Submarine Rescue iMMS

Intelligent Medical Monitoring System

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ISSUE

Submarine Escape and Rescue (SER) is a high stress environment for all involved, not least the medical and rescue teams. Up to 80 submariners can be situated in the rescue complex with varying states of health and medical attention required, resulting in significant burden on the medical teams.

Existing medical monitoring solutions designed for SER are limited in both capability and number of submariners that can be monitored, leading to prioritisation challenges for the medical teams. Furthermore, SER missions can be multi-nation, leading to language barriers and potential misunderstanding between operators and submariners. Providing further challenges for the medical team.

A solution to address the highlighted issues and bring SER medical monitoring capability to healthcare standards is highly desirable.

SOLUTION

Using cutting edge technology that is commonplace in medical settings, JFD is pleased to provide its Intelligent Medical Monitoring System (iMMS) for SER applications.

iMMS is modular and configurable to the requirements of different SER systems, with monitoring split into three tiers:

- **Initial Tier:**
  - Vital signs monitoring of all submariners and rescue team members in the rescue complex
  - Automated subject location tracking.
- **Intermediate Tier:**
  - Specific medical investigation provided by standalone devices.
  - Devices include: 12-lead ECG Monitors, NIBP Monitors, Spirometer, Point-of-Care Ultrasound.
  - Additional devices can be integrated.
- **Advanced Tier:**
  - Elevated critical care monitoring provided by patient monitor and defibrillator for a reduced number of submariners.

Wearable Device
Vital Sign Monitoring

Standalone Devices
Medical Spot Checks

Corpuls3
Patient Monitor & Defibrillator

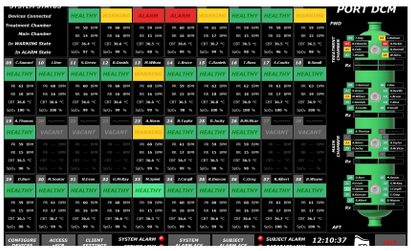
The iMMS platform enables personnel monitoring throughout the rescue complex and consists of:

- **Data Hubs:**
  - Data hubs communicate with medical devices.
  - Up to 20 devices per data hub.
  - Connects via local area network to system server.

Data Hub
Small Form Factor
100mm x 30mm

- **System Interfaces:**
  - Bespoke medical console consisting of server, client, and electronic health record (EHR) software.
  - EHR software accessible only by medical personnel.
  - Mobile access to client and EHR software via tablet computers.
  - Alarms interface alerting medical team to deterioration of condition.

Medical Console
Main System Interface



Client Software
Medical Console & Tablet Computers

Hyperbaric Tablet Computers
Secondary System Interface

BENEFITS

- Continuous medical monitoring of all submariners.
- Comprehensive data driven medical triage.
- Modular platform configurable to rescue system.
- Reduced likelihood of escalation through earlier detection of medical conditions.
- Reduced burden on support personnel.
- Alarms interface alerting deterioration of condition.
- EHRs capturing medical data for future analysis.
- Reduced obsolescence concerns due to iMMS platform.
- System expandability to add further capability.

ENHANCEMENT OPTIONS

iMMS could be enhanced via:

- Additional standalone devices (intermediate tier).
- Submariner exposure profile generation.
- Remote telehealth functionality.
- iMMS integration with submarine rescue vehicle.
- DISSUB entry kit.
- Data synergy with submarine platform iMMS.
- Tailored data export capability.