How to read DTN post voyage analysis report

Company information

DTN Mission

Empower our customers with intelligent and actionable insights that exceed their expectations and enable their success on a daily basis.

DTN Vision

To be the independent, trusted source of insights to our customers who feed, protect, and fuel the world.

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What is a post voyage analysis report?

A post voyage analysis report (PVAR) provides verified analysis of the vessel's performance, such as speed, time gains or losses, fuel consumption characteristics by fuel type, and adherence to the charter party (C/P) clauses.

You can request a PVAR is when you are using:

1. RouteGuard consultancy service & PVAR
2. FleetGuard monitoring service
3. FleetGuard without PVAR (Note: there will be additional voyage data format and quality requirements)

How to read and analyze a PVAR

A PVAR includes an introductory page followed by three sections.

1. Management summary – a review of the voyage, broken into individual legs.
2. C/P speed and consumption – includes speed, bunker, and wind and wave analyses.
3. Passage details – provides detailed track, analysis and observed weather, and bunker consumption information.

Figure 1 represents an analysis:

- **Leg description** – a short leg summary describing the applicable C/P conditions, if the vessel was laden, under ballast, or other noticeable comments (example: if a leg was performed within a sulfur emission control area.)
- **Date effective** – date from which moment on the CP was effective.
- **Speed** – an indication if the vessel's speed was in line with C/P compliance.

Post Voyage Analysis Report

Performance Results:

	Date effective	Speed	HFO consumption	MDO consumption
Laden 13.0kts		✔	✔	✔
Laden 13.0kts (SECA)	04 Jan 2020 03:30	n.a.	n.a.	n.a.
Laden 13.0kts	06 Jan 2020 09:30	n.a.	n.a.	n.a.
Laden 12.0kts	20 Jan 2020 09:45	✔	✔	✖

VesselName:
From: CORINTO
To: INCHON
Issued: January 31 2020
Reference NR: 135910

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Figure 1

1 Possible values for the speed, heavy fuel oil (HFO) consumption, and marine diesel oil (MDO) consumption are:

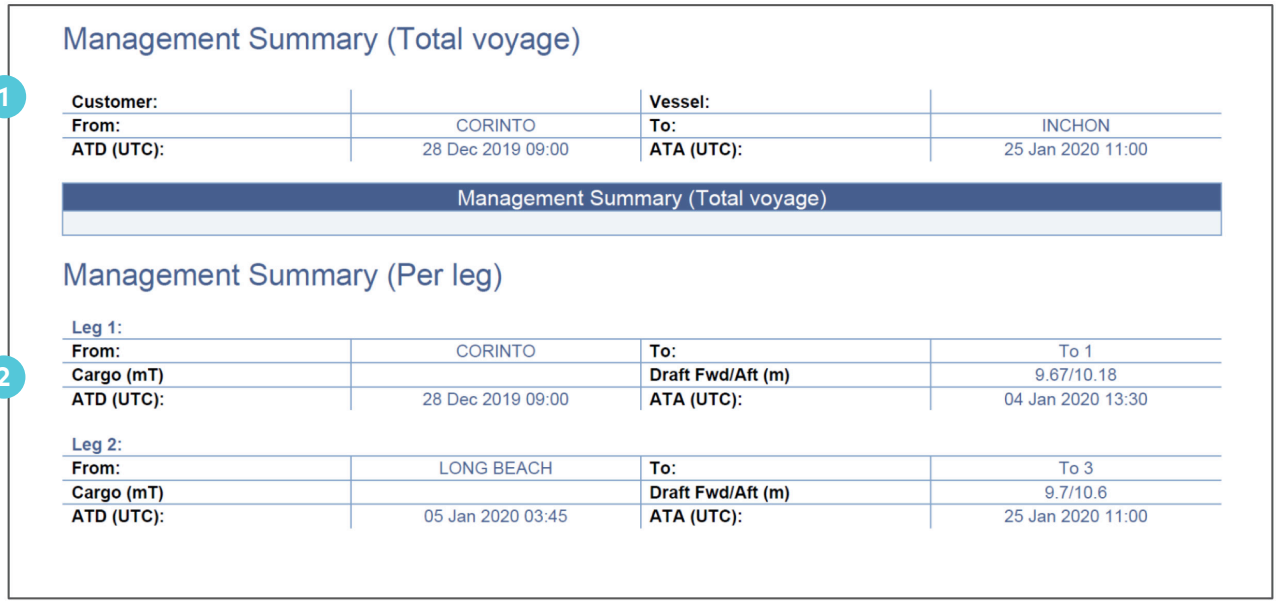
- ✖ Not compliant with the agreed-upon C/P conditions.
- ✔ Compliant with the agreed-upon C/P conditions.
- n.a. Compliance is not established due to good weather (GWx) not being analyzed.

