Advances in Telemedicine

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Telemedicine

Simple forms of telemedicine were introduced in the 1920s and gradually increased in complexity over the following decades using telephone-based technology. It was the development of the internet that allowed rapid progress and the widespread use of telemedicine. Another significant "driver" was the COVID pandemic.

Telemedicine via live video kept healthcare professionals and patients safe from exposure to the virus as neither party had to travel to clinics or hospital institutions to provide and receive care.

Obvious areas of use

- Remote communities (where DanMedical's D-MAS system was first used)
- Hospitals, Clinics and areas with poor specialist medical expertise availability
- Remote work locations
 - Offshore





General Benefits of Telemedicine

- Improved Access to Care
- Convenience and Time Savings
- Continuity of Care
- Cost Efficiency
- Infection Control
- Expanded Specialist Access
- Enhanced Patient Engagement

General Challenges of Telemedicine

- Technological Barriers
- Data Security and Privacy Concerns
- Licensing and Regulatory Issues
- Limited Physical Examination
- Digital Literacy Gaps
- Quality of Care Concerns





DanMedical Overview

- With our D-MAS systems, DanMedical provides advanced telemedicine support for any location from remote and offshore environments to hospital and clinical settings
- We design and evolve our products in line with the vital developments and implementation of guidelines and standard practices set within the North Sea
- Using the North Sea as a reference as to how health and safety can be improved to the highest level, we are supporting the implementation of these standards in other regions, for example in the APAC Region, where some operators have now started to implement telemedicine to saturation diving project requirements

2006 2012 <u>Now</u>

DanMedical began providing topside medical systems to the offshore industry

To support telemedicine requirements in saturation diving, our first chamber-compliant and compatible system was provided to a North Sea diving contractor for service on a DSV



Currently, our systems provide the latest innovative technology available to support diving operations and provide confidence at the worksite that, in the event of an incident, divers will receive prompt, effective, and professional medical support



Industry recognition of the importance of telemedicine in medical contingency arrangements

IOGP 411

Medical equipment held on-site which includes that of a minimum specification that is capable of measuring: blood pressure, heart rhythm, and SPO₂, and be able to transmit this information from inside of the chamber to a doctor remote from the worksite, such that the information can be viewed in real time

DMAC 28

A saturation rated telemedical patient monitoring system (for blood pressure, ECG, pulse, temperature, SAO₂)

NORSOK U-100

Persons performing advanced first aid shall have priority and unimpeded access to suitable telecommunication with the RCDD, the duty diving doctor or any other competent personnel as might be required.

For all diving operations performed under this standard, telemedicine equipment shall be available for communication with the duty diving doctor.

In addition to video conferencing, the telemedicine capabilities should at least include blood pressure, pulse oximetry, transmission of high resolution images and 12 channel ECG.

The equipment shall be able to transmit video and sound to the onshore health service. The equipment shall also include units for monitoring and transmission of vital physiological parameters, as a minimum ECG, non-invasive blood pressure and SPO₂

IMCA D061

Some hyperbaric chambers may be equipped with a medical monitoring system. Such systems permit remote medical monitoring of the patient using real-time data taken within the hyperbaric chamber. Sharing this real-time data with a shore-based Diving Medical Physician may help to enable more informed and accurate medical decision making



