



CIRM Guideline

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PERFORMANCE TEST PROCEDURE FOR ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEM (ECDIS)

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1. INTRODUCTION

1.1. SCOPE & PURPOSE

This Guideline outlines a performance test procedure to be carried out on a ship's Electronic Chart Display and Information System (ECDIS) installation, to determine if the ECDIS meets the operational requirements defined by the International Maritime Organization (IMO). Ultimately the purpose of the Guideline is to ensure that an in-service ECDIS is functioning properly, in the interests of safety of navigation.

The Guideline describes a range of manufacturer-recommended tests and checks, which correspond to IMO's requirements for ECDIS as laid down in SOLAS regulations V/19.2 and V/27, MSC.232(82) and MSC.1/Circ.1503/Rev.1.

Where a ship's ECDIS back-up arrangements are met by a second independent ECDIS according to the safety equipment certificate, then the performance test procedure described in Annex 2 should be carried out on the back-up ECDIS installation.

1.2. BACKGROUND

Development of this Guideline was initiated in response to concerns raised by stakeholders across the maritime industry about the condition of in-service ECDIS, which are frequently found to have operational issues. Problems typically encountered include inadequate power supply arrangements, the running of outdated software versions, disabled audio signal for alerts, and the incorrect functioning of interfaces to connected equipment, among others.

The Guideline was produced by CIRM's ECDIS Working Group, with the input of ECDIS manufacturers, system integrators, and service providers.

It is envisaged that many of the tests/checks described in this Guideline could be automated, minimising the time required for a surveyor/inspector to perform the test or check on board.

2. PERFORMANCE TEST PROCEDURE

2.1. EXAMINATION OF ECDIS

The examination of the ECDIS installation should include:

- Confirmation that the ECDIS equipment is not in an obvious failure condition prior to commencement of the task;
- Confirmation that the ECDIS has adequate power supply arrangements in place as defined by IMO and Flag State requirements. Reference should be made to approved installation drawings if available. Should power supply arrangements include any Uninterrupted Power Supply (UPS) device, its operational condition should be checked and (if applicable) the battery's expiration date should not be exceeded;

- Confirmation by visual check that the display allows important features to be discriminated by colour, following the process defined in the manufacturer's documentation;
- Confirmation that the ECDIS software version is capable of displaying up-to-date electronic charts correctly through compliance with the International Hydrographic Organization's (IHO) chart content and display standards currently in force (as recommended in MSC.1/Circ.1503/Rev.1);
- Confirmation that an audible signal is available for new (unacknowledged) alerts;
- Confirmation that the ECDIS is interfaced with, and receives valid data from, navigational sensors. As a minimum ECDIS should be interfaced to one electronic position fixing system (EPFS), one heading sensor, and one speed and distance measuring equipment (SDME) device;
- Depending on the associated installation dates, ECDIS connections to the following equipment should be checked: Voyage Data Recorder (VDR) (IEC 61162-450); Bridge Navigational Watch Alarm System (BNWAS); Central Alert Management (CAM);
- Confirmation that the ECDIS has the ability to load Electronic Navigational Charts (ENCs) and their updates, by checking that the system has a portfolio of recent ENCs installed;
- Confirmation that the input devices installed (e.g. dedicated keyboards, tracker balls, etc.) are in operational condition;
- Confirmation that the ECDIS uses correct Coordinated Universal Time (UTC) Time;
- Confirmation that the ECDIS has 12 hours/3 months voyage logs available;
- Confirmation that the overall condition of the equipment is satisfactory;
- Confirmation that the equipment is left in the normal operational condition after completions of all checks/tests.

2.2. SUPPORTING MATERIALS

The manufacturer should provide sufficient supporting materials (for example - performance test manual, relevant checklists and test programs, software tools for automated tests and/or data collection) in order to facilitate the performance test procedure.

2.3. RECORD OF RESULTS

The results of the performance test procedure should be recorded.

Annex 1 and Annex 2 of this document provide example performance test reports which may be used to record results when conducting the performance test procedure on a main ECDIS and a back-up ECDIS, respectively.

Annex 3 of this document provides an example results summary, which may be used to reflect the condition of the ECDIS following the conclusion of the performance test procedure.