2 There is a separate section describing the general vessel and voyage particulars:

- **Name** – name of the vessel.
- **From** – departure port for the voyage.
- **To** – destination port for the voyage.
- **Issued** – issue date and time of the PVAR.
- **Reference number** – report number, which can be used during conversations with our team.

Section 1: Management summary

The PVAR's management summary (Figure 2) provides a general overview of the voyage details, as a whole and by each leg.



Management Summary (Total voyage)

Customer:		**Vessel:**	
From:	CORINTO	**To:**	INCHON
ATD (UTC):	28 Dec 2019 09:00	**ATA (UTC):**	25 Jan 2020 11:00

Management Summary (Total voyage)

Management Summary (Per leg)

Leg 1:

From:	CORINTO	**To:**	To 1
Cargo (mT)		**Draft Fwd/Aft (m)**	9.67/10.18
ATD (UTC):	28 Dec 2019 09:00	**ATA (UTC):**	04 Jan 2020 13:30

Leg 2:

From:	LONG BEACH	**To:**	To 3
Cargo (mT)		**Draft Fwd/Aft (m)**	9.7/10.6
ATD (UTC):	05 Jan 2020 03:45	**ATA (UTC):**	25 Jan 2020 11:00

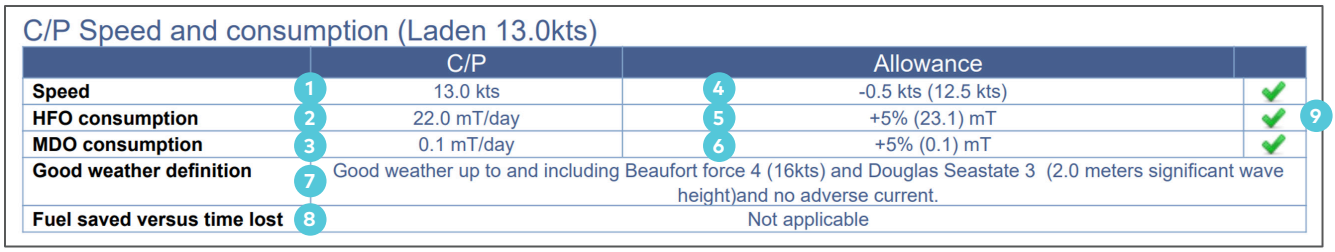
Figure 2

1. The management summary of the complete voyage is for all legs combined:
   - **Customer** – requesting company.
   - **Vessel** – name of the vessel.
   - **From** – departure port for the voyage.
   - **To** – destination port for the voyage.
   - **ATD (UTC)** – actual time of departure for the voyage in Coordinated Universal Time (UTC).
   - **ATA (UTC)** – actual time of arrival for the voyage in UTC.
   - **Management summary** – observed and written comments about the voyage provided by the operations team.

2. The management summary for the individual legs:
   - **From** – departure port name for the leg; could be a descriptive name from the previous leg.
   - **To** – destination port name of the leg; could be a descriptive name from the next leg.
   - **Cargo (mT)** – if reported, the amount of cargo on board the vessel in metric tons (mT).
   - **Draft Fwd/Aft (m)** – if reported, the daft forward (bow) and the draft aft (stern) in meters for the leg.

Section 2: C/P speed and consumption

The C/P speed and consumption table (Figure 3) lists the agreed-upon C/P conditions and allowances that we use for the analysis of the leg. Typically, this information is provided ahead of the voyage. An icon (refer to the green checkmark) is shown if the vessel has complied with the C/P conditions for this part of the voyage.



