

e-Navigation IdeaScale Online Dialog: Ideas and Comments

Idea Title

Broadband Connectivity at Sea

Idea Details

This idea is put forward to engage the public in discussion of a specific eNavigation idea. The idea is that, as part of the U.S. eNavigation program, the federal government should see that broadband data and communications connectivity be extended out to 30 miles from the shore. Such a connectivity infrastructure would permit, for example, high speed Internet service over which multiple providers could furnish data and navigation information products and services to ships.

30 miles is suggested because:

- it is approximately the range of emerging broadband technologies;
- it would cover all the U.S. commercial ports and harbors where navigation is complex; and
- beyond 30 miles (in most cases) the water is so deep and traffic so sparse that navigation is less complex.

Federal government involvement under the eNavigation umbrella is suggested because:

- maritime shipping is interstate so national coverage would be needed to make the capability useful;
- the federal government is situated to "consolidate" the user market so as to make the result commercially attractive to private sector communications providers; and
- federal assets such as shore side real estate, buoys and authorities are available to leverage in establishing transmission sites.

Broadband availability could support, for example:

- the provision of real-time navigation information such as wind, wave, real-time water depth, vessel traffic, etc.;
- single window/single instance reporting by vessels;

Comments

Is the plan to cover the whole U.S. coastline in a distance of 30nm or just the area around ports and harbors?

The idea always emerges when new services are envisaged. When River Information Services were about to be implemented in Europe the branch organizations first called for broadband wireless services. One basic economic problem: more broadband means less coverage, meaning more base stations and higher costs.

I think that all safety-related information as well as basic e-government services should not be based on one dedicated commercial communication link. As it is highly unlikely that services with such coverage and a limited number of users could be offered to the market conditions we're used to from the mobile telephony market there's always the threat to create a monopoly which is very expensive for the end users. This could happen because in the end the authorities are in most cases not willing to bear the costs for such telecommunication service. And if there is an available, affordable communication provider the users will go for it anyways.

Basic e-Nav services like real-time navigation information and the single window do not have very high data volume. All real-time navigation related information should be transmitted over AIS wherever possible. The single window as second major part of the e-Nav services is neither dealing with a large amount of data nor is there a need for real-time. Most important for the single window would be the availability of free Wi-Fi (or similar technologies) in ports or VTS areas.

All other data communication should take place over commercial telecommunication services provided on the open market.

I recommend to first clarify what and how much communication is needed for the e-Nav services which are planned to be provided. It will then turn out if there are any needs which cannot be covered by existing technologies/services and to then fill the gaps with as little costs for the end users as possible.

The Port of Pittsburgh Wireless Waterways Project does this using WiMAX as does the Singapore MPA for the Strait of Malacca and at the e-Navigation Underway Conference just concluded the subject of extending cellular service areas was discussed as a real world possibility. (see <http://www.e-navigation.net/index.php?page=Wireless-broadband-networks-for-e-Navigation-towards-the-future>)

I refer interested parties to the following story in the Washington Post about WiFi connectivity.

http://www.washingtonpost.com/business/technology/tech-telecom-giants-take-sides-as-fcc-proposes-large-public-wifi-networks/2013/02/03/eb27d3e0-698b-11e2-ada3-d86a4806d5ee_story.html?wpisrc=nl_tech

PORTS data via AIS

The USCG proved that PORTS data (real time weather and tidal current data) can be transmitted over AIS to marine pilots' portable pilot units. I'd like to see this done nationwide in the maritime areas to promote safe shipping of marine traffic.

S-100 should be used for surface weather at both trans-oceanic and local/regional scales.

I believe that if we use S-100 rather than application specific AIS messages that then you could not only transmit values but also how to portray these values on the navigation screen. This will only work if display of S-100 information becomes part of the ECDIS and Radar Performance Standards, but that I believe is the intent for e-navigation. S-100 has a much richer meta data information content.. Doing so still requires us to develop answers to the questions you raise...

One issue here is the "chicken and the egg": (1) currently there are no (or few) standards (nor requirements) for portrayal of met/hydro information on ECDIS/ECS/PPUs; and (2) there is very little information being transmitted by AIS. So manufacturers have been reluctant to implement the ability to portray this data on their systems.

The approach being taken now is to use standard formats (e.g., AIS application-specific messages) to transmit the information, then work with users and manufacturers to help develop portrayal means.

AIS bandwidth doesn't have the spare capacity in some busy ports to support this. Another network would be more appropriate in those cases. Also we may want to distribute this information beyond the range limitations of VHF. I think publishing this information on the e-Navigation Cloud and allowing ships to subscribe to the information is a better way to go. The ship's automatic communications router would select the appropriate network on the basis of criteria like cost, size of message, urgency, network congestion level, network availability (from the ship), etc. etc.

Also consider the idea "Broadband Connectivity at Sea" submitted earlier in this On-Line Dialog. It would support distribution of PORTS data plus much more. Note that the range proposed for that "connectivity" is the same as the range of VHF radio which carries the AIS information.

Navigation as a Free Web Service

This topic is put forward to engage the public in a discussion of a specific idea which addresses the lack of harmonization of navigation systems, data and interfaces targeted by e-Navigation. Comments are sought on the idea and whether it should be pursued as part of the USA e-Navigation strategy.

