Danelec

Value from maritime data

Voyage Data Recorder

- with Remote Management & Maintenance Solutions

DM100 VDR G2
DM100 S-VDR G2
DM100 L-VDR G2

MAC13594-19A

Resilient and flexible marine technology

Optimise the safety, performance and cost of your vessel and fleet operations with cutting-edge Voyage Data Recorders (VDR) technology, Shaft Power Meters (KYMA), and intelligent maritime Internet of Things (IoT) solutions from Danelec Marine.

Our technology enables more than 10.000 ships worldwide to meet stringent safety and environmental regulations, and we continue to develop new ways of improving performance and efficiency through the application of data collected on board and accessed in the cloud.

Ensuring resilience and effectiveness, all Danelec solutions - since the introduction of our leading VDRs in 2001 - are designed according to our key product principles:

SOLID - SAFE - SIMPLE

Danelec's Global Presence

With offices in Denmark, Norway, Greece, Germany, Poland, Singapore, South Korea and China as well as over 600 factory-trained personnel in more than 50 countries worldwide, Danelec has a truly global presence ensuring reliable, cost-efficient and fast service and support to our customers anywhere.

Revolutionizing Shipboard Service

Save time and money, while eliminating in-port delays with Danelec's SoftWare Advanced Protection (SWAP).

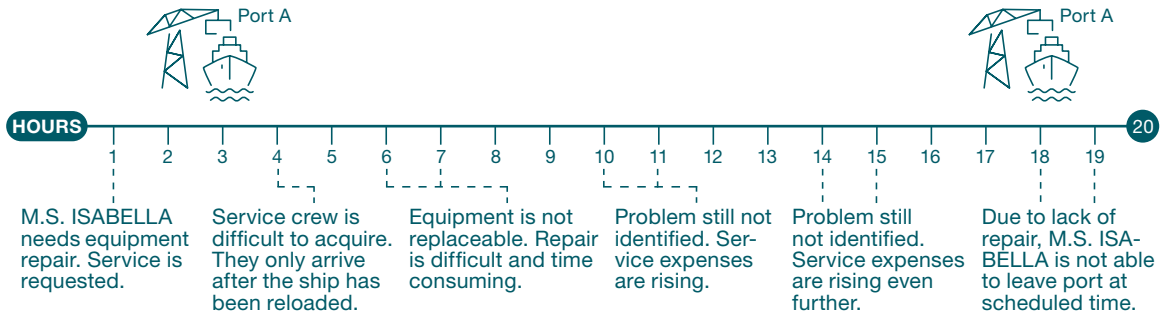
This unique approach allows all system software and programming data to be saved on a swappable memory card for quick and easy transfer to a new VDR unit during service or repair, saving hours in software installation and configuration.

- On-board repairs take hours, not days
- Save money by reducing man hours
- Protect and secure VDR data
- Keeps ships on schedule

SWAP™ Technology

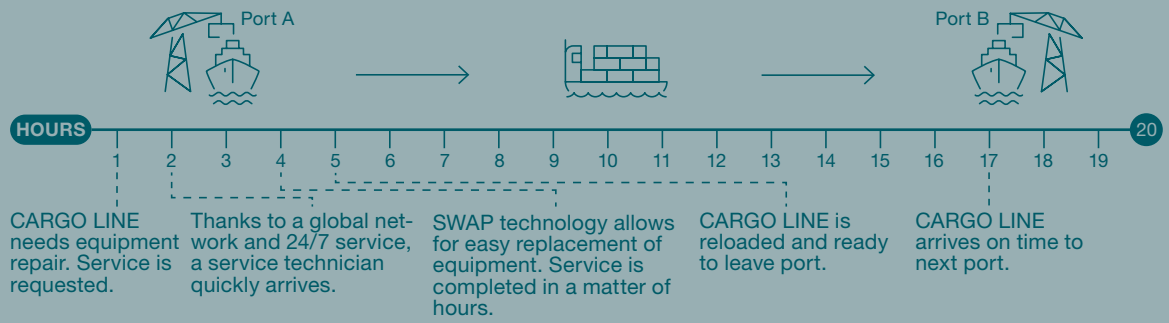
REPAIR ON BOARD

TRADITIONAL WAY



MOVE REPAIR TO SHORE

DANELEC WAY



SOLID
Product design

Dependable operation
Equipment that is built to be at sea

– Our products are based on an application-specific design to ensure extreme reliability. Fewer components mean fewer points of failure, resulting in the highest Mean Time Between Failure in the industry.