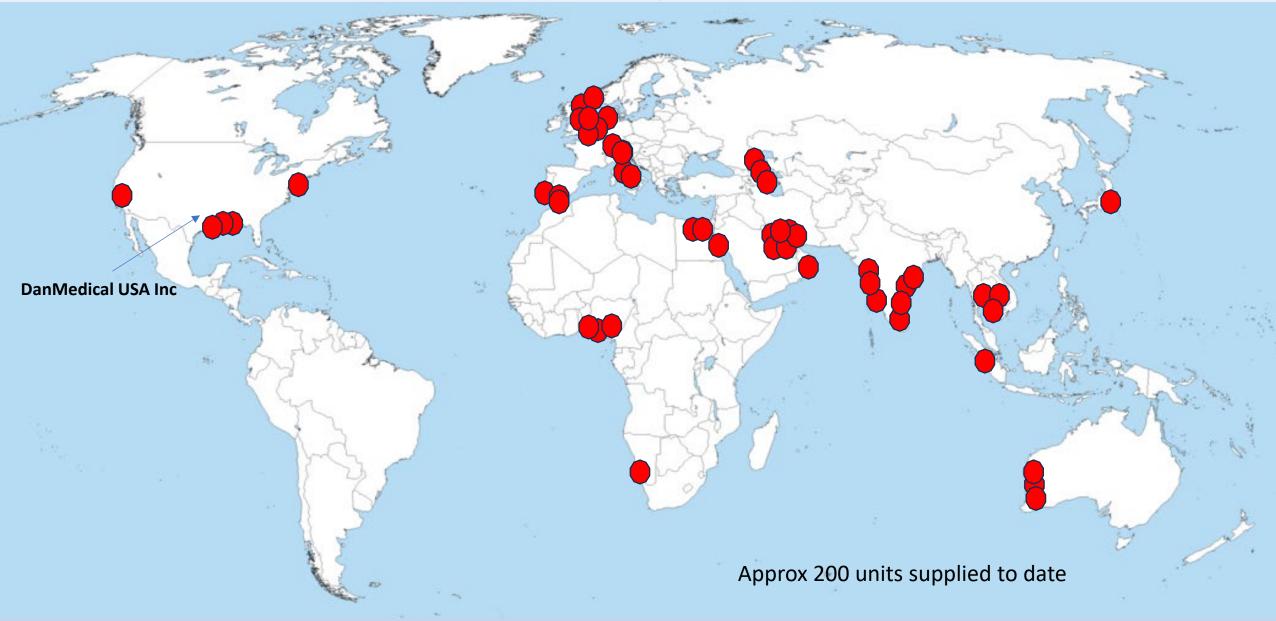
The industry recognises the importance of providing the best medical contingency possible, with proven equipment

Extensive experience with TeleMedicine means it is now suitable and expected for medical monitoring of divers in saturation

Despite international adoption, there are still areas where some Diving Contractors and Operators are not compliant with industry guidance...



World Coverage Map



Standard Functions

Live Monitor display for all vital signs information

Resting ECG: 12-channel display, Extended ECG monitoring: 10-lead input with recording capability

input with recording capability

Pulse Co-Oximetry: Masimo SET finger clip sensor (SpO2) enables monitoring of oxygen saturation, perfusion index and pulse rate



Non-invasive Blood Pressure: Reusable arm cuffs supplied in various sizes

Core + Skin Temperature: Core temperature probes and a skin temperature probe (YSI 400 series sensors)

Spirometry module: Record and store PEF and FEV1 data

HD Digital Imaging Webcam: High resolution digital video used for real-time consultation and to capture images for wound care/injury detail. The HD Webcam with extended lead allows the medical team to see in the chamber or sick bay situation in real-time digital Video

OtoScope: for Ear, Nose and Throat, supplied with various sized speculums



Additional Functions

Digital Video DermatoScope: with polarising filter for skin, melanomas, lesions and magnified images for wound care

Digital Video IriScope: to look at the surface of the eye for injury

Digital Video DentalScope: for mouth, teeth and tongue

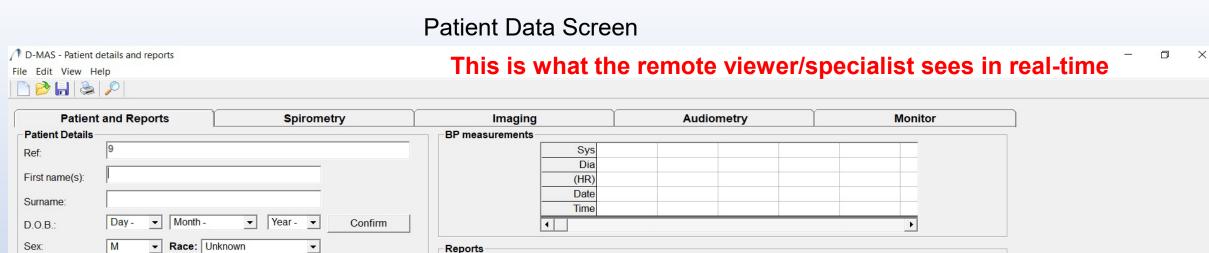
Audiometry Module (HSE & OSHA Hearing Test)

