Comparison of ENCs, RCDS, Paper Charts Against the Requirements for ECDIS

(ECDIS P.S.as revised by NAV 52/WP.4/Add.2 in 2006)

P.S. Section	Summary of Requirement	ECDIS with ENC	RCDS with RNC	RCDS with RNC 2.0	Paper Chart	
	Scope					
1						
1.1	Function of ECDIS	●	●	●	●	○ - Does not provide
1.2	Meets SOLAS V/19 and V/27	●	●[1]	●	●	◐ - Partly provides
1.3	Governments provide data	●	●	●	●	● - Provides
1.4	Updating required	●	●	●	●	
1.5	Provides route planning and monitoring	●	●	●	●	
1.6	Can display other data	●	●	●	●	Not Applicable
1.7	Is as reliable as paper chart	●	●	●	●	
1.8	Provides required alarms	●	◐	●	○	Reduced alarms for RCDS mode are in ECDIS P.S., Table 1 of Appendix 7
1.9	May operate in RCDS mode	●	●	●	○	
2	**Application**					
2.1	Standard applies to all ECDIS	●	●	●	●	Separate standards apply to paper charts.
2.2	Applies to ECDIS, RCDS, and backup	●	●	●	●	Separate standards apply to paper charts.
2.3	Chart data specified in IHO standards	●	●	●	●	Separate standards apply to paper charts.

P.S. Section	Summary of Requirement	ECDIS with ENC	RCDS with RNC	RCDS with RNC 2.0	Paper Chart	
2.4	Meet MSC.191(79) and MSC/Circ.982	●	●	●	●	Separate standards apply to paper charts.
3	**Definitions**					
3.1	ECDIS	●	●	●	●	
3.2	ENC	●	●	●	●	
3.3	SENC	●	●	●	●	
3.4	Standard Display	●	●	●	●	
3.5	Display Base	●	●	●	●	
3.6	S-32 has more definitions	●	●	●	●	
4	**Chart Information**					
4.1	Use government data	●	●	●	●	
4.2	Data should be adequate and updated	●	●	●	●	
4.3	ENC/SENC not changeable	●	●	●	●	
4.4	Store updates separately	●	●	●	●	
4.5	Accept and apply official updates	●	●	●	●	
4.6	Accept manual updates	●	●	●	●	
4.7	Keep record of updates	●	●	●	●	
4.8	Display updates to review	●	●	●	●	

P.S. Section	Summary of Requirement	ECDIS with ENC	RCDS with RNC	RCDS with RNC 2.0	Paper Chart
4.9	Accept encrypted data	●	●	●	○
5	**Display**				
5.1	Be able to display all SENC data	●	●	●	●
5.2	Base, Standard, and All data displays	●	○	●	○
5.3	Standard Display with 1 keystroke	●	●	●	○
5.4	"Switch-on" goes to last display	●	●	●	●
5.5	Can add to Standard Display; Base cannot be edited	●	⊖	●	○
5.6	Provide "pick reports"	●	● [5]	● [5]	● [5]
5.7	Display scale can be changed	●	○	●	○
5.8.1	Safety contour defaults to 30m	●	○	●	○
5.8.2	Unavailable safety contour default	●	○	●	○
5.8.3	Indication of safety contour displayed	●	○	●	○
5.9	Safety depth selectable and emphasized	●	○	●	○
5.10	ENC displayed without info degradation	●	●	●	●
5.11	Insure that updates are correctly loaded	●	●	●	●
5.12	ENCs and updates distinguishable	●	●	●	●
6	**Scale**				

P.S. Section	Summary of Requirement	ECDIS with ENC	RCDS with RNC	RCDS with RNC 2.0	Paper Chart	
6.1.1	Overscale indication	●	●	●	●[8]	
6.1.2	Larger scale ENC exists	●	●	●	⊖	Some nations indicate larger scale chart coverage on each chart.
7	**Other Navigational Information**					
7.1	Other info should not degrade SENC	●	●	●	●	
7.2	Remove other info with 1 keystroke	●	●	●	○	
7.3	Use common reference system	●	●	●	●	
7.4.1	May add radar or ARPA info	●	●	●	○	
7.4.2	Radar data must match scale, projection, orientation	●	●	●	○	
7.4.3	Adjust all data for antennae offsets	●	●	●	○	
8	**Display Mode**					
8.1	"Noth-up" is required	●	●	●	●	
8.2	"True motion" mode is required	●	●	●	○	
8.3	True motion display regeneration	●	●	●	○	
8.4	Manually change displayed chart area	●	●	●	●	
8.5	Indication when no data at scale is available	●	●	●	○	
9	**Colors and Symbols**					

