

Test report

99320420

based on:
EN 60945

Maritime AIS Transceiver
MDS
AIMS MIV

Contents

Main module

	Page
1 Introduction	1
2 Product	2
3 Test Schedule	2
4 Product documentation	3
5 Observations and comments	3
6 Summary	4
7 Conclusions	5

Modules with test results and other information

Operational checks according to EN 60945 clause 6	6
Summary	6
Operational check of modes required by the equipment standard	7
Operational check of design of control facilities	8
Operational check of use of controls	9
Operational check of identification	10
Operational check of illumination	11
Operational check of damage and safety	12
Operational check of inter-unit connection	13
Operational check of digital panels	14
Operational check of indicator	15
Operational check of software	16
Durability and resistance to environmental conditions to EN 60945 clause 8	17
Summary	17
Dry heat functional test	18
Damp heat functional test	19
Low temperature functional test	20
Vibration	21
Corrosion	22
Unwanted electromagnetic emission according to EN 60945 clause 9	23
Summary	23
Immunity to electromagnetic environment according to EN 60945 clause 10	24



Summary	24
Special purpose tests according to EN 60945 clause 11	25
Summary	25
Acoustic noise and signals	26
Compass safe distance	27
Safety precautions according to EN 60945 clause 12	28
Summary	28
Protection against accidental access to dangerous voltages	29
Maintenance according to EN 60945 clause 13	30
Equipment manuals according to EN 60945 clause 14	31
Marking and identification according to EN 60945 clause 15	32
Used test equipment	33
Product photographs	34
Additional information	42



1 Introduction

This report contains the result of tests conducted by Telefication

Telefication bv
Edisonstraat 12a
6902 PK Zevenaar
The Netherlands

Telefication complies with the accreditation criteria for laboratories as described in the STERLAB Criteria which contains all of the criteria from EN 45001 and ISO/IEC guide 25 and the relevant criteria from ISO 9001. The accreditation covers the quality system of the laboratory as well as the specified activities described in the accreditation certificate bearing the accreditation number L021 and is granted on 30 November 1990 by the Dutch Council For Accreditation (RvA: Raad voor Accreditatie). An extended procedure for performing tests outside their permanent premises has been accepted by the board of STERLAB for accreditation. Telefication is thereby allowed to conduct tests on any suitable site by regular Telefication staff, using suitable equipment that is property of Telefication or of a second party.

Ordering party:

Company name : Marine Data Systems
Address : 580 Kyalami Boulevard, Kyalami Business Park
Postcode : --
City/town : Kyalami, Midrand
Country : South Africa
Date of order : 12 April 2002



2 Product

A sample of the following product was submitted for testing:

Product Category : Universal Automatic Identification System
Manufacturer : Marine Data Systems
Trade mark : MDS
Type designation : AIMS MIV
Hardware version : Ver 0
Software release : Ver 1.18
Serial number : 020002642

3 Test schedule

Tests were carried out in accordance with the specifications detailed in chapter 6 "Summary" of this report.

Tests were carried out at the following locations:

- Marine Data Systems, Kyalami, South Africa, from 15 May ↔ 5 June 2002
 - *operational checks (clause 6);*
 - *safety precautions (clause 12);*
 - *maintenance (clause 13);*
 - *equipment manuals (clause 14);*
 - *marking and identification (clause 15).*
- Gerotek, Pretoria West, South Africa, from 31 May ↔ 1 June 2002
 - *durability and resistance to environmental conditions; damp heat (clause 8).*
- CSIR National Metrology Laboratory, Hennopsmeer, South Africa, on 4 June 2002
 - *durability and resistance to environmental conditions; vibration (clause 8).*
- Gerotek EMC Labs, Littleton, South Africa, from 23 May ↔ 27 May 2002
 - *unwanted electromagnetic emission (clause 9);*
 - *immunity to electromagnetic environment (clause 10).*
- Hermanus Magnetic Observatory, Hermanus, South Africa, on 6 August 2001
 - *compass safe distance (clause 11.2)*



4 Product documentation

For production of this report the following product documentation was used:

Description:	Date:	Identification:
Technical doc. AIMS MIV Rev 07	May 2002	1101-0010-AA-00-TM

The above mentioned documentation will be filed at Telefication for a period of 10 years following the issue of this report.

5 Observations and comments

The assessment against EN 60945 has been performed on several remote locations, as specified in chapter "*Test Schedule*", and has been witnessed by Telefication.