C/P Speed and consumption (Laden 13.0kts)

	C/P	Allowance	
Speed (1)	13.0 kts	(4) -0.5 kts (12.5 kts)	✔
HFO consumption (2)	22.0 mT/day	(5) +5% (23.1) mT	✔ (9)
MDO consumption (3)	0.1 mT/day	(6) +5% (0.1) mT	✔
Good weather definition	(7) Good weather up to and including Beaufort force 4 (16kts) and Douglas Seastate 3 (2.0 meters significant wave height)and no adverse current.		
Fuel saved versus time lost	(8) Not applicable		

Figure 3

The C/P speed and consumption table contains the following information:

1. **Speed** – warranted speed, as agreed on between the charterer and owner.
2. **HFO consumption** – C/P-warranted, HFO-categorized consumption, as agreed on between the charterer and owner.
3. **MDO consumption** – warranted, MDO-categorized consumption, as agreed on between the charterer and owner.
4. **Allowance on speed** – minimum warranted speed. Without specification in the CP, 0.5kts is used as an allowance on speed.
5. **Allowance on HFO consumption** – maximum warranted daily HFO-categorized consumption based on the C/P.
6. **Allowance on MDO consumption** – maximum warranted daily MDO-categorized consumption based on the C/P.
7. **Good weather (GWx) definition** – the conditions on warranted speed and consumption, based on the C/P (vessel's description). In cases where GWx is not specified in the C/P agreement, by default, DTN uses up to and including Beaufort Scale wind force 4 and Douglas Sea Scale state 3.
8. **Fuel saved vs. time lost** – if about is + and - 5%, fuel savings are offset against C/P consumption -5%. Fuel saved vs. time lost is then applicable. If about is only +5%, then fuel saved vs. time lost is not applicable. About is an agreed-upon clause between the C/P and the party.
9. **Icon indicators** – indicating C/P compliance for this part of the voyage. The following icons are being used:
   - ✖ Not compliant with the agreed-upon C/P conditions.
   - ✔ Compliant with the agreed-upon C/P conditions.
   - n.a. Compliancy is not established due to GWx periods not being analyzed.

Section 2.1: Speed analysis

The speed analysis (Figure 4) table consists of the following parts:

1. **All weather** – a summary of voyage details in all weather conditions of the total voyage.
2. **Good weather** (GWx) – a summary of voyage details in good weather conditions. The analysis only covers the parts where the vessel experienced GWx (according to the GWx definition).
3. **Calculation** – the underlying data for calculation.
4. **Result** – this part provides the time deviation (gain or loss), showing the underlying calculation and result.

Speed analysis

	1 All weather	2 Good weather
5 Distance	2043.84 nm	444.95 nm
6 Time	155.0 hrs	34.0 hrs
7 Average speed	13.186 kts	13.087 kts
8 Average RPM	88.0 RPM	86.7 RPM
9 Current factor	0.019 kts	0.086 kts
10 Weather factor	0.166 kts	0.0 kts
11 Performance speed	13.0 kts	13.0 kts

	3 Calculation	4 Result
12 C/P Time	2043.8 nm / 13.00 kts	157.22 hrs
13 Maximum warranted time	2043.8 nm / 12.50 kts	163.51 hrs
14 GWT extrapolated voyage	2043.8 nm / 13.00 kts	157.2 hrs
15 Time gain		0.01 hrs

Figure 4

5 **Distance**

- All weather – analyzed distance from the start of sea passage (SOSP) until the end of sea passage (EOSP), along with all received positions from the vessel, as reported; possibly complemented with manual backtrack markers to account for navigational features. Positions from the vessel, sent either via email or through the automated identification system (AIS).
- Good weather (GWx) – accumulated distance of all good weather periods, calculated along the reported positions (via email or AIS) from the vessel.

6 **Time**

- All weather – time between first SOSP and last EOSP, excluding the time between intermediate SOSP and EOSP reports or positions "excluded from analysis" (highlighted in yellow on the passage table).
- Good weather (GWx) – accumulated time of all good weather periods.