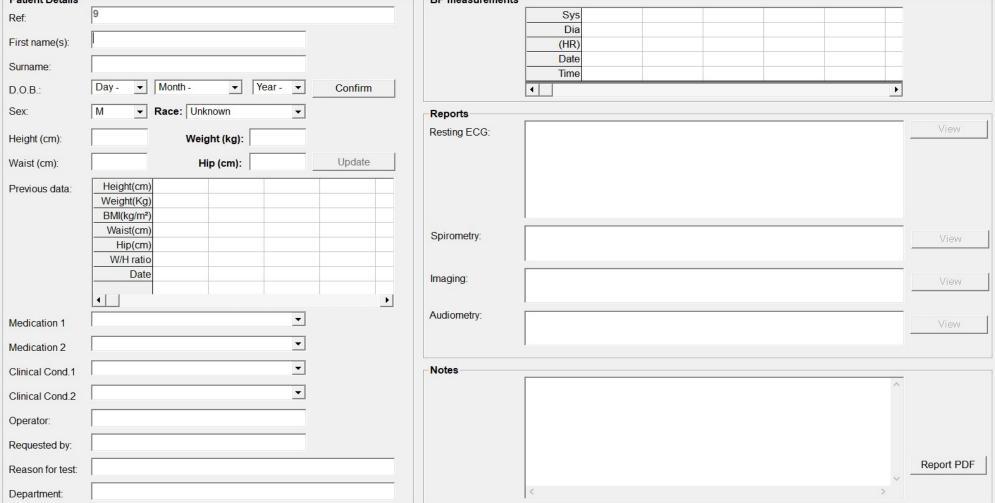
- The Audiometry module takes measurements of the patient's hearing function
- Equipped with ear defending headphones with 29dB attenuation at 1Khz (so the test can be performed in a work environment) and a response switch, our industry leading calibrated Audiometry test complies with the latest HSE guidance to periodically test and proactively detect Noise Induced Hearing Loss (NIHL) for workforces.













