# EAVDAM

## The **EfficienSea** **AIS** **VHF** **Datalink** **Manager**

# Proposed functions

## Version 1.6, 2011-12-20

efficiensea.org

Part-financed by
the European Union

# Index

efficiensea.org

Part-financed by
the European Union

# Welcome to the EAVDAM application

The EAVDAM application has been developed under Work Package 5 of the EfficienSea project. More information about EfficienSea can be found at www.EfficienSea.org

The EfficienSea project has provided this application to you and invite you to participate in it's future evolution, if you or your organisation find it useful, and have the resources to contribute to the future development.

This application is available – for free – as Open Source Software under the Free BSD license. This basically means that all involved parties are welcome to copy it, use it, to modify it, and to integrate it with other applications as they see fit.

The source code is available at https://github.com/DaMSA/EAVDAM. At this site, you will also find install scripts and resources for cooperation on the future development of EAVDAM.

Thorugh the EfficienSea project, a large number of desirable features and suggestions for changes were proposed by the expert team involved in the specification and development of the application, and the HELCOM AIS Expert Working Group, who assisted in beta-testing the application.

Not all these proposed functions made it through the necessary prioritization process, as the implementation phase went ahead. Many of the proposed functions are however the result of desirable functionality proposed by experienced users, and have been collected in this document for future reference, with the aim of inspiring user organisations who wish to participate in the future maintenance and development of the EAVDAM project.

Known bugs/issues with the current version 1.6 of EAVDAM are also listed in this document.

efficiensea.org

Part-financed by the European Union

# Issues, which are known in EAVDAM version 1.6

The following issus were registered after the final release of EAVDAM version 1.6

## *Bugs / errors*

### Measuring tool uses american miles rather than nautical miles

The measuring tool [ ⚲ ], which the EAVDAM application has inherited from the OpenMap project, indicates distances in american miles, rather than nautical miles. As users of this application would be used to nautical miles, this is misleading.

### Changing antenna parameters does not affect coverage area declarations

When registering a new station, the application will generate default coverage declarations. You may leave these – or manually modify them to suit more realistic coverage profiles, depending on analytical information available to you. However, if you modify the antenna parameters, for instance the antenna or terrain height – or even the position of the station - the default coverage declarations are NOT automatically reset. This must be done manually, by enabling the coverage layers, rightclicking the station and selecting „reset receive/transmit/interference coverage to polygon". This lack of automatic resetting the coverage is by design, in order not to throw away detailed manual declarations of coverage, however some user friendly mechanism to warn the user about the consequences of changing the antenna or position parameters and allow automatic update of the coverage profiles, should be implemented in the future.

## *Other issues*

### e-mail data exchange

Has never been properly tested. Use of FTP data exchange is recommended.

# Functions, which were not implemented

During the EfficienSea project, a list of desirable functionality was discussed, but some functionality could not be implemented within the resources available to the project. These ideas and their origin have been recorded in the following sections, with the purpose of inspiring those, who could able to contribute to the future development of EAVDAM.

## *Minor suggested improvements*

### User friendly parameter entry

*Proposee*: Jens K. Jensen, Danish Maritime Authority
*Contact*:  jkj@dma.dk
*Description*: Currently station parameters for a new station cannot be saved, if antenna height AND terrain height parameters have not been entered.  If antenna height is typed in, but no terrain height has been registered, ‚0‘ should be assumed for terrain height.

### Sorting of stations in alphabetical order

*Proposee*: Rolf Zetterberg, Swedish Maritime Administration
*Contact*:  Rolf.Zetterberg@Sjofartsverket.se
*Description*: It would be useful if the list of stations (in the 'Edit Stations' dialog, roll down menu) were sorted in alphabetical order.

