to say that we normally do not comment on pending legislation. However, the Commandant has said on numerous occasions that he looks forward to imaginative and innovative solutions. And we look forward to working with the committee staff on those type of solutions for this national problem.

Mr. GARAMENDI. I think that introduction is pending probably this week?

Mr. RASICOT. Yes, sir.

Mr. GARAMENDI. So then you can comment and be very specific about it. It also, as I understand the legislation, would allow us to find financial help from other agencies that might want to have space on either refurbished or a new icebreaker. So I draw your attention to that.

Mr. RASICOT. Yes, sir.

Mr. GARAMENDI. And we look forward to hearing back from you and any organizations that would be interested in that matter.

I yield back.

Mr. YOUNG [presiding]. This is for the Coast Guard, and I would suggest to the committee and the ranking member that I still think we either have to pass legislation for an independent study for leasing a management-private partnership. I have argued with every admiral, every Commandant, for the last 40 years about this concept of having to own a vessel.

I was here when we funded the *Polar Star* and the rest of those three vessels. There are a lot of reasons why they are not operating. One is a stupid law; we have to replace it with the cheapest product when there is something that breaks down. That is our fault.

Secondly, though, is the money. I do not know whether even this fund that we are going to introduce will ever get enough money to build a Coast Guard icebreaker. I do believe we ought to have an independent study and see whether it can be done a cheaper way with a better result than we will have trying to appropriate the money for going through the Coast Guard.

Now, what is the estimated cost of—you cannot tell me yet when you go through the *Polar Star*?

Mr. RASICOT. I am sorry, sir?

Mr. YOUNG. The estimated cost of refurbishing?

Mr. RASICOT. No. It is impossible to tell right now, it really is, because we have to get a look at the material condition.

Mr. YOUNG. Did we not put money in the *Polar Sea*? Which one did we refurbish?

Mr. RASICOT. We refurbished the *Polar Star*.

Mr. YOUNG. We already did the *Polar Star*?

Mr. RASICOT. Well, for a 7- to 10-year life cycle. Yes, sir.

Mr. YOUNG. OK. So what are you looking at this life cycle of the *Polar Sea*?

Mr. RASICOT. Well, it really depends on how the acquisition progresses. And right now we need to just look at the ship itself and see what it is capable of. It has been sort of deteriorating while *Polar Star* has been available, and we have actually taken some of the stuff off of *Polar Sea* to make *Polar Star* work.

So you are paying Peter to pay Paul, or whatever the right saying is there. So we just need to get on board, sir, and do an engineering analysis. I really cannot provide you an answer.

Mr. YOUNG. OK. I respect that. But I really suggest, respectfully, you are wasting your money. This is like trying to fix a brand-new house that is full of termites. It will cost a lot of money. You will

make a lot of studies, a lot of effort. And the end result will be it is going to cost us $100 million to try to refurbish this ship.

And I really believe we ought to look. Is there a better way of getting icebreakers into our activity, especially when everybody else is involved? You see what China is doing. Russia has got the best icebreaking fleet now. Finland has always had a good one. And I don't want to be leasing from them.

I still think there ought to be a proposal. I don't see why the Coast Guard cannot come out with—what do you call it—a projected suggestion on what would a shipyard charge us for a 35-year lease with a ship built to our specification and maintained by the shipowner. That is the beauty of it.

Because you guys have done—not you personally or any of the Coast Guard—done a terrible job, I believe, in maintaining the icebreakers that we have. The hulls are not in bad shape. It is all the other nonsense—like you said, outdated. They have got fuses you have to put in like the old days that have got a clip on each end.

I have been on a couple of these ships, and they were state of the art when we built it. But that was 35 years ago, 40 years ago. Forty years. And so I am just suggesting—if I can, I am going to talk to the chairman. We are going to see if we cannot get an independent study. And I may be wrong. Maybe you are right.

I will yield to the gentleman.

Mr. GARAMENDI. I think you hit upon something interesting. If I understand the Coast Guard, you have been studying the requirements for a new ship. Is that correct?

Mr. RASICOT. We have had an interagency integrated planning team studying those requirements, yes.

Mr. GARAMENDI. What is the status of the planning?

Mr. RASICOT. We hope to finish it this year. As you recall, we did a preliminary operational requirements document, which we completed. You then refine that, get the stakeholders back in, and see if anything has changed. Did we get it right? And we are trying to get this right. This is a 40- or 50-year-old asset. We do not buy these every year. So we are trying to get it right. So we are looking to get this done by the end of the year, sir. Calendar year.

Mr. GARAMENDI. My friend the Ice Man here. With that in hand, there would be information that a private company could then look at and come up with some answer to your question.

Mr. YOUNG. And that is what I expect. What is your requirement? Put it out there. You have got quite a few shipyards now because the Navy is cutting back. The shipyards are available. We have a lot of private shipyards that are interested in this operation. They can look at this and give us an estimated cost of what would happen.

Now, part of this is our fault because my understanding is—which agencies, once the lump is all lump sum? OMB. They want to say, OK, because it takes—let's say the ship costs $800 million versus $1.4 billion. They want to charge us $800 million, charge us against the budget, and I am saying that is nonsense.

We have to change that where it is the amount of money you expend to lease the vessel in that year. And that would solve some problem. That would solve a problem. This is all bureaucratic—it is a stupid way to do things. But the main thing is I have watched

this done before where if an owner of the vessel leases to a recipient with covenants from the recipient, and part of the contract is maintaining the vehicle, it is up to them to maintain it, so either you want to re-lease it or, in fact, it would be valuable as an asset at the end of the lease.

That is all I have ever asked for the last 25 years is to try to look at—the last study I know of that was done by the Coast Guard is 1980. That was 35 years ago. And maybe it didn't pencil out then. So that is all I am asking, is that you consider it. And every Commandant has argued with me over this and they say, do not do it.

Do you have another question?

Mr. GARAMENDI. Yes. Just to follow up on your point, later this year there will be detailed information about what a new icebreaker will need to be. I suppose it will be not only the physical nature of it but also the kinds of scientific space that would be needed in it and so forth, so it would go into some detail.

Perhaps it could be made available to the private industry to come up with a bid that might then be a lease. I suspect that it will take a couple of lines in some appropriation, or maybe in a Coast Guard reauthorization bill, that would require that that information be available to the private companies for the purposes of achieving your goal. You might want to look at that.

Mr. YOUNG. Yes. Mr. Chairman, I was just talking about the lease option, and apparently there is a study taking place, what is going to be required. And I think we ought to get an estimate because I do not want the Coast Guard to do the study itself. With all due respect, that gets kind of self-serving.

I would either like to have an outside agency do it or give us the details of the requirement for what they seek and see whether we can get a vessel or a suggestion. Because again, it is maintenance. There is nothing wrong with those three ships we built other than they just wore out and the parts were not replaced correctly.

And it was not your fault. We have a "buy American" clause. And we do not put modern stuff in. We place it with, very frankly, and that is one of the reasons—I do not think the hulls are hurt. The hulls have not been used that much, and hulls do not really wear out unless you run into a rock like we did up north. We didn't know where that was.

That is something we have to do, Mr. Chairman. I don't know whether it is in our jurisdiction because this surveillance—or, excuse me, mapping of our sea bottoms in the Arctic is crucially important. We have no concept of what is out there, especially offshore. We still do not know where they ran into it. But anyway, it has nothing to do with drilling. It is lack of navigational aids. I think the last area was done in 1905, so we are really outdated.

Mr. Chairman, I do not have any other questions. Would you like to ask some more questions?

Mr. HUNTER. Yes. It seems like we are falling behind. You have all these other countries that we talk about here in disparaging ways sometimes—Europe, Russia, China—doing all the stuff that we are not doing right now, whether it is backup to GPS, whether it is building icebreakers. I would like to just get your general sense of what are we doing wrong?

Number two, when it comes to the icebreakers, I do not think we should presuppose that it should even be a Coast Guard icebreaker. It might be DOD-owned. It could be some kind of interagency. It could be a leased vessel that is run by merchant mariners where the Coast Guard is not even involved in it, where the ice gets broken. Because obviously, none of this stuff is getting done.

I guess we are going to have meetings on it. September 3rd there is going to be a meeting on GPS backup stuff. There are going to be more meetings on icebreakers going forward, with no actual plan to implement anything. So we are falling behind. I am just curious. Why are we falling behind these other countries on these issues? Go ahead, go down the line. I am just curious. Please, speculate.

Mr. RASICOT. Sir, I do not have a good reason as to why the perception might be we are falling——

Mr. HUNTER. Let's not mince words. It is not a perception. We do not have any heavy icebreakers and they do. So I would call that purely we do not have icebreakers and they do.

Mr. RASICOT. Yes, sir. And we do have an active program of record to recapitalize one heavy icebreaker. We are moving forward on that. We will have the operational requirements——

Mr. HUNTER. So my question is, why do you think we are falling behind? Even if we get one, we are still behind. Peer competitor nations, we are behind, even if we have one. So my question is, why are we falling behind? What do you think?