Future proof
Never obsolete, always supported

– We guarantee serviceability of our products during their lifetime for a minimum of 10 years after their End-of-Life dates. Since our products are developed in-house, we have full control over all components.

SAFE
Service & support

Immediate global support
There is always a service tech near your ship

– Our extensive global network of service centers carry spare parts and provide service repairs 24/7 with 600+ factory-certified technicians in 50+ countries.

World class service
Consistent, efficient and transparent

– Our eService platform™ automates and streamlines traditional manual processes, bringing unprecedented levels of consistency and efficiency to shipboard service.

SIMPLE
Operation & maintenance

Information at your fingertips
Capture shipboard data and put it to use

– Our remote management solutions enable instant cost-optimized shore to ship management, so you can leverage big data for informed decisions and more efficient asset management.

Maximize uptime
Rest assured your ship sails on schedule

– Our exclusive SWAP technology™ enables fast and easy replacement of equipment in case of failure, without reinstalling software or reconfiguring the system.

Technology that surpasses the mandatory requirements

Secure safety

Optimize operations

Reduce cost

Is Your System IMO-Compliant?

Danelec VDRs ensure that you are always ready for regulations

As a critical safety equipment on board larger commercial vessels, being able to rely on the quality of the VDR solution installed is crucial.

Danelec's new generation VDR was the first to meet the toughest performance standards and technical requirements, as defined through MSC.494(104) and the amendments to the performance standards for shipborne voyage recorders, set out in the annex to the Resolution MSC.333(90) effective from July 2022.

DM100 VDR G2, DM100 S-VDR G2 as well as DM100 L-VDR G2 are all built on the latest VDR technology platform offering high quality and reliability in a compact and lightweight, easy-to-install solution.

Our VDRs are designed specifically for the maritime environment, right down to the last component, and engineered based on more than 20 years of experience and customer feedback.

VDR, S-VDR or L-VDR?

Passenger ships and cargo vessels of 3.000 GT and above constructed on or after July 1, 2002 must carry a VDR to assist in accident investigations, while on cargo ships of 3.000 GT and above which were built before July 1, 2002 a Simplified VDR (S-VDR) is accepted to be fitted for the same purpose.

Light Voyage Data Recorders (L-VDR) are non-mandatory systems, intended for vessels not required to implement a VDR or a S-VDR system by law, but are in need of responsible documentation of voyage related data.

Future-proof VDR technology

Danelec set the bar for quality and functionality when VDR became mandatory in 2002. We continue to lead, with the most powerful, scalable and cost-effective technology portfolio featuring future-proof solutions for reliability, easy installation and next generation IoT capabilities.

Data Acquisition Unit

Specifications: 30 days of recording capacity on built-in 1TB SSD · 10 inputs for bridge audio and VHF · 12 inputs for serial data (IEC 61162-1, IEC 61162-2 and Modbus) · 7 inputs for IEC 61162-450 network data (1000BASE-T) · AC power (110-230V, 50-60Hz) · Built-in UPS with NiMh batteries. **Dimensions and weight:** W: 495 mm, H: 250 mm, D: 242 mm, W: 11 kg

Protective Fixed Capsule

Specifications: 48 hours of recording capacity · 64GB memory · 90 days acoustic underwater beacon · Supplied with 50 meters cable · Ethernet (100BASE-TX) interface · Powered from Data Acquisition Unit (PoE). **Dimensions and weight:** W: 360 mm, H: 195 mm, D: 208 mm, W: 8 kg

