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DEPARTMENT OF TRANSPORTATION

U.S. COAST GUARD

STATEMENT OF CAPTAIN ALVIN CATTALINI

ON MARITIME VESSEL TRAFFIC CONTROL TECHNOLOGY

BEFORE THE

SUBCOMMITTEE ON TECHNOLOGY AND COMPETITIVENESS

COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY

HOUSE OF REPRESENTATIVES

SEPTEMBER 30, 1992

Deputy Chief

Office of Navigation Safety and Waterway Services
United States Coast Guard, Washington, D.C. 20593-0001

Captain Alvin Cattalini

United States Coast Guard

Captain Cattalini, a native of Vallejo, California, was commissioned in 1963 upon graduation from Officer Candidate School. Except for two tours in the training community, his Coast Guard career has been devoted to his specialty of Aids to Navigation and Waterways Management.

He has served aboard the cutters BITTERSWEET, CITRUS, and WILLOW, and commanded the cutter MALLOW. Ashore he has commanded USCG Training Center Petaluma, California and the San Francisco Vessel Traffic Service. Other shore assignments include district Aids to Navigation and Waterways Management branches in San Francisco, St. Louis and Miami and a tour as training officer at Training Center Petaluma.

Captain Cattalini's current tour at Coast Guard Headquarters is his third. Earlier tours were as Chief of the Short Range Aids to Navigation Division and Chief of the Signals Management Branch. He has served as Deputy Chief, Office of Navigation Safety and Waterway Services since July 1991.

A 1962 graduate of St. Mary's College of California with a B.A. degree in Economics, he holds an M.P.A. degree in Governmental Management from American University. He also holds a master's license in the U.S. Merchant Marine.

His military decorations include the Meritorious Service Medal, three Coast Guard Commendation Medals, the Coast Guard Achievement Medal, the Commandant's Letter of Commendation Ribbon, plus unit, campaign, service and marksmanship awards.

Captain Cattalini is married to the former Joan McGlynn of Oakland, California. They have three daughters: Gina, Teresa and Ann.

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Good afternoon, Mr. Chairman and distinguished members of the subcommittee. I am Captain Alvin Cattalini, Deputy Chief of the Office of Navigation Safety and Waterway Services. Thank you for this opportunity to discuss emerging technology in vessel traffic control and radionavigation in confined waters.

The Coast Guard is keenly interested in applying new technology in the maritime arena. When new, cost-effective technologies are discovered and are proven to work reliably, those which enhance maritime safety or make marine transportation more efficient are examined by the Coast Guard for possible implementation. I would like to report on the progress made in Vessel Traffic Services (VTS), Electronic Chart Display and Information Systems (ECDIS), and the differential Global Positioning System (dGPS) since the last Coast Guard appearance before this subcommittee in January of this year.

In response to the Oil Pollution Act of 1990, the Coast Guard is establishing an Automated Dependent Surveillance (ADS)

capability to augment the existing radar surveillance system in Prince William Sound, Alaska. On August 31, 1992, the Coast Guard awarded a contract to Raytheon Marine Company to deliver and install an ADS system there. This system will allow the Coast Guard Vessel Traffic Service (VTS) in Valdez, Alaska to track the movements of tank vessels throughout Prince William Sound.

ADS is a technique where a highly accurate navigation sensor aboard a vessel determines and reports its position to the VTS without intervention by shipboard personnel. The VTS electronically queries the vessel over a data communications channel, and the vessel responds with its latitude, longitude, course, speed, and a unique identification code.

The Coast Guard issued regulations on August 17, 1992 which will require all tank vessels of 20,000 deadweight tons or more operating in Prince William Sound to install the equipment necessary to participate in the ADS system. This equipment includes a differential GPS (dGPS) receiver, a digital selective calling radio receiver/transmitter and a control unit.

The Prince William Sound system will use Digital Selective Calling (DSC) for communications between vessels and the VTS. This technique allows for only the vessel being interrogated to respond to the VTS, thus access to the communications channel is easily controlled by the VTS.

The system will also contain a state-of-the-art computerized control and data processing system in the VTS. The sophisticated computer display system at the VTS will employ an electronic chart display and information system (ECDIS) that will show the position of each vessel in relation to the channel, any hazards in the area, and the trackline the vessel is supposed to follow. This computer system will also display radar information superimposed on the electronic chart.

This is the first operational application of ADS we know of, and VTS authorities all over the world are watching our efforts with keen interest. The ADS system incorporates three cutting-edge technologies into vessel traffic service operations: dGPS, ECDIS and DSC. We are confident that this technology will be capable of being employed in other Vessel Traffic Systems in the continental United States with minor modifications. However, these components are not yet fully developed, tested or deployed. It is our intent to use the Valdez system as a prototype for testing and evaluation before pursuing additional deployment. Valdez is an ideal place to do this -- there is an existing VTS, a minimum of international traffic, and no crowding of the radio communications frequency spectrum.

One major obstacle to overcome before applying this technology elsewhere is communications loading. In Valdez, two or three vessels would typically be tracked by the system simultaneously. However, in New York Harbor, for example, a

hundred or more vessels may be tracked at a given time. The greater load can be handled by Digital Selective Calling only if multiple VHF radio channels are used. Regulatory changes to maritime frequency spectrum assignments will be needed to provide the necessary channel availability. Failing that, another means of communication will have to be identified.

