

## Setting Nautical Charting Priorities A Regional Approach for Managing Limited Resources

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The Regional Navigation Managers of the Office of Coast Survey directly support the National Ocean and Atmospheric Administration's (NOAA's) strategic goal to "promote safe navigation." These representatives assist the Coast Survey with managing the NOAA's nautical chart data collection and information programmes to meet local customer needs. Coast Survey programmes provide coastal navigation services and new electronic technologies to help mariners and pilots significantly reduce the risk of accidents and spills. Navigation Managers are focused on resolving charting and navigation questions, educating customers on emerging charting technologies and their uses, and soliciting feedback on NOAA's navigation products and services from the commercial maritime industry.

### Introduction

Between 1975 and 1994 financial support for NOAA's navigation services declined by 50 percent in constant dollars and between 1988 and 1998 US foreign waterborne commerce increased from 5.5 to 8.4 million metric tons. To effectively manage the charting programme with limited resources, the Coast Survey has created regional navigation managers to ensure critical charting requirements are identified and addressed.

### Promote Safe Navigation - A NOAA Strategic Goal

In the last 50 years, ships have doubled in size, waterborne commerce has tripled, and today over 98% of all US cargo, by weight, passes through US ports and harbours. While navigation is becoming increasingly demanding, new electronic technologies promise to help in reducing the risk of accidents and spills of hazardous materials. One of NOAA's seven strategic goals is to meet the mariners' and pilots' emerging technological needs by providing them with the tools for safe navigation. The vision is that by 2005, merchant ships, fishing vessels and recreational boats will safely ply US coastal waters, electronically guided by space-based navigation and advanced information technologies. NOAA will revolutionise US marine and air navigation, mapping and surveying and assist commercial shipping in moving increased quantities of cargo safely and efficiently. NOAA will provide a precise satellite derived reference system as the

basis for the nation's nautical data and geographical positioning needs. The Office of Coast Survey supports this strategic goal by providing hydrographic surveys and nautical charts of US waters.

### **Decline of the Customer Network**

Until 1996, the Office of Coast Survey relied on the maritime community and NOAA field units for feedback on its products and to send in requests for updating NOAA's suite of navigation products. This system, while not perfect, worked until NOAA experienced a severe decline in funding. As a result, the number of NOAA hydrographic ships fell from 11 to 3 and hydrographic, geodetic, Coast Pilot, and tide parties were slowly eliminated or reduced to bare capability. The NOAA ships and field units, which once provided a strong customer relations network, now only provided a sketchy picture, at best, of the charting needs of the maritime community. Without good communication, Coast Survey lacked critical information from its customers to effectively manage the charting programme. Furthermore, the maritime community increasingly criticised the available navigation products as inadequate.

### **Defining Priorities**

With limited resources and a rapidly growing list of requirements due to increased shipping and, perhaps more importantly, an increase in the draft of commercial vessels, Coast Survey needed a method to ensure that it addressed the top priorities with its limited resources. Though not popular with the recreational boating community, the Coast Survey focused its efforts on the needs of national security and of deep-draft commercial shipping. Survey and charting plans were developed based on the needs of the top 40 commercial ports. These plans, which are in continual maintenance, take into consideration a number of factors such as the frequency of shipping, whether the cargo is hazardous, national security, and the age and techniques used to collect the soundings. An attempt was made to solicit feedback on these plans from the maritime community, but the response was, in many cases weak, or non-existent.

### **Breaking out of the Beltway**

Unlike the United States Coast Guard (USCG) and the United States Army Corps of Engineers (USACE), which are organised into regional districts, allowing their staff to more easily attend regional meetings, most of the Coast Survey is located within the "beltway" of the city of Washington, D.C. The phrase "managing from within the beltway" is a phrase used in the United States to describe an organisation that lies inside the eight-lane highway or beltway, which encircles Washington, D.C. This location is good on one hand because it permits strong communication to the Administration and to Congress, but on the other hand it does not encourage good communication with maritime users in ports, which are often several thousand miles away. Coast Survey soon realised that it had slowly and unknowingly become myopic and needed to quickly modify its customer outreach efforts.

### **Testing the Regional Approach**

Recognising that weak communications existed with customers in the field, Coast Survey decided to try something radically new. The idea was to place three senior NOAA Corps Officers in the field for the purpose of establishing a Coast Survey presence in Alaska, New England, and the Southeast United States. With broad guidance and only minimal direction from headquarters, these regional representatives or navigation managers quickly introduced themselves to the local maritime community and established a close working relationship with local pilots and the USCG. The guiding principles for the navigation managers was to identify survey requirements for waterways critical to commercial navigation, improve and customise nautical

charts to satisfy specific regional needs, arrange partnerships with local maritime professionals, in order to update the Coast Pilot, and work with regional customers to define new navigation products such as the electronic navigational chart, raster navigational chart and "print on demand" charts.

