

**Marine Rescue Technologies  
White Paper  
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**539 Cross Creek Circle  
Sebastian, FL, 32958  
(1) 772 388 1326**

[www.marinerescuetechologies.com](http://www.marinerescuetechologies.com)



## **Automated Personnel on Board and Muster System (Automated Emergency Roll Call)**

*Michael Ritchie, VP*

## Introduction – The Muster Drill

The Muster Drill (a lifeboat drill or a boat drill) extends originally from the marine industry. Typically a Muster Drill on a cruise must be performed upon departure. The general purpose of the muster drill is that in case of an emergency, all senior staff is available at pre-determined stations in order to facilitate emergency measures related to hazardous materials, man over board, or mass evacuation.

For a MCA Guideline on Muster Drills see <http://www.mcga.gov.uk/c4mca/mgn71.pdf>

**Applications: Large Vessels, Work Platforms, Critical Assets, Dams, Nuclear Plants, Chemical & LNG Plants, Hospitals, Military Installations, Universities, etc...**



## *Problem Statement*

The marine environment requires personnel on board (POB) and readiness for any situation at all times. The muster drill is a mandatory procedure to accurately account for every person on board and his/her location. The exercise sounds simple but on a large ship the logistics of this critical exercise is quite daunting. For example, cruise ships have up to 1200 personnel on board and as many as 2400 passengers.

A Muster list and drill is basically an emergency plan. The emergency plan/Muster Drill must include the following:

- A Muster List that specifies and conveys an emergency plan to the officers, the crew and passengers.
- The emergency plan or muster drill must also take into account that there are multiple languages spoken on board.
- The list will convey where everyone is to report, who is responsible, their duties and the chain in command in the event that someone is missing.
- Duties will include but are not limited to assembly and control of passengers, and emergency tasks related to hazardous materials, fire, and mass evacuation.

The primary objective of the Muster List and Drill is to gain operational awareness as soon as possible. The captain and the officers must know who has reported to their stations, who is missing from their stations and who has reported to the wrong area or who has not reported at all.

An accurate POB and muster drill is a crucial in assessing the situation and providing the relevant data for the captain to dictate the proper orders.

### *Previous Options*

The conventional method of recording POB and performing a muster drill required yellow tablets and communications over radio. The POB and drills are performed on “yellow tablets” meaning a person is manually writing down who has entered and exited the vessels. The POB sheets can be lost, requiring the crew member who performed the task to perform a recall by memory to account for crew members who have come and gone.

Moreover, a vessel with 200 plus personnel operating on this archaic method means the muster drill could take up to or longer than one hour. In an emergency situation this is unacceptable. Imagine a fire, explosion or possible situation requiring an abandonment decision. Every second counts. The captain cannot decide to abandon ship or look for lost (or unaccounted for) crew members in a fire until he gets an accurate situational awareness.

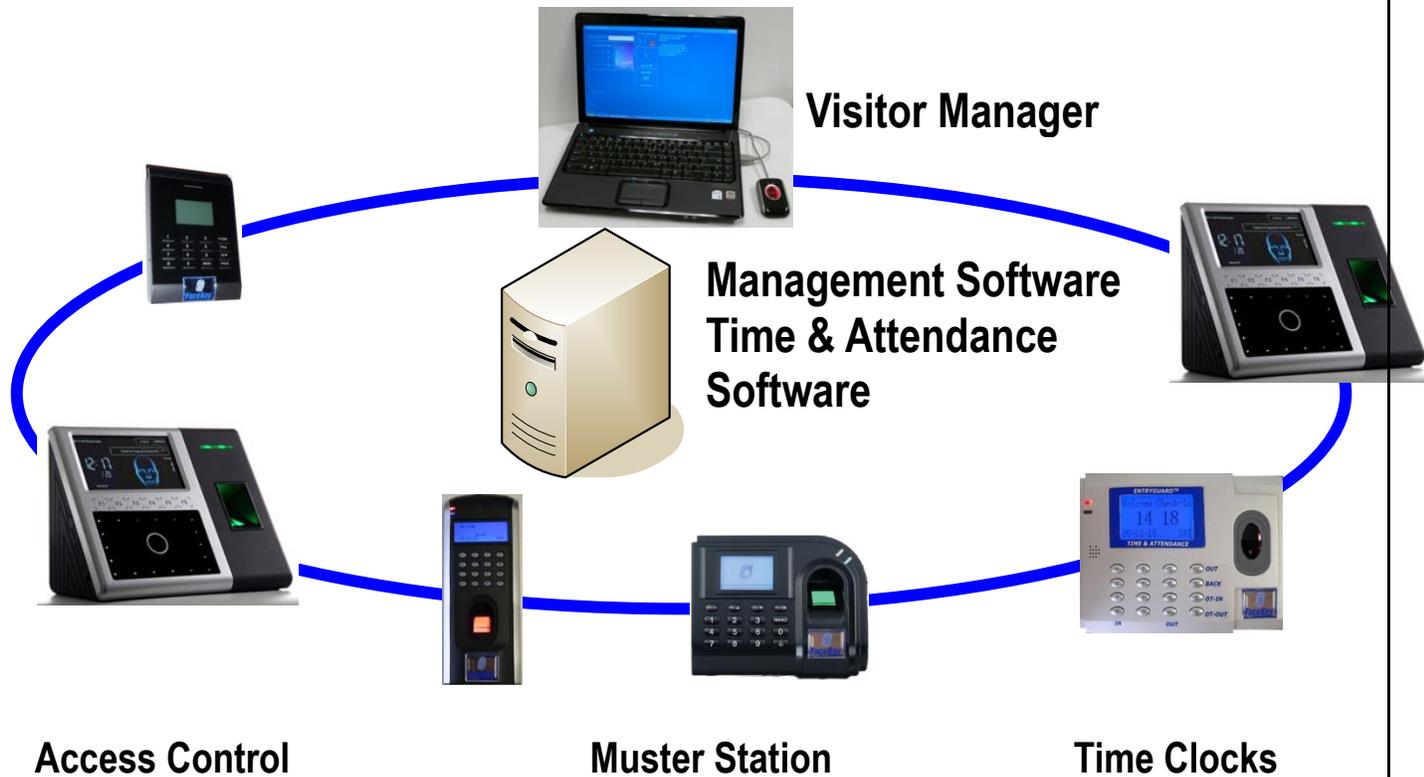
In addition, large vessels could have between 12-24 muster stations. The captain and his officers are responsible for compiling a full report of POB and the results of the muster drill.