Mr. RASICOT. I do not have a good reason for that, sir. I just do not know.

Mr. HUNTER. Admiral?

Ms. LANDRY. Competing national priorities. That is what I would say.

Mr. YOUNG. If the chairman will yield for a moment?

Mr. HUNTER. Absolutely.

Mr. YOUNG. One of the things that I have been concerned over the years, we in the Congress—I was partly guilty of this—but OPA. Never had that responsibility before. Oil spill responsibility was given to you by the Congress, so we never really funded it adequately.

When I first came to this body, you had navigational aids, search and rescue. Think of all the responsibilities that you have now. And we really do not fund the Coast Guard adequately. I am convinced that that is our biggest challenge. I cannot blame an agency as much as I do the Congress in not recognizing the importance of the mission and the importance of, very frankly, being an Arctic nation. And I am very prejudiced that way because I am the Arctic nation.

[Laughter.]

Mr. GARAMENDI. You are the Ice Man.

Mr. YOUNG. Sometimes they do not think I am an Ice Man. They think I am a volcano. But I really think we have a responsibility. Because you talk about defense, and I am all for defense. Do not get me wrong. We talk about all these other things. And yet we say, here, Coast Guard, you have got this job to do but, by the way, we are not going to give you anything to eat, so keep running a mile. That is pretty hard to do.

So I think we ought to be talking that way to some of our Members of Congress, and this is a very serious issue securitywise, I think internationally. We have got probably 74 ships going through the Bering Straits this year, which you did not have before. It goes back oil spill liability. I know we had the oil spill liability bill here, and I worked on OPA when it passed.

I still do not know how we are going to make other countries—China is going to be drilling up there. They do not give a rat's tail. See, I was good. I kept my language straight. And we have to have the shipping channels in place, the GPSs in place, the lorans in place, everything expecting for the next 100 years because that is where the action is going to be.

You have got 31 of the known minerals we use today above the Arctic Circle. They were never accessible before. You have oil beyond anyone's imagination at the North Pole. And people look at me like I am crazy. I am not kidding about that. You talk to my geologists, at some time the North Pole did not have any ice. We did not have any climate change. It was a different time of the globe.

And so we had better be prepared, and I think it is our responsibility to try to make that happen. So I am not blaming the Coast Guard for all this. I do not like all the agencies working against one another. Now, that concerns me a great deal.

Mr. Chairman, I have a little case where this administration came out with the flood plain. This came out of the White House, the flood plain. They have got three alternatives—a 100-year status, a 1,000-year status, and then they have one that is going to be the future-thinking flood plain. And all the agencies have adopted a different policy.

How do I get a permit? Do you have an answer to that? Anybody have an answer to that? That is what we have when we have agencies. One does this, one does that, and one does this. You know what? We do not go anywhere. It is like a dog team. I was an old dog musher. If we had all the dogs going in one direction, I got home. But if I had one dog going one way, another dog going the other way, and another dog going the other way, I killed them all because we did not go anywhere. So we figured out what we do. And I am not suggesting I do that to anybody in this room.

[Laughter.]

Mr. YOUNG. I am just saying we have got to get on the same page. We have got to go forward and not getting all this, it is my deal, it is my deal. That does not serve anybody. Mr. Chairman, I do not have any questions.

Mr. HUNTER. This is way more fun when you are going.

[Laughter.]

Mr. HUNTER. Mr. Garamendi, any more questions?

Mr. GARAMENDI. I could have a lot of fun, but I think Mr. Young's statement stands for itself. And we heard it earlier, and now the icebreaker issue. And also, Ms. Landry, you spoke the truth. It is a matter of priorities. It is a question of priorities. And we have to make those choices, and we often fail to do so. Mr. Young was speaking about it. I will let it go. Thank you.

Mr. HUNTER. I thank the gentleman from California. I just want to note, too, congratulations, Ms. Landry, on filling the Coast

Guard USAA [United Services Automobile Association] board of directors coming up. Way to go. I use USAA sometimes. I think it is just homeowners or something, but anyway, congratulations.

I yield back to the chairman.

Mr. YOUNG. I believe this meeting is adjourned.

[Whereupon, at 11:28 a.m., the subcommittee was adjourned.]

Statement of the Honorable John Garamendi

Subcommittee on Coast Guard and Maritime Transportation
Hearing on "Federal Radionavigation Plan, H.R. 1684, the Foreign Spill Protection Act, and H.R. ----, the National Icebreaker Fund Act"

July 28, 2015

Good morning Chairman Hunter, and thank you for scheduling this hearing to shine a bright light on two important issues of critical economic and national security importance to our Nation – the need to have a secure, reliable and land-based system to back up and complement our Global Positioning System, or GPS, signals, and the need to ensure that the United States has on hand a modern fleet of polar icebreakers..

The Coast Guard has known for many years that its aged and weary fleet of heavy icebreakers – notably the POLAR STAR and the POLAR SEA – is unreliable and in need of replacement. Nonetheless, and despite the fact that the Coast Guard by law is the sole source of icebreaking services within the Federal Government, the Coast Guard has failed miserably to plan for the recapitalization of these specialized vessels essential for operation in the High North.

Mr. Chairman, we must find a path forward to provide the Coast Guard with new icebreakers to meet its mission needs at both poles. That is why I was pleased to join you, full committee ranking member Peter DeFazio, and other colleagues in cosponsoring your legislation to establish a National Icebreaker Fund in the treasury.

In light of the present budget constraints we face, this new fund could provide an additional tool to cobble together the funds necessary to ensure that the Coast Guard can either build or otherwise acquire icebreakers to avoid a future critical gap in operational capabilities.

More ominous than the looming gap in icebreakers, and even more unrecognized and unappreciated by the Congress and the public at large, is the potential catastrophe that could befall virtually every sector of critical infrastructure in the United States should there be a natural or man-made disruption, corruption or cessation to GPS satellite signals which are critical for positioning, navigation, and most important, timing.

Think about it for a minute: every sector of critical infrastructure systems – transportation, financial, energy, agriculture, defense, communications, to name just a few – all rely on GPS signals. In fact, our reliance on GPS has become so embedded in the fabric of technology and society that it is no exaggeration to say that GPS is a "single point of failure" and a huge liability for the economic and national security of the United States.

Interestingly enough, we have also known about this risk since the Clinton administration. Moreover, we have also identified a solution: a land-based, low frequency signal that uses the former LORAN-C infrastructure called enhanced LORAN, or eLORAN. In closing, Mr. Chairman, if eLORAN can work, we need to find a way to end the sleepwalking and get this system up and running now. For if not, we risk facing an avoidable calamity, and one entirely of our own making.

STATEMENT OF
THE HONORABLE PETER DEFAZIO
SUBCOMMITTEE ON COAST GUARD AND MARITIME TRANSPORTATION
HEARING ON "FEDERAL RADIONAVIGATION PLAN, H.R. 1684, THE FOREIGN SPILL PROTECTION ACT, AND H.R. ----, THE NATIONAL ICEBREAKER FUND ACT"
JULY 28, 2015

Mr. Chairman, thank you for scheduling this morning's hearing on two issues that have gone overlooked for far too long— the need for reliable icebreakers and a legitimate back up for positioning, navigation and timing signals should the Global Positioning System fail.

Back around the time of the Vietnam War the Federal Government and Congress decided that it made the most sense to consolidate all icebreaking functions in the Coast Guard to save funds and eliminate redundancy with Navy operations. This strategy did accomplish the objectives of consolidation and saving money.

But what this strategy failed to accomplish or even contemplate, however, was the fact that all vessels – even icebreakers – need to be replaced at some point.

And here's the rub; fifty years later we find our Coast Guard with an aged and unreliable icebreaker fleet; a fleet that has spent the majority of its time inoperable, tied up and rusting away in Seattle with no real plan in place on how to replace them with new, technologically advanced polar class icebreakers.

How did it come to pass that the nation with the world's most advanced blue water Navy cannot seem to scrape together the funding necessary to build new icebreakers when Russia, Sweden, Canada, Norway, and even China, are moving ahead to build new icebreakers.

This is an embarrassment that has to change, and change quickly, or we will discover soon enough that even the world's most powerful Navy has limited reach above the Arctic Circle.

The Global Positioning System, or GPS, is another example of the Federal Government getting it right, but not quite.

From its initial creation back in the late 1970s and early 1980s as a Defense Navigation Satellite System, the launch of contemporary GPS satellites in the early 1990s and subsequent granting of civilian access to GPS signals has allowed GPS to become ubiquitous and engrained in virtually all aspects of modern technology.

All in all, GPS has been a tremendous boon to the U.S. and global economies. GPS has made access to reliable and accurate positioning, navigation and timing data as easy as turning on your cell phone.

But just as icebreakers age and need to be replaced, it is also a fact that relatively weak GPS signals can be disrupted, degraded, spoofed, or corrupted, often with serious consequences.

Additionally, GPS signals are susceptible to more than human disruption, such as by hackers or terrorists. Non-human factors, such as solar flares and collisions with space debris, can also bring down a GPS signal.