- Compliance with clause 8.12 (corrosion) has been declared by the applicant;
- Compliance with clause 14 (equipment manuals) has been declared by the applicant;
- Compliance with clause 11.2 (compass safe distance) has been verified by the Hermanus Magnetic Observatory in South Africa on 6 August 2001, without the supervision of Telefication.

See chapter "*Additional information*" for details.



6 Summary

The product is intended for use in the following application area:

UNIVERSAL AUTOMATIC IDENTIFICATION SYSTEM

The sample was tested according to the following specification:

EN 60945

1997



7 Conclusions

The results of the type tests as stated in this report, are exclusively applicable to the product item as identified in this report. Telefication does not accept any responsibility for the results stated in this report, with respect to the properties of product items not involved in these tests.

This report comprises of a main module and 1 module with test results and other information. All pages have been numbered consecutively and bear the Telefication logo, the report number and sub-numbers. The total number of pages in this report is 42.

All tests are performed by:

name : H.H. Lodewijk

function : Test Engineer

signature :

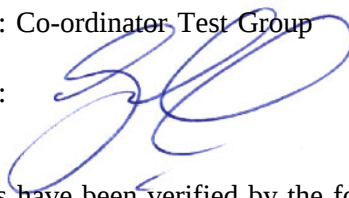


Review of test methods and report by:

name : J.P. van de Poll

function : Co-ordinator Test Group

signature :



The above conclusions have been verified by the following signatory:

date : 23 July 2002

name : drs. ir. W.B.A. Blom

function : Managing Director

signature :



Test Form: Operational checks according to EN 60945 clause 6**Summary**

According to EN 60945:1997 third edition the following checks are performed:

Subclause	Minimum Performance requirement reference	Performance requirement	Result
6.1	4.2.1	General	P
6.2	4.2.2	Design of control facilities	P
6.3	4.2.3	Use of controls	P
6.4	4.2.4	Identification	P
6.5	4.2.5	Illumination	P
6.6	4.2.6	Damage and safety	P
6.7	4.2.7	Inter-unit connection	P
6.8	4.2.8	Digital panels	P
6.9	4.2.9	Indicator	P
6.10	4.2.10	Software	P

Results:

P = pass
F = fail

NA = not applicable
NP = not performed

Test Form: Operational check of modes required by the equipment standard

EN 60945 reference : 6.1

Observation of the operational check	Result
Equipment is tested according to the equipment standard IEC 61993-2	yes

Test Form: Operational check of design of control facilities

EN 60945 reference : 6.2

Observation of the operational check	Result
The number of operational controls, their design and manner of function, location, arrangement and size provide for simple, quick and effective operation of the EUT.	NA
The shape and size of each control is appropriate to its mode of operation.	NA
All controls are logically grouped according to their function.	NA
The information presented is suited to the maximum expected rate of change of information.	NA
The display unit contains the following rotating controls which turn clockwise for increased function.	NA
Indicators on the display move to the upwards for increase function.	NA
The equipment elements related to control are readily distinguishable from elements provided for other functions, such as equipment set-up.	NA
There is a time delay of at least 3 seconds between initial operation of a distress button and the alert being activated.	NA

Test Form: Operational check of use of controls

EN 60945 reference : 6.3

Observation of the operational check	Result
All operational controls permit normal adjustments to be easily performed, and are arranged in a manner which minimizes the chance of inadvertent operation.	NA
All controls not required for normal operation and which may affect performance are not readily accessible.	NA
The operational controls which could switch off the equipment or may lead to degradation of performance, or to false indications are protected against unintentional operation.	NA
All the operational controls and indicators are easy to use and are correct and suitable related to their function and environment.	NA
Distress is activated by a dedicated distress button which is not a key of an ITU input panel or an ISO keyboard.	NA
The distress button is red coloured, marked distress and protected by a transparent springloaded cover, protected against inadvertent operation.	NA
Distress initiation requires two independant actions.	NA
Equipment indicates the various states of the alert transmission.	NA
It is possible to interrupt (after distress call has been sent completely) and initiate distress alert at any time and in any mode the equipment is in.	NA
There is a time delay of at least 3 seconds between initial operation of the distress button and the alert being activated.	NA