1. GPS as a free service has worked because it is universal and constant (relatively speaking). Over the twenty years since it was declared operational, strikingly little has changed in GPS, despite the best efforts of the US Government to modernize. GPS still offers a single frequency service to civilian users, plus assurance that semicodeless on L2 will not be removed until L2C is available. This stability has been one factor in making it work. The signal structure is unchanged, the service unchanged. The only significant change is the steady march downward of the user range error.

The idea is that the federal government should provide navigation as a free web service, i.e. an "ECDIS on-line". Only an Internet browser and GPS would be needed to use it. Functionality would be basic but would include the required capability of an ECDIS. Use of the web navigation service would meet the mandatory ECDIS carriage requirement. (Note: For the purposes of this dialog, ignore connectivity issues and limit comments to "navigation as a web service.")

2. The items proposed ("common operator interface", "distribution of real-time information such as tides, currents, vessel traffic and chart updates", and so on) are problematic, because under this scenario the US Government must deal with (relatively) rapid change. Look at the changes to user interfaces in the past five years. The tablet has rapidly become the platform of choice, replacing the laptop. The internet has become ubiquitous (relatively speaking). And information assurance is putting constant demands on any information sharing system. I am not convinced the US Government can be agile enough, or wealthy enough for that matter, to adapt to the changing times. While "free" is almost always good, in this case "free" could mean stifled, stagnant, unadaptable, and for the US government, expensive.

This proposal offers a number of potential benefits:
-Provides a common operating picture aboard all ships and ashore;
-Provides a common operator interface from vessel-to-vessel and ship-to-shore;
-Supports the distribution of real-time information such as tides, currents, vessel traffic and chart updates;
-Eliminates the need for chart and software update because data and functionality would be shore-based on constantly updated servers;
-Works for a broad base of users and supports a broad range of devices;
-Reduces end-user cost and eliminates data encryption, secret keys and the complex fee structures experienced with ENCs.

I am sorry to be negative on this one, but I see more issues than solutions, at least on the broad scale. I would recommend the US Government support the evolution of affordable, standardized e-Navigation services, and let the market evolve nimbly as technology advances.

I agree with this concept as a vision for e-Navigation efforts to aim for. As others have noted there are significant challenges, including:

- harmonized, non-proprietary data standards
- dynamic information presentation and portrayal; i.e., that the information needed is available and presented when it is needed, without overloading the user
- setting requirements for use by different users (e.g., recreational vs. commercial vessels)
- development of reliability, recoverability, redundancy and other requirements and solutions to meet them

Also, the concept of a "common operating picture" frequently makes people think that all users (aboard various vessels and various shoreside users) are looking at the same display, symbols, etc. It is more accurate to think that in this concept all users have access to the same information at the same time, but the presentation is tailored to their (dynamic) needs and specific situations.

"Single Window" reporting

We have heard a lot about the desire for those required to report information to the government (e.g., cargo movement) one time only and for the information to be shared with all the government agencies who need it; rather than have multiple reports in multiple different formats to the various agencies.

This is a big task - are there any specific types of reporting that should be focussed on? Any "low hanging fruit?" Is this more important than any other e-Navigation efforts?

The reporting of hull (vessel) data, cargo and voyage information in one standardized format (world-wide!) would have a major impact on global transportation. As it provided benefits for both authorities and industry, it is very likely to become the main driver for e-Nav. On top of that it would allow for sharing the information with other transport modes to allow for completely transparent cargo tracking over the complete route.

Ideally most of the information would be reported/exchanged by shore entities (e.g., agents, shipping companies, gov't agencies). However, there obviously needs to be a means for information from a vessel to get to one of these entities. Also, it would be best if existing systems were used to meet reporting requirements. So, e.g., the stevedore entering (scanning a barcode? reading RFID?) information on cargo being unloaded is shared automatically with the terminal and shipping company and then with Customs and other agencies, etc.

The single window concept has lots of benefits to vessels engaged in international commerce and has long been discussed amongst CBP and Coast Guard as related to eNOA/D filings and the crew/passenger lists especially for vessels with multiple ports of call in the U.S. Our present practices are hard to explain to foreign masters or crew and does include duplicative filings between government agencies that are not able to share this information. The pilot program of the I-418 has shown there are a few bugs mainly between the handshaking of information for USCG and CBP regulatory needs and interests. These efforts have taken years to move forward and it will most likely take several more to change outdated regulatory requirements but it is clearly a step in the right direction. Clearly making one filing and updating it between ports would be a huge improvement and it would appear would improve crew security and help with vessel tracking between government agencies. There are of course other duplicative filings so hopefully the Single Window concept can become a reality.

Notice of Arrival

This concept would help both the government and the industry in avoiding duplicate and inconsistent data submission. Please remember that limited tonnage coastal trade vessels are not required to and generally don't carry broadband equipment, so this consolidated reporting portal would need to accept multiple inputs such as emails with attachments, web forms and initially also fax submissions.

