SMART
MARITIME
NETWORK

A
STANDARDISED
VESSEL DATASET
FOR NOON REPORTS

Created by the Smart Maritime Council

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Standardised data for the Noon Report

The Smart Maritime Network's **Standardised Vessel Dataset (SVD) for Noon Reports** project aims to provide a free and open list of defined data formats for common vessel operational data points typically found in the daily Noon Report, with the goal of offering maritime stakeholders a central reference point for data mapping that can be applied by shipping companies, technology providers or any related third parties to improve the digital capabilities of the industry.

Building on the data structure described in the ISO 19848 *Ships and marine technology — Standard data for shipboard machinery and equipment* documentation and incorporating other relevant standards, the list of suggested standard data point names and formats is designed to be completely non-proprietary, company and vendor agnostic, and is free to download and apply by all users.

IDENTIFYING **PAIN POINTS**

The *Standardised Vessel Dataset (SVD) for Noon Reports* project was initiated following discussions amongst members of the *Smart Maritime Council*, a cross-industry membership group focused on technology harmonisation, standardisation and interoperability that includes vessel operators, technology providers and other stakeholders.

The group holds regular meetings in various shipping centres across the world to discuss the challenges impeding progress in maritime digitalisation, with the aim of identifying common pain points amongst shipping stakeholders and exploring ways of reducing those barriers through improved collaboration and standardisation.

One of the issues repeatedly referenced during early Council meetings was inconsistency in shipboard data reporting formats, and how the need for customisation of software systems to accept similar but non-identical data sets was hindering data collection and analysis across much of the maritime sector.

Suggestions were requested from the group to find ways of improving this situation, with the creation of a standardised dataset proposed as a practical and achievable method of reducing some of the problems encountered in advancing vessel digitalisation.
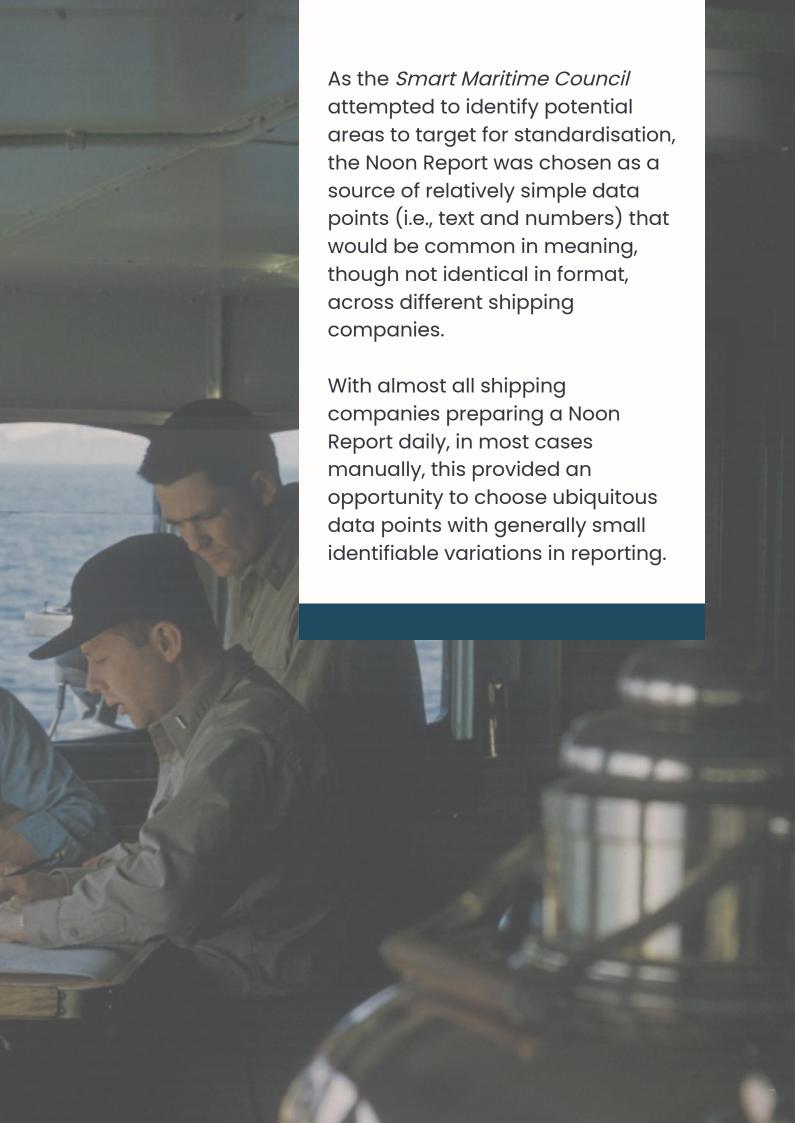
WHY THE
NOON REPORT?

