

USCG Research & Development Center

and

Eighth Coast Guard District

**BOATRACS Test and
Evaluation Project**

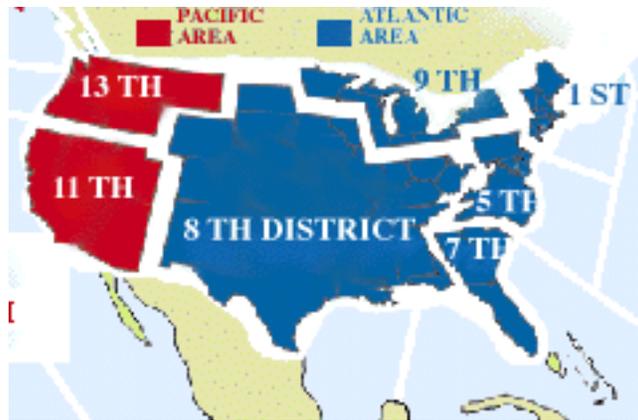
Test Plan



20 September 1997

INTRODUCTION

The Eight Coast Guard District has an extremely large AOR encompassing 26 States. The District is responsible for 1,200 miles of coast line and 10,300 miles of inland waterways. The major missions are Law Enforcement, Search and Rescue, and Pollution Response.



To meet the mission needs in this large AOR, the District has numerous cutters and boats. Currently, the District Command Center does not maintain an up-to-date surface picture; the ability to receive near real-time position reports from all assets would be highly beneficial. In addition, the District lacks the ability to communicate with all vessels at all times.

BOATRACS

BOATRACS is a two-way satellite based data communications and positioning system that allows shore sites to reach their vessels throughout the entire United States and up to 400 hundred miles off shore. There are no dead zones and no skip zones in the BOATRACS foot print. The BOATRACS system is proven and reliable. It is the marine version of the OmniTRACS system that is designed and manufactured by QUALCOMM. There are currently over 200,000 systems in operation worldwide. The system has been operational for over eight years and it continues to be upgraded to meet new demands. QUALCOMM has a complete backup Earthstation, backhaul phone lines, and standby satellite transponders ready in case of any failures.