I think this would be particularly important for various agencies, if they can agree to use a single portal. CBP, ICE, USCG, agents, class societies, pilot associations, tug operators, etc. would benefit.

e-Navigation Infrastructure
System Architecture

Adopt an Open Source (OS) Reference System Architecture (RSA) for the e-Navigation infrastructure. It would allow:

- Automated Ship/Shore Information Exchanges (in S-100 format)
- Inter-operability between diverse computing environments (On-Board and Ashore)
- Health & Accuracy “Meta” Data for all Information Sources□
- Region/Area Specific Solutions□
- Redundancy with Automatic Fail-Over for all Critical Resources
- Use Existing Infrastructure/Technology where possible (On-Board and Ashore)
- Modular & Scalable□
- Allow for Encryption of Information Exchanges (i.e. Transport Layer Security or TLS)
- Allow for Non-TCP/IP Protocols (NAVTEX, SafetyNet, DSC, AIS/IEC 61162)
- Must be Technology Agnostic to make it Future Proof (i.e. 3D Head’s Up Display, etc.)□
- Technology Life Cycle Tools (Incl. Remote Trouble Shooting and Upgrading)
- Low Total Cost of Ownership (Acquisition, User Training and Maintenance Costs)
- Mix & Match Applications with sensors and other information sources
- Deploy an application on any computing platform without customization

The experience with adoption of a Reference System Architecture in other industries (AUTOSAR in the automotive industry, SAVI in the avionics industry) shows that the quality

This is an excellent base format for realtime interaction. The proofing of such will be the challenge. However it does appear that the built-in redundancy could possibly handle tampering. The most compelling is the UPS (uninterrupted power supply) and how it is achieved.

GLPC-C4, Open Architecture Standards Based Data Aggregation Sys

Since April 2010 Port Fourchon Louisiana has been utilizing an open architecture standards based data aggregation, situational awareness, and decision support system. The system fuses knowledge of current operational status with consequence analysis and incident alerts delivering a real time geospatial framework used to manage critical operations. This framework for interactive collaboration is currently utilized by the Greater Lafourche Parish Port Commission HQ, and our partners the Lafourche Parish Sheriff's Office, Fire Central, Harbor Patrol, Port Operations, and Louisiana Offshore Oil Platform to improve port security and enhance port resiliency. I believe this open architecture standards based approach could be effectively replicated in ports nationwide. It has enabled us to:

- Improve real-time data collaboration within the Port, between Terminals and with the Port's partners □
- Leverage existing investments in technology; not replace □
- Build off current workflows; limit disruptions to operations □
- Meet everyday operations requirements; not just "in case of emergency" utilization □
- Provide real time situational awareness aggregating data into a unifying common operating picture from sources such as Port Security Cameras with embedded analytics and Live vessel tracking (AIS)
- Identify and monitor real time operational status of critical infrastructure with their dependencies and vulnerabilities.

This capability was effectively used by state and local officials to coordinate cleanup efforts following the Deepwater Horizon oil spill, fusing proprietary and public information to create a comprehensive operating picture not previously available.

there are a couple of other comments that refer to an Open Source Reference System, which is a very good idea. However, even more important is that the data standards and protocols need to be open: no one should ever need to buy a proprietary hardware or software system (or sign a non-disclosure agreement) to use any data or access any system that is part of the MTS.

This does not mean that vendors can't make proprietary systems -- but it does mean that anyone can interact with those systems or use the data those systems use.

An example of doing it wrong: Canadian Raster Nautical charts are distributed in an encrypted BSB format -- you can not (legally) write an open source reader for this format, in order to use these charts, you have no choice but to buy a proprietary product, and if there is no such product that supports your use-case, you can't use them at all. This kind of system should not be part of the US MTS.

Why use an Open Source Reference System Architecture?

Charles Leadbeater provides an excellent case for adopting an Open Source (OS) Reference System Architecture for the e-navigation infrastructure and also talks about the reasons why current vendors of proprietary solutions will resist an OS RSA.

No comments received on this idea.

"You can not (legally) write an open source reader for this format, in order to use these charts" - is this legal stricture akin to the USA Digital Millenium Copyright Act (which would punish reverse engineering, or decryption, as a part of the coding of the chart reader).

Science is the reverse engineering of nature; STEM (Science, Technology, Engineering, and Math) education is potentially a very important partner in such enterprises as eNav, but is undermined by overly aggressive assertions of ownership of ideas (no wonder US is lagging in STEM). Open Source is a proven alternative, and is definitely appropriate here.

Open Source is very important here -- but even more important is Open Standards: there should be no data format or protocol used in the MTS that requires anyone to use proprietary software or hardware to use.

Software Quality Assurance

Software Quality Assurance (SQA) is fundamental for the success of e-Navigation. The subject, which needs much efforts to mature, has been tackled and supported in the NAV sub-committee and should be developed in IALA. The attached link gives more details and more references.

SQA must not only verify specifications are met, but that the device or system meets operational needs, is intuitive and usable. This assessment must be done early, else risk large schedule slips. On the GPS program, we often had a new software release get hung up after completing FQT because the operators could not use the product for their mission operations.