But our dependence on GPS has also created the circumstance of GPS being recognized as a single point of failure that could bring sectors of critical infrastructure, including parts of our national defense, grinding to a halt.

And what would that mean? Well, take for example the transportation and energy sectors along the Columbia and Willamette Rivers in the Pacific Northwest. All of the flood control locks and dams, and the power plants could go off line. The switches for several rail lines could become unsynchronized. All the tug and barge tows coming down river and the ocean container ships passing over the Columbia River bar would be without accurate navigation headings.

Any of these outcomes happening separately would be terribly disruptive. But if they all occurred simultaneously, the outcome could be

truly calamitous especially considering that emergency response operations would also be disrupted.

And what is the Federal Government doing to address this known "single point of failure?" It would appear not as much as it should to develop a legitimate back up for positioning, navigation and timing signals should GPS fail something akin to an enhanced LORAN, or eLORAN system.

In closing Mr. Chairman, thank you again for scheduling this hearing on these two vitally important issues. We need to make sure the government gets it right in both cases. Too much is at stake. Thank you.

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TESTIMONY OF
MR. GARY RASICOT
DIRECTOR OF MARINE TRANSPORTATION SYSTEMS

AND

MS. MARY LANDRY
DIRECTOR OF INCIDENT MANAGEMENT AND PREPAREDNESS POLICY

ON
"COAST GUARD ICEBREAKER NEEDS, RADIO NAVIGATION PLAN, AND OIL SPILL RESPONSE CAPABILITIES"

BEFORE THE
HOUSE COAST GUARD AND MARITIME TRANSPORTATION SUBCOMMITTEE

JULY 28, 2015

Introduction

Good morning Mr. Chairman and distinguished Members of the committee. We are honored to be here today to discuss the Coast Guard's icebreaking needs, radio navigation plan, and oil spill response capabilities.

COAST GUARD POLAR ICEBREAKING PROGRAM

The Coast Guard's current icebreaking activity in the Arctic and Antarctic is being met with the minimum number of assets necessary, but as these assets age, the ability to maintain this level of effort is at significant risk. The Coast Guard Cutter (CGC) POLAR STAR, the nation's only operational heavy icebreaker, was reactivated in 2013, extending its service life by 7-10 years (2020 to 2023). POLAR STAR's classification as a heavy icebreaker makes it suitable for operations in either the Antarctic or Arctic. Although still in commission, a second heavy icebreaker (POLAR SEA) is inactive and has been unable to get underway since experiencing major propulsion plant casualties in 2010. The HEALY, a medium polar icebreaker, was commissioned in 1999 with a design service life of 30 years, and is primarily designed for operations in the Arctic.

CGC POLAR STAR is currently in dry dock undergoing planned repairs prior to deploying for a third time in support of Operation Deep Freeze later this year. Operation Deep Freeze (ODF) is an annual activity managed by NSF to resupply the National Science Foundation's (NSF) Antarctic research station at McMurdo Sound. During the past two ODF deployments, POLAR STAR also came to the aid of mariners in distress, including the rescue of an Australian fishing vessel trapped in the Antarctic ice. The Coast Guard's second active icebreaker- CGC HEALY- is currently underway in the Arctic, where the crew is working with the National Oceanic and Atmospheric Administration (NOAA) to test Arctic technologies. HEALY's deployment will

continue through October and will also support an NSF study of trace elements in the Arctic water column and the Coast Guard's own annual studies collectively known as Operation Arctic Shield.

Due to its age and certain antiquated systems, extensive maintenance activities must occur on POLAR STAR upon her return from Antarctica, if she is to be used for the next year's Operation Deep Freeze. Because maintenance facilities for a large icebreaker are limited and a home port shipyard may not be available or cost effective, there may be excessive strain on the crew. For example, in 2014 POLAR STAR crew members spent over 220 days away from home port between Operation Deep Freeze and their follow-on maintenance period in Vallejo, CA; the Coast Guard anticipates a similar operational schedule for the POLAR STAR in 2015. The requirements that Coast Guard is developing for its new icebreaker will address such issues.

The Coast Guard is collecting updated information to inform a decision regarding whether to decommission or reactivate POLAR SEA. By the end of fiscal year 2015, we will commence a Preservation Dry Dock on POLAR SEA which will slow deterioration of the hull and machinery and preserve the vessel for layup work that is necessary regardless of future disposition. In conjunction with and following this dry dock our plan is to conduct a full Materiel Condition Assessment of the hull and all systems with $6million in funding requested in the 2016 President's Budget. The assessment will determine the scope of work and costs that would be incurred to reactivate POLAR SEA based on the vessel's current condition. The Coast Guard plans to evaluate the cost effectiveness of reactivation based on the assessment and anticipates a final determination to either decommission or reactivate by the end of 2016. Regardless of the final determination, a reactivation of POLAR SEA is only viable as a bridging strategy and does not mitigate the need for the recapitalization effort currently underway if we are to maintain our current polar icebreaking capacity.

The acquisition program underway is currently in the Analyze/Select phase which involves establishing asset requirements, evaluating alternatives for achieving the requirements, and assessing the merits of each alternative to select a solution. In January 2015, the Coast Guard completed a Preliminary Operational Requirements Document (PORD) for the new Polar Icebreaker that established baseline requirements as defined by an interagency Integrated Product Team (IPT). Future milestones include finalizing requirements, completing an Alternatives Analysis, and identifying a preferred material solution. Upon selection of a material solution the Coast Guard will develop a formal Acquisition Plan. Details of the acquisition timeline will continue to evolve until the plan is finalized. The fiscal year 2016 President's Budget includes $4 million to continue these pre-acquisition activities.

The ongoing recapitalization effort to acquire a single new heavy icebreaker will sustain our current capacity. Additional assets may be needed as human activity increases in the Polar Regions. The Coast Guard is also meeting the demands of increasing Arctic activity during the summer months through mobile and seasonal presence in the region. In 2016, the Coast Guard's Operation Arctic Shield will focus on assessing the operational capabilities of cutters, boats, and aircraft, executing the Coast Guard's multiple Arctic missions, and strengthening relationships with state, local, and tribal stakeholders.

COAST GUARD INVOLVEMENT WITH THE 2014 FEDERAL RADIONAVIGATION PLAN

The Federal Radionavigation Plan (FRP) is the official source of positioning, navigation, and timing (PNT) planning for the U.S Federal Government. The FRP is prepared jointly by the

Departments of Defense (DoD), Homeland Security (DHS), and Transportation (DOT), and is signed by the Secretary of each agency. The Coast Guard's responsibilities include statutory obligations under 14 USC § 81 to establish, maintain, and operate aids to maritime navigation, aids to air navigation (as requested by the FAA or DoD), and electronic aids to navigation systems.

The FRP reflects planning for present and future federally provided PNT systems, covering common-use PNT systems (i.e., systems used by both civil and military sectors). The Federal Government operates PNT systems as one of the necessary elements to enable safe transportation and encourage commerce within the United States. While all users require services that are safe, readily available, and easy to use, unique requirements exist for military as well as civil users.

Nationwide Differential GPS

The Secretary of Transportation has statutory authority to implement the Nationwide Differential GPS (NDGPS) service in support of surface transportation and other terrestrial civil PNT missions. System operations and maintenance are provided by the Coast Guard under a Memorandum of Agreement (MOA) in a coordinated fashion with the Coast Guard-provided Maritime Differential Global Positioning System (MDGPS) as a combined national differential GPS utility.

DGPS was developed by the Coast Guard to improve accuracy in positioning aids to navigation when the original GPS signal was transmitted for civil users with Selective Availability, which decreased the position accuracy of GPS from five meters to approximately 100 meters. By using static reference stations to calculate corrections to the GPS signal received from the satellites DGPS is able to retransmit a corrected GPS signal to users with DGPS receivers, providing accurate positioning information to within approximately three meters. In May of 2000, the U.S. Government decided to permanently disable Selective Availability, providing all users with GPS receivers with the maximum accuracy available from the GPS satellites. Furthermore, the newer GPS III satellites no longer have the capability to transmit with an induced error.

Over time, a number of factors have contributed to the declining public use of NDGPS, including lack of a carriage requirement, technological advances in GPS, and limited availability of consumer-grade DGPS receivers. Working with the Department of Transportation and U.S. Army Corps of Engineers, which both have responsibility for terrestrial uses of DGPS, the Coast Guard is finalizing a Federal Notice that will provide the public an opportunity to comment on a proposed plan to continue to provide differential coverage in major ports and waterways.

OIL SPILL RESPONSE CAPABILITIES

The Coast Guard is committed to proactive oil spill prevention and response. As the nation's lead federal agency for ensuring maritime safety, security, and stewardship, the Coast Guard protects people on the sea, protects the U.S. against threats delivered from the sea, and protects the sea itself. Our stewardship function includes marine oil spill preparedness and response in our role as pre-designated Federal On-Scene Coordinator (FOSC) in the Coastal Zone and, through a memorandum of agreement with the Environmental Protection Agency (EPA), for designated inland waters. This authority originates from the Clean Water Act as amended by the Oil Pollution Act of 1990 (OPA 90) and by regulation in the National Oil and Hazardous Substance Pollution Contingency Plan (or NCP for short). As FOSC, the Coast Guard is involved in

preparing for spill incidents and responding when they occur. The FOSC leads government planning and preparedness activities in the coastal zone, overseeing the preparedness of the marine transportation industry segment we regulate, and collaborating with other regulatory agencies in their preparedness oversight of other elements of the petroleum supply chain.