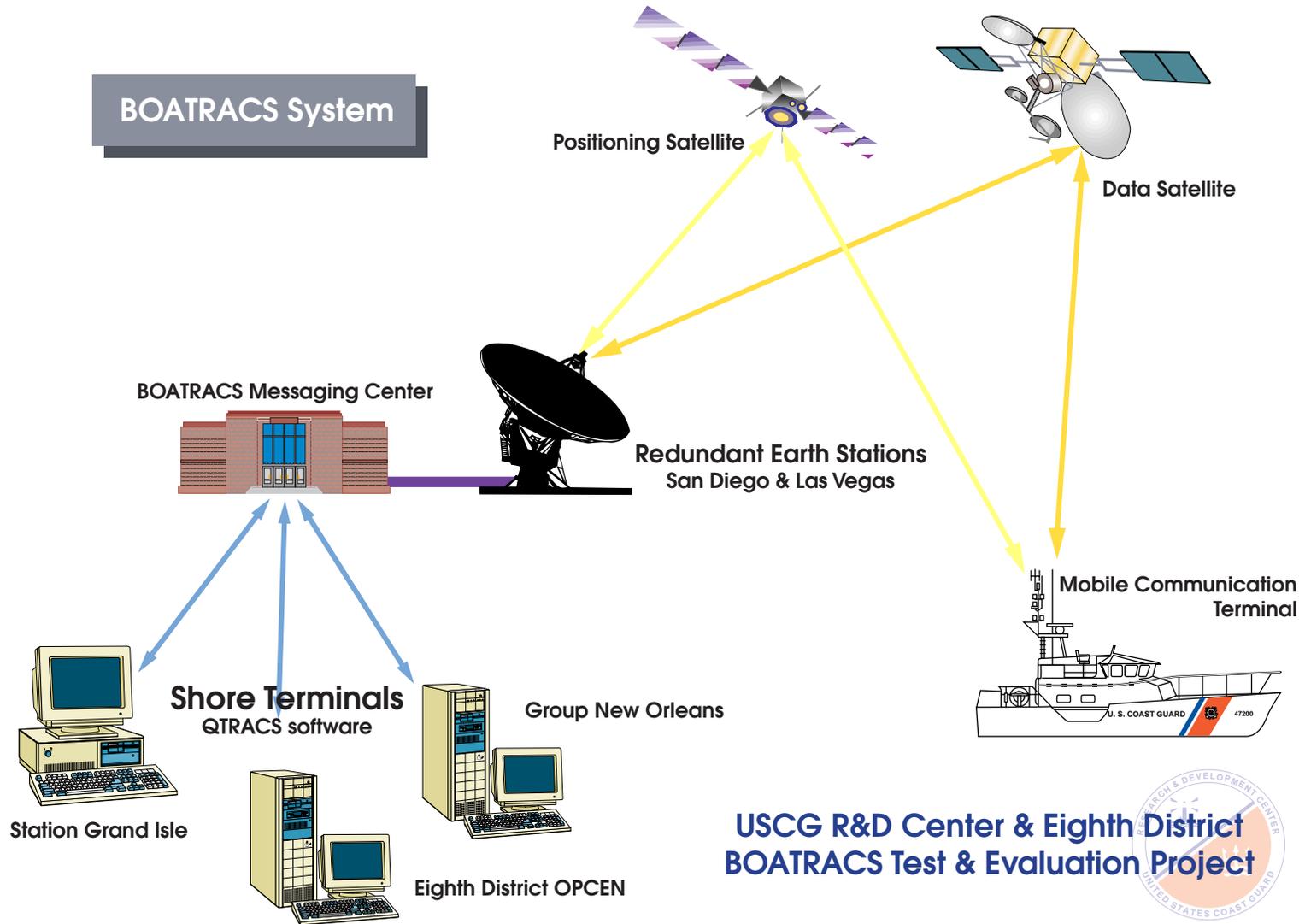


Figure 1 — BOATRACS System Diagram

BOATRACS data communications operates in a closed loop environment so that the users know that delivery status of each message. Each message is positively acknowledged. Built into the basic structure of the QUALCOMM OmniTRACS system in position updates every hour with no crew activities required. Position updates are also provided with each message.

BOATRACS can operate in a several configurations. The basic vessel hardware utilizes a display unit with a keyboard. BOATRACS also can integrate with onboard PCs thereby giving the crew access to any application necessary. This capability enables the vessel to be integrated into the office as though it was another office down the hall.



Figure 2 — BOATRACS Mobile Communications Terminal (MCT)