7. **Average speed**
   - All weather – the all weather distance divided by the all weather time, resulting in the average speed during the all weather analyzed parts of the voyage.
   - Good weather (GWx) – the good weather distance divided by the good weather time, resulting in the average speed during the good weather analyzed parts of the voyage.
8. **Average revolutions per minute (RPM)**
   - All weather – average RPM as reported by the vessel, during the all weather analyzed parts of the voyage.
   - Good weather (GWx) – average RPM as reported by vessel, during the good weather analyzed parts of the voyage.
9. **Current factor**
   - All weather – the effect of the current on vessel speed, based on analyzed current data for the total voyage.
   - Good weather (GWx) – the effect of the current on vessel speed, based on analyzed current data for the analyzed good weather period.
10. **Weather factor**
    - All weather weather factor – is primarily the weather factor on all weather. The mathematical equation is: weather factor = performance speed – current factor – average speed.
    - Good weather (GWx) weather factor – is, by definition, zero for good weather periods, following the warranties on speed and consumption. The physical, real-life weather factor is not zero, but this is not relevant in relation to the warranties from the C/P.
11. **Performance speed**
    - All weather performance speed – all weather performance speed is considered to be equal to good weather performance speed.
    - Good weather (GWx) performance speed – is the mathematical equation: average good weather speed + current factor + weather factor.
12. **C/P time** – is all weather distance divided by the C/P speed.
13. **Maximum warranted time** – is the all weather distance divided by the minimum warranted speed.
14. **Good weather time (GWT) extrapolated voyage** – all weather distance divided by the performance speed.
15. **Time gain** – indicates the deviation in time, reflecting performance on speed. Time gain is highlighted in green. Time loss is highlighted in red. Time loss is: maximum warranted time – GWx extrapolated time. Time gain is: C/P time – GWx extrapolated time.

Section 2.2: Bunker analysis

Figure 5 is the HFO bunker analysis. Figure 6 represents the MDO bunker analysis.

HFO Bunker evaluation

	All Weather	Good Weather
Consumption	65.25 mT	65.25 mT
Average per day	17.576 mT	17.576 mT
GWx allowed consumption		69.424 / 72.895 mT
GWx allowed consumption extrapolated		71.670 / 75.253 mT
GWx cons. extrapolated voyage		64.91 mT
Deviation total voyage (under consumption)		6.76 mT

Figure 5

MDO Bunker evaluation

	All Weather	Good Weather
Consumption	0.0 mT	0.0 mT
Average per day	0.0 mT	0.0 mT
GWx allowed consumption		0.371 / 0.390 mT
GWx allowed consumption extrapolated		0.383 / 0.402 mT
GWx cons. extrapolated voyage		0.0 mT
Deviation total voyage (under consumption)		0.38 mT

Figure 6

Consumption

- All weather – total consumption during the voyage, accumulated reported consumptions on good weather days, or consumption based on reported remaining on board (ROB) figures on reported positions.
- Good weather (GWx) – total consumption during good weather. It is the number of consumed bunkers or consumption based on reported remaining on board (ROB) figures during the good weather periods.

Average-per-day during

- All weather – the number of consumed bunkers divided by the all weather time, multiplied 24.
- Good weather (GWx) – the number of consumed bunkers in good weather divided by the good weather time, multiplied by 24.

Good weather allowed consumption (excluding allowance)/(including allowance) = (GWx time x CP consumption/24hrs and GWx time x maximum allowed consumption/24hrs)

Good weather allowed consumption extrapolated over the voyage (excluding allowance)/(including allowance) = (maximum warranted time x CP consumption/24hrs and maximum warranted time x maximum warranted consumption/24hrs).

Good weather consumption extrapolated voyage – the extrapolated good weather consumption based on the good weather consumption and the performance speed. Equals: GWT extrapolated time x average per day good weather consumption/24hrs per day divided by 24 times the total voyage time.

Deviation total voyage (under or over consumption) – as per the evaluation result in accordance with C/P. Refer to annexure A.

Section 2.3: Wind and wave analysis

The wind analysis (Figure 7) shows in detail the total hours of direction and strength of wind in Beaufort for the total voyage. The wave analysis (Figure 8) shows in detail the total hours of significant wave height in meters and direction of waves for the total voyage. The following table shares statistical information on the experienced weather conditions. These images are for illustrative purposes only.

The map (Figure 9) shows a visual of the track of the total voyage. Each reported position from the vessel shows: the day of the month (in black), a wind barb indicating wind at that time by 5 kts steps (in red), and the total significant wave height and direction (in blue).