Under the U.S. "polluter pays" approach to environmental response, the petroleum industry and supply chain players are required to plan, prepare and retain equipment for response, as well as carry out this pre-planned response under government direction when a spill occurs. Because of these requirements, regulated industry provides the bulk of the U.S. pollution response capability. In the U.S., those who spill oil on the navigable waters are liable for cleanup costs and are referred to as the "Responsible Party (RP)". In the event that the RP is either unknown or the spill exceeds RP capabilities, the Coast Guard will hire commercial and/or government response resources using the Oil Spill Liability Trust Fund.

The Coast Guard's primary jurisdiction for oil spill preparedness and response consists of the navigable waters of the U.S., adjoining shorelines, the contiguous zone, and the high seas involved in outer continental shelf activities. Our Coastal Zone preparedness and response functions are complemented by the EPA in the inland zone under the same statutes and regulations. The coastal zone is generally waters affected by the tide, the Great Lakes, and specified inland ports, with specific boundaries negotiated between EPA regions and Coast Guard districts, documented in memoranda of agreement and added into Regional and Area Contingency Plans.

While the Coast Guard and EPA lead federal preparedness and response efforts, responding to pollution incidents involves coordination with numerous state and federal agencies as well as the private sector, Non-governmental Organizations, science institutions, and academia response capabilities. The Coast Guard also depends on its own personnel and resources to augment the required industry response capability and provide RP oversight.

The Coast Guard also coordinates with federal, state, and international partners to ensure government and industry have the necessary oil spill response equipment, capability, and contingency plans to address worst-case discharge scenarios in anticipation of increased maritime activities in the Caribbean, U.S. and international Gulf of Mexico, and Arctic regions, and to mitigate potential risks associated with oil exploration and production. As a result of Cuba offshore drilling in 2011-2012 strong multilateral engagement occurred in the Caribbean to address oil spill risks to the United States. This effort produced the non-binding Wider Caribbean Region Multilateral Technical Operating Procedures for Offshore Oil Pollution Response (MTOP). The intent of MTOP is to build a responder-to-responder network that can work effectively in the event of a large spill that threatens more than one of the participating countries. The Coast Guard is committed to continued multilateral engagement to enhance international pollution response cooperation and capabilities.

Coast Guard Pollution and Incident Management Resources

National Strike Force personnel and equipment are strategically placed throughout the U.S. and available to provide nationally deployable incident management, oil spill response expertise, and specialized equipment. The Coast Guard's fleet of 225-foot seagoing buoy tenders are equipped with deployed Spilled Oil Recovery Systems (SORS), and three National Strike Force Teams maintain Vessel of Opportunity Skimming Systems (VOSS), trailers with air palletized inflatable

booms, viscous oil pumping systems, various submersible and non-submersible high-volume pumps, and dispersant monitoring equipment.

Coast Guard Sectors nationwide are staffed with officers and enlisted members proficient in pollution response operations. These personnel are responsible for mitigation and response activities through Responsible Party oversight or mobilization of contracted resources. Certain Sectors maintain pollution response trailers that provide oil spill response capabilities for first response operations in remote locations. Combined with the efforts of numerous state and federal agencies, the private sector, NGOs, science institutions, and academia this network comprises the National Response System that, through cooperative work, successfully responds to thousands of oil spills every year within the United States.

Coast Guard Pollution and Incident Management Enhancements

Throughout its 45 years, the National Response System has been proven to be a resilient, agile construct during myriad pollution incidents. The system experienced no greater challenge than in 2010 during response operations following the MC252 Deepwater Horizon oil spill. As a result of the lessons learned from Deepwater Horizon, the Coast Guard has taken a number of actions to enhance our spill preparedness and response posture. For instance, the Coast Guard instituted a two week Federal On-Scene Coordinator course that provides junior incident commanders with applied knowledge for directing smaller oil spills, while enhancing major spill response readiness. Additionally, the Coast Guard established a full time national Incident Management Assistance Team (IMAT), as well as civilian Incident Management and Preparedness Advisors in each Coast Guard District.

The Coast Guard also regularly conducts Spill of National Significance (SONS) exercises. A SONS is a spill that due to its severity, size, location, or impact, requires extraordinary coordination to contain or clean up the discharge. In recent years, the Coast Guard has shifted the SONS exercise program towards annual training and seminar events which include the opportunity to discuss complex and politically sensitive response issues among the DHS and the fifteen National Response Team (NRT) agencies. Additionally, senior level seminars were conducted in 2012, 2013, and 2014 that focused on offshore spill scenarios in the Arctic. The Coast Guard gathered lessons learned from these seminars and established critical guidance and policy for future spills. Currently, the Coast Guard is working with the EPA on a SONS exercise scheduled for 2016, which will focus on a crude-by-rail incident.

In addition to the initiatives mentioned above, the Coast Guard works closely with stakeholders to develop new oil spill response capabilities as Chair of the congressionally-mandated Interagency Coordinating Committee on Oil Pollution Research (ICCOPR). Additionally, the Coast Guard Research and Development (R&D) Center continues to build upon its 40-year track record of successful research to address oil spill response capability needs. Recently, the Coast Guard has been actively engaged in analyzing oil spill response equipment in the Arctic environment. Engineers and scientists led by the Coast Guard R&D Center have utilized HEALY's deployments to the Arctic to perform testing and evaluation of communications equipment, ice navigation technologies, and oil spill detection and recovery capabilities in sea ice.

In partnership with the DHS Science and Technology Directorate (S&T), the Coast Guard is also engaged in research on Arctic communications; coastal Surveillance and maritime domain awareness; identification, tracking, and communicating sea-ice hazards, high resolution

modeling of Arctic sea ice and currents, and oil spill modeling for the Bering, Chukchi, and Beaufort Seas. These S&T efforts complement those of the Coast Guard R&D Center and bring a wide array of expertise to bear on addressing the challenges of Arctic operations, including DHS Centers of Excellence such as the Center for Maritime, Island, Remote and Extreme Environment Security (MIREES).

Conclusion

Over the past 224 years, the Coast Guard's missions have evolved along with the United States. The broad scope of the Coast Guard's authorities, and our diverse mission set, are highlighted in the topics discussed today- from our icebreaking mission in the Polar regions, to our support as partner agencies assess PNT alternatives, and our oil spill prevention and response activities.

Mr. Chairman, thank you again for the opportunity to testify today, and for your continued support of the United States Coast Guard. We would be pleased to answer any questions you may have.

Question#:	1
Topic:	Alternative Planning Criteria guidelines
Hearing:	Federal Radio Navigation Plan, H.R. 1684, Foreign Spill Protection & National Icebreaker Fund Acts of 2015
Primary:	The Honorable Don Young
Committee:	TRANSPORTATION (HOUSE)

Question: The Western Alaska Captain of the Port (COTP) zone comprises over 1 million square miles of ocean. Due to the environmental conditions that exist in this very large remote area, and the limited coastal infrastructure in place, the Coast Guard has created special rules for meeting the requirements under the Oil Pollution Act of 1990. These special rules are referred to as Alternative Planning Criteria, or APC. APC affords vessel owners and operators the flexibility needed to keep compliance costs reasonable yet provide protection to the environment.

OPA 90 established that private sector resources must be under contract for vessels to operate and be in compliance. So the vessel operators pay, and that cost is passed on in freight costs charged to customers. The fees charged for a system across an entire Captain of the Port zone that has little infrastructure cover the costs of the entire area. That way, costs remain lower for all vessel operators, even those serving the remotest ports and villages. Alternative Planning Criteria have been used successfully in Western Alaska for a couple of decades to provide for OPA 90 compliance.

As I understand it, the Coast Guard is planning to change all of this and issue guidelines that will allow organizations to establish APC that cover only the high-volume foreign-flag vessel traffic in narrow areas on the Great Circle Route rather than the entire COTP zone. What this means is that these high-volume fees derived in this small region will stay in this small region, or simply be turned into profit. But in the more remote areas of Western Alaska, the cost of compliance will go up. As a result, small, remote communities will be hit hard in the form of higher prices for fuel oil and other supplies. So, companies offering contracts to cover remote areas will be put at a competitive disadvantage because they must charge more. Companies offering contracts to the small region, like the narrow area of the Great Circle Route, will get a windfall as they do not have to provide coverage throughout the entire COTP zone.

I know that everyone has woken up to the fact that the Arctic is important and that there will be some increase in vessel traffic. As I understand it, the APC approach is flexible and meets the needs even as they change in remote areas. I do not think that a radical change in the Western Alaska APC is required.

