Telehealth Consult
Telemedicine Platform
Remote doctor/specialist consults
Version 02
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Date: 22-08-2013
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General

See separate document with revised wording for this page

1.1 Purpose
The purpose of this document is to provide an overview of the Telehealth Consult Telemedicine Platform solution. This telemedicine solution can be used for preventative health check-ups as well as to treat injuries or illnesses, and includes access to a team of specialized doctors for evaluation consults. Emergency consults can also be accessed 24/7.

Included in this document is an explanation of the features of the telemedicine solution as well as instructions on the necessary steps to install and configure the Telehealth Consult Cart client Software onto a Telehealth Consult Cart, a customer laptop or desktop. This configuration is needed for the communication with a FB terminal over the satellite path.

1.2 Background
The telemedicine solution was designed for remote applications, such as offshore vessels, to be able to access healthcare from their existing remote locations. Regular health checks are imperative to keep the crew healthy and fully operational, and access to immediate care for injuries and illnesses is critical to sustain the crew’s productivity.

1.3 Target Audience
The document is written for shipping companies who want to invest in the healthcare of their crew members in order to maintain operational productivity. The sea farer can read what the features and what kind of preventive measurements can be taken with this solution.
Introduction

2.1 Overview of the Solution

2.2 Description

Three companies have partnered together, in order to design a product named **CrewCare** that will address the needs of Shipping Companies to provide their crew members with remote medical services and healthcare. CrewCare is comprised of three components:

1. **IT & Cloud Services**: provided by Telematic Medical Applications ([www.telemed.gr](http://www.telemed.gr), [www.tma.com.gr](http://www.tma.com.gr))
2. **Telemedicine Equipment & Technology**: provided by AMD Global Telemedicine ([www.amdtelemedicine.com](http://www.amdtelemedicine.com))
3. **Medical Services**: provided by US-Telehealth ([www.us-telehealth.com](http://www.us-telehealth.com))

The Telehealth Consult client Software provides a store and forward technology for health organizations to create telehealth cases that can be reviewed either locally or by another remote consultant if a trust relationship exists between the organizations.

**Telehealth Consult Telemedicine Platform**
The detailed steps listed in the first section will install the Telehealth Consult Cart Software onto the cart, desktop or laptop running Windows XP/Vista/7. The next section will outline how to configure the software Telehealth Consult Cart.

Telehealth Consult Cart uses WCF (Windows Communication Foundation) for authentication, and requires connection to an authoritative time source. During installation of the Telehealth Consult Cart software, the time service will be enabled and an authoritative time server will be established for the client. Should the client host of the Telehealth Consult Cart software be greater than five minutes different from the Telehealth Consult Server, users will not be able to log into the Telehealth Consult Cart software, so to avoid such issues Telehealth Consult Cart software will sync automatically with the Telehealth Consult Server time.

### 2.3 Features & Benefits of the Solution

#### 2.3.1 Customized Services

**CrewCare** is proud to tailor its service offerings to meet the unique needs of each location. Since most oil fields are located in remote locations and have limited (or no) access to everyday medical care and emergency we are happy to provide a customized solution that includes remote physician access using telemedicine.

#### 2.3.2 Types of Illnesses and Injuries Treated

**CrewCare** treats most basic illnesses and handles semi-emergent issues, such as those that you would normally see your primary care physician for. In extreme remote situations, CrewCare physicians can help you determine what is an emergency and what is not. Examples of injuries and illnesses that can be treated onsite include, but are not limited to the following:

- Cold
- Ear Infections
- Flu
- Some Immunizations
- Allergies and Asthma
- Physicals
- Minor Injuries and Illness
- Drug and Alcohol Screening
- Minor Cuts and Abrasions
- Wellness Consultations
- Diabetes and High Blood Pressure
- Smoking Cessation

Telehealth Consult Telemedicine Platform
2.4 Crew Care Benefits

2.4.1 Maximize crew up-time and productivity
Your crew is one of your most valuable assets and lost man hours equals lost revenue. Getting your crew the proper care at the first sign of injury or illness helps protect those assets, ensuring that injuries are addressed so they don’t become worse or that illness doesn’t spread affecting an entire team. Crew Care makes medical care in the oil field more convenient than ever, to ensure your crew stays healthy and fully operational.