Test Form: Operational check of identification

EN 60945 reference : 6.4

Observation of the operational check	Result
All the operational controls and indicators are easy to identify and read from the from the position where the equipment is normally operated.	P
The instrument and indicator character type is simple and clear. Character heights are: 2 mm or 5 mm and the character widths are 2 mm and 3 mm which is clearly readable at the normal operating distance of about 1 metre.	NA
All the controls and indicators are identified in English.	P
All controls for optional facilities which are not fitted are blocked off.	NA
Optional facilities provided by software involved with common control arrangements are clearly indicated in the menu screen.	NA
The indicators are satisfactory positioned relative to the operators line of sight, and are not obscured when operating associated controls under normal operating conditions.	NA
Intruments meant to be operated, or fitted in connection with controls are readable from a distance of at least 1 metre, and other intruments are readable from a distance of at least 2 metres.	NA

Test Form: Operational check of illumination

EN 60945 reference : 6.5

Observation of the operational check	Result
The illumination provided in the EUT is adequate for operation under all expected ambient illumination conditions.	NA
All light sources can be dimmed to prevent interference with the navigation.	P
There is no external illumination required which should be identified in the equipment manual.	NA
Alarm indicator cannot be dimmed below reading intensity.	NA
The illumination is dazzle-free and adjustable to extinction.	NA
The controls which are not illuminated can be located easily and unambiguously by tactile means.	NA
All information is presented with high contrast on a low-reflectance background which emits negligible light at night.	NA
There are no transparent covers which cause reflections.	NA
Alarm indication is red, or if on displays, red or otherwise highlighted	NA
Alarm indicator is not illuminated during normal operation.	NA
All lamps are adjustable from full brightness for all conditions of varying ambient illuminations.	P

Test Form: Operational check of damage and safety

EN 60945 reference : 6.6

Observation of the operational check	Result
Misuse of the controls for normal use which are accessible to the operator can not cause damage to the equipment or injury to personnel.	NA

Test Form: Operational check of inter-unit connection

EN 60945 reference : 6.7

Observation of the operational check		Result
The manufacturer declares that software interfaces to other equipment are tested in a full possible configuration so no special testsoftware was necessary.		P
a	Exchange of signals between units has a minimum effect on the signal source.	P
b	There is no mismatch of transmission lines between units.	P
c	The capability exists of sustaining 1kV of isolation between the units.	P

Test Form: Operational check of digital panels

EN 60945 reference : 6.8

Observation of the operational check	Result
The equipment has a digital input panel which is conform ITU-T Rec. E.161 and/or ISO 3791.	NA

Test Form: Operational check of indicator

EN 60945 reference : 6.9

Observation of the operational check	Result
Equipment has a built-in self test program.	P
A distress alert transmission is indicated at the EUT intended to transmit a distress alert.	NA

Test Form: Operational check of software

EN 60945 reference : 6.10

Observation of the operational check	Result
Any software required to facilitate operation in accordance with its equipment standard, including for its initial activation/reactivation, is permanently installed within the EUT, in such way that it is not possible for the user to have access to that software.	P
It is not possible for the user to augment, amend or erase any software in the EUT required for operation in accordance with its equipment standard.	P
Means are provided to self test the equipment.	P

Test Form: Durability and resistance to environmental conditions to EN 60945 clause 8

Summary

According to EN 60945:1997 third edition the following tests are performed:

Subclause	Category	Test	Phenomena	Result
8.2	a c d a b c	Storage Functional	Dry heat 70°C Dry heat 55°C	NA P
8.3	a b c	Functional	Damp heat 40°C 93% relative humidity	P
8.4	a a b c	Storage Functional Functional Functional	Low temperature -30°C Low temperature (portable) -20°C Low temperature (protected) -15°C Low temperature (exposed) -25°C	NA NA P NA
8.5	a		Thermal shock 70°C -> 25°C	NA
8.6	a a		Drop on hard surface 1.00 m Drop into water 20 m	NA NA
8.7	a b c d		Vibration 2 - 13.6Hz 1mm, 13.6 - 100Hz 7m/s ² , resonance 2h	P*
8.8	c		Rain 100l/m, 30 minutes	NA
8.9	d a a		Immersion 600kPa 12h Immersion 100kPa 5min Temporary immersion 1m 5min	NA NA NA
8.10	a		Solar radiation 1120W/m ² 80h	NA
8.11	a		Oil resistance immersion 3h	NA
8.12	a b c d	Corrosion	Salt mist 5% NaCl 2h -> 40°C 95% humidity 7 days	P**