Float-free Capsule*

Specifications: 48 hours of recording capacity · 64GB memory · Supplied with 50 meters cable · Ethernet (100BASE-TX) interface · Powered from Data Acquisition Unit (PoE) · COMSAR/COSPASS approved EPIRB · Built-in AIS emergency transponder. **Dimensions and weight:** W: 237 mm, H: 554 mm, D: 214 mm, W: 5,46 kg

* Optional for S-VDR setup

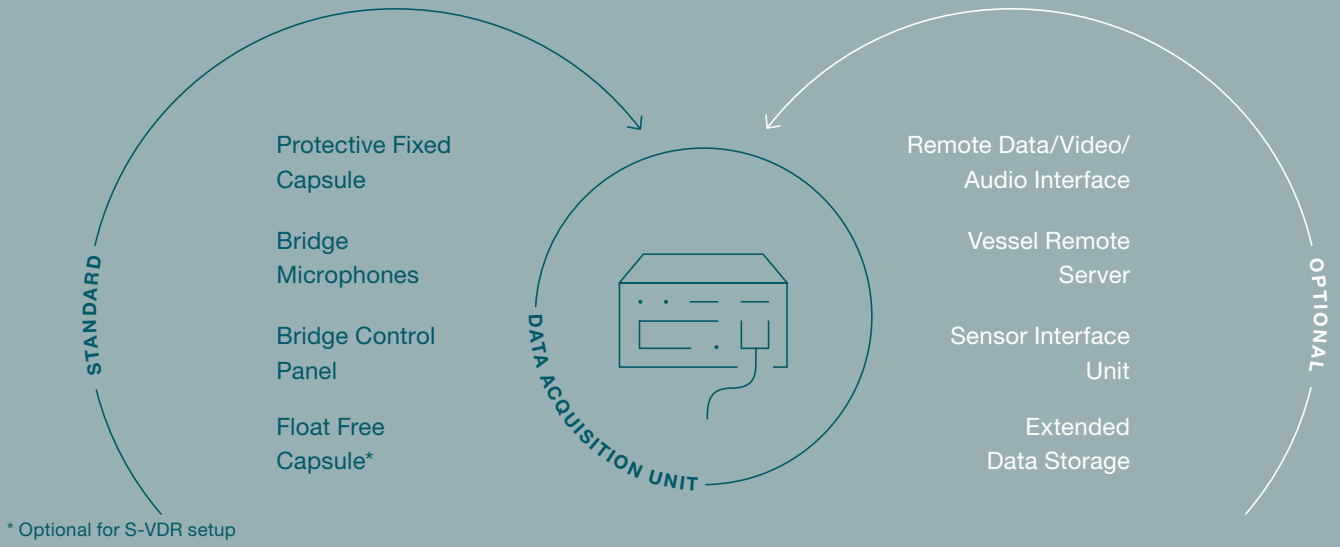
STANDARD

Bridge Control Panel

Specifications: Interface for Operational Performance Test · Built-in graphical color TFT LCD display, Ethernet (100BASE-TX) interface · Powered from Data Acquisition Unit (PoE). **Dimensions and weight:** W: 144 mm, H: 144 mm, D: 64 mm, W: 1,1 kg

Bridge Microphones
Outdoor / Indoor

Specifications: Built-in buzzer for self-test · Built-in amplifier and filters, IP66 water resistant (outdoor only) · Powered from Data Acquisition Unit. **Dimensions and weight:** outdoor: W: 96 mm, H: 96 mm, D: 60 mm, W: 0,5 kg, indoor: W: 84 mm, H: 84 mm, D: 30 mm, W: 0,1 kg



* Optional for S-VDR setup

Remote Data Interface

Serial / Analog / Digital

Specifications: 8 inputs for serial data (IEC 61162-1, IEC 61162-2 and Modbus) (serial version) · 8 inputs for analog data (analog version) · 24 inputs for digital data (digital version) · Powered from Data Acquisition Unit (PoE) or locally · Can be daisy chained · Can operate as standalone (analog and digital versions) · Support for SWAP technology™. **Dimensions and weight:** W: 141 mm, H: 32 mm, D: 163 mm, W: 0,3 kg