Has the U.S. Coast Guard considered what their Alternative Planning Criteria guidelines will mean for remote areas in Alaska, and does the agency have a plan for ensuring compliance in those areas without increasing costs to the communities located there?

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Response: Due to Alaska's remote geography, it remains one of the few states without sufficient oil spill response resources to meet the national planning criteria mandated under Section 311 of the Federal Water Pollution Control Act (FWPCA). Updating the Coast Guard's regional APC guidance will help to address the issue of building oil spill response resources in the region and is consistent with the congressional mandate in the FWPCA. The Coast Guard also continues to explore opportunities to improve its regional APC guidance, including consistency with the FWPCA Section 311 standard of "maximum extent practicable." We do not have evidence that updated guidance will result in negative consequences to remote communities. In fact, recently an oil spill response company stood up in Dutch Harbor and is employing more than 50 personnel, more than 40 of which are trained responders. The Coast Guard expects gradual improvements, over time, to response capability in the region.

The Coast Guard's main objective in developing this guidance is to clarify the standard based on the current environment and existing regulations. One of the main goals of this guidance is identify the actual response gaps so that appropriate resource capability improvements can be addressed moving forward. The Coast Guard will continuously provide flexibility in APC approvals to reflect the unique challenges of remote areas.

Question: Given the risk of hurting communities in remote areas and the fact that APC guidelines for Western Alaska have been working for decades now, don't you think the Coast Guard should slow down before establishing any new guidelines?

Response:
The Coast Guard conducted a review of its national policy for Oil Spill Removal Organizations in 2014 and a subsequent review of its policy for approving Alternate Planning Criteria (APC) in 2015. As part of this programmatic review, the Coast Guard determined an update to the guidance, previously issued for APCs in Alaska, was required. Specifically, the promulgation of new regulations for nontank vessels (400 gross tons or greater) initiated response planning requirements for over 15,000 vessels nationwide. Within the state of Alaska, this new regulation was applicable to 97% of the vessels transiting the Great Circle route. The Coast Guard felt that clarification of the APC submission requirements contained in 33 C.F.R. § 155.5067 was required in order to bring consistency to the APC approval process for such a large audience.

This update will better describe the challenges that exist in Alaska regarding issues such as mobilization timeframes, lack of oil spill removal organizations, inadequate shoreline cleanup capability, and on-scene sustainment for response crews and equipment. This update will further help the vessel owner or operator better identify response resource

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gaps with the national planning criteria and planned mitigation measures to address these gaps. Addressing these gaps is necessary for full compliance with 33 C.F.R. § 155.5067. The update will also ensure accurate, fair and consistent review of APC submissions and provide additional transparency as the Coast Guard reviews newly proposed APCs. The Coast Guard believes it is important to promulgate this updated guidance within a timeframe that allows a thorough review of the challenges associated with the state of Alaska. Expediency is not necessarily a primary focus given the extent of this project and the Coast Guard's desire to involve industry experts, state, local, and NGO representatives to ensure the most thorough product is released within a reasonable timeframe. The Coast Guard is also focused on the identification of response resource gaps for the Alaskan waters and understanding how APC administrators plan to address these gaps both now and in the future. The Coast Guard does not intend to harm or negatively impact remote communities as a result of this process and believes that it will ultimately act as a mitigation strategy in protecting these communities from the harmful effects of oil spills.

STATEMENT OF

KAREN L. VAN DYKE
DIRECTOR, POSITIONING, NAVIGATION, AND TIMING
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U.S. DEPARTMENT OF TRANSPORTATION

BEFORE THE

SUBCOMMITTEE ON COAST GUARD AND
MARITIME TRANSPORTATION
U.S. HOUSE OF REPRESENTATIVES

HEARING ON

The Federal Radionavigation Plan, H.R. 1684, the Foreign Spill Protection Act, and H.R. ----, the National Icebreaker Fund Act of 2015

July 28, 2015

Chairman Hunter, Ranking Member Garamendi and Members of the Subcommittee:

Thank you for the opportunity to appear before you today to discuss the Federal Radionavigation Plan and the importance of positioning, navigation, and timing systems to America's national security, homeland security, economic security and efficiency.

Positioning, Navigation, and Timing (PNT) capabilities are critical for transportation safety, efficiency and capacity-increasing programs, including major initiatives such as the Federal Aviation Administration's air traffic control mission, Intelligent Transportation Systems (ITS), and Positive Train Control (PTC). The Global Positioning System (GPS), in particular, is used for every mode of transportation, and there are numerous safety and efficiency applications of this enabling technology that provide tremendous benefit to America's transportation infrastructure. GPS is a key technology for vehicle collision-warning and crash-avoidance systems while enabling shorter routes, increased time and fuel savings, and reduced traffic delays across all modes of transportation.

As designated by the 2004 National Security Presidential Directive (NSPD)-39, the Department of Transportation (DOT) has the lead responsibility for the development of requirements for civil applications from all United States Government civil Departments and Agencies. In addition to the transportation applications, GPS is essential for the safe and efficient operations of first responders, search and rescue,

resource management, weather forecasting, earthquake monitoring, surveying and mapping, precision agriculture, telecommunications and financial transactions.

The Deputy Secretary of Defense and Deputy Secretary of Transportation co-chair the National Executive Committee (EXCOM) for Space-Based Positioning, Navigation, and Timing, which includes representatives from seven cabinet agencies, the National Aeronautics and Space Administration (NASA), and the Joint Chiefs of Staff.

Since 1980, the Federal Radionavigation Plan (FRP) has been the official source of positioning, navigation, and timing strategy and planning for the Federal Government. It is jointly developed biennially by DOT, the Department of Defense (DoD), and the Department of Homeland Security (DHS).

The 2014 FRP contains six sections:

- Section 1 – Introduction to the Federal Radionavigation Plan: Describes the purpose, scope, and objectives of the plan, including an overview of the National PNT Architecture, and discusses PNT system selection considerations.
- Section 2 – Roles and Responsibilities: Presents DoD, DHS, DOT, and other Federal agencies' roles and responsibilities for the planning and providing of PNT services.
- Section 3 – Policy: Describes the U.S. policy for providing each Federal PNT system identified in this document.
- Section 4 – PNT User Requirements: Summarizes performance requirements for availability, accuracy, integrity, etc. for civil applications.
- Section 5 – Operating Plans: Summarizes the plans of the Federal Government to provide PNT systems and services for use by the civil and military sectors. This section also presents the research and development efforts planned and conducted by DoD, DHS, DOT, and other Federal departments and agencies.
- Section 6 – PNT Architecture Assessment and Evolution: Summarizes the activities and plans of the Federal Government to implement the National PNT Architecture.

The FRP also contains appendices covering System Parameters and Descriptions, PNT Information Services, and Geodetic Reference Systems and Datums.

Section 5.1.2 of the FRP recognizes the need to mitigate disruptions to GPS. Like all radio-based services, GPS is subject to interference from both natural and human-made sources. A loss of GPS service, due to either intentional or unintentional interference, in

the absence of any other means of navigation, would have varying negative effects on operations. As stated in the FRP, the U.S. Government encourages all GPS users to be aware of the impacts of GPS interference and incorporate or integrate alternative PNT sources where needed to ensure continued operations. The Federal Aviation Administration (FAA), for instance, is currently developing requirements and recommendations for future alternative PNT solutions that address mitigations for GPS disruptions.

Sub-sections of section 5.1.2 document sector-specific mitigations and operational procedures to mitigate vulnerabilities to GPS. The FAA currently maintains a ground-based navigation aid infrastructure that serves as the aviation backup to GPS. The ground infrastructure, as documented in the FRP, includes Very High Frequency (VHF) Omni Directional Ranging (VOR), Distance Measuring Equipment (DME), and the Instrument Landing System (ILS). The FRP also documents research into use of multi-sensor PNT systems such as inertial navigation systems, light detection and ranging (LIDAR), and map matching.

Modern transport-category aircraft with inertial systems may be able to continue navigating safely for a period of time after losing PNT position updating, depending on the route or procedure being flown. In some cases, this capability may prove adequate to depart an area with localized interference, or alternatively the flight can proceed under visual flight rules (VFR) in appropriate weather conditions. However, inertial performance without PNT updates degrades with time and will eventually fail to meet airspace requirements.

Integrated GPS/inertial avionics, as well as improvements in antennas and algorithms, could provide increased interference resistance, effectively reducing the area affected by GPS jamming or unintentional interference. Industry research is proceeding to enhance these technologies, with an expectation that they might be marketed to a broader cross section of the aviation community at some point in the future.

GPS enables the safe and efficient movement of waterborne commerce along the U.S. Marine Transportation System, and is especially critical as ports become increasingly congested with larger containerships, tankers, and passenger vessels. In the event of a GPS disruption, methods of conventional navigation, such as shipboard radar, visual aids to navigation, fathometers, and paper charts, may help maintain the flow of commerce along waterways and in ports. However, ports may have to reduce the number of allowed vessel movements, and port congestion may become even more problematic and costly, in addition to an increased risk of maritime accidents. In

addition, USCG exercises a certain amount of control over the waterways, under the authority vested in the Captain of the Port, and may close waterways or restrict marine activity during adverse conditions or special operations.