The prototype developmental ECDIS at VTS Valdez is one of the first uses of this technology in a shore-based operational situation. We anticipate that eventual employment of ECDIS technology ashore and afloat will significantly affect all aspects of maritime navigation, piloting, and safety.

There are significant policy and regulatory implications associated with ECDIS related to system specification, shipboard installation, performance standards, training, certification, chart data content, and the means of updating electronic charts. Working with other governmental and private organizations, the Coast Guard is conducting a comprehensive ECDIS test and evaluation program. Two major components of the program are participation in the U.S. ECDIS Testbed Project and the establishment of a Joint USA - Canada Cooperative Research Program on ECDIS.

The U.S. ECDIS Testbed Project is a program to develop a system which meets the provisional performance standards of the International Maritime Organization (IMO) and assess its

operational capabilities and limitations. An update on the status of the ECDIS test and evaluation program, including preliminary results of sea trials of ECDIS on various types of vessels, is expected within the next year. In addition to addressing the Coast Guard's regulatory concerns, the test and evaluation program is expected to help define the U.S. position with regard to the IMO final performance standard.

The subject of the Global Positioning System (GPS) and the Coast Guard's differential GPS project was briefed in detail to the Committee in January. We described how dGPS improves upon the standard positioning service available for non-military use by using a reference receiver located at a known position to correct both natural and man-made errors in the satellite signals. The reference receiver monitors all possible satellites, continuously communicating local area corrections over a separate communications link. These corrections are then applied to received satellite signals within the vessel's dGPS receiver, achieving a highly accurate position. The 100-meter GPS accuracy is thus improved to better than 10 meters, providing unprecedented accuracy to mariners approaching and navigating within our ecologically vulnerable harbors.

Seven experimental dGPS stations are now operating to provide coverage in our New England/Mid-Atlantic testbed area; the St. Mary's River in northern Michigan; and at Galveston and Aransas Pass in Texas. As I said earlier, a similar system will

be installed in the Prince William Sound area of Alaska, and will be the position sensor for the ADS system there.

The Coast Guard intends to provide dGPS service for all harbor and harbor approach areas of the coastal continental United States. The Great Lakes, Puerto Rico, and much of Alaska and Hawaii would also be covered by the service. Project completion is planned for January, 1996.

Recently, a dGPS Broadcast Standard was circulated among industry for comment. Industry comments were subsequently incorporated into the document, and it has been informally accepted by the Systems Group of the International Association of Lighthouse Authorities. Final publication of the standard will provide the information necessary for more manufacturers to develop and refine equipment for the general public.

With respect to Vessel Traffic Services (VTS), the Mission Need Statement for the VTS major acquisition project has been approved by the Department of Transportation. This document recognizes the Coast Guard's responsibility to provide vessel traffic management in selected major ports and inland waterways. The project will establish VTS systems in new ports as determined by the Port Needs Study and improve capabilities in those ports where a VTS currently exists. Vessel Traffic Services are seen as a key element in reducing navigational risk in congested or confined waters. VTS's are also viewed by the Coast Guard as a

means of achieving the goals of the National Transportation Policy by contributing to a vital, efficient, safe, and secure transportation infrastructure.

This major acquisition effort has been designated "VTS 2000." The VTS 2000 system will use state-of-the-market components employing open architecture and modular design techniques. This approach readily permits the insertion of new technology and accommodates planned future improvements such as Automated Dependent Surveillance. Our intention is to design a "living system" which will permit planned upgrades over the life of the system. The system will use proven technology available in the market place which meets our requirements and has the flexibility to adapt to new technology as it evolves.

The Coast Guard has reviewed H.R. 5457, the Maritime Navigation Technology and Research Act of 1992, and does not support enactment at this time. While we recognize that modern technology will play an important role in improving the accuracy, reliability, and safety of vessel navigation, we believe that no additional legislation is presently required to achieve these benefits.

The Act would require the operational use of systems that are not yet fully developed, tested, deployed, or available "off-the shelf." As I indicated previously, completion of our planned dGPS system is not anticipated until 1996. The preliminary

results from our ECDIS test and evaluation program are about a year away. The IMO final performance standard will necessarily follow that by some amount of time.

Even if the requisite equipment and systems were in place today, we believe that the timeframe specified for putting the rules in place is unrealistic. We feel that adequate public participation in the rulemaking process is essential, albeit time consuming. We believe that the economic impacts of proposed carriage requirements should be carefully considered. The costs and benefits, especially those applicable to small vessels, and particularly to recreational vessels, should be addressed.

The Coast Guard is actively involved in research and development of VTS and vessel navigation technologies. In addition to the VTS, dGPS, and ECDIS research already mentioned, our R&D program is addressing a variety of vessel navigation and waterways management issues. We believe that our current research includes the technology areas that would be required by the Act.

We see no need for the proposed Maritime Navigation Research Advisory Committee. That committee would duplicate responsibilities of the Navigation Safety Advisory Council (NAVSAC), originally called the Rules of the Road Advisory Council, which has existed since 1980. NAVSAC is the deliberative body that advises the Secretary of Transportation,

through the Commandant of the Coast Guard, on matters relating to the prevention of collisions, allisions, and groundings, including the rules of the road, navigation regulations and equipment, routing measures, marine information, diving safety, and aids to navigation systems.

In summary, while we appreciate the intent of the proposed legislation, we believe we are making substantial progress and do not believe that enactment would be appropriate at this time.

Thank you very much, Mr. Chairman. I will be happy to answer any questions you may have.