Remote Video Interface

Analog: BNC / Digital: DVI-I

Specifications: 2 inputs for video recording · RGBHV (analog version) or DVI-D / DVI-A (digital version) · Ethernet (100BASE-TX) interface · Powered from Data Acquisition Unit (PoE). **Dimensions and weight:** W: 149 mm, H: 49 mm, D: 206 mm, W: 0,5 kg

Remote Audio Interface

4 / 8 channels

Specifications: 4 / 8 inputs for bridge audio and VHF · Ethernet (100BASE-TX) interface · Powered from Data Acquisition Unit (PoE). **Dimensions and weight:** W: 149 mm, H: 49 mm, D: 256 mm, W: 0,5 kg

OPTIONAL

Extended Data Storage NAS

1TB / 3,8TB / 7,6TB

Specifications: Up to 18 months of recording time · Marine approved (IEC 60945) · SSD · Available in 2x1TB, 2x3.8TB or 2x7.6TB RAID 1 configuration · Ethernet (1000BASE-T) interface · AC power (110-230V, 50-60Hz) through AC adaptor. **Dimensions and weight:** W: 61 mm, H: 172 mm, D: 116 mm, W: 1,1 kg

Sensor Interface Unit

Compact / Modular

Specifications: 8 inputs for serial data (IEC 61162-1, IEC 61162-2 and Modbus) · 8 or 16 inputs for analog data · 64 inputs for digital data (compact version) · 48 inputs for digital data (modular version) · 1 free slot (modular version), AC power (110-230V, 50-60Hz). **Dimensions and weight:** compact: W: 525 mm, H: 342 mm, D: 169 mm, W: 12 kg, modular: W: 525 mm, H: 342 mm, D: 336 mm, W: 23 kg

Vessel Remote Server

VRS 002 G2 / VRS 003

Specifications: 5 / 8 ethernet (1000BASE-T) ports · 1 RS-422 serial interface · 1 / 2 digital inputs · IEC 60945 protected · 256 GB / 1 TB SSD · 1GB / 4GB RAM · 1.000 / 10.000 max no. of tags · Built-in motion-tracking sensor · USB port for future applications (VRS 002 G2) · Application hosting (VRS 003) · DIN rail mountable (VRS 002 G2) · 12-24V DC power input · AC power (110-230V, 50-60Hz) through AC adaptor. **Dimensions and weight:** VRS 002 G2: W: 180 mm, H: 30 mm, D: 100 mm, W: 0,45 kg, VRS 003: W:292mm, H: 32 mm, D: 125 mm, W: 1 kg

Key Features

- Fast and cost efficient retrofit of other brand VDRs (50+) via Conversion Kits
- Supported by our unique SWAP technology™ for quick and easy equipment replacement in case of failure
- Resilience to cyber attacks and unwanted traffic
- Advanced data utilization remotely via DanelecConnect
- Real-time monitoring and replay of recorded data
- Consistent and on-going quality control of installation, servicing and APT
- Access to APT certificates and service history of your VDR on our unique eService Platform
- State of the art memory storage for extended operational lifetime and superior reliability

Tailor-made Conversion Kits for Easy Replacement of Other Brands

A growing number of (S-)VDRs have been installed more than a decade ago and are typically beyond their intended service life. They can be unreliable, and many are not supported anymore making spare parts rare and servicing expensive. Save between one and two working days per installation when upgrading to a Danelec VDR through conversion kits that enable technicians to optimise and simplify migration from VDRs developed by more than 50 different manufacturers.

In addition, by applying a set of mechanical hardware, software tools and sensor interface solutions developed by Danelec, cable runs and mounting hardware from existing systems on board can be reused.

Our conversion kits include pre-drilled adaptor plates and mounting brackets for the main unit, memory capsule, and bridge microphones as well as Remote Data Interface (RDI) units for serial, analog and digital connections, and a software tool for conversion of old configuration files.

