Voluntary guidelines for MASS test areas

# Introduction

These guidelines have been developed to assist operators and users of MASS test areas in defining services in and rules for use of the test areas. This document does not replace more detailed industry guidelines, national or international legislation or other documents that cover similar themes.

In this document it is assumed that the test areas may have two distinct functions:

1. They are obviously a facility for doing in situ tests of MASS and MASS systems which may or may not be open for any user.
2. They can also be a source of historical data sets, e.g. covering MetOcean, traffic density, sensor data recordings or others that can be of use to developers of MASS or MASS systems. Again, this may or may not be available to any users.

The main subjects covered in these guidelines are:

* Historical data collections and provision.
* Infrastructure and other services available to users.
* General format of descriptions of test areas and the services they provide
* References to other guidelines and documents

# General system architecture for a test area

In general, a test area can be configured with one or more of the facilities listed below:

1. The physical area where tests can be made.
2. Various infrastructure for use by test vessels, e.g.:
   1. Communication
   2. Radar, video or other land-based sensors
   3. Planning and control systems, including office spaces and similar
3. Services related to risk assessment, reporting and approval of tests. This may include warning systems for other ships, leisure crafts or others.
4. Historical data provision services for analysis and planning of test runs. This would mainly be Bathymetric data, AIS data, Charts, MetOcean, etc.
5. Historical data provisions for calibration or test of sensor processing or navigation systems. This requires standardized media formats for AIS, MetOcean, Video, radar or other data sources.

# Historical data collections

A test area can also be a valuable source of data, either for planning of tests or for verification of new algorithms, e.g. for object detection or classification or for maneuvering. Data types that can be of use are:

* Video recordings from tests in the area. This can be used to check object detection or classification algorithms. This may be visual light recordings or various forms of low light or IR recordings.
* Radar recordings from same type of test runs. This has similar applications as previous. It is also interesting if simultaneous recordings of video and radar are available.
* AIS data from various periods. Should probably have anonymized ship identities. This can be used to test maneuvering algorithms, possibly in conjunction with video or radar data.
* MetOcean data.
* Charts and bathymetric data.

## Standardized data sets for detection and classification

It would also be useful to have standardized data sets with, e.g. recordings of AIS, X-band Radar and visual light video to test detection and classification algorithms in different areas, weather and seasons. Use of data could also be conditional on publishing results for benchmarking of different algorithms. Standard sets could be characterized by:

* Having a number of ships with AIS in the picture (possibly with some offset in position or other likely AIS data errors)
* Having a number of smaller crafts without AIS.
* Having a number of standardized small objects, e.g. floating cylinders, boxes or other standard objects. These may or may not be a danger to navigation.
* Optionally, coastal features, anchored ships, aids to navigation and similar.

The data sets must be labeled with actual contents and environmental conditions. The data sets need not be identical, but should contain enough features to be interesting cases for object detection and classification.

# General description formats for test areas

It is useful if a general description of test areas is available to prospective users locally or in other regions, if the area has resources or test possibilities for the larger community. Some information that should be available is:

* Location and extent of area.
* Types of tests that are allowed.
* Requirements for use of area, application procedures if relevant.
* Availability of infrastructure and services.
* Availability of historical data.
* Contact point

# References

1. Maritime UK (2017). An Industry Code of Practice, a Voluntary Code, Maritime Autonomous Surface Ships up to 24 metres in length, Version 1.0, November 2017.