A lack of standardisation in data collection increases the effort and cost required to access data analytics in shipping, with resources on both the buyer and service supplier side wasted on customisation processes required to allow non-standard data sets to be ingested into analytics applications.

These processes, which take place during most maritime software deployment projects, require work to be performed without value being created. This need for data customisation to access each new software system also restricts shipping companies' ability to easily move from one software provider to another and take advantage of new digital tools as they come available.

As the *Smart Maritime Council* attempted to identify potential areas to target for standardisation, the Noon Report was chosen as a source of relatively simple data points (i.e., text and numbers) that would be common in meaning, though not identical in format, across different shipping companies.

With almost all shipping companies preparing a Noon Report daily, in most cases manually, this provided an opportunity to choose ubiquitous data points with generally small identifiable variations in reporting.
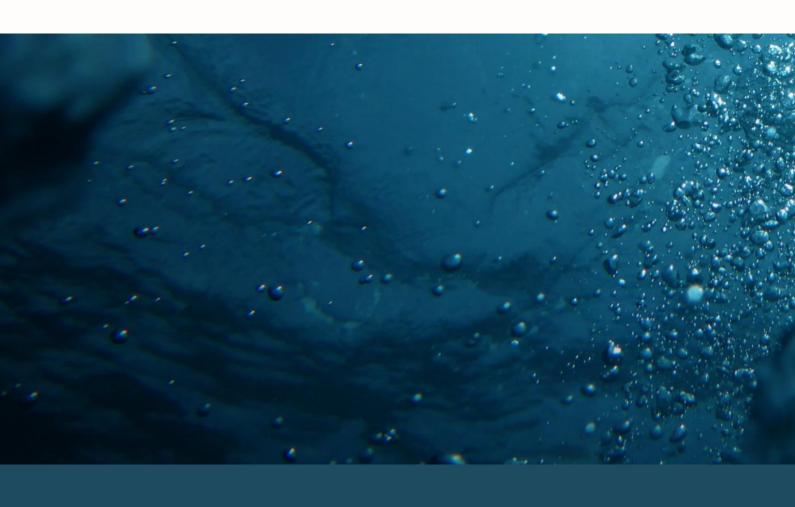
WORKING WITH EXISTING STANDARDS:
ISO 19848

When evaluating how to proceed in creating a standardised list of Noon Report data points, *Smart Maritime Council* Members agreed that any such list needed to be in an open, non-proprietary format, building on international standards wherever possible, so that it could be applied by any stakeholders without licence, payment or control by any other party.

Council Members MTI (a subsidiary of shipping company NYK) and ClassNK had already been involved in a project in Japan working with multiple industry stakeholders to create a new ISO standard that would offer a method of data description for the capture and processing of sensor data from shipboard machinery and equipment.

Details of this work were shared with the *Smart Maritime Council*, and its potential application in creating a standardised dataset was immediately apparent.

As an open, independent data standard for maritime, the ISO 19848 naming structure provided a useful template to follow to develop ID tags for the *SVD for Noon Reports* project. For items that are not listed in the existing ISO 19848 list, new IDs following the same URL-style structure would be created.

ISO 19848 *Ships and marine technology — Standard data for shipboard machinery and equipment* was subsequently formally adopted by the *Smart Maritime Council* as an officially supported standard in February 2020, for use in this project and for general application in any other relevant Council activities.

CREATING A STANDARDISED DATASET

With the decision made to create a standardised list of common vessel operational data points found in Noon Reports, the *Smart Maritime Council* worked with Stolt Tankers, one of the group's shipping company Members, to create a template based on its own existing reports.