Built-in Security Features to Mitigate Risk of Attacks

As a critical piece of equipment, not only due to regulations but also as one of the most important tools to ensure safety on board, our VDRs have been designed with powerful built-in security features to prevent unauthorized access and to protect against viruses.

- **Secure boot prevents unauthorized code from being executed**
- **Hardened embedded Linux protects against viruses and malware**
- **Physical Service mode switch prevents unauthorized write access to the VDR configuration**

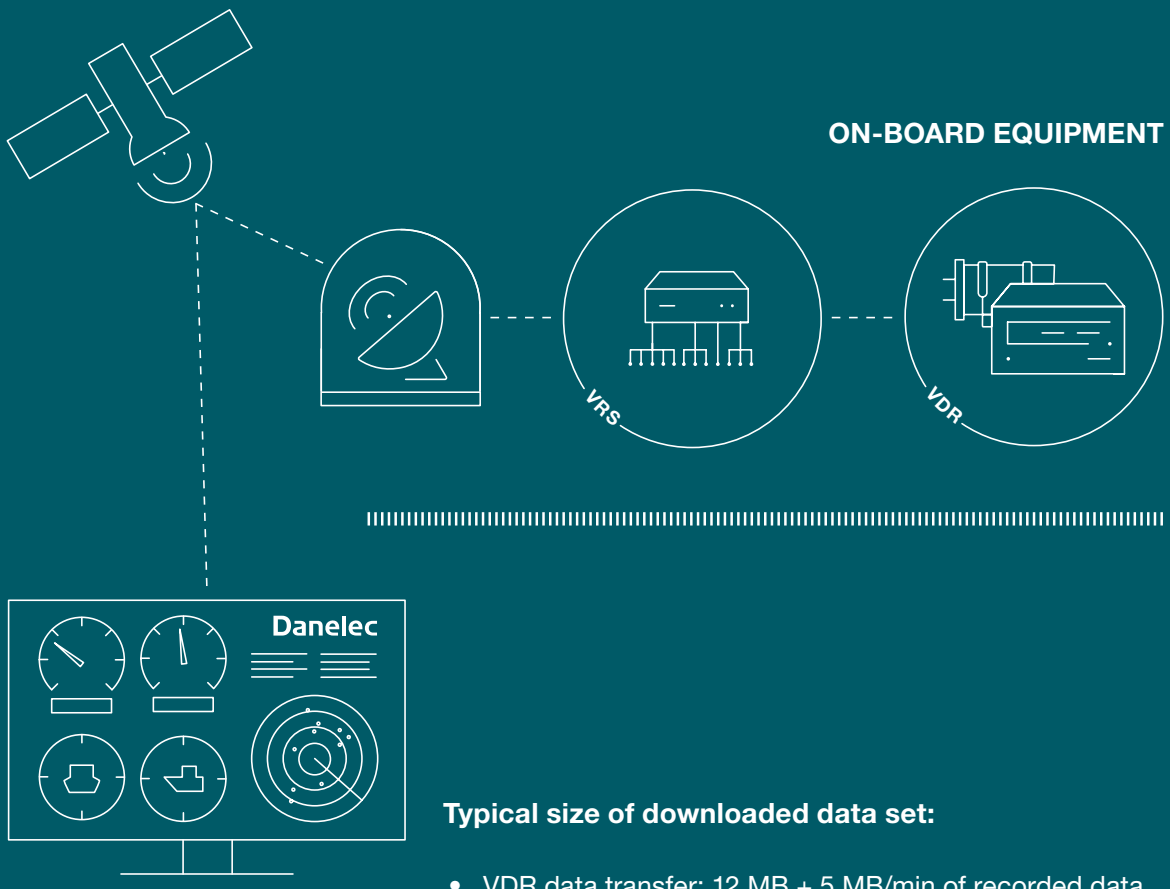
Remote Access and Management Solutions for Shipboard Systems

- Powered by DanelecConnect

In an age of connectivity, enabled by the widespread availability and decreasing cost of satellite communication links between vessels and shore, there is an ever-growing need for shipowners and operators to get instant access to crucial data related to vessel operations.