P.S. Section	Summary of Requirement	ECDIS with ENC	RCDS with RNC	RCDS with RNC 2.0	Paper Chart	
9.1	Use IHO colors and symbols	●	●	●	●	Paper charts use official national colors and symbols
9.2	Use IMO navigation symbols	●	●	●	●	Paper charts use official national colors and symbols
9.3	Use S-52 for symbol sizes	●	○		●	Paper charts use official national colors and symbols
9.4	Own ship symbol size is selectable	●	●	●	○	
10	**Display Requirements**					
10.1.1	Display info for route planning	●	●	●		
10.1.2	Display info for route monitoring	●	●	●		
10.2	Monitor size requirement	●	●	●	Not Applicable	
10.3	Meet IHO color and resolution req'ts.	●	●	●	●	
10.4	Display visible in day or night	●	●	●		
10.5	Identify info removed from Standard Display	●	○	○	●[6]	
11	**Route Planning, Monitoring and Recording**					
11.1	Planning and monitoring are provided	●	●	●	●	
11.2	Use largest scale data for alarms	●	○	●	○	
	Route planning					
11.3						

P.S. Section	Summary of Requirement	ECDIS with ENC	RCDS with RNC	RCDS with RNC 2.0	Paper Chart	
11.3.1	Straight and curved segments	●	●	●	●	
11.3.2	Routes should be adjustable	●	●	●	●	
11.3.2.1	Add waypoints	●	●	●	●	
11.3.2.2	Delete waypoints	●	●	●	●	
11.3.2.3	Move a waypoint	●	●	●	●	
11.3.3	Alternate routes	●	●	●	●	
11.3.4	Indications for route crossing safety contour	●	○	●	○	
11.3.5	Indications if passing area with special conditions	●	○	●	○	
11.3.6	Alarms for off-track deviations	●	●	●	○	
	Route monitoring					TOTALS
11.4		9	7	9	6	
11.4.1	Show own ship	●	●	●	○	Paper chart does not show own ship's position in real time.
11.4.2	View an area not containing own ship	●	●	◑	◑	Viewing another area with paper charts requires using additional paper charts.
11.4.3	Alarm when crossing safety contour	●	○	●	○	
11.4.4	Alarm/indication for entering area with special conditions	●	○	●	○	
11.4.5	Alarm when exceeding cross-track deviation	●	●	●	○	
11.4.6	Indication if will cross danger	●	○	◑	○	
11.4.7	Use continuous positioning system	●	●	●	○	Paper chart does not show own ship's position in real time.

P.S. Section	Summary of Requirement	ECDIS with ENC	RCDS with RNC	RCDS with RNC 2.0	Paper Chart	
11.4.8	Alarm if position system is lost	●	●	●	⊖	The positioning system provides an alarm, but the paper chart itself does not.
11.4.9	Alarm in advance of critical point	●	●	●	○	
11.4.10	Use the same geodetic datum	●	●	●	●	
11.4.11	Switch to alternate route	●	●	●	●	
11.4.12.1	Time labels on trackline	●	●	●	●	
11.4.12.2	Show points, etc. for nav. Purposes	●	●	●	●	
11.4.13	Display coordinates of a point	●	●	●	●	
11.4.14	Display ship's geographic coords.	●	●	●	○	
11.4.15.1	Plot LOPs	●	●	●	●	
11.4.15.2	Show positioning discrepancies	●	●	●	●	
	Voyage Recording					
11.5						
11.5.1.1	Record ship's past track	●	●	●	○	
11.5.1.2	Record chart data used	●	●	●	○	
11.5.2	Record voyage track	●	●	●	○	
11.5.3	Make record unalterable	●	●	●	●	
11.5.4	Preserve voyage track	●	●	●	●	

P.S. Section	Summary of Requirement	ECDIS with ENC	RCDS with RNC	RCDS with RNC 2.0	Paper Chart
12	**Calculations**				
12.1	Accuracy consistent with SENC	●	●	●	◑
12.2	Bearing accuracy consistent with display	●	●	●	◑
12.3.1	Calculate distance and azimuth	●	●	●	○
12.3.2	Calculate geographic position	●	●	●	○
12.3.3	Make geodetic calculations	●	●	●	○
13	**Performance Tests**				
13.1	On-board test of major functions	●	●	●	○
13.2	Provide alarm of system malfunction	●	●	●	○
14	**Back-up Arrangements**				
14.1	Safe take-over of ECDIS functions	●	●	●	○
14.2	Safely complete the voyage	●	●	●	○
15	**Connections with Other Equipment**				
15.1	No degradation of operation	●	●	●	○
15.2	Connect to ship's sensors	●	●	●	○