* tested by CSIR National Metrology Laboratory

** see statement of compliance in chapter "Additional information"

Results:

P = pass

F = fail

Category:

a = portable

b = protected

NA = not applicable

NP = not performed

c = exposed

d = submerged

Test Form: Dry heat functional test

EN 60945 reference : 8.2
Basic standard : IEC 68-2-2

Temperature : 55°C
Duration : 10-16h
EUT : Transceiver unit (protected)
Power supply : DC

Power supply variation	Voltage (V)	Result
Nominal Power supply	24	NA
High voltage +30%	31.2	P
Low voltage -10%	21.6	NA

Comments : During the performance test and checks the EUT operated in accordance with its equipment standard.

Test Form: Damp heat functional test

EN 60945 reference : 8.3
Basic standard : IEC 68-2-30

Temperature : 40°C
Relative humidity : 93%
Duration : 10-16h
EUT : Transceiver unit (protected)
Power supply : DC

Power supply variation	Voltage (V)	Result
Nominal Power supply	24	P
High voltage +30%	31.2	NA
Low voltage -10%	21.6	NA

Comments : The performance check was performed with the EUT switched on and the EUT was kept operational for two hours. During the performance check the EUT operated in accordance with its equipment standard.

Test Form: Low temperature functional test

EN 60945 reference : 8.4
Basic standard : IEC 68-2-1
Temperature : -15°C
Duration : 10-16h
EUT : Transceiver unit (protected)
Power supply : DC

Power supply variation	Voltage (V)	Result
Nominal Power supply	24	NA
High voltage (+30%)	31.2	NA
Low voltage (-10%)	21.6	P

Comments : The performance check was performed with the EUT switched on and the EUT was kept operational for two hours. During the performance test and checks the EUT operated in accordance with its equipment standard.

Test Form: Vibration

EN 60945 reference : 8.7
Basic standard : IEC 68-2-6
EUT : Transceiver unit
Endurance test : 2h at 30 Hz if no resonance ($Q > 5$)

Vertical vibration direction					
EUT	Frequency (Hz)	Acceleration table (m/s^2)	Acceleration EUT (m/s^2)	Q	Result
Transceiver	5-100	7.0	-	< 2	P
Horizontal vibration longitudinal					
EUT	Frequency (Hz)	Acceleration table (m/s^2)	Acceleration EUT (m/s^2)	Q	Result
Transceiver	5-100	7.0	-	< 2	P
Horizontal vibration transversal					
EUT	Frequency (Hz)	Acceleration table (m/s^2)	Acceleration EUT (m/s^2)	Q	Result
Transceiver	5-100	7.0	-	< 2	P
Endurance (vertical, horizontal 1 and horizontal 2)					
EUT	Frequency	Acceleration table (m/s^2)	Duration (h)	Q	Result
Transceiver	30	7.0	2	< 2	P

Comments : Performance checks were carried out during each endurance test period and before the end of each endurance period.
There was no degradation of performance during and after the test.

Test Form: Corrosion

EN 60945 reference : 8.12
Basic standard : IEC 68-2-52
EUT : Transceiver unit (protected)

Test	Result
The corrosion test is waived in accordance with clause 4.1 of EN 60945. See chapter " <i>Additional information</i> " for the manufacturer's statement regarding evidence that EUT would pass the test is annexed to this report.	P

Test Form: Unwanted electromagnetic emission according to EN 60945 clause 9

Summary

EN 60945 reference : 9
EUT : Transceiver unit

For test results, refer to Gerotek Test Report 72MN95901, which is annexed to this Test Report.

Test Form: Immunity to electromagnetic environment according to EN 60945 clause 10

Summary

EN 60945 reference : 10
EUT : Transceiver unit

For test results, refer to Gerotek Test Report 72MN95901, which is annexed to this Test Report.

Test Form: Special purpose tests according to EN 60945 clause 11

Summary

According to EN 60945:1997 third edition the following checks are performed:

Subclause	Performance requirement	Result
11.1	Accoustic noise and signals	P
11.2	Compass safe distance	P

Results:

P = pass
F = fail

NA = not applicable
NP = not performed

Test Form: Acoustic noise and signals

EN 60945 reference : 11.1
EUT : Transceiver unit

Acoustic parameter	Observation	Result
Acoustic noise power	Acoustic noise power is far below 60 dB(A) (produces no acoustic noise)	P
Acoustic noise power of an alarm	No audible alarm available *	NA

* The unit provides an external alarm output from a relay contact.