Danelec's remote management capability allows "push-through" and "pull-through" of data sets from the VDR. The ship operations team can query the VDR at any time requesting data from specific sensors or set up a schedule of downloads from each sensor, under dynamic control from the computer.
The solution is powered by our Vessel Remote Server (VRS) which serves as a proxy server and firewall to the VDR. The remote server box connects to the vessel's existing network/communication infrastructure, and through the Danelec VDR Remote Access Tool software application enables access to the VDR from a PC on shore for transfer and replay of recorded VDR data, system diagnostics and even remote configuration.

The remote management functionality is a plug and play solution which allows shore offices to easily and securely log on and download data from a Danelec VDR by remotely connecting via an IP link to the system. A powerful built-in Network Processor combined with a physical "extended mode" switch on the VRS protect against the risk of cyber attacks and unwanted traffic.



Typical size of downloaded data set:

- VDR data transfer: 12 MB + 5 MB/min of recorded data
- Pre-APT: 30 MB (5 mins sample)
- VDR dump for Support: 2 MB
- Alarm analysis: 0.6 MB

Remotely Initiated Data Transfer

- **Emergency transfer of recorded VDR data to shore**
- **Customize duration and offset of the data set to download**
- **Downloaded data fully playable, even with poor connection**
- **Configurable graphical and numerical views**

VDR Explorer playback software provides real-time monitoring and replay of recorded data on any PC. In the event of an accident or an emergency on board, the shipmanager can connect remotely to the VDR and trigger the transfer of recorded data. Crucial vessel data downloaded from the VDR can be used for instant replay onshore, saving valuable response time to an incident. The information can be shared with authorities, accident investigators and insurance companies without the need for the vessel to return to port. *Complies with MSC.333(90) requirements for data download and playback software.*

Pre-APT & Remote Configuration

- **Diagnose status of VDR and connected sensors remotely**
- **Prepare for APT and service attendance while the vessel is at sea**
- **Remote configuration of the VDR from shore**

For the mandatory VDR Annual Performance Tests (APTs), service companies or shipmanagers can connect remotely to perform diagnostics of the VDR and all connected shipboard systems through a data sample while the vessel is at sea.

Being able to carry out pre-checks speeds up the actual APT when the ship arrives in port, and enables the service technicians to be prepared with the appropriate tools and spare parts to meet the ship on arrival, thus the risk of an unsuccessful APT which may result in a second attendance can be avoided.