Typical reporting items were selected, grouped by type (*General Information*, *Weather*, *Fuel* etc), and listed with a text-based description of what the item refers to – for example, 'Position' comes with the description 'Current location of vessel at time of reporting'. These Noon Report elements were then organised into a structure with three basic components: a standard Data Point Name, Standard Units (or an agreed layout for reporting), and a specific ID based on the ISO 19848 reporting structure.

In creating this template, research was also conducted to identify existing open international standard formats already applying to the items included in the Noon Report list, such as those used by maritime groups like the Digital Container Shipping Association (DCSA) in its published *JIT Port Call Data Definitions* and its *Standards for Operational Vessel Schedules*. The *Port Information Manual* produced by the International Taskforce Port Call Optimization (ITPCO) was also used as a reference.

Based on this research, existing standards for items such as UN Locode for port identification were applied to the Noon Report list, while other ISO standards were also used where applicable, including ISO 8601 (*Date and Time Format*), ISO 19018 (*Ships and marine technology — Terms, abbreviations, graphical symbols and concepts on navigation*), and ISO 80000 (*Quantities and units*).

DATA POINT	VALUE	STANDARD UNIT
General		
Position		HHMMSS.SS,llll.ll,a,yyyyy.yy,a (UTC, Latitude, N or S, Longitude, E or W)
Time		yyyy-mm-ddThh:mm:ssZ
Vessel Name		Text (Translated from ASCII)
IMO Number		XXXXXXX (Seven Digits, Translated from ASCII)
Ship Type		Text (Select from prescribed list)
Voyage Number		Text (Manual Input)
Leg		HHMMSS.SS,llll.ll,a,yyyyy.yy,a,XXX (as with Position above, plus Three digit Waypoint ID)
Remarks		Text (Manual Input)
Port and Route Information		
Departure Port		XX XXX (UN/LOCODE Designation)
Departure Time		yyyy-mm-ddThh:mm:ssZ
Destination Port		XX XXX (UN/LOCODE Designation)
ETA PBP		yyyy-mm-ddThh:mm:ssZ
ETA Berth		yyyy-mm-ddThh:mm:ssZ
ETA VTS		yyyy-mm-ddThh:mm:ssZ
Distance to next waypoint NM		NM
Distance to next waypoint km		km
Distance to desination port NM		NM
Distance to desination port km		km
Projected Speed kn		kn
Projected Speed km/h		km/h
Voyage Time		hrs
Speed and Distance		
Boiler Electricity Consumption		kWh
Generator Production		kWh
Draft		m
Draft Fore		m
Draft Aft		m
DWT		t
Heading		°
CP / Order Speed		kn
Observed Distance NM		NM
Observed Distance km		km
RPM		r/min
Slip %		%
Engine Distance NM		NM (Calculated from RPM mutiplied by propellor pitch)
Engine Distance km		km (Calculated from RPM mutiplied by propellor pitch)
Speed Over Ground kn		kn
Speed Over Ground km/h		km/h
Speed Over Water kn		kn

Data Point names and Standard Units were chosen for the Standardised Vessel Dataset (SVD)

Potential sources for automated data collection, for example through the extraction of specific data contained within NMEA source strings, were investigated as part of this initial process. Some of the early work done in this regard is still contained within the basic templates created by the *Smart Maritime Council* and is available for reference for interested parties.

However, after further consideration it was ultimately decided that the complexity involved in automatically collecting a range of data that has historically been manually input in most cases meant that any suggested processes for automation of collection of the standardised data points should sit outside the initial scope of the project.

It was agreed that the development of systems for automated data collection in the standard format may also be better pursued by external technology companies in their own development of services and could provide a significant value-add to firms looking to leverage standardised data for analytics purposes.

Suggestions by third parties of methods for automation of collection of the standardised data included in the *Standardised Vessel Dataset* list are welcome and may be published alongside the standard data templates in the future to offer additional resources to maritime operators looking to broaden their data collection and analysis capabilities.

