

TRAINING TECHNOLOGY

Naval Embedded Training

TRAINING PROCUREMENT

Canadian Forces Flying Training

TRAINING TRANSFORMATION

Transformation through Technology

TRAINING TECHNOLOGY

Simulator Upgrades

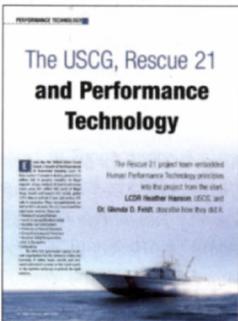




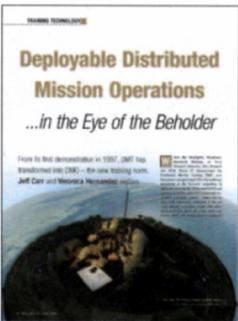
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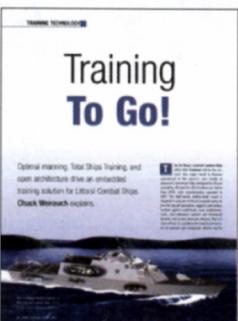
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The USCG, Rescue 21 and Performance Technology

Every day the United States Coast Guard, a branch of the Department of Homeland Security: saves 15 lives, assists 117 people in distress, protects \$2.8 million USD in property, interdicts 30 illegal migrants at sea, conducts 90 search and rescue cases, seizes \$21 million USD worth of illegal drugs, boards and inspects 122 vessels, guides 2,557 ships in and out of port, and services 135 aids to navigation. These accomplishments are tied to USCG missions. The U.S. Coast Guard has eight major missions. These are:

- Homeland Security/Defense
- Search & Rescue/Maritime Safety
- Maritime Law Enforcement
- Protection of Natural Resources
- Marine Environmental Protection
- Maritime Safety/Transportation
- Aids to Navigation
- Icebreaking.

No other U.S. government agency or private organization has the extensive variety and inventory of cutters, boats, aircraft, and command-and-control systems as the Coast Guard, or the expertise necessary to perform the eight missions.

The Rescue 21 project team embedded Human Performance Technology principles into the project from the start.

LCDR Heather Hanson, USCG, and Dr. Glenda D. Feldt, describe how they did it.



Image credit: USCG/Dave Hardesty

Rescue 21 - System Overview

To fulfill these missions a dependable and up-to-date radio communication system is imperative. The legacy equipment in the USCG left some areas of the U.S. coastline in radio "dead zones" which created hazards for boaters in those areas. Efforts were put into place to replace the aging National Distress and Response communication system with a new one. The new \$600+ million USD system is called Rescue 21 because it will help save lives in the 21st Century. Rescue 21 is a Major Systems Acquisition developed for the USCG by General Dynamics Command Control Communications & Computer Systems (GDC4S) in Scottsdale, AZ. The Rescue 21 equipment will be installed at 46 Group Communication Centers in the continental U.S., Alaska, Hawaii, Puerto Rico and Guam. Rescue 21 will replace the current inventory of aging, obsolete VHF-FM radio communications equipment.

The color graphic (right) includes all components of the Rescue 21 system.

- At the 12 o'clock position on this graphic, our Group Communications Center (GCC) equipment is shown, that includes the Operator Workstations shown at the 11 o'clock position. GCC equipment includes two computer screens with a geographic representation of the area coastline on one screen and a point-and-click radio operation panel on the other screen, a keyboard, mouse, microphone, foot pedal, and speakers, as well as the servers to run this equipment.