Wind analysis
Number of hours of wind
Beaufort, total significant wind

Relative Bearing Wind Force		Head 0-30	Bow 30-60	Beam 60-120	Quarter 120-150	Follow 150-180	Total Hours	Percentage
Bft	< 1							
	2			3	10	6	19	21 %
	3	21	5	5	11	12	53	59 %
	4				7	11	18	20 %
	5							
	6							
	7							
	8							
	9							
	> 10							
Total hours		21	5	7	28	29	89	100 %
Percentage		23	5	8	31	32	100	

Figure 7

Wave analysis
Number of hours of wave height
Meters, total significant wave height

Relative Bearing Wave Height		Head 0-30	Bow 30-60	Beam 60-120	Quarter 120-150	Follow 150-180	Total Hours	Percentage
Meters	0	12	6		2		20	22 %
	1	0	0	36	29	4	69	78 %
	2							
	3							
	4							
	5							
	6							
	7							
	8							
	>9							
Total hours		12	6	36	31	4	89	100 %
Percentage		14	7	40	35	4	100	

Figure 8

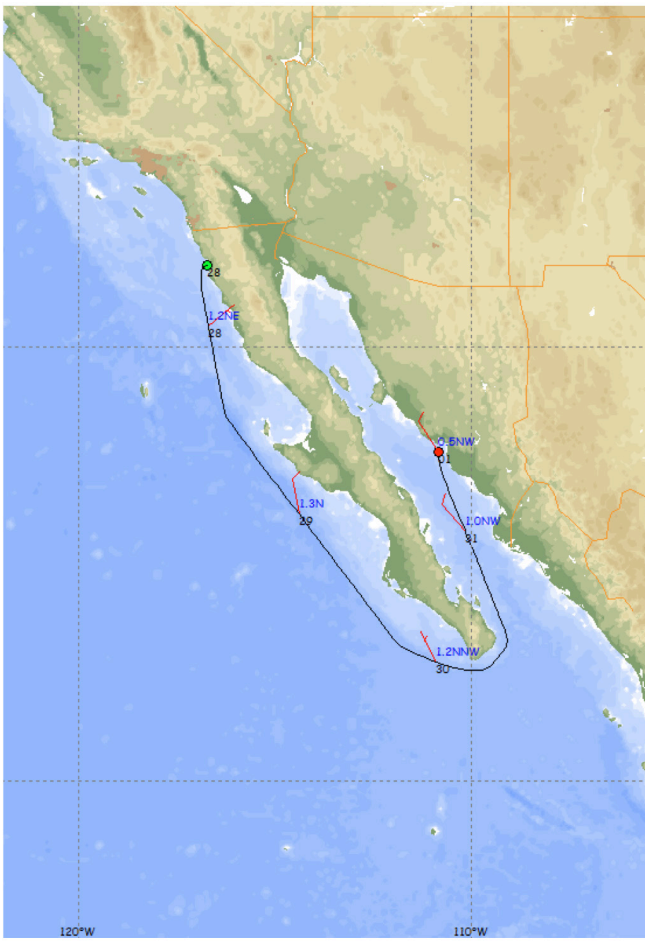


Figure 9

Section 3: Passage details

The passage details (Figure 10) present detailed information related to track, our weather forecast, bunker consumption, and observed weather by the master mariner. The days can have multiple colors:

- **Green** – indicates that this voyage day can be seen as within the C/P details of a good weather day.
- **White** – indicates that this is not a good weather day.
- **Yellow** – indicates days that have been excluded from the analysis. Time and distance of these days are not included in the performance calculations.
- **Orange** – indicates an analyzed good weather day, which is not taken into account as a good weather day. It is excluded from the good weather period included in the total voyage.

