ABB Ability™ Routeguard

See what’s new in Routeguard

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Meet your unique voyage objectives with better route recommendations

Voyage costs will likely grow significantly due to several factors, like inclusion of shipping in the EU Emissions Trading System (EU ETS) and the transition to more expensive low greenhouse gas intensity fuels. Further complicating matters are increasingly extreme weather patterns, which impact the safety of crew, ship, and cargo and the fuel consumption on the voyage – and more frequent supply chain disruptions that can have substantial voyage impacts.

Finding an optimized route that meets your unique objectives has never been more challenging or critical. The trusted ABB Ability™ Routeguard – Onshore routing service can help, and it now offers these new enhancements.

What's changing in Routeguard?

- New route advice format for ships
- New optimal speed routing algorithm
- Use of vessel-specific performance models
- Integration with Vessel Routing API

New route advice format for ships

Driven by client feedback, this new format ensures crews onboard vessels can make better use of our analyst's trusted advice. Our route analysts can now send these new files to ships:

- An initial route advice PDF
- A daily route advice PDF
- Route RTZ file (RTZ v1.0 with minimum mandatory elements)
- Route CSV file (JRC ECDIS format)

Key differences between the existing and the new route advice are summarized below:

Bunker Data	Existing route advice	New route advice
Last logged position	•	•
The remaining distance to the destination	•	•
ETA at the final destination in UTC	•	•
Comments from the route analyst	•	•
Waypoint table	•	•
Weather table	•	•
Engine load advice (MCR)		•
ETA and delay information at all intermediate stops		•
ETA in UTC and the local time zone		•
Remaining ECA distance to the destination		•
ECA entrance and exit coordinates		•
Image with route overview including visualization of ECA areas		•
Images with the weather forecast and route overlay at the start of route advice, +24 hours from the start, and +48 hours from the start		•
Graph showing calculated SOG with wind speed and wave height that the ship is expected to encounter		•
RTZ file of the route (RTZ v1.0 with minimum mandatory elements)		•
CSV file of the route (JRC ECDIS format)		•

Explanation of the new route advice PDF

- The first page contains a table summarizing the advised route, an overview map showing the route, and important commentary from the route analyst.
- The following few pages contain images showing the weather forecast along the calculated route.
- The page after the weather images contains the waypoint table.
- The next section of the route advice report contains the weather table.
- The last page of the route advice contains a time series graph showing calculated SOG with 10m wind speed and total significant wave height that the ship is expected to encounter in the weather forecast period.