2.4.2 Help retain and recruit critical employees
The most knowledgeable members of your crew are often some of the oldest, yet they are critical for efficient operations. Providing the proper care to those who may be developing (or have developed) new chronic conditions can help keep them in the field longer, knowing they won’t be jeopardizing their health. Moreover, your company may find that recruiting the most experienced employees just got easier.

2.4.3 Minimize OSHA recordables
Proper knowledge of how to treat oil field injuries comes with an appropriate understanding of OSHA. Our experienced occupational medicine and emergency medical personnel understand that appropriate and timely treatment on-site can help minimize recordables.

2.4.4 Minimize lost time incidents
Similar to OSHA recordables, lost time incidents are costly. Our experienced occupational medicine and emergency medical personnel understand that the appropriate and timely treatment on-site can help keep crew members on the job or get them back to the field in a safe and timely manner.

2.4.5 Minimize non-emergent medical transportation costs
In extreme remote situations, we work directly with first responders to ensure that emergency evacuations are necessary. Virtual consultations allow the appropriate physician specialist to work in conjunction with the first responders and to determine which injuries are truly emergent and require costly transportation or those that can be handled on site.

2.4.6 Minimize non-essential Emergency Room visits
When the ER is the only medical option, it gets used far more often than actually necessary. Crew Care Clinics are not a substitute for an emergency facility, but for your non-emergent care concerns they are a far more efficient option. We pride ourselves on providing your crew reduced wait times and more cost efficient care.
2.4.7 Medical Control
Crew Care can provide medical control parameters or work with your existing providers to improve your medical program. We work with experienced occupational medicine physicians who can help guide local medics and determine when a higher level of care is needed. Our medical control team understands the ways to maximize care for your crew while minimizing your OSHA recordables.

2.4.8 Physician Access
Crew Care provides access to physicians across virtually every specialty. Our affiliated physicians use the latest protocols and telemedicine to ensure the highest levels of care for your crew. With Crew Care, your crew can see and speak directly with a physician using the latest in medical teleconferencing technology.

2.4.9 Crew Care Clinics
Crew Care is establishing a chain of clinics throughout some of the regions needing remote care the most. If you are drilling in an area and believe that your crew could benefit from having access to healthcare, we would like to help. Our clinics are capable of providing the same kind of care you would receive in most urban clinics with the same commitment to high quality.

2.4.10 Wellness
Few things are more important than maintaining a healthy workforce. CrewCare is able to provide basic wellness for your remote individuals, encouraging them to make smart choices in their daily lives. Advice on exercise, diet, chronic disease management, and smoking cessation are just a few of the topics addressed.
Configuration settings

3.1 Setting up the solution

The solution can work with a standard windows platform;

Minimum System Requirements

- .NET Framework 4.0
- Windows XP SP3
- Adobe Reader >= to Version 7.0 with License Accepted

At windows firewall of the desktop or laptop the following settings must be made to the Client: (Use Administrative Tools | Windows Firewall with Advanced Security)

Outbound rules should exist:

- Port 80 TCP
- Port 443 TCP
- Remote Desktop (TCP Port 3389)
- Time Server (UDP Port 123)
- WCF (TCP Port 6968)

Equipment peripherals (via USB or COM ports):
- Vital Signs (SPO2, NiBP, Temp, HR)
- ECG
- Video Otoscope
- Camera dental

The installation of the software is to be done on the windows platform. Use the setup application of the solution and follow it step by step. During the installation the IP address of the hosted shore server and time server will be asked. This information must be provided as the service is connected to a platform on shore and from there consults can be made. See in the appendix for details.

3.2 Setting up Inmarsat equipment

The FB can be set by using a standard profile having a Private IP address;

See in appendix for details.