National authorities have to make sure that SQA is sufficiently defined by international regulations and that SQA of individual systems/equipments is certified in conformance with those regulations. In short, they are the ones eventually responsible for the possible deficiencies in SQA; see SOLAS I(b): "The Contracting Governments undertake to promulgate all laws, decrees, orders and regulations and to take all other steps which may be necessary to give the present Convention full and complete effect, so as to ensure that, from the point of view of safety of life, a ship is fit for the service for which it is intended. "

I believe that US National Authorities can help improve software quality by supporting an Open Source (OS) Reference System Architecture (RSA) for the e-navigatiuon infrastructure. Doing so will encourage peer review of infrastructure software (i.e. services that support applications) not only by developers that are employed by a particular vendor but by a much larger group. The analogy is Linux.

Also adopting an OS RSA will make many more applications/solutions available thus increasing competition among vendors. This increased competiton is likely to improve software quality.

SQA issues were raised at the e-Navigation Conference in Seattle in November 2012, and I agree it is an important topic. It appears IMO and possibly IALA will be addressing these issues; are there any aspects of SQA that need to be (or can only be) addressed by National authorities?

Presentation and portrayal of e-Navigation information

e-Navigation promises to deliver more information to shipboard and shoreside users. "Information overload" is a concern, but missing important information is also a risk. How information is presented and portrayed to end users is critical. Information may be portrayed as graphics, text, tables, numbers or via other visual or audible means.

- Is there a specific set of information that should have standard symbology?
- Should the same symbology be used on every display, shipboard and shoreside?
- Is there specific information that should be left to the equipment manufacturer or end user how it is portrayed?

A unified symbology must be an end state, unless a completely personalized interpretative layer can be achieved that aligns with the end user's level of authority and responsibility. In short, there are two modes: a standard, simplified presentation that can be used for transferring information between entities (people, states, commercial operator levels, etc.); and a personal, 'what do I think is important', mode that enhances situational awareness for the operator.

I believe that regional solutions/standards should be avoided as much as possible due to the obvious complexity this would add.

Not sure we have much choice but to live with any international standards (hoping, of course, that we are in a position to influence their development). However, I agree there is a need for an easy-to-use, up-to-date reference to symbols and other information presentation for use in training and practice.

It also appears that symbology may be context dependent - e.g., the representation of some information may be appropriate as text in some situations whereas a symbol or even sound may be more appropriate in others.

I agree that standards need to be set, but we cannot expect to drag international symbology over into the US system. I do, however, think that creating a new eChart-No.1 showing the new symbols in a training format we are used to might prove valuable.

Symbology is extremely helpful. I always think about the emergency cards on airplanes; they graphically transmit a lot of critical information w/o a lot of text. It all depends on the info, somethings are easier graphically, while others are more pronounced in numerical format.

Addressing the three bullets:

Standard symbology: Everything, but most important is chart symbols. The ECDIS symbols need to be reviewed because there is too many differences between them and tried and true paper Chart-1 symbols. The ECDIS/ENC symbols were designed around old display technology, but today's displays are capable of much finer and more scaleable symbols. The old IHO charts evolved with the purpose of clarity, whereas the ECDIS/ENC symbols were created with the need to display with the least amount of pixels and color palette.

"S-Mode" for onboard navigation displays

It has been suggested that a standard default display (so-called "S-Mode") would be beneficial for shipboard navigation equipment. According to the Nautical Institute: "The concept calls for all navigation systems in the future to have a standard 'S-Mode' switch, that when activated defaults to a standard display (for example, head-up display, relative vectors and so on) that can then be fully manipulated through a standard menu system where functions (such as for changing range, aspect, or using EBL/VRM [electrical bearing line/variable range marker], parallel indexing etc) would all be standardised, and the input interface with the systems (perhaps track ball, joystick or keyboard) would be standard. The concept for S-Mode is to create standard features. S-Mode is not envisaged as a simplified or restricted display mode, but instead would offer a high degree of functionality. However, the use of these functions would all be standard and anyone trained in the use of S-Mode would therefore be competent and confident to make the best use of navigation systems on any ship so equipped."

- Is this something that would be of use to mariners?
- What role would/should government have in developing and implementing S-Mode in conjunction with other stakeholders (e.g., vessel pilots, ship owners/operators, navigation equipment manufacturers)?
- What priority is this in relation to other e-Nav initiatives?

Keep it simple.

The amount of information available today is tremendous, much of it good and important, most of it superfluous. Ship Masters should be provided with as much information as possible but must be allowed to dumb it down to a very narrow focus. I pilot large vessels in restricted waters in all conditions and I know that distractions can and do lead to trouble. Many of the end users will be cold and tired and perhaps not well seasoned. They will often be alone on the bridge. They will not be computer experts, but seaman, away from home for long periods, working long hours. If e-navigation can relieve the stress endured by these seaman than I support it wholeheartedly. If e-navigation adds to their stress then what's the point? Governmental inter-agency cooperation should be a high priority in e-navigation, redundant reporting by vessel personnel is a distraction. Don't ever forget that every distraction effects safe navigation. Automated ship's weather observations should also be a priority, both for the National Weather Service and for individual route planning. All of these great ideas need to be affordable and show a positive return on investment. Commercial Marine entities are currently running the gauntlet of potentially impossible capital investments to meet mandated Ballast and Emission standards. We do not make the workplace better by eliminating the workplace.