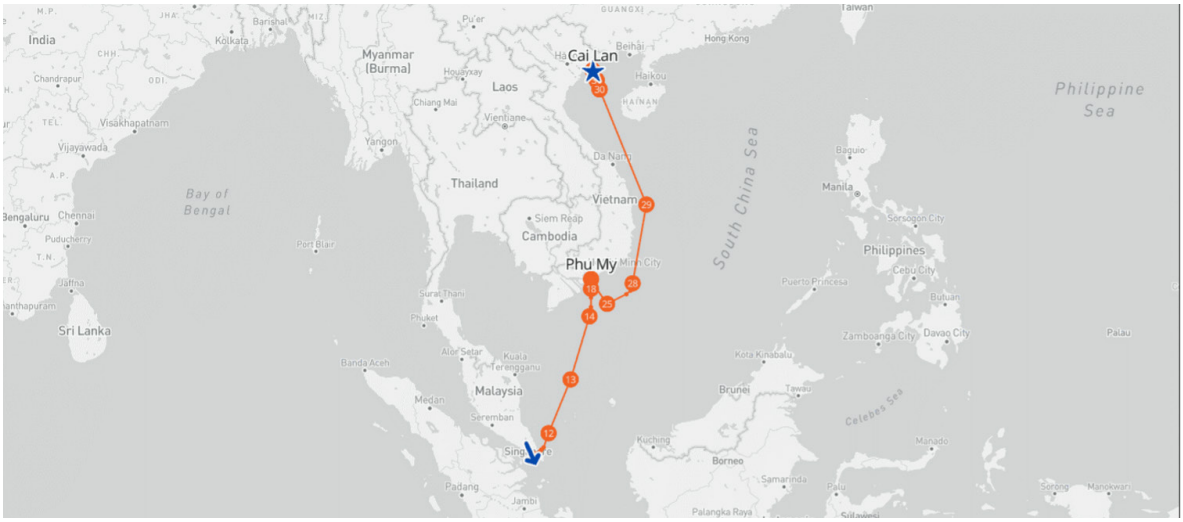
Daily Route Advice

An example summary table

Voyage Name	Optimal Speed Routing; SAN FRANCISCO - PANAMA CANAL - LE HAVRE - ANTWERP
Starting Engine Load Advice (%MCR)	89.9
ETA At Next Intermediate Stop (UTC)	LE HAVRE / 21 Aug 2023 14:59
ETA At Next Intermediate Stop (Local Time)	LE HAVRE / 21 Aug 2023 16:59
ETA Destination (UTC)	ANTWERP / 24 Aug 2023 02:45
ETA Destination (Local Time)	ANTWERP / 24 Aug 2023 04:45
Remaining Distance To Destination (Nm)	1676.2
Remaining ECA Distance To Destination (Nm)	362.0
Routing Service / Optimization Type	Optimal Speed / Cost
Last Logged Position / Start Position (UTC)	45° 43′ 19″ N 37° 0′ 18″ W @ 17 Aug 2023 11:48
Loa / Beam	183.09 m / 32.2 m
Draft Fwd / Draft Aft / Loading Condition	10.95 m / 10.95 m / Loaded

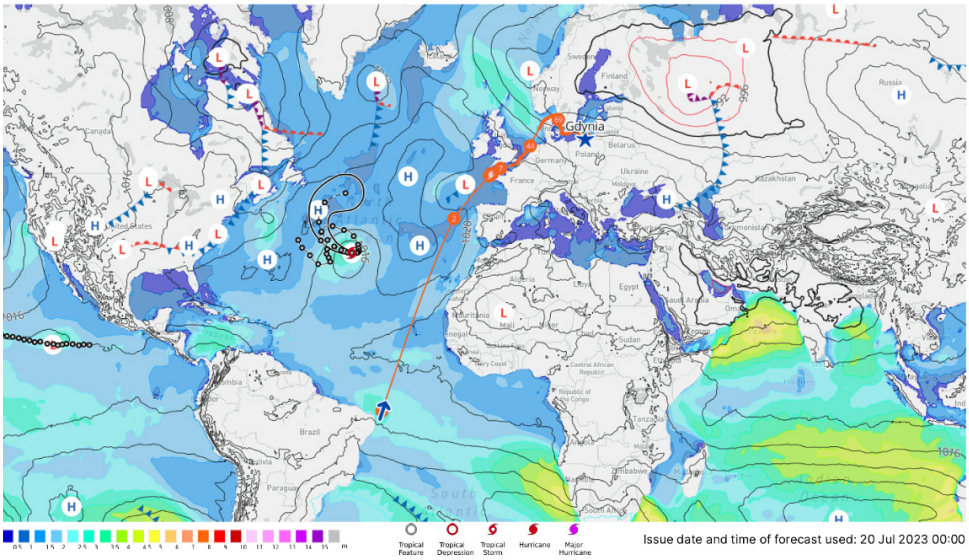
- Includes ETA at the next intermediate stop, which can be an interim port, bunker stop, armed guard stop, or a drifting location, and at the final destination, both in UTC and the local time zone of the stop
- Shows the remaining total distance and remaining ECA distance to the final destination
- Provides starting engine load advice (only when a ship-specific speed power curve is provided)

An example overview map of the advised route



- Shows the current vessel position
- Includes the location and name of the final destination with intermediate stops
- Some hard waypoints are numbered to match the numbering in the waypoint table

Visual overview of pressure, total wave height (Hs) and hurricane along the route
(Valid: 20 Jul 2023 03:00 which is approximately at the start of the route advice)



An example image showing weather along the calculated route

- The weather images show the calculated vessel position with the issue date of the forecast used for plotting and the valid time for the plotted weather
- These images include plots for pressure, total wave height (Hs), and hurricane information and show weather forecasts at the start of the route advice, at + 24 hours, and at + 48 hours
- When the route starts from outside the forecast period – which can happen when initial route advice is made well in advance of the ETD – all the images will be removed from the route advice PDF