Telehealth Consult Telemedicine Platform
3.3 Testoverview

There is a satellite connection made with this solution via satellite and some consults where made

<table>
<thead>
<tr>
<th>Product</th>
<th>Result</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Created an ECG to an employee. Send it over to the server.</td>
<td>The ECG was received fine in the form of a consult to the doctor/specialists.</td>
<td>Pass</td>
</tr>
<tr>
<td>Making camera Pictures and added this to this consult an send it over</td>
<td>Also the picture s where send over and found back in the server ready for consult remotely</td>
<td>Pass</td>
</tr>
<tr>
<td>Consult was taken place and right treatment was given by doctors/ specialists. This treatment was send over to the client.</td>
<td>Treatment was received at client and performed on the patient.</td>
<td>Pass</td>
</tr>
</tbody>
</table>

Support

4.1 References

http://www.crewcare.net
http://www.amdtelemedicine.com

4.2 Contact information

Telehealth Consult Support: Telematic Medical Applications Ltd
Customer Support:
Telematic Medical Applications Ltd
Tel: +302111165330-2
Fax: +302111165333
info@tma.com.gr  info@telemed.gr
**AMD Global Telemedicine**
321 Billerica Road Chelmsford, MA 01824, USA
Toll-Free: 1-(866) 44-8452
Phone: 1-(978) 937-9021
Fax: 1-(978) 937-5249
email: techsupport@amdtelemedicine.com
www.amdtelemedicine.com

**CrewCare Support:**
CrewCare Telemedicine Services
1180 Seton Parkway, Suite 300 - Kyle, TX 78640
tel: 1-888-566-0961
Email: info@crewcare.net
Website: www.crewcare.net
Appendix

5.1 Setting up the Telehealth Consult Client Software

5.1.1 Installation of Telehealth Consult Cart Software

1. Log in to the Telehealth Cart, desktop or laptop with a windows administrator account.

2. Insert the Telehealth Consult Cart software installation disk into the CD-ROM and run “ClientSetup_build_6.x.x.x.exe” to start the Install Shield Wizard.

3. At the Welcome Screen, click on Next.

![Welcome Screen to Telehealth Consult Cart Software Installation](Figure 1)

Figure 1 – Welcome Screen to Telehealth Consult Cart Software Installation

(Note: All pictures are representative and do not necessarily reflect the actual 6.x version number of the software being installed.)

4. Click on “I Agree” to accept the License Agreement. This Install Shield Wizard will proceed to the install Location.

Accept the Default destination folder as shown in Figure 2.
5. For security reasons, it is highly recommended that the Data be in a separate partition than that of the OS. On a Telehealth cart, the hard drive is partitioned into two drives (C and D). By default the installation will suggest placement of the Data Directory to the D:\drive. If installing on a customers’ laptop/desktop with only a C:\drive, accept the Data Directory in that location.

6. Enter the IP address of the Telehealth Consult Server. The IP address will be given by the client’s IT Administrator.
7. Enter the IP Address of the Time Server. If an organization using a Domain Time Server as the Authoritative Time Source, enter the IP address of that server. The Telehealth Consult Server may also be an Authoritative Time Source if setup and can be used as well. This will be determined by each organization. Note: If the Telehealth Consult Server and the Telehealth Consult Cart are out of sync greater than 5 minutes, providers will be unable to log in on that host box.

8. The installation of the Version 6.x.x.x software will commence. While Telehealth Consult Cart is installing, several DOS windows will open and close around the install progress box that is seen in Figure 6.
9. Click on Finish when the Setup Wizard has completed.

One server per client should be installed. The server could be at TMA’s premises or at client’s depending on the purchasing model.
5.1.2 Setting Inmarsat value added services

Private IP access to the internet is used for testing. For testing purposes is this set to an open profile. If the rules need to be restricted the outbound rules in the trench should be set with the values below.