Table Passage 1

	Track									Weather									Bunkers				Vessel obs. weather				
																			HFO (mT)		MDO (mT)			Wind	Wave	Swell	
Nr.	Code	Date	Time(UTC)	Lat	Lon	Dist (nm)	SOG (kts)	Avg. RPM (RPM)	Current (kts)	Current factor	STW (kts)	Wind Bft (kts)		Wave (m)	Swell (m)		Total Wave Height DSS (m)		ROB	AV(24H)	ROB	AV(24H)	Current Dir (kts)	Dir (Bft/kts)	(m)	Dir	(m)
0	SP	28/10	11:42	31°46'N	116°44'W				S			N			N			1164.0				ENE (0.1)	E (3)(8.0)	0.5	W	0.5
		28/10	12:00	31°45'N	116°49'W				SE	0.2	-0.1	E	2(5.0)	0.2	WSW	1.0	1.02									
		28/10	18:00	30°38'N	116°44'W				S	0.3	0.3	ENE	2(4.0)	0.0	W	1.3	1.3									
1	RP	28/10	19:00	30°27'N	116°41'W	83.7	11.47	88.1	SE	0.22	0.15	11.33	NE	2(5.0)	0.11	W	1.2	3(1.2)	1158.8	17.3			ESE (0.3)	SE (3)(8.0)	0.5	W	1.0
		29/10	00:00	29°26'N	116°28'W				SSW	0.4	0.3	NW	4(12.0)	0.3	WNW	1.2	1.24									
		29/10	06:00	28°07'N	115°59'W				SSW	0.4	0.2	NNW	4(16.0)	0.8	W	1.2	1.44									
		29/10	12:00	27°13'N	115°13'W				N	0.1	-0.1	N	4(14.0)	0.8	WNW	1.2	1.44									
		29/10	18:00	26°21'N	114°28'W				ENE	0.1	0.0	NE	3(9.0)	0.4	WNW	1.2	1.26									
2	RP	29/10	19:00	26°15'N	114°23'W	287.4	11.97	88.7	SW	0.34	0.18	11.79	N	4(12.0)	0.52	WNW	1.17	3(1.3)	1141.2	17.5			NW (0.1)	E (3)(8.0)	0.5	W	1.0
		30/10	00:00	25°26'N	113°42'W				SE	0.2	0.2	NW	2(6.0)	0.2	WNW	1.2	1.22									
		30/10	06:00	24°27'N	112°53'W				WNW	0.3	-0.3	WNW	2(6.0)	0.2	WSW	1.2	1.22									
		30/10	12:00	23°31'N	112°07'W				WSW	0.3	-0.1	N	3(8.0)	0.2	SW	1.2	1.22									
		30/10	18:00	22°51'N	111°00'W				N	0.3	-0.2	NNW	3(10.0)	0.4	SW	1.2	1.26									
3	RP	30/10	19:00	22°49'N	110°54'W	285.8	11.91	88.8	S	0.25	-0.07	11.97	NW	3(7.0)	0.25	W	1.2	3(1.2)	1123.6	17.6			SW (0.1)	N (3)(8.0)	0.5	SW	1.0
		31/10	00:00	22°38'N	109°45'W				SW	0.4	-0.3	W	3(7.0)	0.5	SSW	1.1	1.21									
		31/10	06:00	23°31'N	109°08'W				S	0.5	-0.5	NW	3(10.0)	0.4	SSW	1.0	1.08									
		31/10	12:00	24°33'N	109°35'W				SSE	0.5	-0.5	NW	3(8.0)	0.4	N	0.6	0.72									
		31/10	18:00	25°45'N	110°07'W				SSE	0.2	-0.2	NNW	3(8.0)	0.4	WNW	0.5	0.64									
4	RP	31/10	19:00	25°51'N	110°09'W	286.3	11.93	88.7	S	0.35	-0.29	12.22	NW	3(8.0)	0.42	WSW	0.86	3(1.0)	1106.0	17.6			ESE (0.2)	NNW (3)(8.0)	0.5	SW	0.5
		01/11	00:00	26°55'N	110°38'W				SE	0.7	-0.7	NW	3(9.0)	0.4	SSE	0.3	0.5									
5	EP	01/11	04:48	27°39'N	110°50'W	114.6	11.69	88.5	E	0.37	-0.23	11.92	NW	3(8.0)	0.37	S	0.31	2(0.5)	1098.8	17.8			E (0.3)	NW (3)(8.0)	0.5	S	0.5

Legend

PP	Polled position
IP	Insert position
EP	End of sea passage
SP	Start of sea passage
RP	Reported position

Good weather

Excluded from good weather

Excluded from analysis

Figure 10

Per column definitions for Figure 10

- **Start of sea passage (SP)** – is the start of the sea passage, as reported by the vessel.
- **Speed over ground (SOG)** – the distance along logged positions/time between same positions.
- **Average rounds per minute (RPM)** – as reported by vessel.
- **Current direction and speed** – current analysis data.
- **Current factor** – geometric difference between the vessel's heading and speed through water and the vessel's course over ground (COG) and vessel's SOG.
- **Speed through water** – SOG corrected for current factor.
- **Wind direction/Bft/wind speed** – analyzed weather data.
- **Wave (m)** – significant wind wave height during the period.
- **Swell (m)** – swell direction and height in meters.
- **Total wave height and Douglas Sea State** – analyzed total significant wave height (significant wind wave height + swell height). Equivalent Douglas Sea State is added, considering that Douglas Sea State refers to total wave height.
- **Remaining on board (ROB)** – reported ROB figures from the vessel.
- **AV (24H)** – either reported consumption, pro rata to 24 hours, or difference between ROB, pro rata to 24 hours.
- **Observed weather** – weather data as reported by the vessel in daily reports (illustrative only).