Surface transportation agencies are working with industry to ensure that safety-critical systems that use GPS and its augmentations consider the loss of these PNT services and are able to mitigate its effects. The Federal Railroad Administration (FRA) encourages an integrated approach to technology by railroads that incorporates systems that are interoperable, synergistic, and redundant. These technologies and procedures include dead reckoning from fixed points using wheel tachometers, inertial navigation systems (INS), sensor circuits, signaling systems, and dispatcher operations. These redundant systems and procedures ensure the safe and efficient operation of the railroad system during the loss or disruption of GPS.

Because it is expected that signal availability from GPS may not be adequate for surface users experiencing canopy or urban canyon obstructions, the integration of complementary and/or alternate systems that perform a verification test on the GPS navigation solution and that support continued operation in the event of degradation to the GPS signal will be employed in a multi-sensor system-of-systems configuration.

The PNT EXCOM is currently investigating use of an eLoran system to serve as a backup PNT capability to GPS. In March of 2015, the Department of Transportation invited comment from the public and industry regarding consideration of an eLoran system as a backup PNT capability to GPS.

There were approximately 200 responses to the *Federal Register* Notice. Most responses were not application-specific, other than for maritime use. The aviation community, in general, favored use of existing ground-based navigation aids.

In closing, I would like to say a few words about the Nationwide Differential GPS (NDGPS) service which augments GPS by providing increased accuracy and integrity using land-based reference stations to transmit correction messages over radiobeacon frequencies.

As discussed in Section 5.3.4 of the FRP, DHS, in coordination with DOT, is analyzing the future requirements for NDGPS to support investment decisions beyond Fiscal Year 2016. Future investment decisions might include maintaining NDGPS as currently configured, decommissioning NDGPS as currently configured, or developing alternate uses for the NDGPS infrastructure.

Discussion on the future of NDGPS, as well as on a backup PNT capability, is planned for the next meeting of the National Space-Based PNT Executive Committee in September.

Thank you and I look forward to answering your questions.

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Statement of Martin Faga

House Subcommittee on Coast Guard and Marine Transportation
Hearing: "Federal Radionavigation Plan"
July 28, 2015

Mr. Chairman, distinguished members of the committee, thank you for the opportunity to testify today about the critical importance of establishing a complementary system for our space-based system for Positioning, Navigation and Timing – the Global Positioning System (GPS). I am Martin Faga and I am testifying today as a private citizen. In the past, in various professional capacities, I have been extensively involved with the GPS system. I served as a congressional staff member in the late 70s and through the 80s, as Air Force Assistant Secretary for Space from 89-93 just as the GPS system was being completed, then as an executive at the MITRE Corporation, an engineering firm with extensive involvement in GPS and a wide range of national security and air traffic control systems. All of those are behind me. Today, I serve as a member of the administration's National Space-Based Positioning, Navigation, and Timing Advisory Board. However, I don't appear here on behalf of the Advisory Board.

As we know, GPS has become a world-wide public utility with countless users. We are all familiar with GPS for navigation, which is important for everyday applications; but also those where safety of life is involved such as maritime and aviation navigation. What is less well known is that GPS is very important for the distribution of precise timing. All networks, such as cellular telephones, financial networks, and the internet itself require that the network have access to timing information accurate to about 1/1,000,000 of a second. This is difficult to achieve over long distances and for long periods of time. GPS provides the best and least expensive way to achieve this; hence it has been widely adopted for such purposes. However, the result of GPS disruption would be the disruption of the many systems that depend on GPS timing for their operation. Most have local timing equipment that will work for minutes to hours, but GPS disruption longer than a few hours would result in the failure of many of the computer, communications and electronic services on which a modern society runs. In the extreme, the results could be catastrophic.

GPS is a wonderful system and it should be used whenever it is available. Its highly accurate signal is free for all to use and has been incorporated into virtually every technology. But it is a low-power space-based signal that can be disrupted. Such disruptions could result from many sources. These include:

Space weather. Large solar flares can interrupt signals from space and in extreme cases, can damage or destroy satellites and sensitive ground equipment.

Collisions. Space has become crowded with both satellites and debris. Several collisions in space have occurred, and at least one was intentional. Fortunately, the GPS orbit is less susceptible to collision than many.

Error. The US Air Force has done a superb job of maintaining and operating our GPS system. It would be hard to be excessive in praise for 20 years of Air Force performance. But, human and software error is a threat to every complex system. The Russian navigation satellite system, GLONASS, twice went out of service last year (once for 13 hours) because bad information was accidentally loaded into the system. Europe's Galileo satellite navigation system has suffered from positioning and programming problems. GPS, GLONASS, and Galileo have all suffered from failed satellite launches. Simple, honest human mistakes are a real and unpredictable threat.

Intentional disruption. Senior members of the Administration have stated publicly that several nations have the ability to damage or destroy satellites in space, launch cyberattacks on control and communications systems, and jam signals over very wide areas.

GPS spoofing (providing false location information) and jamming are also within the reach of many non-state actors. While such incidents might not result in a national or multi-day disruption of GPS service, they could still have very serious military or societal consequences.

GPS disruption is of such great importance because it is a part of so much of our critical infrastructure. DHS describes the critical infrastructures of the United States in 16 categories, such as energy, transportation, financial services, agriculture, etc. DHS reports that GPS is important to all categories and critical to 13 of the 16.

Most other conceivable cyber-disruptions could cripple individual companies, agencies, or even an industry. But a major disruption of GPS would quickly and severely impact almost every sector, industry and citizen.

Every mode of transportation would immediately slow down, become more dangerous and accident prone. It would take more time and more fuel to deliver fewer people and less cargo, regardless of how they were being moved. Within several hours our telecommunications would begin to fail as cell towers and radio systems lost time synchronization. Then financial and other data systems would begin to shut down as it became impossible to certify the sequence of the millions of transactions that are normally processed each second. The internet would be affected.

Concern over our critical dependence on GPS was first officially recognized by President Clinton in 1998 in Presidential Decision Directive/NSC-63, on *Critical Infrastructure Protection.* It directed the Department of Transportation to look at the issue and make recommendations. Based on that work, in 2004 President Bush issued his National Space-Based Position, Navigation and Timing Policy, NSPD 39. It directed the Department of Transportation to work with the Department of Homeland Security and procure a backup capability for GPS.

In 2008, after much study and discussion, all of the concerned departments and agencies across the federal government identified a terrestrial system called Enhanced Loran as the best means to complement GPS. Loran stands for LOng RAnge Navigation and was first introduced during World War II. It uses a very low frequency radio signal transmitted from multiple locations on the ground. The Loran receiver triangulates among several towers and calculates its position to within about 10 meters and transmits accurate time to within 50/one-billionth of a second or better, more than sufficient for the critical timing applications I described earlier. It is not as accurate as GPS, isn't global, and, unassisted, doesn't provide altitude information. On the other hand, it is very difficult to disrupt and has different failure modes than GPS, making the two together a great pairing. In addition, it offers service in mountainous terrain, urban canyons, and inside buildings which are sometimes difficult to do with GPS.

Several versions of Loran existed in the United States, and around the world, from World War II until 2010. The system was widely used for maritime applications and some air navigation applications but was too complicated and expensive for the widespread use we see with GPS. An updated version, called Enhanced Loran, or eLoran, has been developed which would make the high powered transmitters cheaper and would allow for very small, low cost receivers that could be used widely. I would expect that they would almost always be used in conjunction with GPS

A system for the Continental United States could be built out and operated for 20 years for several hundred million dollars. A very substantial sum indeed but bear in mind that we spend about $1 billion *annually* to maintain the GPS systems. This is not to imply that Loran could replace GPS at lower cost - it can't - but the cost of a complementary system should be weighed against the recognition of the vital role of Position, Navigation and Timing systems to the operation of our modern, high-tech society.

The government has never acted on the 2008 decision to build the eLoran system, and the risk to our nation grows because of increased foreign threat and increased dependence on GPS. Senior DHS officials have stated in recent months that "GPS is a single point of failure for critical infrastructure."

The government's 2008 decision on eLoran has since been confirmed as the only realistic path forward by numerous studies and analyses, including work done by the Administration's National PNT Advisory Board. In fact, the advisory board has repeatedly urged the government to move ahead with the project and protect the nation.

A very basic eLoran system would cost about $40M to establish, if we took advantage of existing, unused, government facilities, and could be operational in less than a year. It would provide a difficult to disrupt *time* signal to the Continental United States that could greatly reduce the risk to our critical infrastructure. It could also serve as the basis of an open-architecture system to which others could contribute to and expand upon by adding their own primary and differential transmitters.

The system could also be a source of revenue. If a service contract was properly structured, an eLoran system could generate enough income to pay for itself over its first ten years of operation while also offering a lower performance, free service. While not exact parallels, there are several examples in place today of federal service contracts, such as the FAA's Automatic Dependent Surveillance Broadcast system, where the government and industry cooperate to build a system that generates revenue, and both share the benefits of the income generated.