S-mode is an idea, that as soon as you hear it you say "why didn't we do this before?" Given that mariners often change vessel assignments, S-mode should be defined by an international group such as the IMO getting input from mariners and not from non-seagoing IMO representatives.

Most navigators cannot process more than four visual variables simultaneously. Navigational decisions often must be derived from more than four variables. The assimilation needs to be done after perceptive processing (the four variable limit). Side-by-side uncluttered displays of parallel information would seem to be more productive than a single display that can be dumbed down. However, if there is a space restriction, the S-mode is much better than the lengthy process of adding and subtracting elements to the display.

Context is often missing in the alarms; the sensor or subsystem is meant to alert the operator, but too often the operator must interpret the cause of the alarm. This distracts from the actual work being performed, even if it is not a false alarm.

I agree with the need for simplicity in information display. Too many alarms, even if valid, will cause the operator to ignore the alarms. This situation is untenable when the "big alarm" comes that should not be ignored. The sure remedy is to only alarm when operator action is needed, and the annunciation of the alarm must be unambiguous and the action to be taken clear.

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| Manufacturers instruction manuals for e-nav equipment | Some equipment manuals and instructions, upon which navigation officers depend, are not only written by non-navigators but also translated back and forth into different languages. When finally produced in English, they are filled with grammatical errors and incomprehensible sentences, making them very difficult, and sometimes impossible, to understand. Transas is a big offender in this regard. | Making equipment familiarization materials readily available to the mariner is one of the formally recognized gaps (see the gap analysis) that e-navigation will at some point in time address. |
| Decision-focused information efforts | <p>The following efforts have been suggested as specific US e-Navigation projects:</p> <ul style="list-style-type: none"> - Provide navigation data (meteorological/hydrological, nav safety, etc.) via AIS. - Create "water-level aware ENC's" ENC depths, depth curves and bridge air gaps would be adjusted in real-time for real-time water levels. - Develop the ability to measure, predict or model water currents in critical areas that can then be disseminated for use in ECS/ECDIS with ENC's. <p>- Do these projects have merit? - Are any higher priority than the others? - What other capabilities are there that should be considered or pursued to enhance decision-focused information?</p> | <p>The Center for Coastal and Ocean Mapping - Joint Hydrographic Center has been studying many of these ideas. Even though I have not been on the team working on these enhancements, I have had many conversations with the lead scientist, Kurt Schwehr, about the technical and organizational issues of working with AIS communications. On board, the AIS units have provided valuable help in predicting situations beyond the radar horizon and in harbor maneuvering, but beneath the basic functionality is a quagmire of technology by committee. It would seem that a new start AIS should be initiated before we had new data.</p> <p>The real-time weather and tides displays super-imposed on navigational displays also offers some review. While this capability seems desirable, many deck officers already clutter their ECDIS with too much visual information.</p> <p>References: www.ccom.unh.edu www.schwehr.org</p> |
| Chart table or Bridge Navigation Station | Is e-Navigation a task-based functional specification based on integration with existing navigation equipment used on the ship's bridge, or a 'chart table' framework for integrating shore-based and sea-based observations, policies, and best practices in voyage management? Or both on the bridge and 'behind the bridge'? | <p>Agree, and if organizations such as IHO and IMO (with their corresponding member states) don't take the lead, Industry and Academia will; Post Panamax requirements, increased costs and a slow economy will force key industry players to move fast towards innovative technologies to improve profits.</p> <p>Perhaps a robust contextual understanding of 'new bridge design' as posted elsewhere should be separated from the requirements and specifications of what has traditionally been called Voyage Planning? An initial implementation of e-Nav on the bridge can be harmonized with current ECDIS and other Type Approved equipment using open architecture principles in the short term. In medium time scales, adherence to S-100 and implementation of broadband information dissemination using common technologies will add momentum to both bridge and chart room innovation. In long term, automating to the point of robotic ships overseen by fewer crew (?) may be possible, if not likely driven by costs and personnel availability. In this trend set, optimizing information for the mariner aboard and reinforcing ISM oversight ashore must go hand in hand.</p> <p>Both, but there needs to be a lot of work done looking at the different requirements of each, determining the proper capabilities to employ, and then setting standards and priorities.</p> <p>Ideally both, but on the bridge must be the higher priority when making resource decisions.</p> |
| Role of the Federal Government in e-Navigation | What do you see as the role of the Federal Government in e-Navigation? | <p>I believe that an important role of the Federal Government in the development of e-navigation is to set standards, especially where it concerns the common infrastructure that all who participate in e-Navigation (i.e. not just ships but also shore-based players such as VTS, MRCC, Security Authorities, Environmental Authorities, etc., etc.) will need to have to ensure seamless and secure information exchanges. See Idea for adoption of an Open Source Reference System Architecture above.</p> <p>At least to provide high quality data and information necessary for safe navigation in US waters.</p> <p>High quality to include timely changes. Also the US needs to keep the IMO from going overboard with their e-nav project.</p> |

Effective Outreach and Partnership on e-Navigation

What is the most effective way for the Federal Government to collaborate with the maritime industry on the development of e-Navigation policies and services?

