Alternatives to ECDIS

Background

The Norwegian Maritime Authority has observed that a number of smaller vessels that ground use electronic chart systems (ECS) instead of paper charts.

In 2014 and 2017, the Swedish insurance company Alandia tested this type of chart systems. The tests revealed, among other things, that errors occurred at certain scale levels, that the charts were not updated, and that some charts were incorrect. The chart systems were compared to an ECDIS with charts approved by Swedish chart authorities.

The regulatory requirements include the following:

1. the vessel shall have updated paper charts covering the area of the planned voyage; or
2. the vessel shall be equipped with ECDIS with corresponding ENCs for the waters in which the vessel is operating; and
   a. the vessel shall have a backup solution in place, such as:
      i. an alternative ECDIS solution, including ENCs; or
      ii. updated paper charts.

On smaller vessels, it can be challenging to install chart tables and problematic to fit ECDIS with 24-inch monitors.

Alternatives for ships of less than 24 metres in length (L)

The Norwegian Maritime Authority has therefore decided that on board vessels of less than 24 metres of length (L), it is allowed to use an ECS which is type-approved by a notified body in accordance with appendix 1.

The ECS shall be connected to the on-board GNSS receiver. If the vessel is required to have or has a gyro compass, transmitting heading device (THD) or a log indicating the speed through the water, such devices shall be wheel-marked and connected to the ECS.

The vessel must be provided with an alternative chart solution, such as updated paper charts, ECDIS or a supplementary ECS in accordance with the above paragraph.

![Sjøfartsdirektoratet - Norwegian Maritime Authority]

Legal basis

- Regulations of 9 May 2014 No. 1157 on navigation and navigational aids for ships and mobile offshore units, section 3 first sentence
- Regulations of 22 November 2013 No. 1404 on fishing vessels of less than 15 meters in overall length, section 85
- Regulations of 13 June 2000 No. 660 on the construction, operation, equipment and surveys of fishing vessels of 15 m in overall length (LOA) and over, section 10-4
- Regulations of 30 September 2016 No. 1042 on marine equipment, section 16

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Appendix I - Electronic Chart System (ECS) for vessels <24m

The ECS installation shall comply with applicable requirements of the international standards IEC60945, IEC62288 and IEC61174 in full **except** for the clauses identified in the following table:

IEC 61174 requirement		Comment
4.9.2	Chart presentation size	Reduced monitor size*, cf. below requirements
4.12.2	Connection with CAM	N/A
4.12.3	Connection with VDR	N/A
4.12.8	Connection with INS	N/A
5.7.2	Resolution	A pixel size of 0.214 mm gives a nominal viewing distance of 70 cm, cf. IEC62288 4.6.1
Q.1	Figure Q.1	VDR, BAM interfaces are optional
Q.1	Table Q.1	Mandatory; DTM, GLL, GGA, GNS, THS, VBW, VLW, VTG

ECS Monitor

ECS Chart presentation size
The effective size of the chart presentation for route monitoring shall be at least 185 mm by 185 mm.

ECS Resolution
Minimum lines per mm (L) given by $L = 864/s$, where s is the smaller dimension of the chart display area (for example for the minimum chart area, $s = 185$ mm and the resolution is $L = 4.67$ lines per mm, giving a pixel size of 0.214 mm).

ECS Symbols
The minimum sizes for all symbols shall be as shown in the presentation library.
In addition, the symbols shall always be drawn with at least the same number of pixels as are required to draw the symbol at the size defined in the presentation library for the minimum resolution and minimum chart display area (185 mm $\times$ 185 mm).

ECS – IEC61162-interfaces

The ECS shall be capable of receiving data with the non-optional logical interfaces in Figure Q.1 using the sentences listed in the Table Q.1,
Optional logical interfaces, if provided, shall comply with the applicable standards of the IEC61162-series.