ANNEX 1 – EXAMPLE PERFORMANCE TEST REPORT (MAIN ECDIS)

ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEM (ECDIS) PERFORMANCE TEST REPORT

Ship's details

Ship's name	
Flag	
IMO number	
Date keel laid	
Gross tonnage	
Ship's Class Society	

ECDIS details

	Main System
Manufacturer	
Model	
System serial number	
Software version number	
Location on the bridge	

Inspection details

Name of person conducting testing	
Company	
Inspection date	
Inspection location	

Test/Checks on board

Note – Mark **Yes** for success; **No** for failure; or **N/A** for interfaces that are not fitted or functionality that is not in use.

1. Pre-existing conditions

Confirm that the ECDIS equipment is not in an obvious failure condition prior to commencement of the test	<input type="checkbox"/> Yes <input type="checkbox"/> No
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2. Availability of documentation

Confirm that the following documentation related to the ECDIS is available for inspection:	
Type Approval certificate (or similar evidence of compliance)	<input type="checkbox"/> Available <input type="checkbox"/> Not available
Equipment manual (in printed or electronic form)	<input type="checkbox"/> Available <input type="checkbox"/> Not available
Approved installation drawings	<input type="checkbox"/> Available <input type="checkbox"/> Not available

3. Power supply

Confirm that the ECDIS has adequate power supply arrangements in place as defined by IMO and Flag State requirements (reference should be made to approved installation drawings if available)	<input type="checkbox"/> Yes <input type="checkbox"/> No
If an Uninterrupted Power Supply (UPS) device is installed, confirm that the device is in operational condition	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
If an Uninterrupted Power Supply (UPS) device is installed, confirm that the battery is not expired and record the battery expiration date	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A Expiration date: _____
If an Uninterrupted Power Supply (UPS) device is installed, confirm that its failure alarm is functioning properly	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Confirm through use of a blackout test that the back-up power arrangements provide sufficient capacity to operate the ECDIS (this test should be run for 1 minute unless a longer period is required by the ship's Flag State)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

4. Visual inspection of ECDIS display performance

Set the user's manual brightness control and contrast control, if provided, to their calibration reference settings. Following the procedure for on-board use of the colour differentiation test diagrams defined in the equipment manual, display the colour differentiation test diagram appropriate for the ambient light condition and confirm: 1) each foreground stripe is clearly distinguished from its background;	<input type="checkbox"/> Yes <input type="checkbox"/> No
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2) the foreground stripes representing yellow, orange, magenta, green, blue and grey are clearly identified.	
If the Greyscale test is provided, following the procedure for on-board use of the Greyscale test defined in the equipment manual confirm that the greyscale does not show significant degrees of shading.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

5. ECDIS software version

By reference to the equipment and/or the software version recorded above and/or the manufacturer's website or Service Bulletins, record the versions of IHO Standards supported by the equipment (Related to IMO Circulars MSC.1/Circ.1389 and MSC.1/Circ.1503/Rev.1)	IHO S-57: _____ _____ IHO S-52 PresLib: _____ _____ IHO S-63: _____ _____ <input type="checkbox"/> Cannot be determined
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6. Audible signal for ECDIS alerts

Use test alert facility, if available, or initiate any alert condition (e.g. temporary change of Safety contour setting) and confirm that audible signal is available for new (unacknowledged) alarms and warnings	<input type="checkbox"/> Yes <input type="checkbox"/> No
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7. ECDIS mandatory connections to navigational sensors

Confirm that the main ECDIS is interfaced and receives valid data from:	
Electronic position fixing system (EPFS)	<input type="checkbox"/> Yes <input type="checkbox"/> No
Gyrocompass; or marine transmitting heading device if ship is not fitted with a gyrocompass (record which is present): _____	<input type="checkbox"/> Yes <input type="checkbox"/> No
Speed and distance measuring equipment (SDME) device	<input type="checkbox"/> Yes <input type="checkbox"/> No
Confirm that the position of the EPFS antenna and the ship's physical dimensions are set properly in the ECDIS	<input type="checkbox"/> Yes <input type="checkbox"/> No
<i>Please note:</i> It is advised to also test any additional sensors interfaced to the ECDIS equipment.	