The Canadian implementation of e-navigation, at least from what I understand, covers information exchanges that pilots can use with their PPU's. The information exchanges, however, cannot benefit the bridge team because the information is not displayed on nridge equipment, nor do the ships have the infrastructure in place to receive and process such information. Don't get me wrong, it really works for St. Lawrence waterway but I am afraid it isn't necessarily applicable elsewhere.

May I suggest setting up a test bed such as ACCSEAS or Mona Lisa 2.0? I believe that the Port of Pittsburgh Wireless Waterways Project is a prime candidate for testing e-navigation solutions, not only for the inland waterways but for high seas as well. See <http://www.wirelesswaterways.com/>

The way we collaborate here in Oregon is by coming together at the same conferences, dialoguing, listening to each others side, and working toward solutions that benefit all. Our local feds use this model (NOAA, USFWS, BOEM, FERC) and have been very engaged in each community in which they play a role. So I recommend as part of the outreach and partnership activity, the US Government be part of maritime conferences and advisory committees, and learn as much as they can about user needs, then explore common solutions together.

I agree there is valuable work to adapt, but please see the idea in this forum entitled "Open Standards are key" for a case in which we could learn from a Canadian error.

I would very much like to see a WiMAX implementation in New York Harbor, as a test bed for maritime (and other - e.g. better Internet for Governor's Island, particularly Harbor School) uses.

The Canadians do seem to have it together. Wonder, though, if folks have specific experiences where the interaction with U.S. Federal folks was especially positive. Was it the mechanism that worked? The people involved? Was the subject area more conducive to collaboration/coordination?

We could just follow the work done by the Canadians, <http://www.ccg-gcc.gc.ca/e-Navigation>, who completed their work before we even started.

e-Navigation Priorities

What e-Navigation solution(s) should the Federal Government pursue as its highest priority?

There are a lot of issues to consider when developing use cases or CONOPS for each solution. Developing CONOPS in my mind would be an important step towards identifying the issues and forging a consensus on how to address them.

At the e-navigation Underway Conference last month, the Chair of IMO's Correspondence Group on e-Navigation (John Erik Hagen) after consulting with members of the group announced that further analysis (i.e. Formal Safety Analysis) will focus on 5 solution areas:

- o S1: Improved, harmonized and user-friendly bridge design
- o S2: Means for standardized and automated reporting
- o S3: Improved reliability, resilience and integrity of bridge equipment and navigation information
- o S4: Integration and presentation of available information in graphical displays received via communication equipment
- o S9: Improved Communication of VTS Service Portfolio

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| e-Navigation Solutions | What operational or business challenges do you currently face that e-Navigation could solve? | <p>This workflow is accomplished DAILY at Rijkswaterstaat in Netherlands by aligning survey acquisition and real-time quality assurance. Solutions to good data rapidly distributed exist if standards (S-102, for example) are used rather than relying on point data measurements.</p> <p>Ship Owners (and port and coastal authorities), for a variety of reasons, typically are locked-in to a single vendor for their electronic (navigation) equipment the acquisition and service costs are high. If an Open Source Reference System Architecture were adopted for the e-navigation infrastructure then it would turn the electronic equipment market from a sellers' market to a buyers' market with far more offerings of higher quality and lower cost solutions.</p> <p>In the Port of Anchorage, Alaska, shifting shoals has decreased the depth of water significantly on the existing range line. We are seeking a method to get Army Corps of Engineers bottom survey data rapidly delivered to the Portable Pilot Unit in a reliable format.</p> <p>This might well entice shipowners to embrace e-navigation rather than fearing yet more carriage requirements. It would require vendors to change their business models but those who offer solutions that truly work for shipowners in terms of functionality, quality, usability, maintainability and Total Cost of Ownership would do very well, not in the least because their cost of developing solutions would decrease significantly by using open source components for low value add components of their solutions. Also the time to market would decrease and it would allow them to focus on on-going (remote) support services.</p> |
| US Inland Rivers eNavigation Software | US Inland River mariners need more real time (or close to real time) information on updated ATONS. US Coast Guard buoy data available for eNavigation takes way too long to reach the user, often outdated when received. An operational Real Time Current Velocity system (RTCV) around lock & Dam facilities should be a high priority for the USACE. For software developers, since the river is dynamic and not static like the charts, a way to show current river gage levels for the area operated, thus making the charts show a more realistic image of a dynamic river system. | <p>The Port of Pittsburgh Commission's intent, I believe, is encourage use of their WiMAX broadband system (see www.wirelesswaterways.com) for testing RTCV and similar information services. It would require towboats to install a WiMAX radio but they are not expensive even if you take installation cost into account. The WiMAX Network has much greater coverage than the AIS system because it has more base stations along the waterways.</p> <p>Many towboats use Rosepoint Navigation System's ECS. After meeting with Rosepoint, I believe that it could be modified take advantage of this information if it came in through WiMAX rather than AIS. Their ECS already is able to present this information if it comes in over AIS. Their ECS can portray the information on screen, on demand of the skipper in a task oriented manner that doesn't just clutter the screen.</p> |
| Ship-shore communications | <p>An assumption in implementing e-Navigation is that there will be an increase in the need for ship-shore communications.</p> <ul style="list-style-type: none"> - Is this a valid assumption? - What additional information (compared to current capabilities and needs) will need to be communicated? - For what purposes will this additional information need to be communicated (e.g., safety, efficiency, security, business)? - What communications methods are currently being used? - Are any of these over- or under-used? - What new capabilities should be considered for ship-shore communications? | <p>No one yet knows what the volume or the nature of the e-navigation information exchanges will be. They likely will be determined by the e-navigation solutions that will be adopted either through carriage requirements or voluntarily. The volume, however, will probably grow beyond what AIS, NAVTEX, SafetyNet or DSC via VHF will be able to handle.</p> <p>I propose that ships will be required to have a communications router that automatically selects the most appropriate network to use for a message (i.e. information exchange) based on such criteria as cost, latency, urgency of the message, the size of the message, the congestion of the network, etc. Doing so would require ships to advertize on the e-navigation cloud what their current connection status is for each of the available networks (i.e. those listed above plus TCP/IP networks such as WiFi, WiMAX, Cellular, Inmarsat, VSAT and future networks that haven't been invented yet)</p> |

