

# **For Safe Navigation using ECDIS**

- based on the study of relevant deficiencies pointed out by PSC -

ClassNK Ship Management Systems Department  
June 2017

## **Preamble**

As known well, at the first periodical inspection of Cargo Ship Safety Equipment Certificate after 1 July 2017, the existing dry cargo ships of 20,000GT and upwards but less than 50,000GT are also required to be equipped with ECDIS, as well as passenger ships, tankers and dry cargo ships of 50,000GT and upwards.

In 2016, the deficiencies related to ECDIS became the direct grounds for detentions in 4 cases among ClassNK registered ships. Also, ECDIS-related deficiencies are often counted as the one of evidence of detainable deficiencies related to ISM.

Especially in Australia, the deficiencies related to charts, voyage planning and its monitoring have been directly resulted in ISM detainable deficiency. When ECDIS becomes mandatory for all cargo ships, these deficiencies will be replaced with the ones related to ENC and ECDIS-related matters .

Furthermore, from 1 September to 30 November 2017, a joint concentrated PSC inspection campaign by Tokyo MOU and Paris MOU is scheduled with theme “Safety of Navigation including ECDIS”.

It is certain that ECDIS will be one of the priority items.

Considering the above circumstances, hereby ClassNK distribute this material, based on the study of the ECDIS-related deficiencies pointed out by PSC. This material introduces “Examples” of ECDIS-related deficiencies pointed out by PSC and “Points” based on the technical and/or operational backgrounds. We will be glad, if this material will help all the readers ensure reducing PSC risks of the ships.

Also, we would show my sincere appreciation to everyone who kindly cooperated with us on this issue.

June 2017,

ClassNK Ship Management Systems Department

## Contents

1. Installation of ECDIS
2. Trainings and Certification for Deck Officers
3. Hardware/ Components
4. Safety Management System
5. ENC's Updating and Back-up Arrangements
6. Voyage Planning & Route Monitoring
7. Crew Familiarization

References

# 1. Installation of ECDIS

**Table: Example of the Deficiencies pointed out by PSC**

PSC	Def. Code	DEF_ITEM	NATURE_OF_DEFICIENCY	Act. Code
AUS	01101	Cargo Ship Safety Equipment (including Exemption)	Safety Equipment Certificate does not specify whether nautical charts or ECDIS are primary means of navigation.	99
CHN	10111	Charts	Unapproved ECDIS used as primary means of navigation for previous and intended voyage. (ISM)	30
ESP	10111	Charts	ECDIS on board but not approved. (ISM)	30

## Points :

1. ECDIS is to be Type Approved complying with the latest Performance Standard.
2. “Single ECDIS and Paper Chart (back-up)” system is also acceptable, subject to proper updating of both ENC and paper charts.
3. When ECDIS is installed, Safety Equipment Certificate must be reissued with the description of ECDIS in “Form E”.

Page 3 of 4

## Note:

*Please apply for a survey for Safety Equipment Certificate, when ECDIS is installed.*

*If it is impracticable to arrange the installation and the survey concurrently, please ask Class for consulting.*



### 3. Details of navigational systems and equipment

Item	Actual provision
1.4 Gyro compass heading repeater <sup>2)</sup>	Fitted
1.5 Gyro compass bearing repeater <sup>2)</sup>	Fitted
1.6 Heading or track control system <sup>2)</sup>	Heading Control System
1.7 Pelorus or compass bearing device <sup>2)</sup>	Fitted
1.8 Means of correcting heading and bearings	Fitted
1.9 Transmitting heading device (THD) <sup>2)</sup>	Gyro compass
2.1 <del>Nautical charts</del> Electronic chart display and information system (ECDIS) <sup>3)</sup>	Provided
2.2 Back up arrangements for ECDIS	Nautical charts
2.3 Nautical publications	Fitted

## 2. Training and Certification for Deck Officers

**Table: Example of the Deficiencies pointed out by PSC**

PSC	Def. Code	Defective Item	Nature of Deficiency	Act. Code
CAN	01299	Other (STCW)	Navigation officers on board do not have a valid type specific training for ECDIS. Ref STCW 2010.regulation I/14.	17
AUS	01299	Other (STCW)	ECDIS IMO 1.27 model course - No evidence of 3rd officer ECDIS training course.	17
ESP	01213	Evidence of basic training	Evidence of Basic Training in ECDIS for 3/OFF.	17
AUS	01299	Other (STCW)	Newly engaged navigating officer's checklist (S-1201-CN) does not include familiarization with ECDIS. (ISM)	17

### Points:

1. If the Officer's Certificate is issued under the provision of STCW 2010 Manila Amendments, "use of ECDIS to maintain the safety of navigation" is included as one of the minimum requirements for certification of officers. (See Table A-II/1 of STCW Code Chapter II)"
2. There is no regulation background in STCW nor SOLAS, requiring "Type specific Training" . However, crew sufficient familiarization with ECDIS equipped onboard is to be ensured. (See STCW.7/Circ.24 - Paragraph 12, for details)