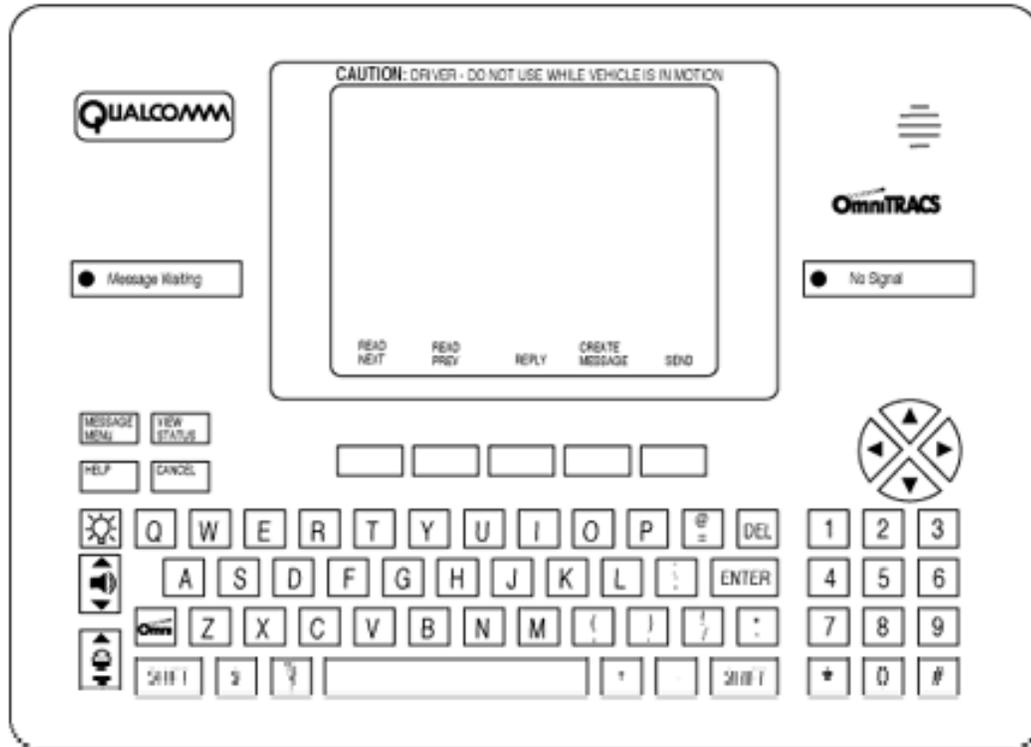


Figure 3 — BOATRACS Enhanced Display Unit

Unlike other forms of marine communications such as cell phones and radios, BOATRACS communication is secure to eavesdroppers. The data is frequency hopped to and from the satellite thereby making it jam resistance. The data transported on the phone lines is password and account protected. If required, encryption devices may also be install.

OVERVIEW

The purpose of this project is to test and evaluate the BOATRACS system. This T&E will determine whether the BOATRACS system specifically, and satellite data communications system in general, can be effectively used to solve the communications problems in the Eighth District. Specific evaluation criteria are included in the final section. In general, the questions to be answered are does a system such as this improve performance, meet requirements not currently being met, and/or reduce cost.

Units / POC's

Listed in the table below are the various units involved in this project. For each unit, the primary and alternate points of contact are listed, along with phone numbers and e-mail addresses.

Table 1 — Units / POC's

U.S. Coast Guard Research & Development Center

Responsibility: Develop test plan, technical assistance throughout project, data collection and analysis, and final report. QTRACS (subaccount) and MCT installed in Comms Lab.

LCDR Gregory W. Johnson	860-441-2671	gjohnson@rdc.uscg.mil
ET1 Mark Wiggins	860-441-2771	mwiggins@rdc.uscg.mil

Commander, Coast Guard Eighth District (o)

Responsibility: Liaison with D8 (o). Project Sponsor. Has QTRACS (subaccount) running in OPCENTER.

CWO Jim Estes	504-589-6228	jestes@d8o.uscg.mil
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ESU New Orleans

LT Rob Biller	504-942-4107	rbiller@esunola.uscg.mil
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ESD New Orleans

Responsibility: Installation and maintenance of BOATRACS mobile communications terminals (MCT).

CWO Dave Robbio	504-942-3074	d.robbio/ESDNOLA@internet.uscg.mil
ET1 Al Ogas	504-942-3084	

Group New Orleans

Responsibility: Operational Commander of patrol boats and Stations, oversee execution of test plan, ensure MCT's are used. QTRACS (master account) installed in COMMCENTER.

LT Regina McNamara	504-942-3002	lt_r_mcnamara/GRUNOLA or reginamcn@aol.com
TCC Dale Powers	504-942-3065	

USCGC Point Sal

Responsibility: Operate MCT IAW this test plan.

LTJG Ottman		
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USCGC Point Winslow

Responsibility: Operate MCT IAW this test plan.

BMCS Marshall	504-385-0037	CGCPTWINSLOW/CGCPTWINSLOW@Internet.uscg.mil
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Station Grand Island

Responsibility: Operational Commander of small boats. QTRACS (subaccount) installed in COMMCENTER.

BMC Taylor	504-787-2136	STAGRANISLXO/STAGRANISL@Internet.uscg.mil
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BOATRACS – Local Rep.

Responsibility: Liaison with BOATRACS and QUALCOMM, POC for hardware and software problems/questions.

Jennifer Comeaux	504-845-2800	jcomeaux@communique.net
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BOATRACS – Customer Service

Responsibility: Primary POC for hardware and software problems/questions. 24 hour customer service.

Mitch Borden	800-262-8722	
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Schedule

The table below lists the milestone dates associated with this project.

Table 2 — Schedule

Task	Start	Complete
Develop Test Plan	8/20/97	9/10/97
Equipment Installation	9/2/97	9/3/97 <i>Winslow</i> 9/30/97 41' UTB's 10/10/97 <i>Sal</i> 11/15/97 RHIB
Operational Test	9/30/97	2/28/98
Status Meetings	9/3/97	9/3/97 Initial Meeting OOA 10/15/97 OOA 11/15/97 OOA 1/15/98 OOA 2/16/98 Wrap-up
Data Analysis	2/28/97	3/13/98
Final Report Draft	3/15/98	3/27/98
Final Report Completed	4/10/97	4/10/97

Phase I

The first phase of this project will be to demonstrate position reporting and simple messaging. The two 41' UTB's from Station Grand Island, the *CGC Point Winslow* and the *CGC Point Sal* will be outfitted with BOATRACS mobile communications terminals (MCT) and keypads. Station Grand Island, Group New Orleans, and the Eighth District will all be provided with shore messaging and display terminals (desktop computer running QTRACS software).