Waypoint Table

An example waypoint table

WPs	ETA (UTC) (DD-Mon / HH:MM)	LATITUDE	LONGITUDE	Name / Delay (hours)	ETA (Local Time) (DD-Mon / HH:MM)	DISTANCE (nm)	Track Type	Engine load advice (%MCR)	SICW (SPEED ADVICE) (kn)	STW (kn)	SOG (kn)	WEATHER EFFECT (Wx) (kn)	CURRENT EFFECT (Cx) (kn)
1	15 Aug / 08:10	40° 8′ 54″ N	49° 27′ 32″ W			-	-	-	-	-	-	-	-
X	15 Aug / 12:10	40° 33′ 20″ N	48° 12′ 58″ W					89.9	15.0	15.0	15.5	-0.0	0.5
X	15 Aug / 16:10	40° 57′ 51″ N	46° 57′ 51″ W					89.9	15.0	14.9	15.5	-0.1	0.6
X	15 Aug / 20:10	41° 22′ 28″ N	45° 41′ 57″ W					89.9	15.0	14.9	15.6	-0.1	0.6
X	16 Aug / 00:10	41° 45′ 59″ N	44° 28′ 57″ W					89.9	15.0	15.1	14.9	0.1	-0.2
X	16 Aug / 04:10	42° 10′ 42″ N	43° 11′ 52″ W					89.9	15.0	15.1	15.6	0.1	0.5
X	16 Aug / 08:10	42° 35′ 39″ N	41° 53′ 20″ W					89.9	15.0	15.2	15.8	0.2	0.6
2	16 Aug / 10:31	42° 50′ 59″ N	41° 5′ 3″ W			410.0	RL	89.9	15.0	15.1	16.4	0.1	1.2
X	16 Aug / 14:31	43° 18′ 55″ N	39° 45′ 58″ W					89.9	15.0	15.1	16.1	0.1	0.9
X	16 Aug / 18:31	43° 44′ 16″ N	38° 30′ 47″ W					89.9	15.0	15.2	15.0	0.2	-0.1
X	16 Aug / 22:31	44° 8′ 46″ N	37° 14′ 34″ W					89.9	15.0	15.1	15.0	0.1	-0.0
X	17 Aug / 02:31	44° 32′ 47″ N	35° 56′ 5″ W					89.9	15.0	15.0	15.3	-0.0	0.3
X	17 Aug / 06:31	44° 55′ 44″ N	34° 37′ 4″ W					89.9	15.0	15.0	15.2	-0.0	0.2
X	17 Aug / 10:31	45° 17′ 55″ N	33° 16′ 30″ W					89.9	15.0	15.0	15.3	-0.0	0.3

- The numbered waypoints are the main navigational waypoints for ECDIS
- The rest of the waypoints (marked X) mainly provide weather impact along the track every four hours
- It shows the ETA at all intermediate stops and the final destination, both in UTC and the local time zone of the stop
- It shows the expected delays at intermediate stops; this is generally provided by the client requesting the route advice
- It shows only the main navigational waypoints when the weather forecast ends and we start using climatology
- Distance and track type in the table are only reported for main navigational waypoints, and these values are measured/valid from previous main navigational waypoint
- Contains Wx (expected speed loss due to wind and waves) and Cx (expected speed loss due to current) at all waypoints
- Engine load, speed advice, and resulting STW, SOG, Wx, and Cx values in the table are all averages since the last waypoint
- Engine load advice is given only when speed – power curve of the main engine of the vessel is provided by the client
- Rows filled in green mark waypoints that are inside the ECA region, including entry and exit points