XML DATA
REPORTING FORMAT

While automated data collection for the Noon Report template was not included in the scope of the project, the *Smart Maritime Council* did create a standard suggested digital reporting method for presentation of the listed data points in a format that could be easily integrated into software applications.

This reporting format uses the standard XML markup language (another open, non-proprietary technology) and identifies each item in the standard Noon Report list with a <record> tag, incorporating <datapoint>, <value> and <iso19848ID> tags included within the overall <record>.

For example, the XML entry for the 'Time' data point from the standardised list, which uses the ISO 8601 DateTime standard for UTC time, would look like this:

```
<record>
    <datapoint>Time</datapoint>
    <value>2023-01-01T10:10:10Z</value>
    <iso19848ID>jsmea_nav/DateAndTime
    </iso19848ID>
</record>
```

PROOF OF CONCEPT

With a standard list of data points in place covering a range of items within the Noon Report, the *Smart Maritime Council* embarked on a Proof-of-Concept process to verify how this standard could be applied to harmonising disparate data sets collected by different shipping companies during the course of their normal operations.
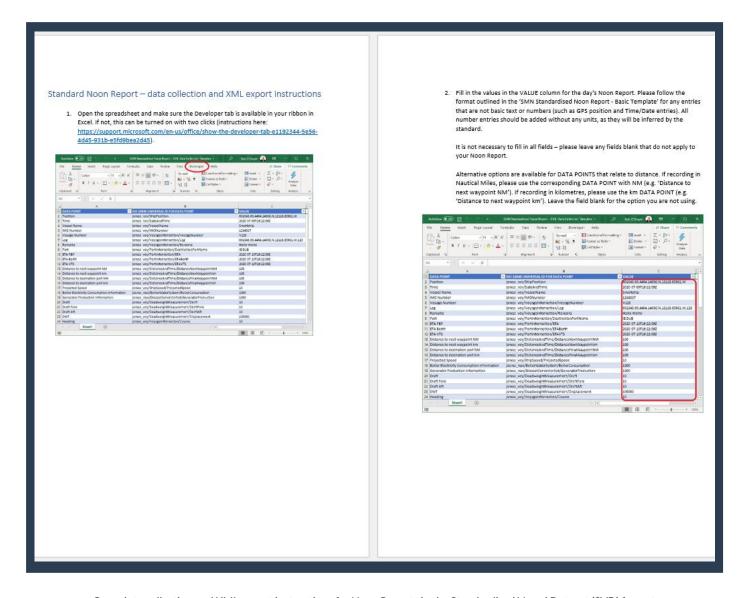
Having worked with Stolt Tankers in creating the initial list of data points, other Council Members from our vessel operating contingent were asked if they would be willing to take part in the proof-of-concept phase, with ship managers OSM, Thome and V.Ships agreeing to participate.

Coincidentally, OSM and Thome would subsequently announce plans to merge to form a single ship management group in January 2023, though for the duration of this project they were separate independent companies.

OSM followed the most direct approach to applying the standard, accepting the task of recording the data directly within a template spreadsheet in the standard format. This process involved crew members aboard one of the company's vessels inputting the data into the template alongside the ship's existing Noon Report workflow each day for one calendar month, and then exporting the data as an XML file using a simple Excel export procedure.

A short four-step instruction manual was created by the *Smart Maritime Council* as a guide for crews to follow to manage the XML export. No issues or difficulties were reported by the crew in following the process, which could be completed with just three clicks after the Noon Report values had been entered into the template spreadsheet.

Crew data collection and XML export instructions for Noon Reports in the Standardised Vessel Dataset (SVD) format

Thome and V.Ships' contributions followed a different approach, with each submitting Noon Reports in their own formats from operating vessels to the *Smart Maritime Council*.

Thome submitted a selection of Noon Reports from different vessels, each using individual reporting formats, from which one vessel was selected for the project. V.Ships supplied Noon Reports for one month from one vessel, recorded in the company's own internal standard format used by its in-house ShipSure fleet management software system.

After the Thome and V.Ships Noon Reports were received, a mapping process was undertaken to link the available data points within each of the two companies' reports to the standardised list and into the standardised units in the project template.