It would be exceptionally important, though, to properly structure the contract or agreement. At the end of this statement I have included some thoughts on provisions that should be included when the government drafts such a contract or agreement, and possible sources of revenue. These are not highly developed and are not intended as a specific proposal.

In the near term, however, the most important things for the nation, are that the Administration identify, empower, and task a single federal executive agent which can work with all stakeholders, including industry, to implement a solution. This is essential because, at present, the responsibility for addressing this issue is scattered across the federal government, as is ownership of the idle infrastructure that would need to be used if we are to put the system in place quickly and most economically.

Thank you again for the opportunity to appear today and discuss this important gap in our national security.

Salient Characteristics

Of a Successful Service-Level Contract

Or Cooperative Agreement

For eLoran

eLoran signals could effectively and efficiently be provided in the United States by the government establishing a service-level, performance based contract (or cooperative agreement) for construction and operation of the system. This is because eLoran is a mature technology, developed in the United States, but now in operation elsewhere in the world. It is therefore very low risk with no need for research before implementation. The government need only specify performance requirements and establish a small staff to monitor contractor/private partner performance.

The goal of establishing such a system is to improve our national and economic security by making our critical infrastructure and systems more resilient and deterring those who might consider jamming or spoofing satellite, and satellite-related, PNT services.

But building an eLoran system will not, by itself, make the nation and its critical infrastructure more secure. Governance and operation of the system must include provisions that will:

- Encourage PNT users to adopt the signal, along with GPS and other PNT sources,
- Ensure robust and reliable service, including reliable income streams, and
- Provide for continual evolution and improvement as new uses and users are discovered.

There is a broad spectrum of governance and business models for the government to choose from in establishing such a system in concert with the private sector. At one extreme, the government may want to limit its investment and involvement to simply allowing use of the infrastructure and frequency. In such a model, a private entity would bear all the responsibility for building the system, operating it, dealing with users, etc. At the other extreme, the government may want to fully fund a national system immediately, and have a more substantial role in its operation and interacting with users (similar to the current model for GPS).

Regardless of the model selected, the service level contract, agreement, or other governing document should incorporate the following salient characteristics:

- **A single, empowered government executive agent.** A single and empowered agent is essential for the system to be cost-effectively built and operated.
    - Government infrastructure and equipment that could be used is owned by at least seven different agencies/departments.
    - Governmental equities, interest and use of the system span all agencies and departments.

- **Provisions for maintaining a signal on air for at least 20 years** beginning when the precise time signal is first available. This is necessary to:
    - Stimulate industry investment in integrated technology products and services,
    - Encourage users to incorporate the signal, along with GPS, in their enterprise systems to increase resilience, and
    - Enable return on investment for private entities that contribute to establishment or enhancement of the system.

- **Allow, but not require, use of legacy government-owned Loran-C sites, along with in-situ and other equipment**
    - This will provide the quickest path to establishing the system and reducing risk to our critical infrastructure by minimizing the time needed for site acquisition and permitting.
    - The government should also make a search for, and make available, any unused relevant equipment that is not in-situ.
    - The private entity should be explicitly held harmless for any pre-existing environmental damage and/or contamination from hazardous materials, petrochemicals or other sources, and not be required to remove or dispose of any hazardous materials or petrochemicals on any site.

- **Day-to-Day Operation and Management by an Empowered Non-Government Entity**
    - eLoran will be a new national PNT utility. Its greatest benefits may be realized by unanticipated users and unanticipated uses. The operator/manager of the system should be able to adapt/modify the system to increase its utility to the nation, as long as the baseline required performance parameters are unaffected.
    - A governmental management entity would probably be unable to be as responsive to innovative users.

- **Ability of the Private Party to use the allotted frequency band and facilities to provide additional revenue generating services.**
    - Responsibilities for any additional costs and disposition of any revenues should also be addressed.

- This would, of course, be absent the objection of the government executive agent.

- **Maximized automation and autonomous operation**
  - The government should mandate performance, not staffing nor equipage levels. The system should be highly automated to minimize cost and maximize performance.
  - Each of the transmitting sites should be fully autonomous using triply redundant, hot-swappable, and/or soft-fail technology. This will require no more than a part time, on-call technician.
  - Transmitting sites should be well secured as they are not staffed and many are in remote locations. Note: More than one of the deactivated Loran-C sites has been vandalized or stripped of scrap metal.

- **An open architecture that other entities can supplement.**
  - Other governmental and private entities may wish to improve/augment service in a particular area by establishing additional primary and/or differential transmitters. System architecture and governance should anticipate this. It should provide a mechanism to coordinate such efforts to ensure they improve, and not conflict with, existing services, both nationally and internationally.

- **Harmonization of the US system with that of other nations.**
  - This will be key for receiver manufacturers and enthusiastic adoption by users.
  - This will require US government agencies and their contractors/ partners to actively engage with international standards bodies such as IALA, IMO, IEC, RTCM and RTCA.

- **Phased implementation, beginning with provision of CONUS precise time**
  - Provision and adoption of eLoran' s difficult-to-disrupt, precise, synchronized time signal will have the greatest and most immediate impact to reduce the risk to critical infrastructure from reliance on GPS as a sole or primary PNT source.
  - A minimum of four transmitting sites are needed to provide an eLoran accurate time signal to the entire Continental United States (CONUS). Eight to ten transmitting sites would ensure that CONUS users would have access to signals from at least two sites. When paired with GPS, this would provide users three independent, but synchronized, sources of time, frequency, and phase, and two sources for data via eLoran.
  - Ten CONUS transmitting sites could be on the air in approximately one year (after the contract was sufficiently funded and execution begun), if existing infrastructure and equipment were used.

- Several additional sites per year could be easily built in CONUS, funding permitting. These would enable location-based services and provide addition resiliency for critical time, frequency, phase and data applications.
- It could be mutually beneficial for Canada and/or Mexico to host eLoran sites that support the first CONUS phase of the project. This could improve the geometry for the US, and help those nations begin to develop their own systems to complement GPS.
- Providing eLoran services in Alaska, Hawaii, Guam, and Puerto Rico will be in the nation's best interests for both infrastructure and transportation. This should be the second major phase of the project. While the logistics may be more complex and costly, establishing the service will not be a technological challenge. In fact, these areas were served by earlier versions of Loran (Loran-A, -C, and -D).

- **Government encouraging use of the signal,** especially integration into critical infrastructure and systems. As mentioned earlier, constructing an eLoran system will be for naught, if the signal is not used.
  - Government has a leadership role to encourage resilience, particularly for critical infrastructure and systems. Once the eLoran signal is available, due diligence, economic, and legal liability should compel widespread use, alongside GPS and other sources. Appropriate government agencies and department should also encourage and facilitate adoption of eLoran and/or other PNT resilience measures through establishment of best practices, regulations (not preferred, but if needed) and other mechanisms.

- **Minimizing cost barriers to adoption.** The needs of national and economic security would be best served if the eLoran system followed the GPS model and the signal was provided without direct cost to end users. However, the government may decide that generating revenue and making the system fiscally self-sustaining is a higher priority. In such a case, the governance and business models should minimize end-users' perceived costs and other barriers to adoption.
  - Slight marginal increases to existing service fees, embedding fees upstream of the consumer and other methods to not directly impose fees on end-users should be strongly considered.
  - As an example, end-users may be more likely to adopt the signal if they can receive it without additional charge by purchasing a $50 receiver, but less likely to adopt it if they must purchase a $30 receiver and pay an additional $15 one-time license fee.

Commercial and/or Fee-Supported eLoran

Possible Revenue Streams

An eLoran system could generate multiple sources of revenue. Depending upon the type of business model(s) selected, the system could pay back government and/or private entity initial investments and operating costs within ten years. These possible revenue sources include:

- **Guaranteed delivery data transmission** –eLoran's high power and low frequency mean that the data signal penetrates where few others will. This includes most indoors, underground and underwater locations. Data speeds of 1,000 BPS are achievable. While this is considerably slower than broadband or "internet" speeds, it is adequate for high-priority, critical, one-way texting, machine control, and other applications. The system could therefore generate revenue as telecommunications provider charging by message or time on the network. Applications could include:
    - Assured wireless control of remote equipment and vehicles, including areas indoors and underground, and to certain depths underwater.
    - Information delivery to first responders and other crews regardless of location. This would be especially good for pre-programmed emergency and operational commands to evacuate, use another procedure, etc.
    - Immediate, but low data rate, device updates and reprogramming. The ability to reach all of the enabled devices on a given network at the speed of light and virtually simultaneously has unlimited potential.

- **PNT Interference Detection and Monitoring** – One of the biggest challenges to countering jamming satellite navigation and timing signals is the lack of a detection network. The eLoran transmitter and receiver network will continuously synchronize with GPS/GNSS signals and instantly detect when differences between the two dissimilar systems occur. Instant reports could be generated to inform federal, state, and local authorities of the anomalies and assist in finding their locations. Mobile disruptors could even be tracked as they drove down the highway, sailed through the port, or flew across the sky. The system could generate revenue by contracting to provide such information to private parties and government agencies concerned about interference incidents.