Expected weather conditions at waypoints along the route

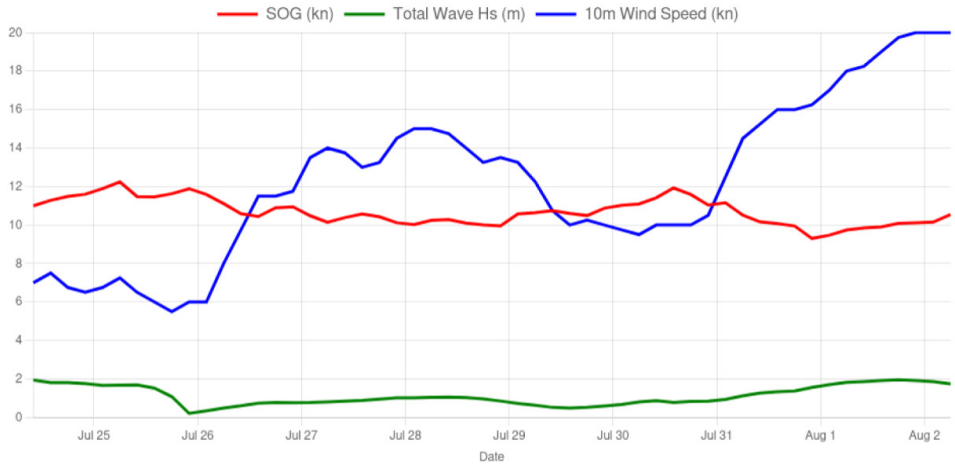
— An example weather table

WPs	ETA (UTC) (DD-Mon / HH:MM)	HPA	10 M Wind			50 M Wind		Gust		Total Wave		Wind Wave		Swell			Current	
			Dir (degree)	Speed (kn)	Risk Speed (kn)	Dir (degree)	Speed (kn)	10m (kn)	50m (kn)	Hs (m)	Risk Hs (m)	Hs (m)	Mean Period (sec)	Hs (m)	Mean Period (sec)	Dir (degree)	Dir (degree)	Speed (kn)
1	24 Jul / 06:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
X	24 Jul / 10:00	1011	120	7.0	9.0	120	8.0	9.0	9.0	1.9	2.2	0.2	2.0	1.9	10.0	180	201	0.3
X	24 Jul / 14:00	1010	130	7.5	8.0	131	7.8	8.0	8.0	1.8	2.1	0.2	2.0	1.8	10.0	181	168	0.5
X	24 Jul / 18:00	1011	133	6.8	9.0	137	6.8	7.8	7.8	1.8	1.9	0.2	2.0	1.8	10.0	187	158	0.6
X	24 Jul / 22:00	1012	121	6.5	9.0	126	6.8	8.0	8.0	1.8	1.9	0.1	2.0	1.8	10.3	190	143	0.5
X	25 Jul / 02:00	1012	96	6.8	9.0	97	7.0	7.5	7.5	1.7	1.9	0.1	1.3	1.6	11.0	190	130	0.7
X	25 Jul / 06:00	1012	181	7.3	10.0	181	7.3	8.0	8.5	1.7	1.7	0.3	1.8	1.6	11.8	197	125	0.8
X	25 Jul / 10:00	1012	164	6.5	9.0	165	7.0	8.0	9.0	1.7	1.7	0.3	2.5	1.7	11.5	192	58	0.3
X	25 Jul / 14:00	1012	155	6.0	9.0	155	7.0	8.5	9.0	1.5	1.7	0.3	2.3	1.5	10.3	197	22	0.3
X	25 Jul / 18:00	1013	167	5.5	8.0	165	7.3	8.3	9.5	1.1	1.4	0.1	1.8	1.1	7.5	200	180	0.0
X	25 Jul / 22:00	1012	183	6.0	9.0	184	8.0	9.3	11.5	0.2	0.5	0.0	0.3	0.2	1.3	0	78	0.0
X	26 Jul / 02:00	1011	161	6.0	9.0	159	8.0	8.5	10.5	0.3	0.4	0.1	1.5	0.3	3.5	72	322	0.1
X	26 Jul / 06:00	1011	134	8.0	11.0	134	8.8	8.8	10.8	0.5	0.5	0.3	2.5	0.4	5.0	85	250	0.3