Once this mapping process was completed, the Noon Reports were converted to the standard Names, ID Tags and Units to allow them to be exported from the template in the project's standard XML format, matching the data format delivered by OSM.

With this data acquisition phase complete, the project now had a collection of Noon Report data from three different ship management companies, collected using separate processes in each instance, but all mapped and exported in the same standard format.

As such, the XML files could be uploaded into any software system supporting the standard and read as equivalent data points without any customisation required to adjust for the originating company.
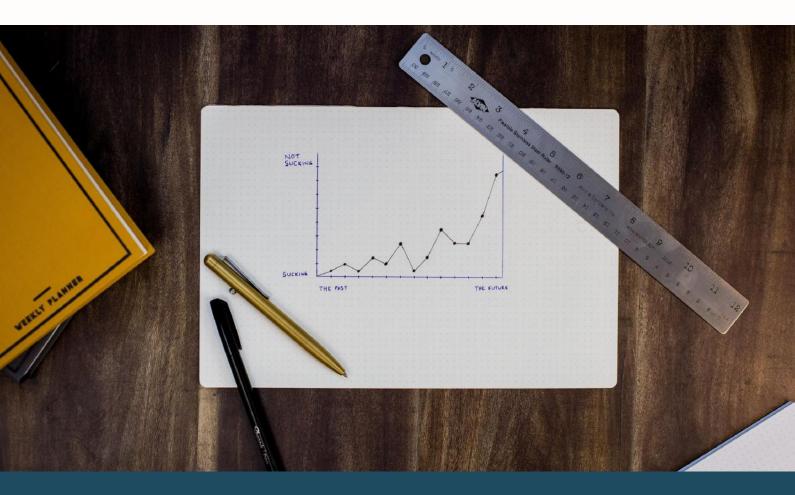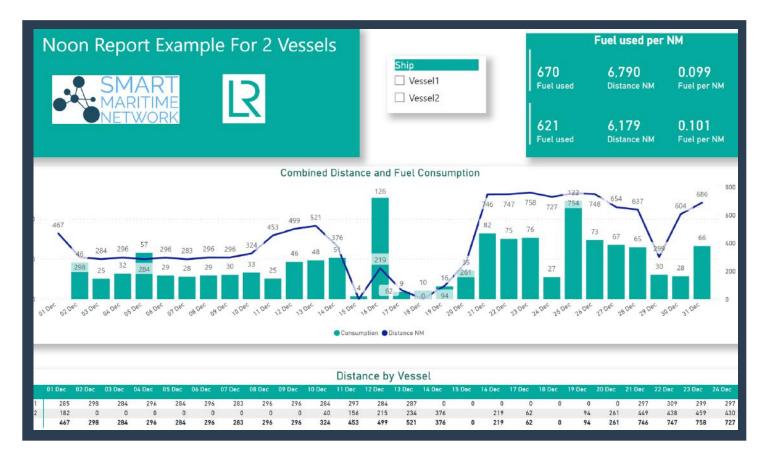
SIMPLIFYING ANALYSIS THROUGH
STANDARDISATION

To complete the proof of concept, the *Smart Maritime Council* turned to the technology providers among the group to take the available XML data files and demonstrate how Noon Reports from different companies that incorporated the standard data format could all be processed and analysed by following a single common upload process.

Classification society Lloyd's Register, which counts maritime software firms Hanseaticsoft, i4 Insight, Greensteam and OneOcean among its Group companies, agreed to participate as the data analysis partner for the project.

After a discussion of the project parameters, the XML Noon Report data files were shared with LR to begin the process. The total size of the shared folder was less than 2MB, including all XML files and standard template Noon Report data collection spreadsheets created in Excel.