### Multiple users in same organisation

*Proposee*: Jens K. Jensen, Danish Maritime Authority
*Contact*:  jkj@dma.dk
*Description*: One EAVDAM installation could be shared between multiple users inside the same organisation, if installed on a shared network drive.  It can then be executed by multiple independant users, however it is unsafe to start multiple *simultaneous* sessions. There is no means of knowing, if another user already has the applicaiton open.  It should be fairly simple to create an indication that another user has an active session going and warn the second users attempting to start the application, to consulting the first user before starting the application. Alternativly, another approach for multiple user in the same organization to share responsibility for one AIS network.

### Removing stations – removing users from FTP site

*Proposee*: Jens K. Jensen, Danish Maritime Authority
*Contact*:  jkj@dma.dk
*Description*: In case an EAVDAM user has once uploaded data to an FTP server, but discontinued to maintain them, they will remain on that FTP site forever.  Deleting them from the FTP server will not clear the information in the local databases of the EAVDAM users associated with this FTP site. Some mechanism to ensure that old user data can be deleted from the central repository – and that this will be reflected at the local EAVDAM users – needs to be implemented.

efficiensea.org

Part-financed by
the European Union

## *Desirable functionality*

### Suggesting changes to stations, belonging to other networks

*Proposee*: Jens K. Jensen, Danish Maritime Authority
*Contact*:  jkj@dma.dk
*Description*:  EAVDAM version 1.6 supports operators of fixed AIS networks in maintaining their own network, and identifying any conflicts in slot allocation that may arise.  However, if the stations belonging to two or more neighbouring operators are in conflict, the parties will have to resolve their conflicts. National or regional administrative bodies may be involved in such a process.

Imagine that one operator (A) has a conflict with a neighbouring operator (B). Operator A has followed good practice guidance, but operator B has not folloed the relevant guidelines.  Operator A might wish to suggest a concrete proposal to operator B of how they could modify their station to be in line with good practice guidance, to avoid conflicts.  Or a national or regional authority might require that operator B configure their station in accordance with relevant regulatory requirements.

Obviously, the involved parties will generally have to communicate via relevant means (e-mail, telephone, letters or physical meetings), however some support for exchanging concrete technical proposals to resolve the issue could easily be built into the EAVDAM application.

It was attempted to include one way of supporting a smooth process for this, in the first version of EAVDAM, however the function was not considered mature at the finalization of the project, and was thus hidden, not to cause confusion:

Currently, users of eavdam can only modify parameters belonging to stations under their own responsibility – and see (read only) the configuration of stations belonging to others. The intended solution was to facilitate the resolving of conflicts, by enabling users of EAVDAM to formulate a PROPOSAL for a modified set of parameters, for stations belonging to some other EAVDAM users area of responsibility.

Just like a user of EAVDAM can created a ‚PLANNED CHANGE' to one of his own stations, he should thus be able to create a ‚PROPOSED CHANGE' to a station belonging to someone else. This proposal should be possible to exchange via existing means of dataexchange, between users of EAVDAM, either via e-mail or via FTP server.  An EAVDAM user receiving a proposal for change for one of his stations, should then be able to analyze the consequences of the proposed change, and decide whether to:
- Accept the proposal (making it a PLANNED CHANGE for his own station)
- Reject the proposal

In all instances a message should be relayed back to the proposee, first acknowledging the receipt of the proposal, and later to indicate whether the proposal was accepted or rejected. Such a mechanism might also facilitate the transfer of responsibility for a given fixed AIS station from one organization or organizational unit to another.

While the EAVDAM application would remain an application designed for peer-to-peer technical cooperation, such a procedure could also support the formal process related to the role of competent authorities distributing required techinical parameter settings to operators under their domain of responsibility.

efficiensea.org

## Import CSV function

*Proposee*: Kaisu Heikonen, Finnish Transport Agency
*Contact*: Kaisu.Heikonen@liikennevirasto.fi
*Description*: Just like it is possible to *export* station parameters from station list in the database of the EAVDAM application to a CSV file, it would be useful for many first time users of the EAVDAM application, if the parameter database for own stations could be populated by *importing* data from a CSV type file. Most administraitons already have station data available in some form, which could be easily transformed to a comma separated file.