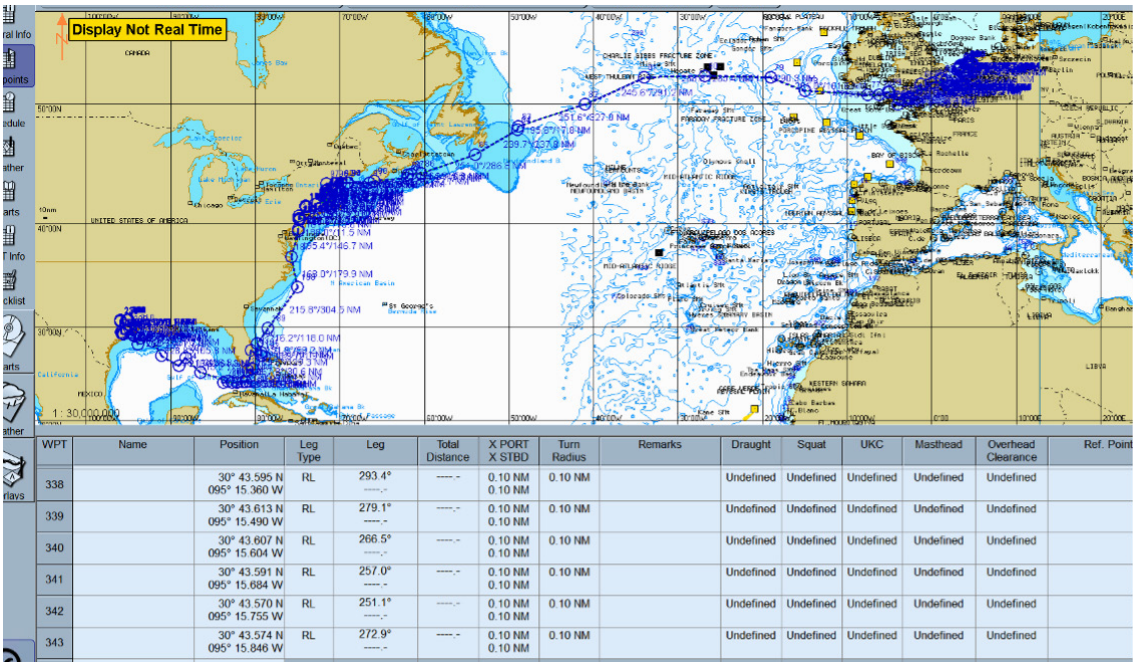
- The weather table is used to report weather along the route for the forecast period
- The waypoint sequence and numbering match the waypoint table
- All weather data in the table (except risk speed and risk Hs) are average values since the last waypoint
- Risk speed means that there is 90% confidence that mean wind speed will not exceed this value since the last waypoint
- Risk Hs means that there is 90% confidence that the significant wave height of the total wave (wind wave and swell combined) will not exceed this value since the last waypoint
- All directions use standard nautical conventions
  - Wind, waves, and swell are coming from these angles
  - Current is going to this angle
  - All angles are measured from true north
- When the route starts from outside the forecast period – which can happen when initial route advice is made well in advance of the ETD – this weather table is removed from the route advice PDF

— An example time series graph

Calculated SOG with wind and wave vessel is expected to encounter in the forecast period



When the route starts from outside the forecast period – which can happen when initial route advice is made well in advance of the ETD – this time series graph will be removed from the PDF.



WPT	Name	Position	Leg Type	Leg	Total Distance	X PORT X STBD	Turn Radius	Remarks	Draught	Squat	UKC	Masthead	Overhead Clearance	Ref. Point
338		30° 43.595 N 095° 15.360 W	RL	293.4°	----.-	0.10 NM 0.10 NM	0.10 NM		Undefined	Undefined	Undefined	Undefined	Undefined	
339		30° 43.613 N 095° 15.490 W	RL	279.1°	----.-	0.10 NM 0.10 NM	0.10 NM		Undefined	Undefined	Undefined	Undefined	Undefined	
340		30° 43.607 N 095° 15.604 W	RL	266.5°	----.-	0.10 NM 0.10 NM	0.10 NM		Undefined	Undefined	Undefined	Undefined	Undefined	
341		30° 43.591 N 095° 15.684 W	RL	257.0°	----.-	0.10 NM 0.10 NM	0.10 NM		Undefined	Undefined	Undefined	Undefined	Undefined	
342		30° 43.570 N 095° 15.755 W	RL	251.1°	----.-	0.10 NM 0.10 NM	0.10 NM		Undefined	Undefined	Undefined	Undefined	Undefined	
343		30° 43.574 N 095° 15.846 W	RL	272.9°	----.-	0.10 NM 0.10 NM	0.10 NM		Undefined	Undefined	Undefined	Undefined	Undefined	

Details about new RTZ and CSV files

Route analysts can now send a new RTZ file (RTZ v1.0 with minimum mandatory elements) and CSV file (JRC ECDIS format) to ships along with the route advice PDFs. Sample RTZ and CSV files can be produced on request.