Phase II

Phase II of the project will extend the functionality of the system. Macros will be developed for the vessel keypads to allow standard messages to be easily sent. Other applications will be developed as

time permits. In addition, one additional MCT will be installed on a RHIB from Station New Orleans.

OPERATIONAL PROCEDURES

Position Reports

The vessels will automatically report their positions at 60 minute intervals while underway. In addition, each time a message is transmitted by the MCT a position report is sent. These positions will be received and displayed at all three shore terminals. A position of a vessel can also be checked by sending a POLL message to the vessel.

The Group and Station terminals will initially be configured to automatically check for messages every 30 minutes. The District terminal will be configured to check for messages every 60 minutes. This can be easily changed by the operator to more or less frequent intervals as operations dictate. The operator can also initiate a connection manually at any time. Sending a High Priority message will also initiate an immediate connection to the Hub.

Messages

In addition to position reporting, all units shall use the messaging capability of the system as much as possible. Following are some examples of messages that could all be sent via the system.

- EPIC Checks
- Change of OPAREA notification
- Vessel movement reports (getting underway, moored, onscene, etc.)
- Daily boarding forms
- Administrative messages to/from Group/Station
- Search Plans
- Search Patterns

The goal is to try to use the system as much as possible. Be as innovative as possible. However, common sense should prevail, if this is not the best method for getting the message through, then

don't use it. Users should especially experiment with using the system during drills.

Trouble Log

All units shall maintain a trouble log to keep track of any problems experienced while using the BOATRACS system. If possible, these problems should be submitted via e-mail. Send to the Internet address of `boatrac@comms.rdc.uscg.mil` with a subject of TROUBLE. Also, if there are areas where the BOATRACS system is available and there is NO VHF-FM coverage, submit a report giving the location. Use the same e-mail address, with a subject of FAILSAFE. These reports should be sent as soon after the incident as possible (operations permitting). If e-mail is not possible, then Faxed reports are acceptable. FAX to LCDR Greg Johnson at 860-441-2792.

Security

The BOATRACS system is acceptable for FOUO traffic. It is not acceptable for EFTO FOUO traffic. The designation of a message as FOUO or EFTO FOUO is up to the drafter of the message. This is in accordance with the Telecommunications Manual (COMDTINST M2000.3B CH2). Typically, most messages/position reports are UNCLAS or FOUO and thus can be transmitted using the BOATRACS system. However, any messages requiring additional protection, that would result in attaching the EFTO FOUO designation (or CONFIDENTIAL or SECRET) must be transmitted over an NSA-approved secure circuit.

MEASURES OF EFFECTIVENESS

System Technical Performance

Coverage

Does the system provide coverage throughout the test area?

Keep record of all positions transmitted, do analysis with MapInfo.

In trouble log, document any areas where unable to transmit/receive and indicate sea state and whether there are any blockages to the line of sight to the satellite (SSW).

Accuracy

How accurate and dependable was the position information? This will be determined through post-analysis of position information, and comparison to GPS.

Availability

Is the system always operational?

In trouble log, document any difficulties in sending messages.

Are all messages rcvd?

In trouble log document any time unable to send message. On shore side track if messages sent not received by mobile.

Did the system perform in all weather conditions?

Cost metrics

Track cost to use system (if were paying standard rates)

Compare costs to doing business by other means (cellular, HF, etc.).

Intraoperability

How well does the system integrate with other CG systems?

Reliability

Did the system ever fail?

In trouble log track all equipment failures, and time to repair.

System Operational Performance***Data communications***

How valuable was the ability to have data communications with these assets.

Cite examples, time savings? money savings? Performance enhancements?

Real-time vessel locations

How valuable was the ability to have a real-time location on these units?

Cite examples, time savings? money savings? Performance enhancements?

Protected Comms

How valuable was the ability to protected communications to these units?

Cite examples, time savings? money savings? Performance enhancements?

Ease of use

How easy was the system to use?

How much training was required? How long did it take to become proficient in using?

Efficiency improvements

Was there any improvement to operational efficiency?

Manpower savings? Time savings?