Route data exchange protocol Currently the opinion in Europe on e-navigation is merely a more efficient way of sharing multiple up to date data between ship and ship, ship and shore and shore-shore. By establishing a communication infrastructure that supports data exchange using AIS or satcom it is expected that VTS stations can take on a similar job as the flight controllers by monitoring their planned routes and proposing alternative routes and also give advices on optimal arrival times etc.

This will have an impact on the navigation equipment, because we have to foresee that the ECDIS needs to be expanded to exchange route data with VTS stations and between ships and therefore the industry will require a common protocol used by all manufacturers. In addition the AIS has to be able to manage a lot of data and most probably satcom has to be included to allow for enough transmission capacity to accommodate many vessels in congested areas. To get full benefit of the e-navigation it may be assumed that integrated navigation systems will be required to allow the easy and free transfer of data between the navigation and communication equipment on board the vessel. As part of collision avoidance systems the route transmitted from other vessels could be displayed on the radar and ECDIS at the same time together with relevant AIS data.

Please refer to the Mona Lisa 2.0 project and the AccSea-project under EU and the Munin-project for unmanned vessels also sponsored by EU.

Also consider impact of machine-to-machine direct communication; the mariner does not need to be involved in every decision (indeed, already is not involved in many engine control microdecisions controlled by PLCs) but must understand the effect of the decision flow aboard the vessel and, most importantly, put it in context of the surrounding traffic.

There are lots of legal repercussions associated with route exchange as ICS has pointed out on numerous occasions, but... the legal framework always lags behind best practices actually adopted by mariners. Rather than dismissing route exchange for legal reasons we should investigate the effect route exchange has on completing voyages from dock-to-dock in a safe, secure and efficient way in an environmentally friendly manner.

While the experience of test route exchange in the EfficienSea and AccSeas projects has been relatively positive, there will need to be substantial testing, simulation and analysis of its use before it can be adopted widely. In particular, its use in relation to the COLREGS is very important.

An example of a route exchange between a tanker and a ferry was presented at the e-navigation Underway Conference see <http://www.e-navigation.net/index.php?page=working-with-the-human-element-decision-support-systems-and-the-human-factors>

This exchange of intentions seemed to contribute to the e-navigation objectives of completing a voyages from dock-to-dock in a safe, secure and efficient way in an environmentally friendly manner.

Consider this as a use of the "Broadband Connectivity at Sea" proposed elsewhere in this National On-Line Dialog.

Sea Traffic Management Reporting and entering information to different key players by different means at different times on different forms belongs to the past. The ideas of National Single reporting Windows is ok but not suitable in the long run. We have to look a little bit further and take examples from Air Traffic management like NextGen in USA or SESAR in Europe. Our mindset must shift from "Need to know" by hysterical reporting systems to "Need to share" where we make our info available for those who have the right access. We need a "Maritime Internet" or a "Federation of Information" for the maritime community. That's the only way to solve the data flow at sea and to get the same picture for the same situation for all stakeholders involved. With that "e-Nav infrastructure" in place we can start launching a bundle of "e-Nav services" like route exchanges, Icemanagement, MSI, environmental NGA's, meteo services etc.

Ferry Boat VHF check-in with VTS via AIS

The Ferry Transit Routing Protocol was presented as an idea by the USCG D11 as a solution to excessive VHF radio traffic during commute hour for Ferry Boats. This would be an electronic check-in of passenger count and other information now transmitted via the VHF radio. Most transmissions take 60 seconds and at commute hour create a lot of congestion that can result in boats leaving late. This information would be sent to the local VTS via AIS with the proper checks and protocol in place agreed upon by USCG and Port Stake holders in the local areas.

There already exist AIS messages that can communicate this information; the work will be to ensure the proper processes, procedures and (possibly) systems are put in place. A few considerations:

- Ensure the information is collected and available to be transmitted by the ferry the AIS
- Ensure information accuracy
- Transmit information at the appropriate time
- Procedures for VTS acknowledgment
- Procedures to ensure any required VTS action can be taken in a timely manner (e.g., providing an updated traffic report)

Also consider the idea "Broadband Connectivity at Sea" submitted earlier in this On-Line Dialog. It would support submission of data plus much more. Note that the range proposed for that "connectivity" is the same as the range of VHF radio which carries the AIS information.