- Files contain all the main navigational waypoints in the route advice
- Files can be imported on ECDIS systems onboard
- Estimated 70-80% of serviced vessels should be able to import at least one of these two electronic route files
- Clients should promote the use of these electronic route files onboard to:
  - Remove the burden from officers who otherwise must manually enter hundreds of waypoints on ECDIS
  - Allow crews to easily see the difference in the route by importing the new route in ECDIS and comparing it with the active route
  - Ensure ships are accurately following route advice

Upon request, we can also send SPOS files together with route advice. This file can be imported easily in SPOS software when in use onboard.

New optimal speed routing algorithm

Currently our route analysts are primarily offering these weather routing services:

- **CP routing** – when a charter party must be followed, resulting in fixed instructed speed
- **ETA routing** – when there is a strict ETA/laycan requirement, resulting in variable speeds to meet the time window in the most optimal way
- **Optimal speed routing** – when there is no fixed ETA and the vessel's speed setting can be changed along the route to achieve the most optimal voyage results

Our recently developed all-new optimal speed routing algorithm allows our analysts to determine the most cost- and fuel-efficient routes. It combines the power of weather routing and speed optimization to create route advice that can potentially improve voyage profitability without sacrificing safety and efficiency.

Here's are some key details about the algorithm's optimization logic:

- The optimal speed route is the cheapest possible route after accounting for all the applied restrictions.
- To find the optimal speed route, the search not only considers all different possible routes but also the possible different speeds along the routes. This will lead to the search being able to find a solution with favorable weather conditions, which can help save fuel consumption or overall cost by varying the speed.
- It can also find a solution that avoids heavy weather conditions by temporarily speeding up or slowing down the voyage to sail ahead of a storm or allowing it to pass. This means the speed advice is not always the local optimum; the goal is to achieve the most optimum voyage outcome.
- For ETA routing, speed changes center around the average speed required to reach the destination on time. In other words, an ETA requirement narrows the range in which the algorithm can change speed. So, if a storm is passing by the algorithm is limited in how much it can slow the vessel and still make the ETA.
- When no strict ETA is required, the algorithm uses nearly the vessel's entire speed range to achieve optimal results. The customer must provide the speed range for input in the route calculation and is responsible for aligning with the vessel and ensuring that the crew can operate within the speed range.
- The algorithm can optimize routes for overall costs – fuel, emission, daily hire, etc. – or total metric tons of fuel to be used.

Use of vessel-specific performance models

We recognize that many of our customers have their own vessel-specific performance models, whether developed in-house or by a third party, and this new feature allows them to use their models in Routeguard's voyage calculations.

The models include:

- Vessel-specific speed loss model
- Speed-fuel-RPM-MCR curve of the main engine
- Speed fuel curve for other fuel consumption (aux + boiler)

Using these models in the route calculation results in more precise routes that are optimized for the vessel's latest performance.

To have route analysts include these models in route calculations, customers must package and send their vessel-specific performance models in the provided format. We can provide sample vessel performance models in XML format by request.

Integration with Vessel Routing API

Our route analysts are now directly connected to our Vessel Routing API solution.

Creates a single source of truth as Routeguard routes will use the same routing algorithm as our direct Vessel Routing API customers.

Increases efficiencies and improves alignment between ship and shore by allowing shore-based monitoring dashboards to easily get and display the route that was send by our route analysts to vessels.

Further enhances the quality of our route advice as routes are calculated with the latest available route network in the Vessel Routing API – meaning our advice accounts for any changes to the local nautical situation in ports and passages globally.

Results in more accurate route advices due to automatic application of vessel type, size, draft, and depth related restrictions in ports and passages worldwide when calculating routes.

What is Routeguard?

Routeguard is an enhanced weather routing and voyage optimization consultancy service for ocean-going vessels provided by our unmatched team of route analysts who are also master mariners. Their unique blend of nautical and meteorological expertise ensures you'll receive a customized best route for each voyage based on your prioritized criteria, like a specific ETA, the most economical option, and more.

The service utilizes highly trusted weather forecasts, cutting-edge weather routing algorithm, and an array of technological solutions designed to advance digitalization journeys.

Learn more about Routeguard today.

VISIT WEBSITE

Glossary
STW – Speed through water
SOG – Speed over ground
ETD – Estimated time of departure
ETA – Estimated time of arrival

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