

8th CSPWG MEETING
Turku, Finland, 29 November – 2 December, 2011
Paper for Consideration by CSPWG
Information Paper on QR Code Enabled Nautical Charts

Submitted by: UNITED STATES (NOAA)
Executive Summary: This paper offers a brief overview of NOAA's experiments with enhancing the utility of paper nautical charts using QR codes.
Related Documents: None.
Related Projects: None.

Introduction/Background

Hydrographic offices have made considerable advances in recent years in improving data delivery to their customers. The U.S.A.'s National Oceanic and Atmospheric Administration (NOAA), Office of Coast Survey, is experimenting with the use of QR codes on paper nautical charts.

Analysis/Discussion

Quick Response codes (QR codes) are two-dimensional bar codes that can carry meaningful information in the vertical direction as well as the horizontal direction. The code consists of black modules arranged in a square pattern on a white background and has several hundred times the amount of data carried by the more familiar linear bar codes.

A typical QR code looks like this:



When you scan or read a QR code with an iPhone, Android or other camera-enabled Smartphone, you can automatically link the mobile device to digital content via a web browser. A QR reader application may first need to be downloaded to the Smartphone.

NOAA is experimenting with QR codes as a way to enhance its static, printed charts by linking them to real-time information. Each nautical chart will have a QR code printed in the margin. When scanned with a Smartphone, the QR code opens a web page on the phone for that specific chart. The web page displayed on the Smartphone contains a menu of direct links to real-time data sites such as, tides, currents, air/water temperature, marine weather, sailing directions etc. Tapping on a menu item on the phone's touch screen causes the selected real-time data to be displayed from the Internet.

QR code enabled charts are intended for use by recreational boaters who do not have an ECDIS or an on-board computer.

Data locations are geographically clustered on the Smartphone menu. For instance, the Smartphone display for NOAA Chart 11416 may show "St. Petersburg." The chart user can then tap links for relevant data in the St. Petersburg, Florida area. The display then lists, "Old Port Tampa." The chart user can tap links for relevant data, such as tides, specifically for Old Port Tampa. Since this is a direct link to data for these locations, there is no need to sort through data for other locales.

Numbered icons, printed on the chart at the location of the real-world measurement devices, match correspondingly numbered menu entries. Currently, NOAA is experimenting with location icons using the "information" lower case letter "i" in a box with numerical subscripts at the location of each measuring device. The icons are roughly placed on the chart in numerical order starting in the upper left and working clockwise.

The Uniform Resource Locator (URL) for each nautical chart's homepage is also printed on the chart along with the QR code. Mariners using any computer with Internet access can type in the URL, or make themselves a desktop icon, and access the chart-specific real-time information over the Internet like any other website. An instructional note also accompanies the QR code and URL on the chart.

The QR code service is free from NOAA. At this time, the codes are only plotted on a small suite of Print-on-Demand nautical charts covering Tampa Bay, Florida. Print-on-Demand charts are available from NOAA's private sector partner, OceanGrafix (www.OceanGrafix.com) and their retailers.


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QR code 11416

CHART 12245 HOME PAGE <https://sites.google.com/site/chart11416/>

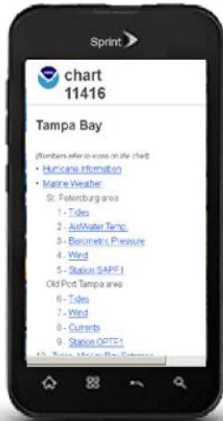
INSTRUCTIONS: Type the home page address in any browser, or download a QR code reader to your mobile device and scan the QR code at the left. Then select information from the displayed list.

Each NOAA chart has an Internet home page. Links to real-time information for the chart such as tides, winds, currents, and weather are accessible from that home page. Icons on the chart () show about where the real-time sensors are located.

Tell NOAA what you think (voicemail) – 888-990-NOAA (888-990-6622)

U.S. Coast Guard Search and Rescue – 305-415-6800

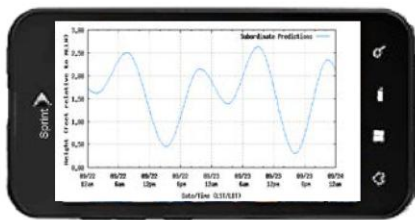
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Scan QR code with
SmartPhone camera

SmartPhone APP automatically
goes to URL encoded in QR code

Select a menu item from
the touch screen.



SmartPhone connects to real-
time data over the Internet.

Reporting Boating Accidents & Rendering Assistance

It is the responsibility of every boater to report any boating accident or damage to the Coast Guard. The following information must be reported:

- 1. Date, time and location of the accident.
- 2. Name and address of the boater.
- 3. Name and address of the vessel.
- 4. Name and address of the vessel's operator.
- 5. Name and address of the vessel's owner.
- 6. Name and address of the vessel's manufacturer.
- 7. Name and address of the vessel's distributor.
- 8. Name and address of the vessel's dealer.
- 9. Name and address of the vessel's agent.
- 10. Name and address of the vessel's broker.
- 11. Name and address of the vessel's charterer.
- 12. Name and address of the vessel's lessee.
- 13. Name and address of the vessel's tenant.
- 14. Name and address of the vessel's occupant.
- 15. Name and address of the vessel's crew member.
- 16. Name and address of the vessel's passenger.
- 17. Name and address of the vessel's crew member's employer.
- 18. Name and address of the vessel's passenger's employer.
- 19. Name and address of the vessel's crew member's next of kin.
- 20. Name and address of the vessel's passenger's next of kin.

Emergency Position Indicating Radio Beacon (EPIRB)

The EPIRB is a small, lightweight, battery-powered radio beacon that can be activated in an emergency. It transmits a distress signal that can be received by a satellite in orbit. The satellite then relays the signal to a ground station, which will alert the Coast Guard and other nearby vessels.

SUNGLASSES INFORMATION

3318. **Warning: Do not drink alcohol or use drugs while operating a vessel.**

1. Do not drink alcohol or use drugs while operating a vessel.
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20. Do not drink alcohol or use drugs while operating a vessel.

QR codes are now being added to the title page of new editions of the nine volumes of the United States Coast Pilot (sailing directions). A QR code on the title page links the Smartphone user with the Coast Pilot home page with access to digital versions of all nine volumes, listings of Notice to Mariners corrections to each volume, Distances between U.S. Ports, and other information.

Conclusions

NOAA is gathering mariners' opinions on the desirability, utility and usability of this enhancement. Further, NOAA is measuring the effort involved in enhancing charts with QR codes and in building and maintaining the Internet services needed to support them. It is too early in this effort to present results from this experiment.

Justification and Impacts

This experiment may open an opportunity to provide an increased level of service to traditional paper chart users via convenient access to chart-specific, real-time data. This experiment is currently in a phase determining feasibility. It could be over a year before a decision is made whether or not to close the experiment and apply this technology to an expanded suite of nautical charts, modify the experiment, or abandon the concept. The use of QR codes is free of any license. The term "QR code" is a registered trademark of Denso Wave Incorporated.

If adopted for production, CSPWG would need to propose, discuss and recommend to National Hydrographers, the design of icons charted at the location of the measurement devices.

Action Required of CSPWG

The CSPWG is invited to note and discuss this Information Paper and consider if this type of data delivery would be useful to mariners worldwide. NOAA's Office of Coast Survey would be extremely interested in hearing about any similar efforts being conducted by other H.O.'s. NOAA can be contacted at QRcodeCharts@noaa.gov with questions or comments pertaining to this topic.