Figure Q.1 – ECDIS logical interfaces
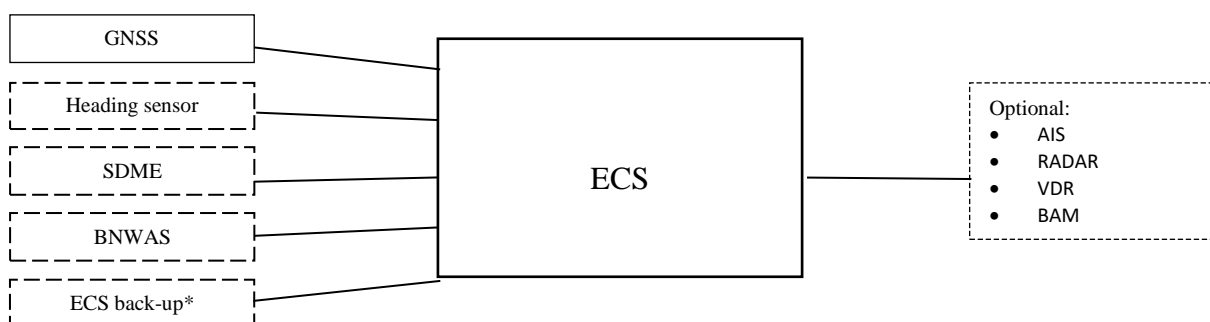
may be replaced by an adequate and up-to-date portfolio of paper charts

Table Q.1 – Mandatory IEC 61162-1 sentences received by ECS (type approval)

Mnemonic	Interface	Name	Comment
DTM	GNSS (EPFS)	Datum reference	
GLL	GNSS (EPFS)	Geographic position - latitude/longitude	
GGA	GNSS (EPFS)		
GNS	GNSS (EPFS)		
THS	Heading sensor	Gyro compass/THD	
VBW	SDME	Dual STW and SOG	
VLW	SDME	SOG	
VTG	GNSS	COG and SOG	
RRT	ECS	Route transfer	

Table Q.2 – Mandatory IEC 61162-1 sentences transmitted by ECS (type approval)

Mnemonic	Interface	Name	Comment
EVE	BNWAS	Operator activity	
RRT	ECS	Route transfer	
ALC	CAM	Cyclic alert list	
ALF	CAM	Alert sentence	
ARC	CAM	Alert command sentence	

Optional interfaces:
IEC61174 Annex Q Table Q.1, Table Q.2, Table Q.3 and Table Q.4 specify additional sentences which can be used with interface alternatives IEC 61162-1, IEC 61162-2 and IEC 61162-450. If interface IEC 61162-3 is used, equivalent PGNs are listed in IEC61174 Annex R.

ANNEX

ECS monitor size requirement. versus IEC 61174 ECDIS requirements:

	IEC 61174 ECDIS	NMA ECS
4.9.2	**Chart presentation size** *(See 6.3.2)* *(MSC.232/A10.2) The effective size of the chart presentation for route monitoring shall be at least 270 mm by 270 mm.*	**ECS Chart presentation size** The effective size of the chart presentation for route monitoring shall be at least 185 mm by 185 mm.
5.7.2	**Resolution** *(See 6.7.4)* *(IHO S-52/5.1) Minimum lines per mm (L) given by L = 864/s, where s is the smaller dimension of the chart display area (for example for the minimum chart area, s = 270 mm and the resolution is L = 3.20 lines per mm, giving a "picture unit" size of 0.312 mm).*	**ECS Resolution** Minimum lines per mm (L) given by L = 864/s, where s is the smaller dimension of the chart display area (for example for the minimum chart area, s = 185 mm and the resolution is L = 4.67 lines per mm, giving a pixel size of 0.214 mm).
5.7.3	***Symbols*** *(See 6.7.1)* *IHO (S-52/3.1.5) The minimum sizes for all symbols shall be as shown in the presentation library.* *In addition, the symbols shall always be drawn with at least the same number of pixels as are required to draw the symbol at the size defined in the presentation library for the minimum resolution and minimum chart display area (270 mm × 270 mm).*	**ECS Symbols** The minimum sizes for all symbols shall be as shown in the presentation library. In addition, the symbols shall always be drawn with at least the same number of pixels as are required to draw the symbol at the size defined in the presentation library for the minimum resolution and minimum chart display area (185 mm × 185 mm).