- **Proof of Position and Proof of Time.** – Relying on a single source of PNT, such as GPS, provides no ability to ensure your position or time are correct. Using complementary PNT solutions can provide a warning when one is providing information that is different than the other.

- **Licensing Receivers** – Over 20 million navigation receivers are sold in the United States each year. Including a small fee as part of the price of on every receiver that had the ability to

receive eLoran could generate a substantial amount of revenue. Such a fee could be discontinued as other sources of revenue from the system made it unnecessary.

- **Licensing the Signal** – The signal could be encrypted such that purchase of a decryption key or service (cable box model) at some periodic intervals was required.

- **Licensing a Data Channel** – This concept is currently being used in the international community, and is referred to as a "Third-Party Data Channel" license. Given that the basic performance and integrity of an eLoran service must be preserved and protected, any available bandwidth could be leased to Public or Private users to pass secure information to select users.

- **Licensing a Portion of the Signal** - More than 90% of the users of precise time in the United States require it at the microsecond (1,000 nanoseconds) level of accuracy. eLoran can provide a signal accurate to 30 nanoseconds. To achieve that level of precision, the eLoran network transmits data that compensates for small differences in the received signal due to the terrain in a given area. This correction data could be encrypted. Most users would access the signal at the microsecond level of accuracy for free. Revenue could be generated by charging those who desire the higher level of precision a fee for the encrypted portion of the signal. For example, evolving FCC e911 service requirements for telecommunications providers will require precise time to within 100 nanoseconds.

- **Broad-based User Fees** – Since navigation and timing signals are essential to so much US critical infrastructure, a case could be made that the cost to endow eLoran should be spread as broadly as possible across the technologies it supports. For example, a temporary – for just one year - eight (8) cent fee on every monthly US cell phone and electric bill could provide enough funding to endow the system in perpetuity.

  This method could be in the best long term interests of industry users, individual consumers and the nation. In one stroke it would minimize cost barriers to adoption and ensure that system construction and continued operation was well funded. Other sources of revenue from value-added services such as data transmission, could even be used to begin to "pay-back" the endowment.

"A Hearing on the Federal Radionavigation Plan..." et al,
Subcommittee on Coast Guard and Marine Transportation
Tuesday, July 28, 2015

Martin Faga Response to Question for the Record

The Business Case for eLoran

Question for the Record --

In your written statement you provided some helpful information suggesting that the development and long-term operation of an eLoran system could be accomplished through a public/private partnership business model. Furthermore, that such a private venture could potentially reimburse the Federal Government in a reasonably short period of time for any estimated Federal expenditures necessary to build-out an eLoran system infrastructure and establish an eLoran signal market.

Submitted by Mr. Garamendi:

(1) Mr. Faga: I would appreciate having you please provide information for the record about possible customers, market surveys and other information that you or your associates might have available about the business opportunities for an eLoran system.

There are many variations in the eLoran systems that can be built, many types of business models that can be used, and many ways the government can encourage the system's use to foster critical infrastructure security. For simplicity and clarity, my answer makes the following assumptions:

1. The US government will allow use of applicable idle facilities and equipment to establish the initial system. Also that use of the facilities for this purposed be planned for at least 20 years, and that the entity chosen to establish and operate the system (the commercial provider) will be free to use it for other revenue-generating purposes that do not interfere with the basic services.

2. The business model selected will be "equipment lease and tiered services" similar to that used by many cable and telecommunications companies. The commercial provider will lease eLoran receivers, offer to install or integrate them within a customer's enterprise for a fee, and charge subscription fees based on the number and types of services provided.

3. The eLoran system will provide a wireless precise time, synchronized to the master clock at the US Naval Observatory, for the continental United States from four transmitter sites. Note that:

    a. Some receivers will be within range of only one of the four primary transmitters. This will provide a quality time signal to pair with the GPS signal. An eventual larger system is preferred so that each receiver will be within range of at least two transmitters so as to provide a more robust service.

    b. The commercial provider will retain the exclusive right to provide secure differential information to enable the most precise services for a fee.

4. The government won't specifically encourage critical infrastructure operators to adopt the eLoran service. However, DHS senior leaders have repeatedly and publicly stated that sole reliance on GPS for timing and location is "...a single point of failure for critical infrastructure." My answer below does assume that DHS is working, and will continue to work, with critical infrastructure providers to encourage them to have more than one source of timing and location information so as to not be impacted by extended GPS disruptions.

Costs – Using existing, idle government facilities and equipment, a minimal eLoran-based precise timing service can be established in the continental United States for roughly $40M in the first year, with recurring operating and maintenance costs estimated at $4M in the following years. I believe that these numbers are consistent with those the Administration has developed and assume the use of existing sites and refurbished infrastructure including antenna and electronics.

Revenues – Responses to the Department of Transportation's Request for Comment earlier this year regarding the nation's need for and potential use of an eLoran system confirmed earlier Department of Homeland Security findings. Most every technology is a consumer of GPS time, frequency, phase, and/or positioning information. The following is a summary of the number of potential subscriptions from four of the eleven Critical Infrastructure / Key Resource Sectors that the DHS identified as critically dependent upon GPS for timing. These numbers essentially represent the market size in these sectors. We can't know at this time what adoption will be but see substantial interest in the responses to DOT noted below.

Industry	Primary Use	Early Adopter Subscriptions
Telecommunications	Sync Time and Phase	750,000
Financial Services	Sync Time	50,000
Energy	Frequency and Phase	10,000
Transportation	Time	5,000,000

Sources:
Responses to "DOT Request for comment: http://www.regulations.gov/#!docketDetail;D=DOT-OST-2015-0053"
http://www.dhs.gov/critical-infrastructure-sectors
Industry/Trade Associations (e.g., ATIS, Small Cell Forum, SIFMA, NERC)

References:
-Executive Order 13636 of February 12, 2013
-Presidential Policy Directive/PPD-21 of February 12, 2013
-FAA Final Report on "Loran's Capability to Mitigate the Impact of a GPS Outage on GPS Position, --- Navigation, and Time Applications" dated March 2004.
Institute for Defense Analysis "Independent Assessment Team (IAT) Summary of Initial Findings on eLoran" dated January 2009.
-DOT Volpe National Transportation Systems Center "Vulnerability Assessment of the Transportation Infrastructure Relying on the Global Positioning System" dated August 29, 2001.
-DOT Volpe National Transportation Systems Center "Benefit-Cost Assessment Refresh – The Use of eLoran to Mitigate GPS Vulnerability for Positioning, Navigation, and Timing Services" dated November 5, 2009.

Users will subscribe to the eLoran for different reasons:

- Lower Cost – In some applications, the total cost of an eLoran subscription will be less than alternatives. Dedicated fiber, network solutions, and advanced clocks can all be very expensive (and in some instances do not meet the need for wide area ubiquitous coverage). eLoran can also be less expensive than acquiring a satellite signal in some cases. For example, if service is needed within a building, acquiring a satellite signal necessitates a roof antenna and a cable run to it, both of which may have to be leased from the building owner. Associated costs also include permitting and installation. Often an eLoran antenna can be sited with the receiver inside a building thereby avoiding those costs.

- Continuity of Operations – Proliferation of low cost jammers and spoofers will increasingly disrupt business operations and hamper vital systems. Decreased tolerance for such disruptions as technologies advance and squeeze more utility from spectrum (ex, 4G and 5G cellular service) will require improved "holdover" services. eLoran will become a complementary utility that will help avoid such disruptions.

  Detecting and Countering Jamming and Spoofing– The government and private entities have ample experience with the difficulty of locating a jammer, even when it is used innocuously for other-than-intentionally-harmful reasons. This is far more difficult when the user intends harm and intentionally conceals his or her location and activity. For example, the jammer could intentionally operate intermittently, vary radio frequency characteristics to avoid "fingerprinting," and/or operate from a mobile platform. Detecting and countering spoofing is an even greater challenge.

- Data Services – The high power, low frequency eLoran signal can include a low rate data channel that is useable within buildings, underground and at some depths underwater (in fact, the US Navy used Loran to communicate with its submarines for many years). This is a unique capability that can be useful to many industries.

- Economic Impact – Infrastructure providers incur a cost, both in reputation and revenue, if their service is interrupted or degraded. Many Sectors have interdependencies or overlaps that multiply the economic effects. For example, the telecoms and energy Sectors underpin all of the other Sectors. Depending upon the nature and duration of the outage, the economic damage is possibly very large. The cost of additional timing protection from eLoran is extremely low in comparison. Relying on a single source of time, frequency, phase or location when one or more is essential to operations and profitability could be viewed as corporate irresponsibility. When eLoran service becomes available at a competitive price, continuing to accept such a single point of failure for a company will become intolerable.

Return of Government Investment - If the government were to fund the initial investment of $40M and annual costs of $4M per year, I believe that demand for the service would generate revenues more than sufficient to recoup all costs in less than ten years.

NOTE: I have avoided proprietary information in this answer. Direct meetings between government officials and eLoran providers and potential users can be arranged to obtain more detail.