### 3. Hardware/ Components

**Table: Example of the Deficiencies pointed out by PSC**

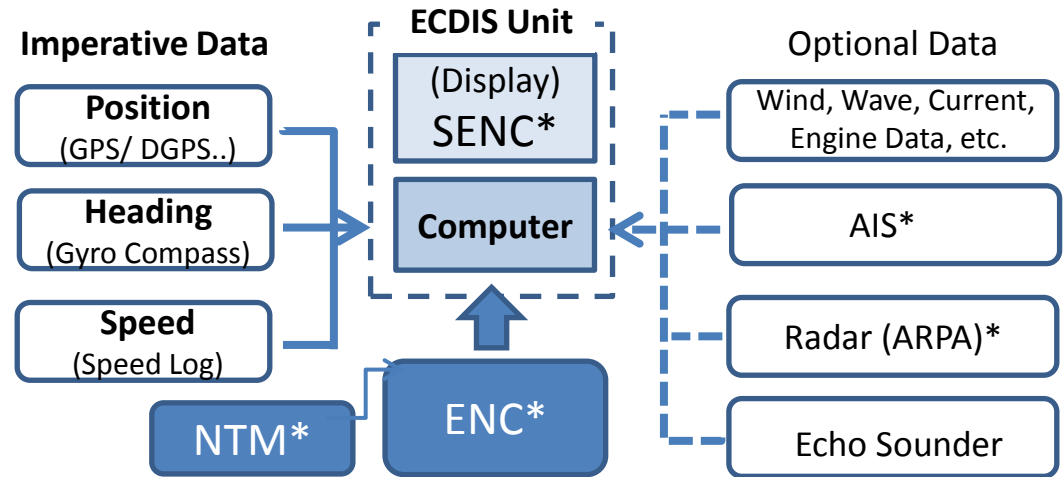
PSC	Def. Code	Defective Item	Nature of Deficiency	Act. Code
CHN	10112	Electronic charts (ECDIS)	ECDIS can not be provided heading and speed data.	17
AUS	10112	Electronic charts (ECDIS)	ECDIS audible alarm defective.	17

Points:

1. Deck Officers should comprehend the system-components surrounding ECDIS onboard.
2. ECDIS is to compatible with the new standard on ENC, **by 31 Aug 2017**. (See Reference 5)

*Note for trouble shooting:*

*If some signal dose not come into ECDIS, the problem maybe with the equipment where the signal comes from, or the connection between ECDIS and the equipment.*



**Fig. ECDIS- Components in general**

- \*SENC: System Electronic Navigational Chart
- \*ENC: Electronic Navigational Chart
- \*Necessary information on NTM to be manually input by Officers
- \*ClassNK requires connection to AIS and Radar.

(See ClassNK Technical Information No. TEC-0907 for details.)

## 4. Safety Management System- Instruction and Procedures

**Table: Example of the Deficiencies pointed out by PSC**

PSC	Def. Code	Defective Item	Nature of Deficiency	Act. Code
AUS	15106	Development of plans for shipboard operations	The ship safety management system as implemented does not ensure adequate safety of navigation as evidenced by absence of procedures for navigation with ECDIS	18
AUS	15106	Development of plans for shipboard operations	The vessel's SMS procedures for planning and route monitoring do not ensure safety of navigation as evidenced by the lack of procedures and processes for use of ECDIS I passage planning and route monitoring.	18
AUS	15106	Development of plans for shipboard operations	SMS does not provide adequate instructions/procedures for the safe operation of shipboard ECDIS	18
AUS	15106	Development of plans for shipboard operations	The safety management system as implemented fails to ensure effective procedures are in place for shipboard operations as evidenced by the lack of onboard familiarization training in the use of ECDIS and deficiency No. 2 & 4 marked (ISM).	30
AUS	15106	Development of plans for shipboard operations	The ship's safety management system procedures for passage planning and route monitoring do not ensure safety of navigation as evidenced by the lack of procedures and processes for use of ECDIS in passage planning and route monitoring	18

### Points:

As ECDIS operation is one of the “Key Operations”, at least the following items relevant to ECDIS should be specified as parts of SMS Manual:

- ENC's and updating
- Voyage planning
- Operation of ECDIS
- Route Monitoring
- Maintenance of hardware and software

## 5. ENC's Updating and Back-up Arrangements

**Table: Example of the Deficiencies pointed out by PSC**

PSC	Def. Code	Defective Item	Nature of Deficiency	Act. Code
BRA	10111	Charts	Nautical Charts – Back up for ECDIS – for Next voyage – There is not evidence of up to date for all of them.	17
AUS	10111	Charts	ECDIS chart cell required for previous and current voyage have not been provided to the ship. (ISM)	17
AUS	10111	Charts	Back up paper navigational charts not fully provided for last voyage. Ship used scanned copies of example chart 4417. (ISM)	17
RUS	10112	ECDIS	Some back-up ECDIS charts for the xxx not been updated with MNs	17
AUS	10112	ECDIS	Largest scale charts (various) for previous and intended voyage not installed on ECDIS. (ISM)	17
AUS	10135	Monitoring of voyage or passage plan	Australian coastal warning was not plotted and monitored in arrival ECDIS chart.	15