8. ECDIS connections to VDR, BNWAS and CAM*

** each of these connections may be mandatory depending on associated equipment installation dates.*

Confirm that the ECDIS has a functioning connection to the following equipment:	
Voyage Data Recorder (VDR) in accordance with IEC 61162-450 or other applicable interface standard Check that the ECDIS does not indicate any transmission failure/errors	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Voyage Data Recorder (VDR) video input (VGA, HDMI, DVI, etc.)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Central Alert Management (CAM) and other Bridge Alert Management (BAM) interfaces, if fitted	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Bridge Navigation Watch Alarm System (BNWAS)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

9. Condition of controls and input devices

Confirm that installed user input devices (e.g. dedicated keyboards, tracker balls, etc.) are in operational condition.	<input type="checkbox"/> Yes <input type="checkbox"/> No
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10. Correct time reference and voyage log recording

Confirm that the ECDIS uses correct Universal Coordinated Time (UTC)	<input type="checkbox"/> Yes <input type="checkbox"/> No
Confirm that the ECDIS has 12hours/3months voyage logs available	<input type="checkbox"/> Yes <input type="checkbox"/> No

11. Operational condition of the equipment

Confirm that the ECDIS equipment is in a condition that is compliant with the relevant regulations. If the answer is “No” provide details of the repair(s) that must be arranged in order to rectify critical defects:	<input type="checkbox"/> Yes <input type="checkbox"/> No
Confirm that the ECDIS equipment corresponds to that which is part of the approved configuration. Record notes if applicable:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

12. State of the equipment after inspection

Confirm that the ECDIS is left in the normal operational condition after completion of all checks/tests.	<input type="checkbox"/> Yes <input type="checkbox"/> No
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ANNEX 2 – EXAMPLE PERFORMANCE TEST REPORT (BACK-UP ECDIS)

BACK-UP ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEM (ECDIS) PERFORMANCE TEST REPORT

Ship's details

Ship's name	
Flag	
IMO number	
Date keel laid	
Gross tonnage	
Ship's Class Society	

Back-up ECDIS details

	Back Up system
Manufacturer	
Model	
System serial number	
Software version number	
Location on the bridge	

Inspection details

Name of person conducting testing	
Company	
Inspection date	
Inspection location	

Test/Checks on board

Note – Mark **Yes** for success; **No** for failure; or **N/A** for interfaces that are not fitted or functionality that is not in use.

1. Back-up ECDIS arrangements

Confirm that the back-up ECDIS arrangements are in accordance with the “Record of Equipment” attached to the relevant safety certificate (Form P, E or C) and that the back-up ECDIS is in operational condition	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
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2. Availability of documentation

Confirm that the following documentation related to the back-up ECDIS is available for inspection:	
Type Approval certificate (or similar evidence of compliance)	<input type="checkbox"/> Available <input type="checkbox"/> Not available
Equipment manual (in printed or electronic form)	<input type="checkbox"/> Available <input type="checkbox"/> Not available
Approved installation drawings	<input type="checkbox"/> Available <input type="checkbox"/> Not available

3. Power supply

Confirm that the back-up ECDIS has adequate power supply arrangements in place as defined by IMO and Flag State requirements (reference should be made to approved installation drawings if available)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Confirm through use of a blackout test that the back-up power arrangements provide sufficient capacity to operate the back-up ECDIS (this test should be run for 1 minute unless a longer period is required by the ship’s Flag State)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

4. Visual inspection of back-up ECDIS display performance

Set the user’s manual brightness control and contrast control, if provided, to their calibration reference settings. Following the procedure for on-board use of the colour differentiation test diagrams defined in the equipment manual, display the colour differentiation test diagram appropriate for the ambient light condition and confirm: 1) each foreground stripe is clearly distinguished from its background; 2) the foreground stripes representing yellow, orange, magenta, green, blue and grey are clearly identified.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
If the Greyscale test is provided, following the procedure for on-board use of the Greyscale test defined in the equipment manual confirm that the greyscale does not show significant degrees of shading.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