## Generate PDF report

*Proposee*: Kaisu Heikonen, Finnish Transport Agency
*Contact*: Kaisu.Heikonen@liikennevirasto.fi
*Description*: It would be useful to be able to generate a PDF document showing the content of the map in the EAVDAM application, with the ability to add a little descriptive text to the report, and possibly include a table with station parameters. Currently, only generation of an image file (JPEG or PNG) of the map content is possible as a native OpenMap functionality.

## Export to GIS formats

*Proposee*: Jens K. Jensen, Danish Maritime Authority
*Contact*: jkj@dma.dk
*Description*: It could be desirable to be able to export data from the EAVDAM application to different GIS formats, to be imported or used together with other geographical data collections. Formats would depende on the needs of specific user organisations.

## Ability to register the use of AIS ASM and geographical extent

*Proposee*: Rolf Zetterberg, Swedish Maritime Administration
*Contact*: Rolf.Zetterberg@Sjofartsverket.se
*Description*: In many contexts, including work o the HELCOM AIS EWG, efforts are being undertaken to register the use o and the effect on the datalink of using AIS ASM (Application Specific Messages) for various applications. It would be useful if a more systematic approach to registering the use of AIS ASM at different stations could be supported by the EAVDAM application. User functions to determine and visualize the geographical distribution of the use of certain specific ASM could be considered. (For instance mapping where particular AIS ASM definitions are used to broadcast MET/HYDRO information.)

efficiensea.org

## TX Coverage prediction using Radio Propagation simulation

*Proposee*: Rafal Niski, National Institute of Telecommunication (NIT), Poland
*Contact*:  r.niski@itl.waw.pl
*Description*: The propagation of radio signals in the maritime VHF band can be estimated using the ITU recommendation *ITU-R P.1546-4 Method for point-to-area predictions for terrestrial services in the  frequency range 30 MHz to 3.000 MHz.*
Using this recommendation, and a 3-D terrain model, and based on a the assumption about the average AIS installation on board vessels, it is possible to perform a farily detailed simulation of the likely transmit coverage area, for any given fixed AIS station.  The National Institute of Telecommunication (NIT), Poland, has implemented a software tool (in C++) which can perform this kind of very detailed analysis, and generate a shapefile descrining the estimated transmit and interference coverage areas for fixed AIS stations.  This shape file can be imported in the EAVDAM application, and upon request NIT may be able to help you perform this kind of analysis.

This method may help you estimate coverage areas before establishing fixed AIS stations, but the estimations will not reveal gaps in coverage caused by imperfect installations, deterioration of equipment e.t.c., and results will need some kind of verification.

However implementing this kind of coverage analysis as an integrated part of EAVDAM would be useful, in relation to estimating the realistic coverage ranges for AIS broadcast services. This was however unfortunately not possible within the resources available in the EfficienSea project. The method is described in detail in the report, D_WP5_3_2_AIS Coverage Analysis_v2.2_20110621', which is available as an official output of the EfficienSea project, please visit www.efficiensea.org. Consideration may have to be given to the fact, that this kind of numerical simulation requires very efficient data processing, which may be more easily implemented in other programming languages than JAVA, which is the basis of the EAVDAM application.  Building an interface to an algorithm implemented in another programming language such as C++ might be relevant.