### **Initial Results**

The results were remarkable and almost immediate. The customers, many of whom had never previously met a representative of the Coast Survey, were very pleased with the introduction of navigation managers to their region and took immediate advantage of their services. As an example of the type of reception these regional managers received, a mariner remarked "...that the safety forum had all the maritime members of the community necessary to address issues relevant to the port except for someone who could speak to charting concerns - now that person is finally here!" Placing the regional manager in the field provided customers with a face to go along with a name. Regional managers began identifying critical needs that were completely unknown to headquarters. In response, Coast Survey priorities were adjusted to address these needs. Chart questions, which had lingered for years in some cases, were quickly resolved. This rapid and accurate feedback increased the credibility of the navigation managers, who were now being asked to formally participate as members of the steering committees and as technical experts.

### **Formalising the Structure**

As a result of the initial success of the regional managers, Coast Survey reorganised and created the Navigation Services Division, whose prime responsibility was customer affairs and quick response to user needs. The division includes the navigation managers, Coast Pilot Branch, Customer Affairs Branch and the Navigation Response Branch. This division would in effect become the "eyes, ears and mouth" of the Coast Survey in the field. Navigation managers would work to educate customers about the Coast Survey and its future plans and to solicit feedback from the customers on those plans to make sure client needs are met. In addition, national and regional conferences could be attended with regularity, increasing Coast Survey's exposure.

### **Examples of Successes**

It was surprising to learn that many customers did not know that the Coast Survey produced nautical charts. Many thought the Navy, Coast Guard or other agencies were responsible. It was also surprising to learn how mariners were operating their vessels in the various waterways and how they used Coast Survey products for navigation. Understanding how these products were being used provided insight into how it was possible to meet user needs more adequately. In addition, it was discovered that different regions had different priorities, with some regions being more concerned with updated surveys, other regions with new chart schemes, and yet others with updates to the Coast Pilot. The following paragraphs, although only a fraction of the numerous success stories over the last three years, will hopefully provide some insight into the breadth of issues and the positive impact navigation managers have achieved, improving the quality of Coast Survey's navigation products.

### **Northeast**

One of the first issues encountered by the Northeast Regional Manager was how to depict a deep-draft route being proposed by the Maine & New Hampshire Port Safety Forum (PSF). The PSF like many of the other safety forums in the United States is composed of pilots, USCG, port authorities, terminal managers, vessel owners, environmental groups, fisherman, and any one else with an interest in local harbour safety. Penobscot Bay is a large pristine, deep estuary in central Maine that is often enveloped in

fog. It is home to some of the richest lobster grounds in the world, a haven for recreational boaters, and several deep draft petroleum terminals. As in many other parts of the world, commercial vessel operators were aggravated by the many recreational boaters cutting across their bow. In addition, the fishermen believed that the deep-draft ships were damaging their fishing gear. The Penobscot Bay & River Pilots proposed to the forum that a 0.4 nautical mile route be established and depicted on the chart to show established pilot routes for deep-draft navigation. Working with the USCG and the safety forum, Coast Survey was able to quickly publish the deep-draft routes on chart 13302. Comments from the forum and the fishermen indicate that the route is a resounding success and in fact the safety forum has requested the British Admiralty to show this route on its charts.

### **Mid-Atlantic**

During the summer of 2000, the Philadelphia Mariners Advisory Committee (MAC) contacted the local navigation manager to assist in modifying the shape of the pilot boarding area from a triangular to more of a rough parallelogram shaped area. This change essentially directed shipping to the pilot boarding area and diverted them away from a nearby shoal. The change to the pilot boarding area was announced at the MAC meeting and the USCG agreed to place buoys marking the area. However, in order to complete the change a survey was required of the area to locate a wreck. The NOAA Ship *Whiting*, which was transiting to New England was contacted and diverted to survey the small area so the USCG could place the buoys. Buoys were placed by early December, Notice to Mariners written, and a new edition of chart 12214 was published in January.