Test Form: Compass safe distance

EN 60945 reference : 11.2
EUT : Transceiver unit

For test results, refer to the annexed Test Report from Hermanus Magnetic Observatory, dated 6 August 2001.

NOTE: tests according to clause 11.2 have not been supervised by Telefication.

Test Form: Safety precautions according to EN 60945 clause 12

Summary

According to EN 60945:1997 third edition the following checks are performed:

Subclause	Performance requirement	Result
12.1	Protection against accidental access to dangerous voltages	P
12.2	Electromagnetic radiofrequency radiation	NA
12.3	Emission from visual display	NA
12.4	X-radiation	NA

Results:

P = pass
F = fail

NA = not applicable
NP = not performed

Test Form: Protection against accidental access to dangerous voltages

EN 60945 reference : 12.1
Basic standard : IEC 529, IEC 71-2
EUT : Transceiver unit

Observation	Result
There are no openings in the EUT where the testprobe can reach hazardous parts	P

Test Form: Maintenance according to EN 60945 clause 13

According to EN 60945:1997 third edition the following checks are performed:

Observation	Result
The EUT is so designed that the main units can be replaced readily, on-board repair is possible without elaborate recalibration or readjustment.	P
The EUT is so constructed that it is readily accessible for inspection and maintenance purposes.	P

Results:

P = pass
F = fail

NA = not applicable
NP = not performed

Test Form: Equipment manuals according to EN 60945 clause 14

According to EN 60945:1997 third edition the following checks are performed:

Observation	Result
See chapter " <i>Additional information</i> " for the manufacturer's statement regarding compliance with this requirement.	P

Results:

P = pass
F = fail

NA = not applicable
NP = not performed

Test Form: Marking and identification according to EN 60945 clause 15

According to EN 60945:1997 third edition the following checks are performed:

Observation	Result
The equipment is marked with the following identification: a) Identification of the manufacturer; b) Equipment type identification; c) Serial number of the unit.	NA* NA* P

* This marking will be affixed by the equipment supplier.

Results:

P = pass
F = fail

NA = not applicable
NP = not performed

List: Used test equipment

The following ancillary equipment is used at MDS for performance checks:

Reference	Description	MDS reference	Model
1	Power Supply	[HW 12.]	GPC-3060-E
2	Environmental Test Chamber	[HW 14.]	I60
3	4-way RF Combiner	[HW 31.]	1902-0066
4	Test Target 1	[HW 35.]	MIV
5	Test Target 2	[HW 36.]	MIV
6	Test Target 3	[HW 37.]	MIV
7	Test Target 4	[HW 38.]	MIV
8	Test Target 5	[HW 39.]	MIV
9	KDU 1	[HW 40.]	KDU 2000
10	KDU 2	[HW 41.]	KDU 1805

Product photographs

Number of photographs: 7

- 1 Assembled view
- 2 Connections-1
- 3 Connections-2
- 4 Label
- 5 Front view with leds
- 6 Internal view side-1
- 7 Internal view side-2

Product photographs

Photograph no.: 1
Description : *Assembled view*



Product photographs

Photograph no.: 2
Description : *Connections-1*



Product photographs

Photograph no.: 3
Description : *Connections-2*



Product photographs

Photograph no.: 4
Description : *Label*



Product photographs

Photograph no.: 5
Description : *Front view with leds*



Product photographs

Photograph no.: 6
Description : *Internal view side-1*



Product photographs

Photograph no.: 7
Description : *Internal view side-2*



Additional information

This chapter lists additional information, as referred to from within this Test Report.

Not any of the additional information has been modified by Telefication.

The following additional information is annexed to this Test Report:

- Statement of Compliance with requirements for Salt Fog environment (EN 60945; clause 8.12, corrosion);
- EMC Test report 72MN95901 by Gerotek Test Facilities, dated 7 June 2002 (EN 60945; clause 9, unwanted electromagnetic emission) (EN 60945; clause 10, immunity to electromagnetic environment).
- Test report on Compass Safe Distance by Hermanus Magnetic Observatory, dated 6 August 2001 (EN 60945; clause 11.2, compass safe distance);
- Statement of Compliance with requirements for equipment manuals (EN 60945; clause 14, equipment manuals);

All pages of above mentioned documents are not included in the total number of pages of this Test Report.
