

Guidance/Best practice for verifiers on the use of external ship's tracking data as part of the risk assessment to be carried out pursuant to Regulation (EU) 2015/757

This document is part of a series of documents prepared by experts gathered under two subgroups established under the umbrella of the "European Sustainable Shipping Forum (ESSF)": the MRV subgroup on monitoring and reporting and the MRV subgroup on verification and accreditation. These two MRV subgroups gathered for the period June 2015 to May 2017 in order to provide technical expertise relevant for the implementation of Regulation (EU) 2015/757 (the MRV shipping Regulation).

As indicated in their terms of reference, the two MRV shipping subgroups gathered relevant expertise and were mandated to identify guidance best practices in areas relevant for the implementation of the MRV shipping Regulation. The substance of this guidance/best practices document was unanimously endorsed by the representatives of the ESSF Plenary by written procedure ending on 30th of June 2017.

Apart from the present document, Guidance/Best practices documents have been established in the following areas:

- Preparation of Monitoring Plans by companies;
- Monitoring and reporting of fuel consumption, CO2 emissions and other relevant parameters;
- Assessment of monitoring plans by verifiers;
- Backward assessment of monitoring plans;
- Materiality and sampling;
- Verification of emissions reports by verifiers;
- Recommendations for improvements issued by verifiers;
- Assessment of verifiers by National Accreditation Bodies in order to issue an accreditation certificate;
- Dealing with situations where the accreditation is suspended or withdrawn close to the planned issuing date of the Document of Compliance (DOC) by the verifier.

All guidance/best practice documents and other relevant documents can be downloaded from the Commission's website at the following address:

https://ec.europa.eu/clima/policies/transport/shipping_en#tab-0-1

1. INTRODUCTION

This document has been prepared by a Task Force under the MRV subgroup on verification and accreditation, co-ordinated by Mr Torsten Mundt (DNV GL). It provides guidance on how verifiers may use ship's tracking data from an external source and use/interpret the information for the purpose of the verifier's risk assessment and on its likely implication for verification of the emissions report.

It has been written to support the implementation of the MRV shipping Regulation by explaining its requirements in a non-legislative language and providing some examples. However, it should always be remembered that the EU Regulations set the primary legal requirements.

There is an obligation for verifiers to check the credibility of reported data as stipulated in Regulation (EU) 2015/757 Article 15.1-5¹.

Requirement	Legal basis
<i>"The verifier shall identify potential risks related to the monitoring and reporting process by comparing reported CO2 emissions with estimated data based on ship tracking data and characteristics such as the installed engine power. Where significant deviations are found, the verifier shall carry out further analyses".</i>	Article 15.1 of Regulation (EU) 2015/757

As indicated, verifiers shall compare reported data with a “*external set of estimated data*” This comparison gives the opportunity to reduce the scope of samples to be analysed / tested in detail when verifying the ship's emissions report.

In essence, it allows adapting the verification activities to the result of the risk assessment.

The “external set of estimated data” would cover the following data for a specific ship:

- 1) aggregated fuel consumption
- 2) aggregated CO₂ emissions
- 3) aggregated distance, and
- 4) aggregated time spent at sea

For the purpose of the verifier performing the comparison, ship tracking data could be obtained through different sources such as:

- onboard sources, such as the navigational or electronic chart display and information system (ECDIS)

¹ http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2015.123.01.0055.01.ENG

- coastal / global positioning systems such as automatic identification system (AIS) or long range identification and tracking (LRIT)
- port call information related to ship movements.

It should be acknowledged that the output figures of the external set of estimated data are not derived (as measurements) from compilations from the ship (i.e. data been produced/compiled by the MRV company).

In the following, this guidance paper focusses on the external data triggered by the Automatic Identification System (AIS) signal as an example for best practice. Essentially, the timely repeated signal of the ship's position is combined by modelling and calculating, with other ship specific data (from openly available data sources) and as such derives to the "external set of estimated data" on fuel consumption and CO₂ emissions.

In regard of date / time records and the covered distances, in principle the data for "distance travelled" and "time spent at sea" is just the addition of places where the signal moved geographically and time wise (in UTC).

The AIS transmits with time intervals of 2 to 10 seconds ship's information about position, course and speed. The distance covered by the ship between two AIS messages can be computed by using the "Haversine formula", which is an expression that gives distances between two points on a sphere from their longitudes and latitudes.

Furthermore, it should be noted that due to technical problems on the AIS as such, like unfavourable weather conditions (for the signal itself) and / or user mistakes, the AIS records can be missing or incomplete. Sometimes, e.g. in pirate areas the system is shut off intentionally.

For cases of good AIS coverage, the data for "distance travelled" and "time spent at sea" appears to be a quite reliable external set of reference data.

2. ATTENTIVENESS WITH HANDLING OF THE EXTERNAL SET OF ESTIMATED DATA

It should be acknowledged that the AIS-based modelling of ships fuel consumption underlays intrinsically some uncertainties caused by environmental conditions that are not (and can't be) reflected to its full extent into the modelling.

Typically, the models are re-connected (calibrated) to "real" ships fuel consumption; however, deviations caused by several factors do exist. Nevertheless, if aggregated yearly, these models may serve as quite representative assessment of a ship's fuel consumption over the year.

The following list is providing some examples of the factors influencing possible deviations of the model from the conditions the ship is exposed to in reality. The non-exhaustive list may serve as indication:

- reflection of real weather conditions
 - the fuel consumption can easily double or triple in strong wind / weather conditions;
 - weather routing systems would be discredited in AIS-modelling as it doesn't take into account the higher fuel consumption in bad weather areas which the routing system is avoiding, and instead calculate just the longer distance for getting around the bad weather area (this is also true for the negative effect of

travelling longer distance at higher speed in order to achieve same Estimated Time of Arrival, (ETA)

- current in seas and estuaries
- draft and trim variations of the ship (fully laden or ballast);
- fuel consumption for auxiliary engines / boilers is modelled and may be ship type / loading and route dependent, those consumers are not commonly identical;
- sometimes AIS signals are not captured by satellites. Therefore on high seas a coverage gap might occur; it (which) might influence the results, distance determination;
- maintenance condition of ships' machinery influences the SFOC;
- maintenance and condition of ships' hull influences the resistance and by that the fuel consumption (see above);
- different AIS model may vary and might provide different aggregated outputs;
- only generic ship machinery data are provided by public available data bases. In case ship owners have applied efficiency improvements but have not changed the data in the public available data set (e.g. HIS-data base), the efficiency increase (= decrease in fuel consumption) can't be reflected properly

The sample size for voyages being analysed / tested comes as an outcome from the risk assessment the verifier is obliged to perform as part of the data verification process (ref. to Articles 11 to 13; and 16 of Commission Delegated Regulation (EU) 2016/2072).

Verifiers make use of external set of estimated data which might allow an adaptation of verification efforts, .e.g. in decreasing the sample size the verifier needs to analyse / test in detail.

If the data on aggregated fuel consumption and on aggregated CO₂ emission reported from a ship is within about $\pm 20\%$ of the "external set of estimated data", it is considered best practice that the sample size of voyages to be analysed / tested in detail may be decreased up to 40% of the initial sample size.

The following graph illustrate the issue:

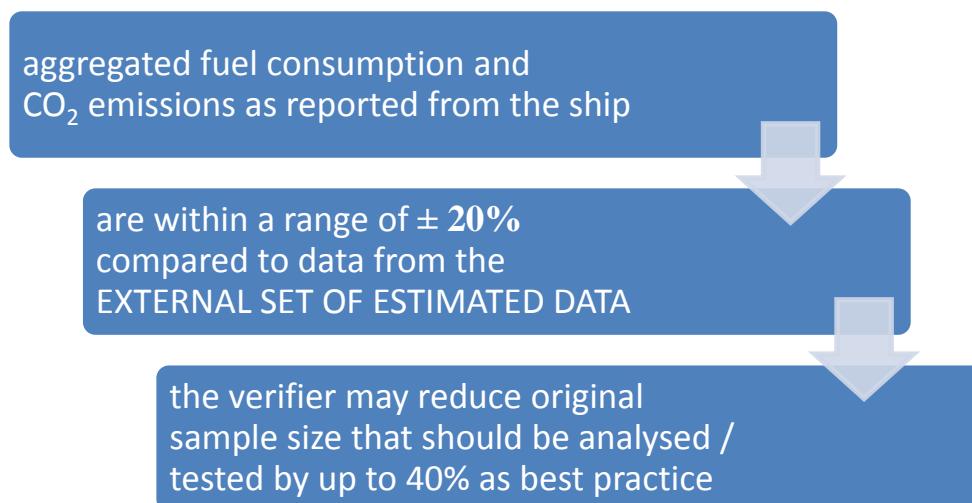


Figure 1: decision tree for a reduced sample size

APPENDIX

Example:

Verifier's risk assessment original voyage sample size:		20 voyages
Aggregated fuel consumption of the ship as reported for the emission report:		
HFO:	5000 t	
MGO:	1200 t	
Sum:	6200 t	
Result of external estimated fuel consumption:		
Sum:	6000 t	
Comparison of reported fuel consumption with external estimated fuel consumption is well within the $\pm 20\%$ proximity level		
Verifier can reduce the sample size up to 40% of the original size sampling:		12 voyages

Abbreviations

AIS	Automatic Identification System
ETA	Estimated Time of Arrival
HIS Fairplay data	Ship data base sorted by IMO no. (HIS is the company trade name)
LRIT	Long Range Identification Tracking
SFOC	Specific Fuel Oil Consumption
UTC	Coordinated Universal Time