Noon Report Example For 2 Vessels

SMART MARITIME NETWORK

LR

Ship
- ☐ Vessel1
- ☐ Vessel2

Fuel used per NM

| 670 Fuel used | 6,790 Distance NM | 0.099 Fuel per NM |
| 621 Fuel used | 6,179 Distance NM | 0.101 Fuel per NM |

Combined Distance and Fuel Consumption

● Consumption ● Distance NM

Distance by Vessel

	01 Dec	02 Dec	03 Dec	04 Dec	05 Dec	06 Dec	07 Dec	08 Dec	09 Dec	10 Dec	11 Dec	12 Dec	13 Dec	14 Dec	15 Dec	16 Dec	17 Dec	18 Dec	19 Dec	20 Dec	21 Dec	22 Dec	23 Dec	24 Dec
1	285	298	284	296	284	296	283	296	296	284	297	284	287	0	0	0	0	0	0	0	297	309	299	297
2	182	0	0	0	0	0	0	0	0	40	156	215	234	376		219	62		94	261	449	438	459	430
	467	298	284	296	284	296	283	296	296	324	453	499	521	376	0	219	62	0	94	261	746	747	758	727

XML data files from the three participating shipping companies in the Standardised Vessel Dataset (SVD) format were uploaded into LR's software for basic analysis

To demonstrate how this data might be used within an analysis framework, LR returned a PDF report graphing fuel consumed per Nautical Mile for different vessels taking part in the project, which could be applied to simple benchmarking or to create insight into fuel consumption trends, for example.

In completing the data analysis part of the project, LR noted that the addition of timestamped metadata alongside the standard data points in the Noon Report (not included in the initial data collection process) would significantly improve the potential for that data to be used to create actionable insights in the longer term.

This suggestion was added to the project workflow and is expected to be incorporated into recommended *Standardised Vessel Dataset (SVD)* data collection processes as an option going forward.

EXPANSION AND PUBLICATION OF THE
STANDARDISED VESSEL DATASET

With the data analysis phase of the *SVD for Noon Reports* project completed, the *Smart Maritime Council* was able to confirm that its proof-of-concept had been successfully delivered: a standardised set of data points had been created, covering common items within the Noon Report; data from three different shipping companies' Noon Reports was collected in the standard format; and that standardised data was successfully imported into a software application for analysis using a common process for each of the shipping companies without any customisation.

Following feedback from the *Smart Maritime Council* after the proof-of-concept, further suggestions were made as to how the standard dataset could be improved or expanded to increase the potential benefit to vessel operators. Among the points raised (in addition to the timestamp metadata issue mentioned previously) was the idea of including vessel emissions data points in the standard list to support collection and analysis of data required for compliance with international regulations, such as the IMO Fuel Oil Data Collection System (DCS) and the EU Monitoring, Reporting and Verification (MRV) scheme.

As a mandatory requirement for various types of vessels, the data requested under these programmes will likely be as ubiquitous and commonly collected as Noon Report information by most shipping companies in the future, and as such should be included within a standard data point list.

After further examination by the *Smart Maritime Council,* it was decided that additions would be made based on the requirements of EU MRV as the more detailed of the two emissions reporting regimes. EU MRV regulations require reporting of fuel consumed, actual cargo carried onboard, and CO2 emitted, whereas IMO DCS only requires reporting of fuel consumed – therefore, a set of data points meeting EU MRV requirements would also cover IMO DCS compliance.

New additions to the standardised list of data points included a 'Ship Type' field, where the user can choose from one of 15 vessel types suggested by the EU MRV regulations, such as 'Passenger ship', 'Ro-ro ship', 'Container ship', 'Oil tanker', 'Chemical tanker' etc. Also included was a field for the name of the vessel's Departure Port and the time of departure, for use in calculating voyage hours.

The *Fuel Received*, *Remaining On Board (ROB)* and *Consumption* sections in the standard list were updated to add entries for LNG, LPG, Ethanol and Methanol fuels, while a new section on *Emissions Reporting* introduced fields for recording CO_2 Emissions Factors for each fuel type (as required by EU MRV), as well as space to record information on cargo carried, in tons, cubic metres or standard units depending on the ship type.

Emissions Reporting data fields were added to the Standardised Vessel Dataset (SVD) following the completion of the Proof of Concept phase

The expanded list created following the proof-of-concept trial was subsequently confirmed as the official 'beta' version of the *SVD for Noon Reports*, and was made publicly available as of 1 February 2023 to offer free and open access to the standard to a wider range of industry stakeholders for the first time.