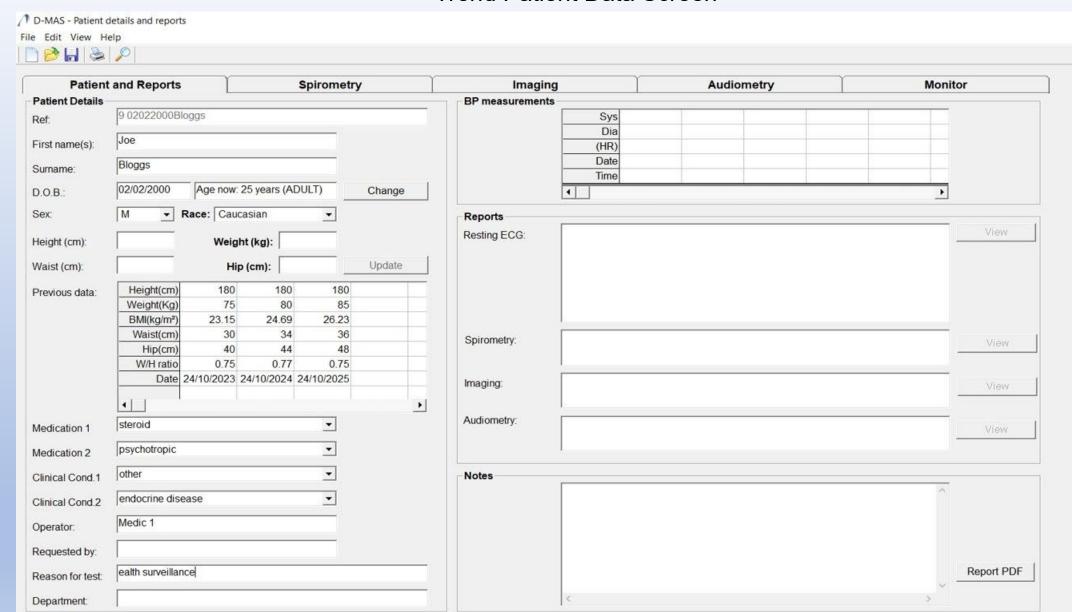








Trend Patient Data Screen

















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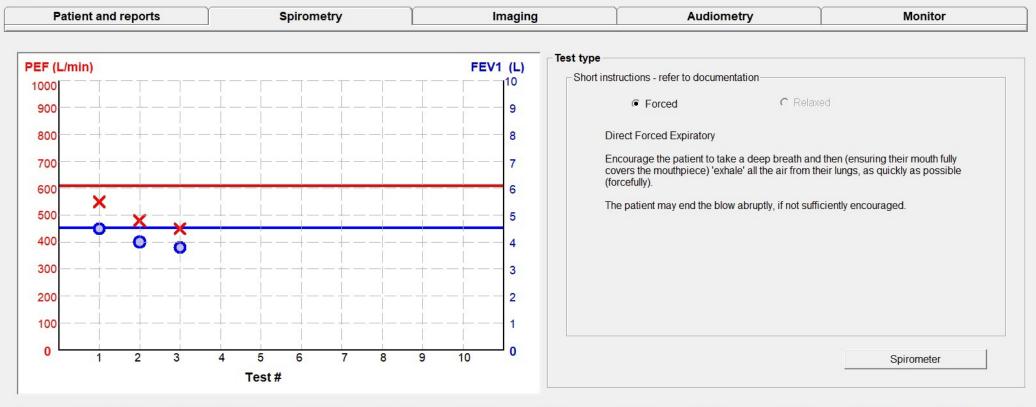
Trend Patient Data Screen

DanMedical - Spirometry

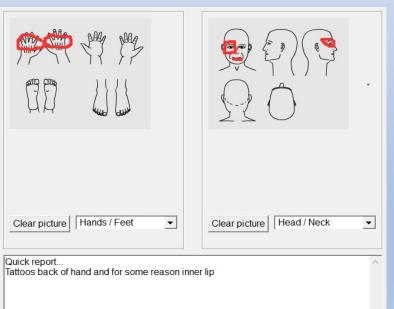
File Edit View Help







	Pred Min	Pred.	Pred Max	Test 1.	Test 2.	Test 3.	Test 4.	Test 5.	Test 6.	Test 7.	Test 8.	Test 9.	Test 10.
Test type	-	-		Forced	Forced	Forced	Forced			Al Maria Calleria			
Date	-	(-)	11-11	24/10/2023	24/10/2024	24/10/2025							
FEV1	3.68	4.52	5.36	4.5 (100%)	4 (88%)	3.8 (84%)							
PEF	487.8	607.2	726.6	550 (91%)	480 (79%)	450 (74%)							
Interp.	-	-	-	Normal	Mild Obs.	Mild Obs.							