P.S. Section	Summary of Requirement	ECDIS with ENC	RCDS with RNC	RCDS with RNC 2.0	Paper Chart
15.3	Provide SENC information to other equip.	●	●	●	○
16	**Power Supply**				
16.1	Operable with emergency power	●	●	●	●
16.2	Switch power without restarting ECDIS	●	●	●	●
Appendix 1	**References**				
Appendix 2	**SENC Displays**				
1	**Display Base**				
1.1	Coastline	●	○		○
1.2	Safety contour	●	○		○
1.3	Isolated underwater dangers	●	○		○
1.4	Isolated other dangers	●	○		○
1.5	Scale, range, north	●	○		○
1.6	Units	●	○		○
1.7	Display mode	●	○		○

P.S. Section	Summary of Requirement	ECDIS with ENC	RCDS with RNC	RCDS with RNC 2.0	Paper Chart
2	**Standard Display**				
2.1	Display base	●	○		○
2.2	Drying line	●	○		○
2.3	Buoys, beacons, aids-to-navigation	●	○		○
2.4	Boundaries of fairways, channels	●	○		○
2.5	Visual and radar features	●	○		○
2.6	Prohibited and restricted areas	●	○		○
2.7	Chart scale boundaries	●	○		○
2.8	Cautionary notes indication	●	○		○
2.9	Ships routing and ferry routes	●	○		○
2.10	Archipelagic sea lanes	●	○		○
3	**All other information (to be displayed individually)**	●	◑ [3]		◑ [3]
3.1	Spot soundings	●	○		○
3.2	Cables and pipelines	●	○		○
3.3	Isolated danger details	●	○		○
3.4	Aids-to-navigation details	●	○		○
3.5	Cautionary note details	●	○		○

P.S. Section	Summary of Requirement	ECDIS with ENC	RCDS with RNC	RCDS with RNC 2.0	Paper Chart
3.6	ENC edition date	●	○		○
3.7	Most recent update	●	○		○
3.8	Magnetic variation	●	○		○
3.9	Graticule	●	○		○
3.10	Place names	●	○		○

Appendix 3 **Navigational Elements**

Appendix 4 **Areas for which special conditions exist**

		ECDIS with ENC	RCDS with RNC	RCDS with RNC 2.0	Paper Chart
	Traffic separation zone	●	○[4]		○[4]
	Inshore traffic zone	●	○[4]		○[4]
	Restricted area	●	○[4]		○[4]
	Caution area	●	○[4]		○[4]
	Offshore production area	●	○[4]		○[4]
	Area to be avoided	●	○[4]		○[4]
	User defined area to be avoided	●	○[4]		○[4]
	Military practice area	●	○[4]		○[4]
	Seaplane landing area	●	○[4]		○[4]
	Submarine transit lane	●	○[4]		○[4]

P.S. Section	Summary of Requirement	ECDIS with ENC	RCDS with RNC	RCDS with RNC 2.0	Paper Chart
	Anchorage area	●	○[4]		○[4]
	Marine farm	●	○[4]		○[4]
	PSSA	●	○[4]		○[4]
Appendix 5	**Alarms and Indications**				
11.4.3	(A) crossing safety contour	●	◐[9]	●	○
11.4.4	(A) area with special conditions	●	◐[9]	●	○
11.4.5	(A) deviation from route	●	●	●	○
11.4.8	(A) positioning system failure	●	●	●	○
11.4.9	(A) approach to critical point	●	◐[9]	●	○
11.4.10	(A) different geodetic datum	●	●	●	○
13.2	(A/I) malfunction of ECDIS	●	●	●	○
5.8.3	(I) default safety contour	●	◐[9]	●	○
6.1.1	(I) information overscale	●	●	●	○
6.1.2	(I) different reference system	●	●	●	○
7.3	(I) no ENC available	●	●	●	○
8.5	(I) no ENC available	●	●	●	○
10.5	(I) customized display	●	○	●	○
11.3.4	(I) route planned across safety contour	●	◐[9]	●	○