The muster drill report is then created with the following information: date and time of muster drill, attendance, missing persons and how long the drill took to complete. Weekly muster reports must be inputted in standard format and saved for viewing by management or the appropriate regulatory agencies.

The emergency drill (or Muster Drill) is common practice or requirement for chemical plants, nuclear plants, dams, hospitals and schools.

### *Auto Crew Management System (ACMS) Solution*

The ACMS is an IT based solution that provides multiple management stations and unlimited number of readers (data collectors) for real time situational awareness. The muster roll call reports are instant and will show who is in attendance, who is missing and who is at the wrong station or area. Within seconds the reports can be printed to multiple printers or exported to third party systems or databases.

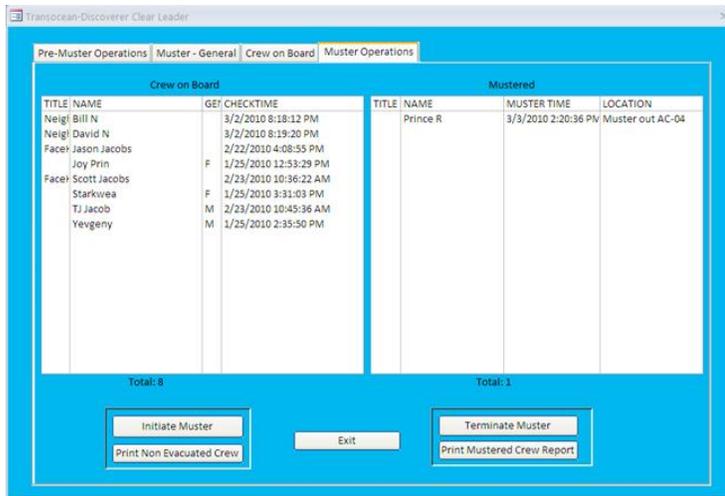


Attendance at each of the muster stations is taken automatically by wireless scanners, keypad, proximity, and/or biometric readers. The Muster roll call and tally is compared against the personnel on board (POB) recorded by ACMS system. The number of muster stations is limited only by the client's hardware capabilities and the readers can easily be installed on conventional local area networks (including wireless) for an easy and inexpensive install.

***Benefits of an Automated POB and Muster solution:***

The key benefits are real time, accurate POB reports and the ability for the captain and crew to collect situational awareness information real time. The ACMS system provides the ability for management to collect situational awareness in real time in order to make critical decisions involving the health and safety of the crew, contractors and guests more accurate and effective.

The Muster system can produce accurate real time reports without manually inputting data to confirm the success or failure of the Muster drill. These reports in most environments (critical assets, evacuation plans, fire drills and Muster drills) are mandatory, and they can affect the competitiveness of their HSE record, their insurance rates provide an accurate benchmark in steadily improving the drill.



The system is inexpensive, increases employee health and safety, and saves time and money.