At Server’s Windows Firewall the following settings must be made: (Use Administrative Tools | Windows Firewall with Advanced Security)

Inbound Rules should exist:

- Port 80 TCP
- Port 443 TCP
- Remote Desktop (TCP Port 3389)
- Time Server (UDP Port 123)
- WCF (TCP Port 6968)
- ICMPv4 allows echo request

- In the windows firewall, click on new rule.
  - On the Protocol and Ports page, select ICMPv4 or ICMPv6 from the Protocol type list. If you use both IPv4 and IPv6 on your network, you must create a separate ICMP rule for each. Click Customize.
  - In the Customize ICMP Settings dialog box, click Specific ICMP types, and then select Echo Request. Click OK.
- Allow all IP addresses on the Scope page.

- Select Allow the connection
• Leave the default on the Profile page

• On the Name page, enter ICMP and click Finish

- Change log file location to C:\Logs\firewall.log

Review NIC settings for all NICs. On all NIC(s):
- Deselect “Client for Microsoft Networks”
- Deselect “File and Print Sharing for Microsoft Networks”
- Verify IP, SM, DG, DNS
- Select radio button in TCP/IP Properties / Advanced / WINS
- “Disable NetBIOS over TCP/IP”
- Uncheck “Enable LMHOSTS lookup”
DISABLE any NICs that will not be connected to network
Security logging: Returning to Windows Firewall with Advanced Security on Local Computer highlighted, Under Public Profile, select Windows Firewall

5.2 Recommended Settings

Peripheral Configuration

Once Telehealth Consult Cart software has been installed, it is necessary to configure any attached peripherals within the software setup utility. The document “Telehealth Consult Peripheral Configuration” outlines the steps necessary to configure the peripherals for use with the Telehealth Consult Cart software. All peripherals will be described in a technical document. The installation of these peripherals could be found at http://www.afhcan.org/documentation.aspx.

5.3 Technical Summary

Sizes shown are for images/tests completed and saved to the Telehealth Server for each cart device.

**Volume standard**
Still photo = 1.48MB
Typical Stethoscope session (10 seconds) = 820kb
Patient name etc & VSM = 1.5kb
### Volume Telehealth Consult

<table>
<thead>
<tr>
<th>Case parameters</th>
<th>Saved Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case created w/form – no images</td>
<td>+/- 1 Kbyte</td>
</tr>
<tr>
<td>Otoscope Image</td>
<td>+/- 90 Kbytes</td>
</tr>
<tr>
<td>Digital Camera Image</td>
<td>+/- 1,550 Kbytes</td>
</tr>
<tr>
<td>Vital Sign Measurement (Temp, Pulse, BP)</td>
<td>+/- 3 Kbytes</td>
</tr>
<tr>
<td>Dental Camera</td>
<td>+/- 100 Kbytes</td>
</tr>
<tr>
<td>ECG (30 sec. trace)</td>
<td>+/- 20 Kbytes</td>
</tr>
<tr>
<td>Scanner (color)</td>
<td>+/- 1,600 Kbytes</td>
</tr>
<tr>
<td>Tympanometer (both ears)</td>
<td>+/- 10 Kbytes</td>
</tr>
<tr>
<td>Audiometer (full test)</td>
<td>+/- 5 Kbytes</td>
</tr>
<tr>
<td>Spirometer</td>
<td>+/- 5 Kbytes</td>
</tr>
</tbody>
</table>

**Case messaging system parameters for client/server communications:**

All case data is encrypted for transmission, and because of this, any data, e.g. a digital camera image @ 1.5 Mbytes, will grow to 4.5 Mbytes during transmission, then return to normal size once decrypted and stored on the AFHCAN server.

The AFHCAN software uses “chunking” of client/server messages when saving cases to the server, i.e. all messages are broken into 1 Mbyte chunks for transmission.

**Bandwidth recommendations:**

Minimum recommended bandwidth for a small/medium organization utilizing a WAN/Satellite link for client/server communication is 128k, but may require increasing to 256k (or larger) for larger organizations as overall utilization dictates.