Imaging



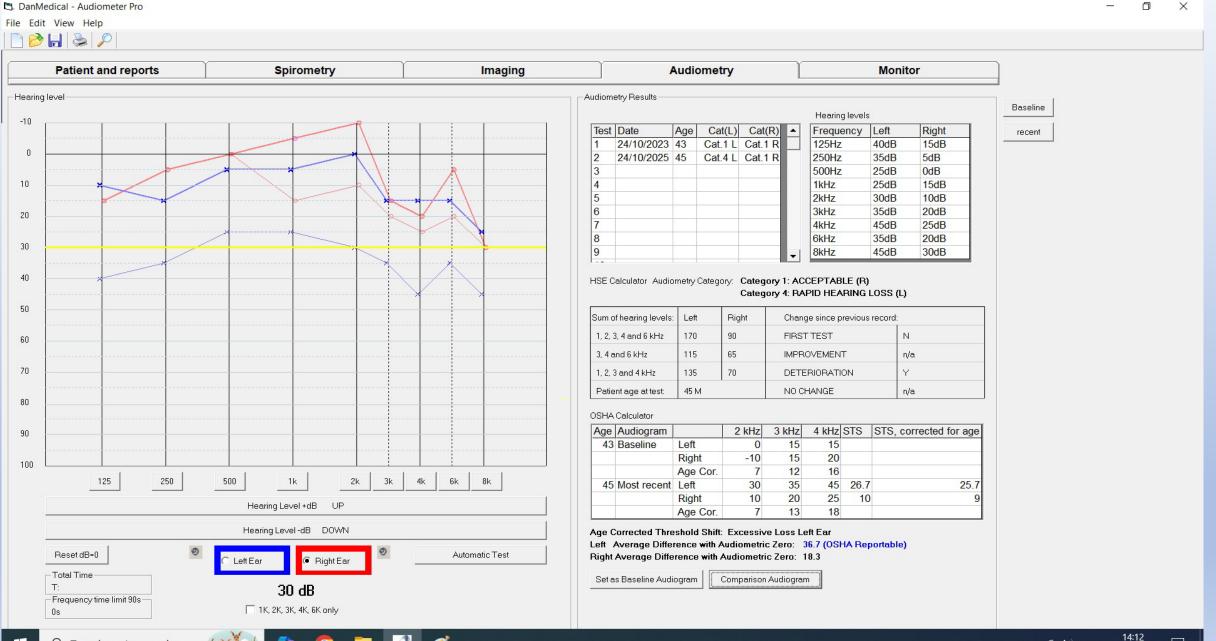








Trend Patient Data Screen















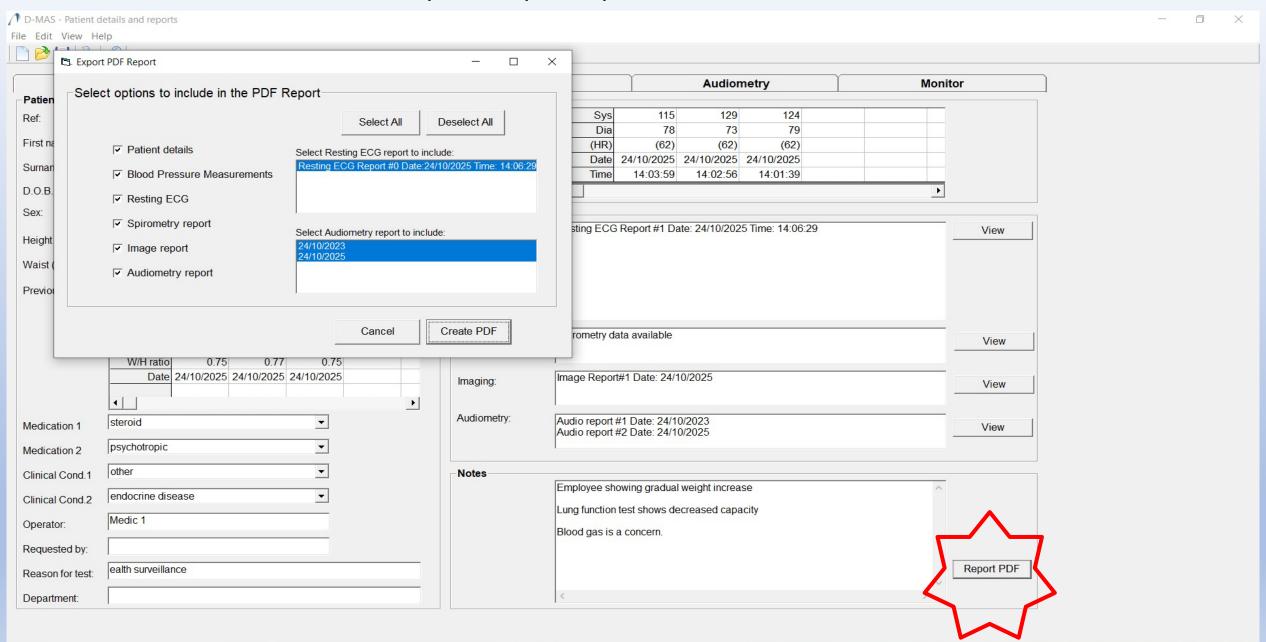


Monitor screen





Export to pdf report

















Password-protected report

D-MAS Patient report.



D-MAS Patient report.



Patient details.

First name:

Operator:

Bloggs Second name:

D.o.b.: 02/02/2000

Gender:

BMI:

Height: 180 cms

Weight:

85 kgs

26.23

D-MAS Report: Spirometry

Patient details: 9 02022000Bloggs

Predicted set: ECCS

First name: Joe

Second name: Bloggs D.o.b.: 02/02/2000

Gender: M Height: 180 m Weight: 85 kg BMI: 26.23

Min

3.68

487.8

Test Type

Date

PEF

FEV1

Interp.