### Points:

1. In case of Single ECDIS, paper charts as back-up arrangement to be maintained & updated.
2. ENC distribution & update
  - Size of one ENC: max. 5MB.
  - Set of ordered ENCs: distributed by “BASE CD (or DVD)”
  - Update data\* of ENCs: supplied by “UPDATE CD (or DVD)” weekly.

(Note)\* Size of each update data for one ENC is small enough for e-mailing via INMARSAT.

3. ENC Manual updating is necessary, to reflect NAVTEX alerts, Notice to Mariners, etc.



## 6. Voyage Planning & Route Monitoring

**Table: Example of the Deficiencies pointed out by PSC**

PSC	Def. Code	Defective Item	Nature of Deficiency	Act. Code
AUS	10135	Monitoring of voyage or passage plan	No evidence that the vessel's position has been monitored on ECDIS during the previous voyage as required by passage plan.	16
AUS	10135	Monitoring of voyage or passage plan	Ship Position was not checked in ECDIS by an independent means of position fixing at appropriate interval for present voyage.	15
CHN	10135	Monitoring of voyage or passage plan	Route monitoring carried out using only GPS for position fixing.	17
AUS	10135	Monitoring of voyage or passage plan	Vessel position fixed using one mean (GPS) only for previous voyage. Vessel's position not verified using other means as planned in passage plan.	99

### Points:

- In general, ECDIS has the following three (3) positioning functions:
  - GPS
  - Line of Position (LOP), for position fixing by bearing, horizontal distance, etc. to target
  - Dead reckoning, for positioning when GPS is malfunctioned (using Gyro & speed log)
- In order to avoid "ECDIS assisted grounding" or other miss-routing caused by tolerance of GPS positioning, ship's position should be fixed periodically using LOPs, which can be input to ECDIS, manually.
 

(Example of LOPs)

  - Bearing from a landmark to the ship, measured by the compass.
  - Horizontal distance to a landmark, measured by radars.

## 7. Crew Familiarization

**Table: Example of the Deficiencies pointed out by PSC**

PSC	Nature of Deficiency
AUS	Watch keeping officers unable to readily demonstrate operational use of ECDIS, <b>manual position fix</b> and unfamiliar with <b>dead reckoning</b> operation. (ISM)
AUS	Navigating officer unfamiliar with key safety features, <b>alarms and warnings</b> displayed on ECDIS. (ISM)
AUS	Navigating officer responsible for passage planning unable to change <b>safety depth setting</b> in ECDIS. (ISM)
SGP	The ships' navigational officers were unable to demonstrate setting <b>the appropriate depths e.g safety depth, shallow water depth</b> etc. for the planning of the ship's sea passage on ECDIS.
AUS	Navigating officer responsible for passage planning unable to demonstrate <b>route safety check and plot manual position</b> . (ISM)
AUS	Navigating officers unable <b>to demonstrate or restore a record of completed route</b> .

### Points:

1. Table A-II/1 of STCW Code Chapter II requires the ability to determine the ship's position using celestial bodies, landmarks, aids of navigation (lighthouses, beacons, buoys) and dead reckoning.
2. AMSA stated that ECDIS familiarization should cover the following area:
  - ① familiarization with available functions , ② familiarization with the menu structure
  - ③ display setup , ④ setting of safety values,
  - ⑤ recognition of alarms and malfunction indicators and action to be taken
  - ⑥ route planning, ⑦ route monitoring
  - ⑧ changing over to backup systems , ⑨ loading charts and licenses updating of software

## References:

1. International Hydrographic Organization (IHO)  
“S-66- Facts about Electronic Charts and Carriage Requirements (Edition 1.0.0- Jan. 2010)”
2. International Maritime Organization (IMO)  
“ECDIS- GUIDANCE FOR GOOD PRACTICE (MSC.1/Circ.1503 -24 July 2015)”
3. International Maritime Organization (IMO)  
“STCW Convention and STCW Code incl. 2010 Manila Amendment- Table A-II/1  
Specification of minimum standard of competence for officers in charge of navigational watch...”
4. Australian Maritime Safety Authority (AMSA)  
“Guidance on ECDIS for ships calling at Australian ports (Marine Notice 7/2017- May 2017)”
5. Technical Information (ClassNK)  
“Revised IHO Standard on ENC using in ECDIS” (No. TEC-1101 - 17 February 2017)
6. International Maritime Organization (IMO)  
“STCW.7/Circ.24 – Interim Guidance... ..on the requirements of the STCW Convention  
(6 February 2017)”