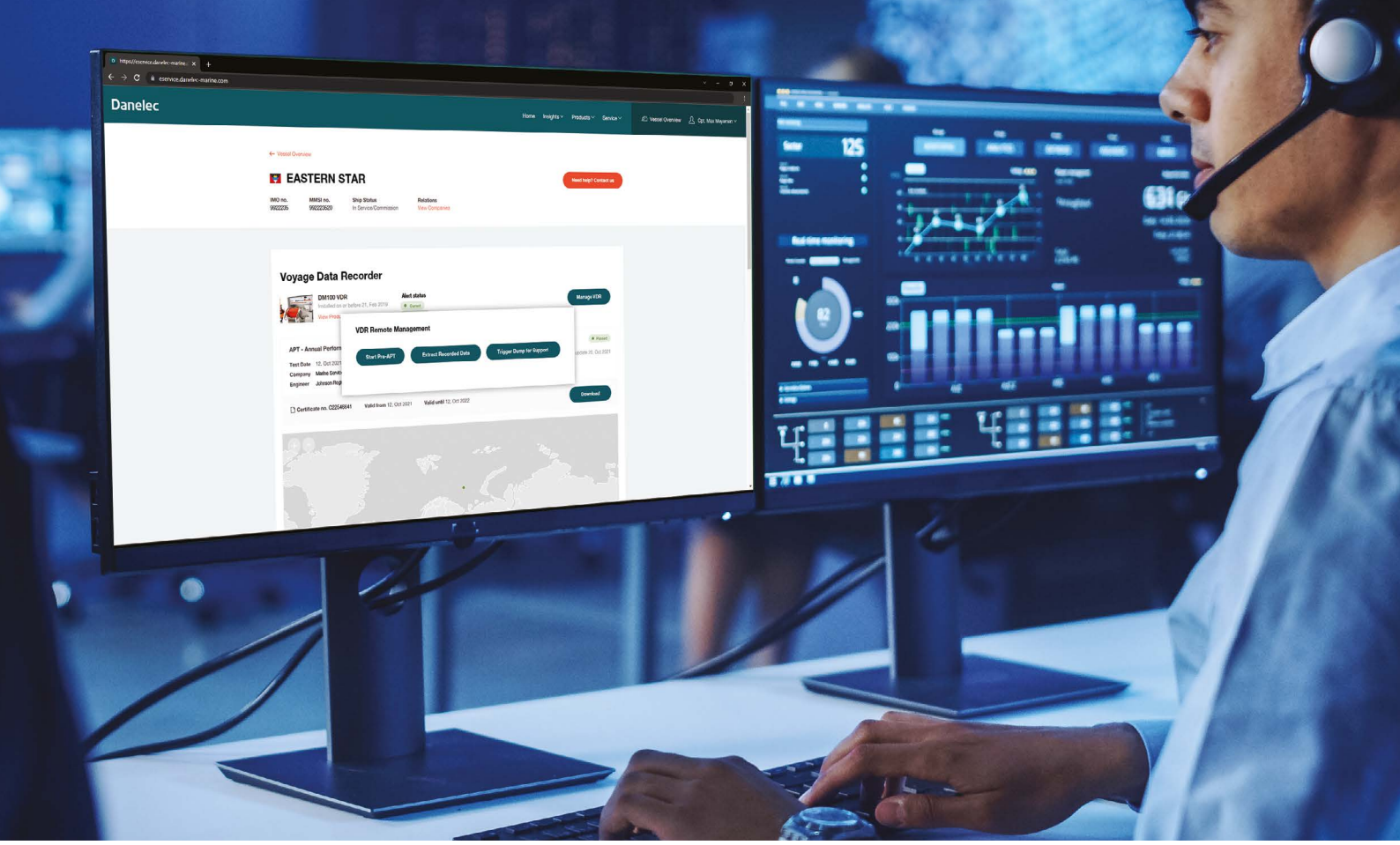
If extended access to the VDR is enabled by the vessel's crew, even remote configuration of the system is possible from shore without physically attending the vessel.

Alarm Analysis & Data Dump for Support

- **Run analysis of alarms from shore**
- **Remote "health check" of the system**
- **Troubleshoot issues before service call**

For routine checks of the VDR system and connected sensors, an analysis of alarms and alerts can be run remotely from shore via DanelecConnect. The report file is small in size in order to keep data communication costs to the minimum.

Should a service issue arise, a log file containing essential data of the VDR system can be downloaded remotely. Based on the data received, a "health check" of the system can be performed by a service company and eventually troubleshooting of the problem can be initiated before the service call.



Designed to Fulfil Current and Future Requirements

Larger storage capacities, optimized infrastructure to accommodate increased network traffic and enhanced cyber security ensure that Danelec VDRs are able to record electronic log books, and complex, high-resolution images from, for example, an S-100 ECDIS, as well as non-mandated data for performance analysis and optimization.

- **Longer recording durations**
- **Support for high resolution images**
- **Support for IP video**
- **Agnostic interface capability**
- **Accepted for insurance purposes**

Automating and Streamlining Shipboard Service Information

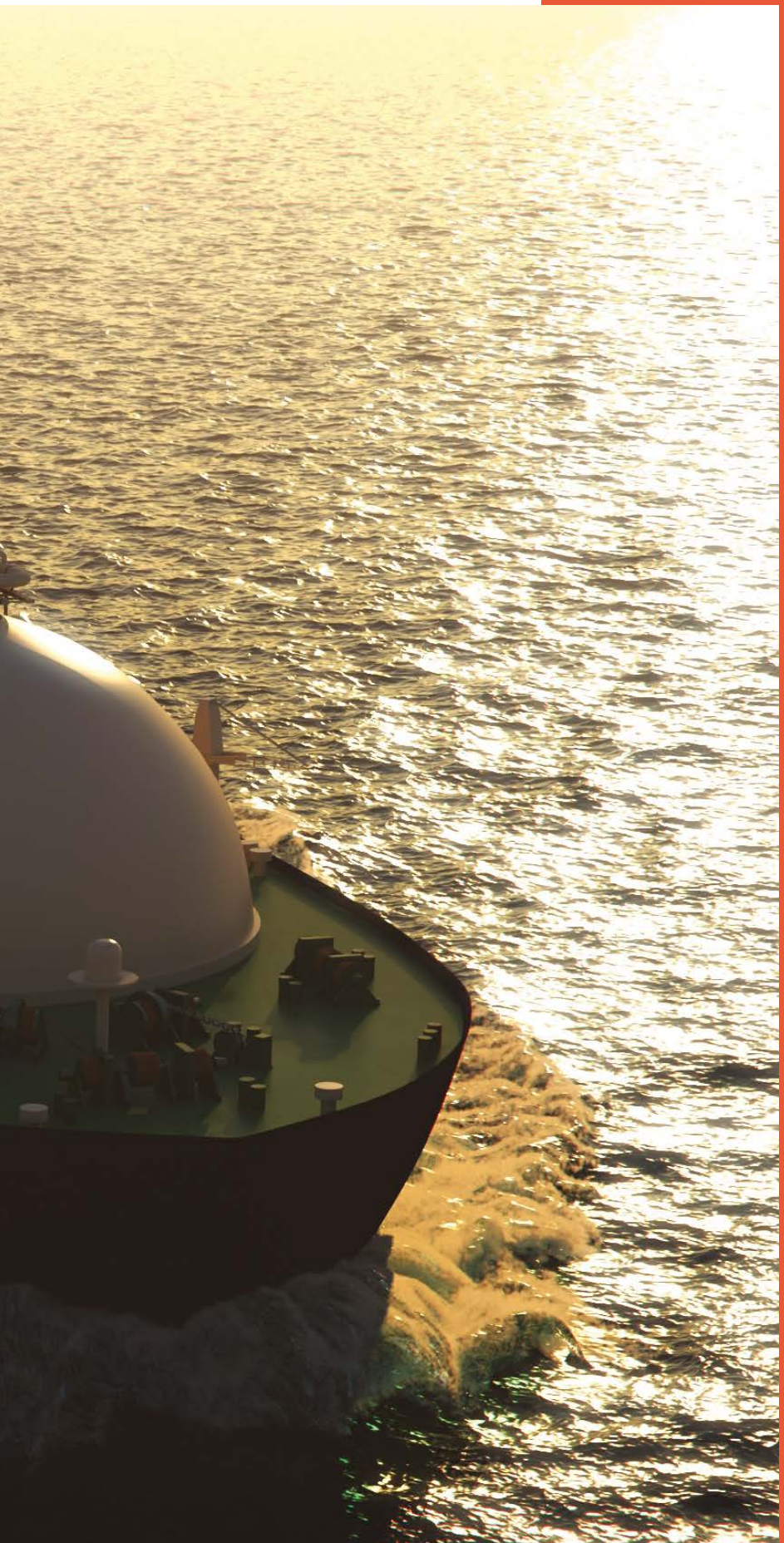
- eservice.danelec.com

The Danelec eService Platform is designed to optimise VDR Installation Performance Tests (IPT) and Annual Performance Tests (APT) by providing more visibility for users.

When logged in, the registered owner, operator, manager or technical manager of a vessel, is presented with an overview of the status of xPTs and is be able to quickly see which VDRs are due to be tested.

With a clear overview of all Danelec VDRs on board your vessels it is easy to plan for re-certification, including contacting your Service Partner in due time.

- **APT certificate on-demand**
- **Real time xPT status information**
- **Complete VDR service history**
- **Vessel and equipment overview**



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