### **Southeast**

The Southeast Navigation manager worked with the Port Everglades Waterway Management Council Navigation in order to correctly place a proposed anchorage near an artificial reef, dumpsite, and an area known to have protected coral. In order to correctly place the anchorage away from the sensitive coral and insure that no debris from the artificial reef or the dumpsite was located in the general area of the proposed anchorage, a full bottom hydrographic survey was required. The Navigation Manager co-ordinated the effort with Coast Survey's Hydrographic Surveys Division resulting in the NOAA Ship *Whiting* performing the required surveys in the spring of 2000. Survey data was plotted on a chart backdrop for review and formal presentation to the Port Everglades Waterway Management Council. Based, in large part, on the full bottom coverage surveys, the council endorsed the proposed anchorage. The proposal is now in the USCG Proposed Rulemaking process and the new anchorage coordinates have been published by the USCG 7th District for public comment. No opposition is expected and the new anchorage and rules will be charted and published accordingly in the US Coast Pilot.

### **Gulf of Mexico**

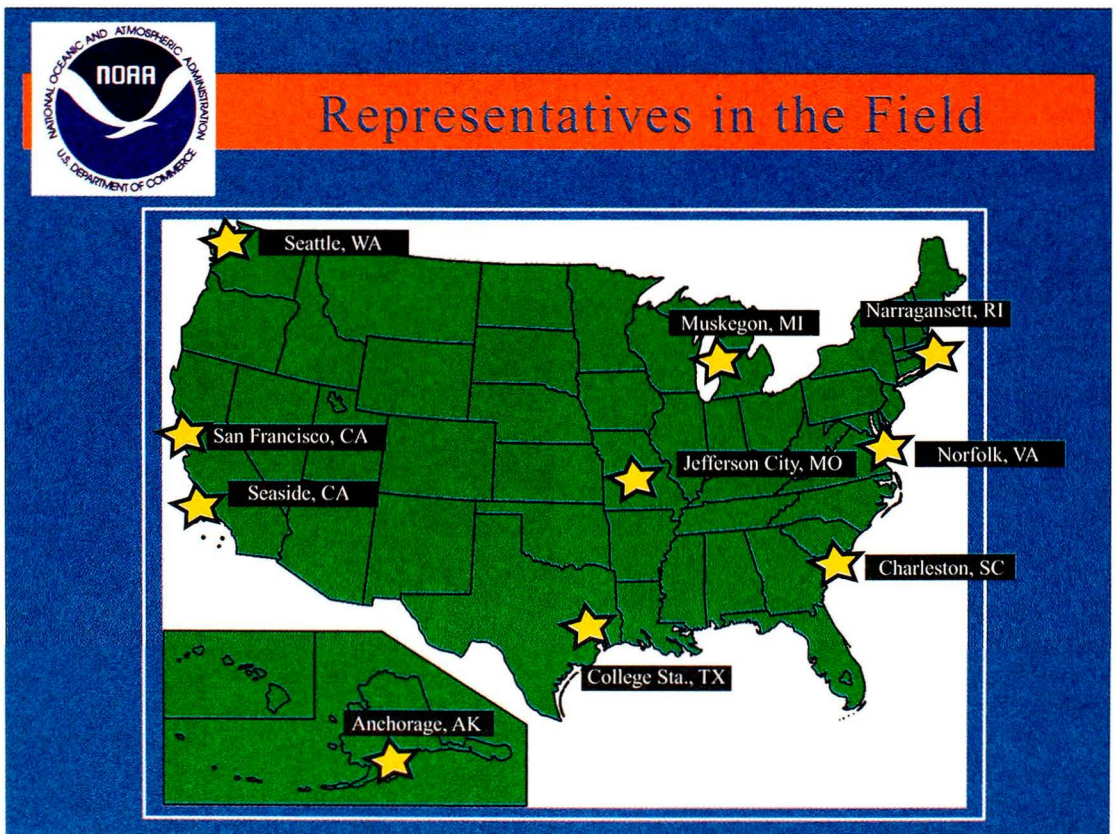
The navigation manager for the Gulf of Mexico is working with the USCG in their effort to implement a prototype Automatic Identification System (AIS) for the lower Mississippi River. The AIS transponders transmit and receive, position, course, speed, name and vessel type information to all vessels with transponders as well as the Vessel Traffic Centre. The information can then be plotted on electronic chart displays, which are based on NOAA Electronic Navigational Charts (ENC) and will be used for collision avoidance. The electronic chart display systems can be either, permanent installations onboard vessels, carry aboard systems or large multi-screen work stations as in the Vessel Traffic Center, capable of displaying the ENCs. Because of the dynamic nature of the Mississippi River, the navigation manager is verifying the ENCs in the field, using a portable laptop connected to a DGPS. This field verification procedure provides vital quality control feedback to headquarters.

## Great Lakes

The Great Lakes Region is the latest region to receive a navigation manager. This navigation manager is working with the local maritime community to implement ENC's for the Great Lakes region. The manager is also working with the Great Lakes Environmental Laboratory (GLERL) to assist in bathymetry data acquisition of the Thunder Bay National Marine Sanctuary. The Robert Ballard team, of *Titanic* fame, will be surveying and exploring portions of the sanctuary. The navigation manager is pursuing a partnership with GLERL to use their research vessel and Coast Survey instrumentation to survey the remainder of the sanctuary. Data collected from the survey will be used both for habitat mapping and for updating the nautical charts of the region. Furthermore, this partnership may prove to be useful in attaining other survey goals in the Great Lakes.

## West Coast

In February 2000, NOAA had scheduled chart 18751 of the Los Angeles area for printing because of low stock in the warehouse. The Marine Chart Division in headquarters was only aware of ten corrections to the chart at that time. The regional manager presented the manuscript of chart 18751 (with the ten corrections) to the local Harbor Safety Committee for review. The committee was astounded at the number of problems with the manuscript and recommended delaying the chart to include major shoreline changes and new surveys of privately maintained channels. The members of the committee identified the changes, and provided the necessary documents required to support the changes within one month. All corrections were applied and chart 18751 was printed in May 2000 for distribution before the stock of the prior edition was exhausted.



The geographic location of the Nav Managers

## San Francisco

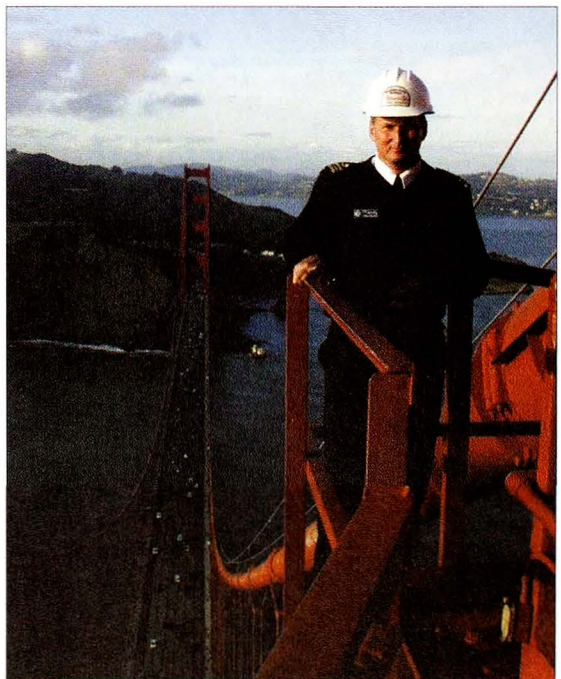
The West Coast is fortunate to have an additional part-time regional presence located in the city of San Francisco. At a Harbor Safety Committee meeting last fall, the navigation manager was approached by the captain of a local ferry. The ferry captain wanted to know when the Coast Survey would re-survey the Mare Island Straits, because the soundings he observed were much shallower than the charted soundings. Following up on this issue, the navigation manager discovered that the area in question was the responsibility of the United States Army Corps of Engineers. After further research, he discovered that the Mare Straits had been surveyed six months earlier and the data had been processed and approved three months earlier. For reasons unknown, the Coast Survey never received the new surveys for application to the chart. This example illustrates the typical functionality of the on-site Navigation Manager. In the words of the San Francisco manager "If he (ferry captain) didn't bump into me at the donut line at the Harbor Safety Committee, would the ferry captain have looked up Coast Survey's number and called headquarters to see why the chart was not accurate?" The answer is probably not, and the accuracy and viability of our product would have suffered as a result.

## Alaska

On July 27, 1999 the small passenger vessel *Spirit of '98* grounded on a charted shoal in Tracy Arm, south-east Alaska, resulting in uncontrolled flooding in the engine room. Luckily, all 126 passengers and crew were evacuated safely and transferred to another vessel. The *Spirit of '98* grounding was the third incident involving a small passenger vessel in the span of 6 weeks - prompting the Coast Guard to establish a task force to investigate the causes of the incidents and recommend ways to prevent future reoccurrence. The scale of the chart (17360 at 1:217,828) was too small for effective navigation in restricted waters with traffic and ice. The Alaska Navigation Manager worked with the task force to request an expeditious survey and quick compilation of a new chart at an appropriate scale. The request was submitted in August 1999, and the NOAA Ship *Rainier* conducted the survey in October using multibeam sonar. The new chart 17311 was unveiled in Juneau in April 2000 - nine months after the series of groundings. Now the passenger vessels, which include 2,000 passenger cruise liners, 100 passenger eco-tourism excursion boats, and day boats out of Juneau, have a large scale chart with recent and highly precise sounding data with which to navigate.

## Co-operative Charting

Earlier in this article it was noted that Coast Survey was concentrating on commercial shipping. But the recreational boater has not been totally ignored. Coast Survey has had a long-standing relationship with the United States Power Squadron (USPS) and the United States Coast Guard Auxiliary (USCGA) who assist Coast Survey with chart corrections. These organisations are regionally based and with the advent of regional managers, it is now possible for the Coast Survey to work much more closely with these organisations in administering the "Adopt-a-Chart" program. This programme makes use of the local expertise of these boating organisations to improve the quality and adequacy of the charts. The



Precise positioning atop the Golden Gate Bridge

navigation managers provide workshops and serve as regional Coast Survey experts whom the local boating chapters can call upon for technical assistance. These groups provide valuable information such as changes in landmarks, Coast Pilot editing, current verification, and special surveys to verify reports of shoaling.

### **Emergency Operations**

Though navigation managers were not originally envisioned as co-ordinators of emergency operations, they have been called upon several times to assist with such efforts as post-hurricane surveys, the search for John F. Kennedy Jr.'s aircraft, and the search for EgyptAir Flight 990. On several occasions, often after major storms, navigation managers have worked with local emergency officials to co-ordinate surveys of approaches and channels to critical ports. These surveys provide the captain of the port with information necessary to safely reopen the port to commercial traffic without undue delay. In the case of Egyptair 990, the regional manager was designated as the NOAA co-ordinator to the effort. The regional manager provided expertise on survey methods, created special chart products for the search and recovery effort and co-ordinated the efforts of the NOAA support team of oceanographers, meteorologists, public relations, and NOAA Ship *Whiting*. The outcome of these responses is that NOAA has created a disaster response plan, which takes advantage of the unique abilities of the navigation managers.

### **Regional Managers Assist with Non-chart Issues**

Although Coast Survey's intention was that these navigation managers handle only navigation issues, many customers ask questions on issues normally handled by other components of NOAA, such as those involved in marine weather forecasting, tides and currents, and fisheries. Since many of these other components of NOAA do not have a regional presence, the navigation managers provide in essence a "one stop" service for information about NOAA and sometimes even other government agencies. If the navigation manager does not know the answer, the approach taken is that the answer will be provided or a person located who can assist the customer. Again, this type of service further increases the credibility and value of the navigation manager in the eyes of the customer.

### **The Navigation Managers of the Future**

For the Coast Survey to have maximum effectiveness on a national scale, a Navigation Manager should be located in each of the following regions: Northeast, Mid-Atlantic, Southeast, Eastern Gulf, Western Gulf, Great Lakes, Southwest, Northwest, Alaska, Hawaii/Eastern Pacific. In addition, a highly mobile, Navigation Response Team (NRT) should be at their disposal for response to emergency surveys such as post hurricane events, reported grounding, and serious chart discrepancies. An NRT would be composed of a three-person team and a small survey boat, be highly mobile and capable of small, full bottom coverage surveys, wreck verification, and ENC data collection. The NRT would not supplant NOAA's survey ships and contracts for data, but complement them by providing quick resolution to the many small survey requests that Navigation Managers receive. *Except for emergencies, many charting requests must currently wait until a survey team is in the area, which in some cases can be a year or more.* Having an NRT in each region would then allow Coast Survey to focus the efforts of NOAA survey ships and contractors on completing the daunting task of surveying a backlog of over 40,000 square nautical miles of water critical to deep-draft commercial navigation.

### **Conclusion**

Navigation managers have been a resounding success and have significantly improved the quality of NOAA's navigation products. They provide a direct conduit for users questions in the field, a conduit for

cartographers trying resolve chart discrepancies at headquarters, and identify priorities for efficiently allocating Coast Survey's limited survey and chart production resources. Coast Survey's successful efforts in developing and marketing raster charts, Print on Demand (POD) charts, and ENC's are tightly linked with the navigation managers' efforts and their rapport with the customers in the field. Without this strong link and positive rapport with the maritime community, many of these successes could have been failures.

### **Biography**

Commander Steve Barnum is the Regional Manager for the National Oceanic and Atmospheric Administration's (NOAA) Coast Survey in the northeast United States. Commander Barnum began his career with the NOAA Corps in 1980. He has specialised in Coast Survey mission objectives for the most part, including over 6 years of hydrographic field operations aboard four NOAA ships. Commander Barnum was raised in New Orleans, Louisiana, and holds a BS in Electrical Engineering from Louisiana Tech University; a BS in computer Science from the University of Maryland; and an MS in Software Engineering from Jo.



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