Pred.

3.68

Max

3.68

607.2 726.6

Test 1

Forced

Normal

24/10/2025

4.5 (100%)

550 (91%)

Department:

Requested by:

Medic 1

Notes:

Employee showing gradual weight increase

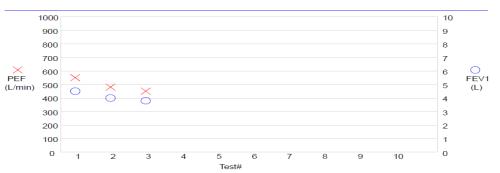
Lung function test shows decreased capacity

Blood gas is a concern.

Dan Medical

Operator: Medic 1 Department:

Requested by:



Test 2

Forced

4 (88%)

24/10/2025

480 (79%)

Mild Obs.

Test 3

Forced

24/10/2025

3.8 (84%)

450 (74%)

Mild Obs.

Previous Blood Pressure results: sys/dia (pulse) 124/79 (62) 24/10/2025 14:01:39 129/73 (62) 24/10/2025 14:02:56 115/78 (62) 24/10/2025 14:03:59

Surname: Bloggs Heart rate First name(s): Durations 98 ms DOB: 25yrs (02/02/2000) 104 ms Gender: ntervals PR 164 ms Race: Caucasian QT 340 ms Operator: Medic 1 QTc 339 ms Department Axes QRS Resting ECG Report #0 Date:24/10/2025 Time: 14:06:29 ST -125 53

SINUS RHYTHM SHORT QT INTERVAL Q wave in septal lead

T wave inversion also present POSSIBLE SEPTAL INFARCTION - AGE UNDETERMINED

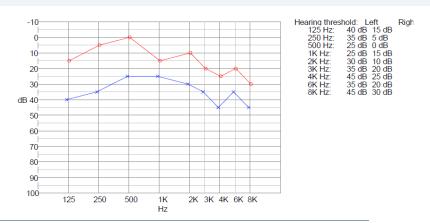
ECG INTERPRETATION:



25mm/s 10mm/mV ~0 Hz to 40 Hz~ Filter On



Password-protected report



HSE Results. Date of test: 24/10/2025 Sum of hearing levels Left: 1.2.3.4 and 6 kHz: 170 3.4 and 6 kHz: 115 1.2.3 and 4 kHz: 135

Patient age at test: 45
Category 4: RAPID HEARING LOSS (L) Category 1: ACCEPTABLE (R)

Patient details: 9 02022000Bloggs

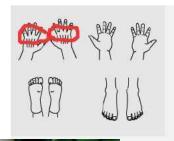
First name: Joe

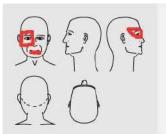
Second name: Bloggs Department: D.o.b.: 02/02/2000 Requested by:

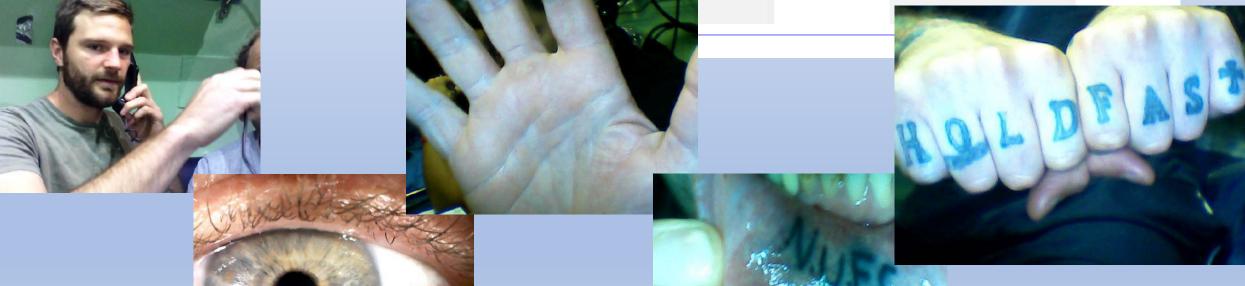
Number of images: 0 Gender: M

Report: Quick report...