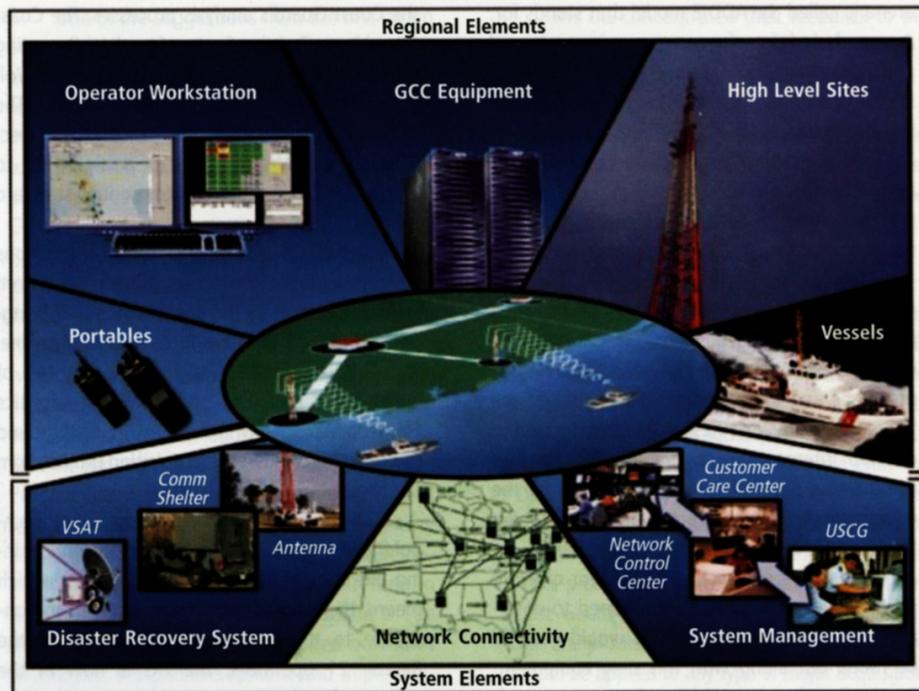
- At the one o'clock position on the graphic, you can see the high-level sites, or towers, that house the transmitters and receivers of signals from boaters offshore. From these towers, the signals are transmitted to the GCCs, where personnel act on them.

- At the 3 o'clock and 9 o'clock positions, are "mobile assets," or portable items. At 3 o'clock is a CG vessel that will have Rescue 21 radios. At 9 o'clock, you can see portable radios that will be used by personnel ashore and on vessels.

- Moving around to the graphic's 5 o'clock position is the network control center and customer care center that provide 24-hour customer support to CG personnel.

- At 7 o'clock is disaster recovery equipment – this includes a portable satellite transmitter/receiver (the VSAT shown), a portable antenna, and the truck that will transport this equipment and portable communications shelter to the area of the country where regular equipment is malfunctioning or damaged.

- At the center of this graphic is a depiction of two vessels radioing the Coast Guard. Their



signals are transmitted to the high level sites (or towers), then transmitted to the GCCs for action. Notice that all the Coast Guard units depicted will be able to hear and communicate with both vessels, for regular and non-distress communications.

- Bear in mind that the users we concerned ourselves with in our HPT look at Rescue 21 were primarily working in the GCCs at the computer screens and with the servers in the 11- and 12 o'clock positions.

Here are some ways Rescue 21 improves communications:

- Enhanced VHF-FM and UHF (line of sight) coverage for better reception of distress calls, Eliminates coverage gaps, Provides position localization within 2 degrees of VHF-FM transmissions so rescue vessels have a much smaller area to search for distress callers,
- Incorporates digital voice recording with playback ,
- Increases number of working radio channels,
- Enhances reception of Digital Selective Calling (DSC), an alternate distress communication system (Channel 70),
- Supports position tracking of CG vessels,
- Permits encrypted communications, and
- Improves interoperability with federal, state, and local port partners.

Rescue 21 provides its users a capability called direction finding, where the tower that picks up a signal gives Coast Guard operators a line of bearing from the caller on their geo-

graphic display. The location where one or more lines of bearing cross is where the CG searches for the distressed boater, which is why sometimes Rescue 21 is said to take the "search" out of search and rescue. Additionally, if a hoax caller is on land, the direction finder will not point toward the water, but towards the beach, and will prevent waste of valuable resources searching for someone at sea. Instead, we may quickly catch the hoax caller. These bearing lines are accurate to within 2 degrees.

Rescue 21 records all transmissions digitally and allows users to enhance and playback a call that may not have been heard clearly the first time.

Users can track on their geographic display all USCG vessels that have R21 equipment. This prevents them from having to call in to manually report their position at time intervals.

The USCG can communicate using Rescue 21 in a secure mode so the general public cannot hear the conversations. This provides more operational security. Rescue 21 also permits the USCG to talk on some channels not previously monitored, permitting better work with other agencies. Rescue 21 also has Digital Selective Calling (DSC) capabilities on VHF-FM.

Embedded HPT

Human Performance Technology (HPT) is a process to determine what interventions to put in place for personnel to be able to perform the work required. A well-accepted model in the HPT

arena is called the ADDIE model that stands for:

- A – analysis (of performance requirements and gaps)
- D – design (of performance interventions)
- D – development (of interventions and training)
- I – implementation (of developed interventions and training)
- E – evaluation (to determine whether the interventions met the needs and filled the gaps)

The ADDIE model was wholly incorporated into the Rescue 21 project. HPT was embedded in the Rescue 21 acquisition project from the early stages. Human Performance Technology processes and tools were used to highlight the job requirements of a Rescue 21 operator and to develop interventions to prepare operators to use the new equipment. As the contracts for the equipment development/production were set up, training was included as an essential item.