## RX Coverage determination using empirical data

*Proposee*: Jens K. Jensen, Danish Maritime Authority
*Contact*:  jkj@dma.dk
*Description*: AIS Receive coverage may be determined by emprical analysis of AIS signals received at fixed AIS stations.  This method is described in the report, D_WP5_3_1_AIS Coverage Analysis_v1.0_20100518', which is available as an official output of the EfficienSea project, please visit www.efficiensea.org.
This method will not be able to predict coverage for planned stations, and will only provide reliable results from areas with some degree of vessel traffic.
However implementing this kind of coverage analysis as an integrated part of EAVDAM would be useful, in relation to estimating the realistic coverage ranges for AIS receive services.
Over time, it is possible to build a reliable description of documented AIS receive coverage, including the ability to detect anomalies due to imperfect installations or deterioration of antennas or  cables.
It would also be possible to utilize this method to perform near real time monitoring of the integrity of the expected coverage of a network of AIS stations.
Based on this method, it would also be possible to compare the signal quality performance of individual vessels, and compare this to the average expected coverage quality in the area in question, and use this to assign signal quality markers to individual vessels.

efficiensea.org

Part-financed by
the European Union

## Auto detect non-registered fixed AIS stations

*Proposee*: Jens K. Jensen, Danish Maritime Authority
*Contact*: jkj@dma.dk
*Description*: Observing a received AIS data stream would enable detecting near by AIS fixed stations, which are not yet registered by the responsible operator using EAVDAM, and mapping the existence of these. This would be a good feature for competent authorities to identify stations which may need to be registered, using EAVDAM, to ensure the integrity of the AIS VHF Datalink, and could provide an easy start to registering own stations.

## Work with simulated data set

*Proposee*: Jens K. Jensen, Danish Maritime Authority
*Contact*: jkj@dma.dk
*Description*: EAVDAM version 1.6 contains a hidden functionality: The ability to work with a simulated dataset, completely separate from the operational network. This feature was introduced in order to facilitate the analysis of a major change to the layout of stations, with total freedom of modifying any station in a given area regardless of ownership, but without interfereing with the active operational data available in EAVDAM. This feature was not matured and tested enough to be made available in the release version of EAVDAM, and the GUI elements for this were hidden to aviod confusion.

## Ability to model Data Link load, based on vessel distribution + fixed stations

*Proposee*: Jens K. Jensen, Danish Maritime Authority
*Contact*: jkj@dma.dk
*Description*: EAVDAM can currently only be used to estimate the bandwidth loading of the AIS VHF Datalink, originating from fixed AIS stations.
It would be useful to be able to describe a geographical vessel density distribution, and simulate the combined Bandwidth loading effects of fixed and mobile stations, under different statistical assumptions. This would enable determination of the level of risk for saturation of bandwidthon the AIS VHF DataLink. Methods could potentially be developed to estimate the effects of coverage quality deterioration based on developments in vessel density distribution. (Initial vessel density distributions can be determined from a dataset of factually received AIS data, and possibly modified by allowing a relative increasing or decreasing of number vessels / stations types in the density distribution.)

## Generate registration form for MMSI numbers for fixed AIS stations

*Proposee*: Nick Ward
*Contact*: Nick.Ward@gla-rrnav.org
*Description*: The ITU have issued a set of standard template for registration of MMSI numbers related to AIS fixed stations in the international MARS database of MMSI numbers, hosted by the ITU. Methods for registering or updating the MARS database using a CSV type of comma separated text file also exist.
The EAVDAM application could be developed to generate such registration forms or even datafiles for keeping the MARS database updated. (The administrative procedures for registration of fixed AIS stations may however vary greatly between individual nations. Support for different specific national application procedures may be considered.)

efficiensea.org

Part-financed by
the European Union

**Register Channel Management configuration and model / visualize effects**

*Proposee*: -

*Contact*:  -

*Description*: Was discussed during the EfficienSea project, but not considered a matter of European priority by the expert team.

**Integration with AIS Base Station management systems**

*Proposee*: -

*Contact*:  -

*Description*: Was discussed during the EfficienSea project, as a matter relevant for manufactureres of AIS management systems to consider.  The datastructures and methods for data exchange described by EAVDAM might form the basis direct integration with such systems.

**xx**

*Proposee*: -

*Contact*:  -

*Description*: -