Crew competences

The implementation of ECDIS has created a gap in the competences of the navigators requiring additional training to be provided to ensure safe operation of ECDIS. This training includes generic ECDIS training (IMO Model Course 1.27) in combination with type specific training provided by the ECDIS manufacturers. This has caused additional expenses to the industry. It has to be expected that introducing e-navigation will require additional education of the seafarers to ensure safe and efficient operation of the e-navigation bridge systems.

No comments received on this idea.

Training is currently being provided on different platforms ranging from class room training to computer based training. There is no doubt that class room training is the best platform which provides the best possible competences but it is also more costly. However, no one has yet made studies in which form of training platform is the most suitable to achieve the necessary competences.

But additional training has to be included in the e-navigation strategy and planned at a very early stage to avoid the same problems as we have faced during the implementation of ECDIS.

In FURUNO the new generation ECDIS includes task based operation as the first ECDIS in the market and this approached could be beneficial when designing the future e-navigation bridge systems. The task based operation means that you only have access to the tools necessary to perform the task at hand. If you a managing your charts you have access to the tools related to this task, but route planning and route monitoring tools are not available. This makes the user interface much more simple, because the menu structure is

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| On The National Discussion | <p>The fact that this discussion has become imperative shows that we (America) is behind when it comes to public transportation. In five more years we will be twenty-five years behind the infrastructure curve with transportation being a focal area. If we are to redeem the time we have lost, obstacles (red tape) must be removed to further this cause. I understand that not everyone wants to be in the M-21 world, so we as a nation should understand that by not being there will continually inhibit our ability to grow and move forward economically and socially.</p> <p>"A closed fist can neither give nor receive anything, however an open hand can both give and receive". We must consider being more "open" as a society of peoples and push for better communication. We can start this new exodus from within our own land. As previously stated we are currently behind in the western world where ground transportation is concerned. On any given friday in our metropolitan areas we will find some form of gridlock in the transporting of peoples, goods, services and freight. This does not have to continue and should not continue.</p> <p>Now having said these things, we must consider our means to this end of mass and rapid transporting. We know that people are the first line to any large undertaking such as this. " We The People" that means the public and our governing officials from all "arterial areas" must advise and be advised because once we are all on the same page this will happen expeditiously. This system must be new and improved with all security* trappings, National high speed ground transport is far overdue and we have started the phase of moving forward, let us move with surety that this is the right thing to do.</p> | No comments received on this idea. |
| Extend this forum indefinitely | <p>Only 2 days ago did I learn of this forum (from the COPT USCG announcement for the NY Harbor Ops meeting). Even if there are workflow deadlines mandating a formal closure of 3/15 (as posted on the website, extended from 2/28/2013), I think the forum should be ongoing, as a valuable meetingplace for interested parties (especially considering what seems to be a slow start - only 26 posts at present indicates awareness of this forum has not penetrated the community so far).</p> | No comments received on this idea. |
| Include Nav Software companies in all processes | <p>As a leading navigation software mfg we find ourselves out of the loop on many issues that impact our ability to create nav software to comply with proposed spec changes or new developments. Please consider including application developers in communication loops as issues are being addressed so we can provide compelling features for commercial & recreational users.</p> | <p>I think you are right as far the US Inland Waters are concerned. On EU inland waters I am sure there are many more players. Also, there are many, many, many more players including ECDIS vendors for the High Seas. But for purposes of US involvement in e-navigation I think you are close. I would include some of the recreational ones including chartplotters from Raymarine, Furuno, Garmin, etc.</p> <p>There are only a few players left in the US market. On the inland waterway there is CEACTION, ICAN and Rose Point. For Bluewater there is Transas and Rose Point, with Nobletec a distant 3rd in commercial.</p> <p>Who will draw up a list of companies? Is Rosepoint Navigation Systems included? For the record: I am not associated with Rosepoint other that I know them.</p> |

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| Standardize USACE dredging survey data and delivery | National standards are needed for dredge survey files. Many USACE district produces xyz dredging survey files, but they make them available to the public (or software developers like us) in a hodge podge way, no standard titles, with no meta data, no standard location to draw from. This makes it impossible for us to build an interface that will let users download and update these critical files for use in navigation. | No comments received on this idea. |
| Access to NGA charts where there are gaps in ENC coverage | <p>1) New SOLAS regulations are requiring/will require mandatory usage of ECDIS and ENCs. There are gaps in adequate/safe coverage in the Caribbean basin (ie: Old Bahama Channel.) It would strongly enhance navigational safety if NGA could grant access, to commercial entities, to use their unclassified digital navigation charts ("DNCs") until complete ENC coverage is available; as these are waters plied annually by cruise and recreational vessels carrying millions of U.S. citizens.</p> <p>2) Currently, NGA eliminates access to their raster /paper charts when a new edition is published. Would greatly appreciate if the NGA could coordinate the release of the new edition AFTER they have ascertained if there is an adequate raster/paper chart available from a national source or recognized hydrographic office approved by the IHO.</p> | No comments received on this idea. |
| Awareness of GPS Vulnerabilities | Create awareness of susceptibility of GPS to disruption from jamming or spoofing and work with community on identification of best practices for mitigation. | No comments received on this idea. |