During this 'beta' period the *Smart Maritime Council* is requesting comments and feedback from external stakeholders in the maritime industry, particularly other vessel operators and software providers, to refine the standardised list even further. A more complete 'Version 1.0' of the *Standardised Vessel Dataset (SVD)* that meets a wider range of user requirements is then expected to be published later in the year, incorporating any approved updates.

EMISSIONS **REPORTING DATA**

With new additions following the proof-or-concept process, the *Smart Maritime Council* believes that the *SVD* now contains standardised data points covering the information required to meet most compliance requirements under EU MRV (and consequently IMO DCS) regulations, which require companies to monitor and report the following items:

- **port of departure and port of arrival** – covered by 'Departure Port' and 'Destination Port' data points.
- **the date and hour of departure and arrival** – covered by the 'Departure Time' data point.
- **quantity of fuel used, each type of fuel used and emission factor for each type of fuel** – the quantity of fuel used can be calculated from the figures contained in the 'Fuel ROB', Fuel Consumption' and 'Fuel Received' sections of the SVD. Emission Factors are contained in the 'Emissions Reporting' section. Default CO2 emission factors, expressed in emissions per quantity of fuel, have been published by IMO for various fuel types (available for reference via REGULATION (EU) 2016/2071).
- **CO2 emitted** – this can be calculated for EU MRV purposes by multiplying data included in the quantity of fuel used (above) by that fuel's Emission Factor.
- **distance travelled** – this can be calculated from the 'Distance Run by Log' or 'Distance Run by OG' data points.
- **time spent at sea** – this is covered by the 'Voyage Time' data point.
- **cargo carried** – this is covered in the newly added Emissions Reporting section of the SVD, with different reporting fields for cargo measured in metric tonnes, in cubic metres, or as standard units appropriate to the vessel type (e.g., TEU for container vessels).
- **transport work** – this can be calculated by multiplying the 'Distance Run by Log' or 'Distance Run by OG' data points by the relevant 'Cargo Carried' data point (whether in Tons, CBM or Standard Units).
- **information relating to the ship's ice class and to navigation through ice, where applicable** – specific data on ice class operations has not been included in the *SVD* at this point.

Creating value from standardised data

Once a standardised list of data points is freely available, the value that it can bring to the industry will be dependent on shipping companies taking the initiative and asking their software providers to add support for the standard to their applications. As with any technical standard, critical mass in adoption is key to its utility.

Software providers have an incentive to support a standard if their customers require it but are unlikely to do so unilaterally if it creates a situation where customers could potentially move their data more easily to a competing system. While the project encourages application developers to add support for the standard to their systems of their own volition, application users themselves must also demand the changes required to support a more open market for data analysis by standardising their data in line with collaboratively agreed standards and asking any providers wishing to work with them to accept those data formats.

In doing so, the software market for shipping can begin to shift towards a value-based ecosystem model – if standard data can be accepted by all application providers, then the software systems that create the most value from that data should prove most successful, as barriers to the implementation of different services are reduced and users are no longer dissuaded from moving between providers by the prohibitive cost of translating all their data to a different format.

At the same time, resources wasted on customised mapping projects to align the disparate data formats collected by different shipping companies to each of the various formats used by different application providers can be redirected to other uses, which could result in lower software prices, or those resources being re-invested into improving maritime analytics programs' capabilities to create additional value for users.

The maritime industry, as a whole, stands to benefit from widespread adoption of standard formats in the collection of vessel operational data. The *Smart Maritime Council* has taken on this project as a cross-industry collaborative body of relevant organisations in the sector and is making this open, independent and non-proprietary list of standard data points available free for use by any parties in the interests of supporting that process, to assist in the continued development of an efficient and sustainable shipping industry.

The *Standardised Vessel Dataset (SVD) for Noon Reports*, as well as related collection templates and supporting information, are available to download from the *Smart Maritime Network* website. In the future, it is hoped that this initial list will be continually expanded to add further standardised data points covering a wider range of use cases beyond the Noon Report, offering a central open reference catalogue of standard data formats free for use by all maritime and supply chain industry stakeholders. The *Smart Maritime Council* welcomes all suggestions for additions to the list and will take any submissions under advisement for inclusion in updated versions of the *SVD*.

Created by the
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