Tattoos back of hand and for some reason inner lip

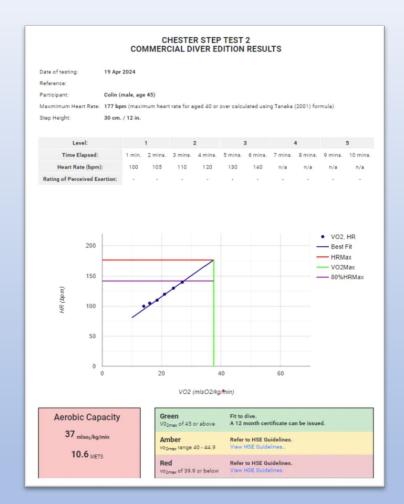






Occupational Health Screening

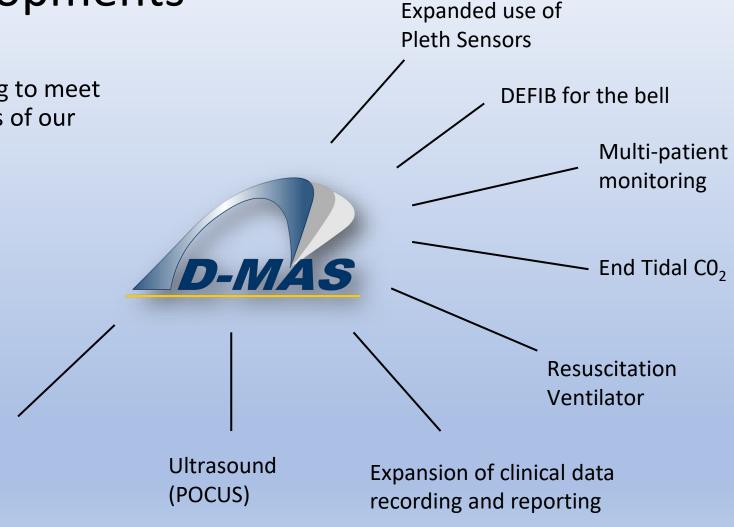
- Minimises operational disruption by enabling proactive health monitoring and surveillance to detect and address medical concerns early before they escalate, for the whole vessel
- Supports with offshore medicals, fitness-to-work evaluations and ERT fitness tests
 - e.g The Chester Step Test can be downloaded onto D-MAS, with results logged to show trends
- Streamlines Operations by combining multiple diagnostic tools into one compact system, reducing the expense of separate equipment, training and maintenance
- Health Surveillance (NAWR, HSAWA etc) allows trend identification by updating and adding data to an individual subject's file and action intervention points to be defined





Current Developments

D-MAS is constantly evolving to meet the needs and requirements of our clients



Cognitive and Wellbeing assessment



DEVELOPMENT CHALLENGES

- Requirement to meet robust and Clinical Grade diagnostic standards and regulatory requirements including periodic calibration.
- User-friendly interface and operating mode for non-medical personnel stressful situation
- Build and test for hyperbaric heliox environment (450msw)
- Cost versus limited market
- Equipment obsolescence

Identifying "nice-to haves" versus genuinely useful functions.



OPERATIONAL CHALLENGES

- Sometimes poor familiarity of the on-call doctor or Medic with such a system
- Problems with talking to divers and helium speech, therefore,
 the importance of text message facilities or built-in unscramblers
- Familiarity and frequency of drills
- Bandwidth restrictions



UNDERUSED POTENTIAL

- Difficulty in getting people to realise that this is not just for divers but is a **valuable resource for everybody on board** It is an integrated system which incorporates all the individual diagnostic and monitoring equipment in the sick bay
- Custom reports including chosen parameters and pictures / graphics
- Occupational health screening and long-term monitoring on an individual basis



Partnerships & Collaborations

We recognise the importance of collaboration in the effort to promote safety within our industry

- Diving Contractors and Operators
- Occupational health teams
- Telemedicine physicians/specialists
- Navy & military clients
- Diving system suppliers
- Training Establishments
- Suppliers of licensed medical devices
- Technology suppliers

















D-MAS Digital Medical Acquisition System

Thank You