5. Back-up ECDIS software version

By reference to the equipment and/or the software version recorded above and/or the manufacturer's website or Service Bulletins, record the versions of IHO Standards supported by the equipment (Related to IMO Circulars MSC.1/Circ.1389 and MSC.1/Circ.1503/Rev.1)	IHO S-57: _____ _____
	IHO S-52 PresLib: _____ _____
	IHO S-63: _____ _____

	<input type="checkbox"/> Cannot be determined

6. Audible signal for back-up ECDIS alerts

Use test alert facility, if available, or initiate any alert condition (e.g. temporary change of Safety contour setting) and confirm that audible signal is available for new (unacknowledged) alarms and warnings	<input type="checkbox"/> Yes <input type="checkbox"/> No
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7. Back-up ECDIS mandatory connections to navigational sensors

Confirm that the back-up ECDIS is interfaced and receives valid data from:	
Electronic position fixing system (EPFS)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Confirm that the position of the EPFS antenna and the ship's physical dimensions are set properly in the back-up ECDIS	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Deactivate main ECDIS and confirm:	
Back-up ECDIS receives valid data from EPFS	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
<i>Please note: It is advised to also test any additional sensors interfaced to the back-up ECDIS equipment.</i>	

8. Back-up ECDIS connections to VDR, BNWAS and CAM*

** each of these connections may be mandatory depending on associated equipment installation dates.*

Confirm that the back-up ECDIS has a functioning connection to the following equipment:	
Voyage Data Recorder (VDR) in accordance with IEC 61162-450 or other applicable interface standard Check that the back-up ECDIS does not indicate any transmission failure/errors	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Voyage Data Recorder (VDR) video input (VGA, HDMI, DVI, etc.)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Central Alert Management (CAM) and other Bridge Alert Management (BAM) interfaces, if fitted	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Bridge Navigation Watch Alarm System (BNWAS)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

9. Capability to load ENC's and Updates

Confirm that the back-up ECDIS has a portfolio of recent (last 4 weeks) Electronic Navigational Charts (ENCs) installed	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
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10. Condition of controls and input devices

Confirm that installed user input devices (e.g. dedicated keyboards, tracker balls, etc.) are in operational condition.	<input type="checkbox"/> Yes <input type="checkbox"/> No
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11. Correct time reference and voyage log recording

Confirm that the back-up ECDIS uses correct Universal Coordinated Time (UTC)	<input type="checkbox"/> Yes <input type="checkbox"/> No
Confirm that the back-up ECDIS has 12hours/3months voyage logs available	<input type="checkbox"/> Yes <input type="checkbox"/> No

13. Operational condition of the equipment

Confirm that the back-up ECDIS equipment is in a condition that is compliant with the relevant regulations. If the answer is "No" provide details of the repair(s) that must be arranged in order to rectify critical defects:	<input type="checkbox"/> Yes <input type="checkbox"/> No
Confirm that the back-up ECDIS equipment corresponds to that which is part of the approved configuration. Record notes if applicable:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

14. State of the equipment after inspection

Confirm that the back-up ECDIS is left in the normal operational condition after completion of all checks/tests.	<input type="checkbox"/> Yes <input type="checkbox"/> No
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ANNEX 3 – EXAMPLE PERFORMANCE TEST RESULTS SUMMARY

1. Operational condition of the equipment

After evaluation of all the materials provided it is confirmed that the ECDIS is found to be in a condition that is compliant with the relevant regulations. If the answer is “No” provide details in section 2 below.	<input type="checkbox"/> Yes <input type="checkbox"/> No
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2. Compliance status of the ECDIS with regards to IHO Standards

It is confirmed that the ECDIS system is compliant with the IHO Standards in force	<input type="checkbox"/> Yes <input type="checkbox"/> No
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3. Mandatory follow up for service / repair (if applicable)

If the ECDIS is found in a condition that is not compliant with the relevant regulations, the following repair(s) must be arranged in order to rectify critical defects:	
Details:	
The required follow-up repair indicated above has been successfully completed.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

4. Recommended follow up for service / repair (if applicable)

The following repair is recommended:	
Details:	Recommended deadline: