EMDM
European Maritime Data Management

**Funding:** European (6th RTD Framework Programme)
**Duration:** Mar 2007 - Feb 2009
**Status:** Complete with results
**Total project cost:** €2,795,368
**EU contribution:** €1,547,657

**Call for proposal:** FP6-2005-TREN-4
**CORDIS RCN:** 86570

**Background & policy context:**
The EMDM project responds to the challenge of safe and secure maritime transport development in Europe as part of an intermodal system. The safety of maritime transport would be improved by a better knowledge and analysis of incidents and accidents.

It is over a decade since International Maritime Organisation (IMO) adopted the Voyage Data Recorder (VDR) performance standard which was formulated to be deliverable by and compatible with the technology available at the time. Technological advances over the last 10 years mean that VDR could and should now be required to deliver more for the investment involved.

**Objectives:**
EMDM aimed to study and develop new applications, functionalities and proposals for specifications and standards for enhanced, interactive VDRs (Voyage Data Recorders) and electronic logbooks (ELBs) for maritime transport. This would enable a better and more objective analysis of the causes of incidents and accidents in European waters, leading to an improvement in maritime safety.

Research focused on the development of low acquisition and exploitation cost VDRs and specific interfaces for retrofitting VDRs on existing ships. New VDR functionalities are being developed with interactive links to existing systems such as the ELB, the AIS or other security devices.

Structural stress monitoring, coupling of VDRs to the electronic logbooks, the integration of other electronic navigational systems were among the functionalities addressed by the project.

**Methodology:**
The EMDM consortium focused on the general improvement of VDRs and Electronic Logbooks regarding their functionalities and specifications, and on the means of improving safety on the sea thanks to these technologies.

This led to the following research and development activities within the project:

- Improvement of standards and specifications for VDRs and for Electronic Logbook,
- Retrofitting of VDRs on existing ships of all sizes,
- Studies of new applications and development of new functionalities for VDRs,
- Development concepts and procedures for the routine use of the information obtained in safely operating vessels and managing shipping,
- Identification and Assessment of possible new applications for Electronic Logbook.

Specific scientific and technical tasks were as follows:
- Standardisation draft for VDR on recording and storing of data and on the access to the data,
- Standardisation draft for Electronic Logbook,
- A software for routine analysis of VDR data
- A low-cost VDR
- S-VDR interfaces with other electronic devices on board, notably with the ECDIS system,
- Enhanced Electronic Logbook Features using VDR data,
- A functionality for VDR which will lead to a reduction in on-board cabling and installation requirements,
- Proposal for future applications of Electronic Logbook and VDR,
- Advanced Knowledge for ship safety, crew training and ship manoeuvring.

Demonstration and Testing activities were also carried out on:
- The retrofitting of VDR on existing ships with different equipment;
- The installation of an integrated ECDIS/VDR Prototype;
- The Advanced Logbook.

**Related Projects:**
- ADOPT - Advanced Decision-support System for Ship Design, Operation and Training
- CAST - Implementing road, rail and waterborne safety and avoiding traffic congestion
- ROTIS II - Remotely Operated Tanker Inspection System II

**Parent Programmes:**
- FP6-SUSTDEV - Sustainable Development, Global Change and Ecosystems - Priority Thematic Area 6 (PTA6)

**Institute type:** Public institution  
**Institute name:** European Commission  
**Funding type:** Public (EU)

**Lead Organisation:**

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Key Results:

Reports have been produced on:

- (S)VDR legislation,
- VDR data technical access and handling,
- Survey results, and
- Draft amendments for existing VDR standards.

In addition, specifications for a low cost VDR adapted for a work boat have been written and a prototype tried on board a Fishing vessel in Brittany.

These reports provide a useful retrospective view of VDR up to the inception of EMDM, and insight into how VDR could meet the challenge of the modern maritime environment. Equipment can take advantage of factors such as lower cost, higher density data storage capacity, increased processing power and the change of technology architectures based upon simple, robust, standardised communication networks that distribute data locally and globally.

A key conclusion was that the electronic logbook opens a complete new horizon in dealing with its data. Shipping companies could use them for new business cases along to the simplification of their normal shipping operations.

There are currently a number of applications for the electronic logbook, such as deck logbook, noon logbook, engine logbook, pump logbook, radio logbook. JRC analysed the most important work streams on vessels that would need to be documented on a logbook. This includes berthing/ piloting as such work streams that need to be documented in form of electronic logbooks, in which capture of data through sensors would be beneficial.

Furthermore commercial vessels could be used for completely automated environmental monitoring and reporting.

Technical Implications

1. Development, manufacture and testing costs of VDRs should be significantly reduced by the following strategies:

   - Removal of the requirement to store radar or audio data would significantly reduce storage requirements (in addition to considerably simplifying the data acquisition and installation aspects of the system). A current-generation VDR system typically requires a 2GB protective capsule to store 12 hours of the full IMO-specified dataset. However, if only sensor (NMEA) data was required, only around 100 to 200MB of storage would be required for 12 hours of data. Alternatively 2GB memory would enable more than 18 days of NMEA data to be stored, or if the NMEA data is compressed, this could increase to ~120 days worth of data.

   - Reduced requirements for the protective capsule (in terms of fire protection and/or penetration) would also have a significant impact on overall system costs.

   - It is recommended that VDR manufacturers be encouraged to make use of any large capacity media available in their VDRs to store more data than the required 12 hours as standard. This maximises the chances of data being available following an incident, should action not have been taken to preserve it from being overwritten within 12 hours of the start of the incident.

2. Regarding the development of an interface between VDR and ECDIS, the objective of decreasing acquisition costs has been reached: the difference between the cost of two separated systems and the cost of a unique system offering two provisions (VD and ECDIS) leads to a 20% saving. Besides, the installation cost of ECDIS is also diminished because this solution saves 70% of installation time.

3. The demonstration of an interface development between the VDR and structural constraints sensors showed that as long as well defined industrial standards are used, for example NMEA-0183, the interfacing between different systems and equipment is quite straightforward. It was shown that data stored in the VDR could be used to certify the existing logbook with reference data originating from the VDR.

4. Regarding the development of Integrated ECDIS/VDR prototype, the data analysed showed fully that the combined system firstly had no effect on the primary VDR functionality and secondly that the ECDIS system was fully functional when running from the single hardware platform.
Policy implications

The research addresses many important issues associated with the implementation of VDRs across the majority of the shipping fleet. It also highlights some background information leading to the introduction of VDRs and the important role of VDRs in respect of legislation and to the maritime community at large.

Documents:
- D1: Report on existing VDR and SVDR Legislation (Other project deliverable)

STRIA Roadmaps: Other specified
Water transport (sea & inland)
Transport sectors: Passenger transport, Freight transport
Geo-spatial type: Other