## Implementation

### Design

The customer's application, premise, onsite facilities, and design objectives will be summarized and confirmed. A proposal will be completed and design agreed upon between the installing company and end user. The system is modular in design and based on the customer's requirements. Design of the system would include the following:

- Recommended IT network, both fixed and wireless
- POB/Muster Management software (Registry system, Access Control, Time and Attendance, Muster Features)
- Muster Stations & software
- Recommended Readers, (bar code, keypad, proximity, biometric & combination)
- Door Controllers & Hardware
- Extended Warranty & Support

### Install & Integration

The ACMS system is installed on a standard corporate network, either as a standalone system or subsystem within an existing site. In addition the system communicates via TC/IP, RS232, RS485 or wireless. In addition the system can interface into existing databases, time attendance, access control, fire and video surveillance systems and command and control system.



## Support

The ACMS system is a standard install, using standard communications and support protocols. The requirement for training is minimal and ongoing support for the system is typically done by the IT department and or the existing security company.

## *The Customer Experience*



### **Customer Situation:**

In the oil and gas industry muster drills are mandatory, often held a minimum of once a week. Reports on the timing, and success or failure of the drill affect their insurance and ultimately their own competitiveness as a benchmark rating on their safety measures and record.

The standard muster drill is labor intensive, includes all 200+ personnel on board and is expensive (see ROI below) to run. In addition, real time information accounting of all personnel in a timely matter is a must. These reports confirm attendance and missing persons are extremely difficult to produce (attendance, missing persons or persons in wrong positions) in an emergency evacuation drill because most persons are recorded manually by paper and pen.

### The ACMS system features offered to the customer

- Incoming and outgoing readers to track arriving and departing personnel.

- Two management stations (laptops), one for helipad safety room for new employees to register and be provided safety procedures. The second management station was used on the bridge to track muster results.
- Biometric scanners at all mustering stations for faster throughput. The end user requires no cards and management is guaranteed positive ID
- Report Generator
  1. Several reports including attendance, location, missing personnel, personnel in wrong locations
  2. Personal data, language spoken, name of craft, parent company, and date and time signed in.
  3. Export capability to third party databases (IE Excel).

**Benefits to the Customer**

- Expert muster program improves health and safety of crew, employees and passengers because of accurate information.
- Routine mustering exercises will be quicker and easier with state-of-the-art equipment and software to produce reports and an accurate account of personnel.
- Time spent searching the ship, especially in potential hazard area, looking for someone who isn't missing will be reduced.
- The almost instantaneous report from the muster exercise will prevent delays in the Captain's options, such as calling for an Abandon Ship.
- Sign-in sheets cannot go missing.
- The report will show where each person signed in and in case they are needed to support the emergency, the person can be summoned swiftly.
- As an added benefit, the system can produce a report at the time of the muster exercise of vessel, plant or other facility. This report will reduce redundant data entry and reduce errors.
- The muster system will show in real time, the personnel unaccounted for to provide the Captain with a clear picture of the progress of the muster exercise even if radio contact is disrupted or congested with other emergency messages.
- System saves time and money

**Cost Savings with an Automated Muster System**

Currently, the customer is required to have a Muster Drill once a week which is taking approximately one hour to complete. With the ACMS the Muster Drill can be completed in less than 8 minutes. The estimated savings (not including lost production time) per year on labor only is as follows:

Application: Oil Rigs	60 Min				
	Per Hour	Drill Per Year	45 Min. Drill Per Year	30 Min. Drill Per Year	15 Min. Drill Per Year
Number of personnel	210				
Average labor cost	\$80				
Labor Cost per hour	\$16,800	\$873,600	\$655,200	\$436,800	\$218,400
Labor savings			\$218,400	\$436,800	\$655,200
Day rate of rig (\$250K)	\$20,833	\$1,083,316	\$812,487	\$541,658	\$270,829
Total Cost		\$1,956,916	\$1,686,087	\$1,415,258	\$1,144,429
Savings			\$270,829	\$541,658	\$812,487
Saving per minute			\$18,055	\$18,055	\$18,055

The calculation does not consider the following:

- Insurance fees saved as a result pristine safety record.

- Reduction in rates charged by “First Responders” because customer knows which area missing personnel are located.
- Savings from the capital cost and lost production time for the rig and support vessels,

\*Daily rates for a submersible rig is \$400,000/day, a jack-up rig is \$140,000 ([www.rigzone.com](http://www.rigzone.com))  
Daily rates for AHTS is \$70,000, supply vessels, \$3,820-10,700 and crew boats range from \$2270 to \$4325 depending on size (April 2010 Work Boat Magazine)

## Summary

The ACMS solution provides accountability and attendance of personnel during emergency situations: evacuation, hazardous material spill, fire, or man overboard drills. The system will provide situational awareness in real life emergencies, including but not limited to chemical, nuclear and manufacturing plants, hospitals, etc...

In addition the ACMS system installs on a standard corporate network. Identification however is done at the device or station, not on the network server. This allows for communications to remain open while data is being transmitted each time the stations are used.

Most importantly the ACMS drastically improves the speed at which employees and guests can respond to an emergency situation and be able to track and the results in a report form, automatically.