When the contract, or Statement of Work (SOW) was written, HPT was required to determine the training program that would need to be rolled out along with this new equipment. For the first time in a USCG major system acquisition project, the contractor was required to use

the Coast Guard's analysis processes. The Coast Guard has a Training System Standard Operating Procedures Manual, or Training System SOP. Vol. 2 of the SOP covers the analysis process. The Coast Guard allows for contractors to select from several different types of analysis, but to follow the CG methods and to produce standard outputs.

The Coast Guard manages acquisitions through a matrix structure, pulling experts from various locations in the organization and bringing them together to produce the best outcome. This includes various "Logistics Elements," of which training is one, and a Training Logistics Element Manager who has an HPT background has been involved in the acquisition project from the beginning.

CG personnel applied performance technology standards to the interventions and training program delivered by the contractor, which means the interventions were required to contribute to the successful performance of the Rescue 21 operators. The CG is now in the process of evaluating the training to ensure that it does. The USCG had oversight of a perform-

ance analysis by GDC4S on the required performance of Rescue 21 operators and had to approve the contractor's methodology each step of the way. The CG provided operators of the legacy equipment for GDC4S to interview and then determine the influences on user performance before developing solutions, such as training and job aids. The tasks identified in the performance analysis were used to develop training scenarios, and the CG reviewed all deliverables for accuracy and realism before the training was put into place.

GDC4S determined that the needed interventions should include a "help" screen on the computer, paper job aids, and three levels of training. Training was developed and implemented for personnel in the regions where the new equipment was deployed. The contractor conducted this deployment training. The second level, entry level training, will be offered in the Occupational Specialist "A" (basic) school in Petaluma, California and in the Search and Rescue School in Yorktown, VA. The third level of training will be computer-based training for recertification of previously trained Rescue 21



Image courtesy Americas Army

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USCG HPT practitioners approved the curriculum and software used for the three levels of training. The contractor was willing to use computer-based training development software that is compatible with other Coast Guard computer-based training efforts.

CG operators helped the contractor to add realism to the training scenarios by having CG instructors at TRACEN Petaluma record the voice (.wav) files for the computer-based simulations used in deployment and entry-level training to ensure the use of proper radio communication terminology and radio procedures.

The CG brought a test group of students – a group made up of CG instructors, CG training system personnel, and users from the field – to attend the first run of the deployment training course and to provide formative evaluation and feedback. Suggestions from this group added value to the process, and their feedback was incorporated into the training presentation, course materials, and course process before the first actual course delivery to the field.

One of the suggestions from the first group of test students was the systematic design of job aids for field users. The test students used their real-world experience, their experience as CG instructors, and their practice with the contractor's proposed training solution to design a job aid to help users operate the Rescue 21 system. CG operators in the initially deployed Group Communication Centers developed additional job aids for use. CG training team members introduced HPT to the contractor in a collaborative way. They brought in users from the field, talked with General Dynamics' engineers and training managers, and used their expertise to develop an end product that adds value to the users. GDC45 and the CG created several Integrated Product Teams (IPTs) to permit regularly scheduled but informal discussions of issues as they arose. An offshoot of the IPTs was the development of the Training Performance Working Group. The Training Performance Working Group discussed the mechanics and desired outcomes of analysis, design/development and implementation followed by evaluation of the job aids and training.

The CG concentrated their feedback to the contractor in the following areas:

- The content of the training
- The handouts provided to the students
- The job aids that CG members developed during the small group validation/beta testing, that were then used during the first runs of the deployment training
- The instructors' presentation and delivery
- The Rescue 21 training simulator system.

The feedback was extremely impactful, because the contractor used CG feedback immediately to improve the first run classes. Then the feedback from the first run classes was used to make improvements in subsequent classes.

So the USCG has come full-circle with the ADDIE model used by HPT practitioners, and the first Groups to receive Rescue 21 equipment should be operational by the end of 2005. The lessons learned in this process will be used to improve all future Coast Guard acquisitions. The successful partnerships and processes used during the Rescue 21 project can be applied to any type of major acquisition, and HPT played a large roll in delivering the right interventions to the field users of the system. **MST**

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