P.S. Section	Summary of Requirement	ECDIS with ENC	RCDS with RNC	RCDS with RNC 2.0	Paper Chart
11.3.5	(I) route planned across specified area	●	◑[9]	●	○
11.4.6	(I) route planned across a danger	●	◑[9]		○
13.1	(I) system test failure	●	●	●	○

Appendix 6 **Back-up Requirements**

Introduction

1

1.1	Provide safe take-over of ECDIS functions	●	●	●	●
1.2	Complete voyage safely	●	●	●	●

2 **Purpose**

3 Functional Requirements

3.1 Required Functions and Availability

3.1.1	Present chart information	●	●	●	●

3.1.2 **Route planning**

3.1.2.1	Take over original route	●	●	●	●
3.1.2.2	Adjust planned route	●	●	●	●

P.S. Section	Summary of Requirement	ECDIS with ENC	RCDS with RNC	RCDS with RNC 2.0	Paper Chart	
3.1.3	**Route monitoring**					
3.1.3.1	Plot own ship's position on chart	●	●	●	○	Paper chart does not show own ship's position in real time.
3.1.3.2	Take courses, etc. from chart	●	●	●	●	
3.1.3.3	Display planned route	●	●	●	●	
3.1.3.4	Display time labels on ship's track	●	●	●	●	
3.1.3.5	Plot points, bearing lines, etc.	●	●	●	●	
3.1.4	Display at least the Standard Display	●		●		
3.1.5.1	Use official data	●	●	●	●	
3.1.5.2	Prohibit changing chart data	●	●	●	●	
3.1.5.3	Indicate chart data edition	●	●	●	●	
3.1.6	Permit updating of chart data	●	●	●	●	
3.1.7	**Scale**					
3.1.7.1	Overscale indication	●	●	●	○	
3.1.7.2	Larger scale chart exists	●	●	●	○	
3.1.8	Meet requirements for other nav. Data	●	●	●	○	
3.1.9	Meet section 8 display mode req'ts.	●			○	
3.1.10	Record actual track	●	●	●	●	

P.S. Section	Summary of Requirement	ECDIS with ENC	RCDS with RNC	RCDS with RNC 2.0	Paper Chart
3.2	**Reliability**				
3.2.1	Provide reliable operation	●	●	●	●
3.2.2	Meet Section 12 accuracy requirements	●	●	●	●
3.3	Alarm/indication for system malfunction	●	●	●	○
4	**Operational Requirements**				
4.1	Use ergonomic principles	●	●	●	●
4.2	**Presentation of Information**				
4.2.1	Use ECDIS colors and symbols	●	◐	●	◐
4.2.2	Monitor size requirement	●	●	●	●
5	**Power Supply**				
5.1	Back-up power separate from ECDIS	●	●	●	●
5.2	Conform to ECDIS requirements	●	●	●	●
6	**Connections with Other Equipment**				
6.1.1	Connect with continuous position-fixing system	●	●	●	○

P.S. Section	Summary of Requirement	ECDIS with ENC	RCDS with RNC	RCDS with RNC 2.0	Paper Chart
6.1.2	No degradation of input sensors	●	●	●	●
6.2	Chart radar meets MSC.192(79)	●	●	●	○

Marine Information Objects

		ECDIS with ENC	RCDS with RNC	RCDS with RNC 2.0	Paper Chart
	Sailing Directions	○	○	●	○
	Tides	○	○	●	○
	Currents	○	○	●	○
	Ice	○	○	●	○
	AMLs	○	○	●	○

Provide Suitable Backup	○	○	●	○

Complies with Standards	●	●	●	●

Notes:

1   Requires appropriate folio of up-to-date paper charts, and only to be operated when ENCs do not exist

P.S. Section	Summary of Requirement	ECDIS with ENC	RCDS with RNC	RCDS with RNC 2.0	Paper Chart
3	All charted information is displayed, but cannot be individually added or deleted.				
4	All such special areas are shown and appropriately labeled, but they will not automatically trigger alarms.				
5	All required information that would be displayed by a "pick report" is already being displayed.				
6	No information can be removed. Requirement is irrelevant.				
8	Change of scale is not possible, so requirement is not applicable.				
9	Mariner must hand-enter special areas, critical points, safety contours, etc. in order to trigger alarms.				

whether data does/would support
not whether standard requires
does not preclude - capability provided by other components of ECDIS
permits the requirement to be met in an equivalent manner