	Nr	- reported position sequence number
	Code	- SP = start of sea passage; RP = reported position, EP = end of sea passage
Track	Date	Day and month of the reported or intermediate position
	Time (UTC)	Time in UTC of reported position or intermediate position
	Lat	Latitude of reported or intermediate position
	Long	Longitude of reported or intermediate position
	Dist (nm)	Analyzed distance between consecutive reported positions
	SOG (kts)	Distance divided by time between consecutive reported positions
	Avg. RPM (RPM)	Reported average RPM
Weather	Current (kts)	Analyzed current, direction, and velocity
	Current factor	Effect of the current on the progress of the vessel
	STW (kts)	Resulting speed following the SOG and the current factor
	Wind Bft (kts)	Analyzed wind direction and strength in Bft (and knots)
	Wave (m)	Analyzed height of wind waves in meters
	Swell (m)	Analyzed direction and height of swell waves
	Total wave height DSS (m)	Analyzed total significant wave height, including reference to Douglas Scale (and total significant height in m)
Bunkers	HFO (mT)	Heavy fuel oil
	ROB	Reported ROB HFO (or HFO LS, HFO ULS, HFO LS DM, HFO ULS DM)
	AV (24hH)	Reported HFO consumption pro rata to 24 hours, or difference between reported ROB figures, pro rata to 24 hours
	MDO (mT)	Marine diesel oil
	ROB	Reported ROB MDO (or MDO LS, MGO, MGO LS, MGO ULS)
	AV (24H)	Reported MDO consumption pro rata to 24 hours or difference between reported ROB figures, pro rata to 24 hours
Vessel's	Current Dir (kts)	Reported current by vessel (direction and velocity), as logged in the noon report
observed	Wind DIR(Bft/kts)	Reported wind direction and strength (either on the Beaufort scale or in knots), as logged in the noon report
weather:	Wave (m)	Reported wind wave height in meters, as logged in the noon report
	Swell	Reported swell direction, as logged in the noon report
	(m)	Reported swell height in meters, as logged in the noon report

Figure 11

Frequently asked questions

How do I order a PVAR?

If you have the service under contract, a PVAR is automatically is created. If you do not have a contract, please contact our sales team to request a PVAR as a one-off service.

What inputs should I provide?

For a PVAR, you should provide the following daily inputs:

- Only ROB figures are sufficient, depending on your needs.
- SOSP, daily noons, and EOSP, including date and time in UTC are required. If passing through SECA, fuel change-over reports are required, including all above details. If speed order was changed, separate position report for change of speed is required, including above details.
- C/P details
    - Vessel's description, including warranted speed and consumption, and conditions for warranties, performance, or weather routing clause.

What is a service-level agreement?

By default, a PVAR is product delivered through our RouteGuard + PVAR service. A PVAR is created within two working days after the voyage is completed and the end of sea passage report is received. While discussing the contract with your account manager, following topics should be agreed upon as input for the service-level agreement:

- Definition of a good weather day.
- Allowance of speed and consumption deviation during a voyage.

Who should I contact for further questions?

You can contact your account manager if you have general PVAR-related questions.

For specific questions related to a DTN-issued PVAR, please contact our shipping team directly via: shippingoperations@dtn.com. Please make sure to also mention the report reference number to allow for a swift response.

Appendix A

Derivation of analysis figures

DTN uses eight decimal digit numbers in calculations, but shows two digits only in its reports.

Speed

$$\text{Charter party time} = \frac{\text{Distance}}{\text{Charter party speed}}$$

$$\text{Maximum warranted time} = \frac{\text{Distance}}{\text{Minimum warranted speed}}$$

Maximum warranted speed = Charter party speed – Allowance
(When the term 'about speed' is used the allowance is interpreted as 0.5 knots.)

$$\text{Good weather average speed} = \frac{\text{Good weather distance}}{\text{Good weather time}}$$

$$\text{All weather average speed} = \frac{\text{Distance}}{\text{All weather time}}$$

Performance speed = Average speed – Weather factor – Current factor

Weather factor = All weather average speed – Performance speed – All weather current factor

$$\text{Time gained} = \frac{\text{Distance}}{\text{Charter party speed}} - \frac{\text{Distance}}{\text{Performance speed}}$$

$$\text{Time lost} = \frac{\text{Distance}}{\text{Minimum warranted speed}} - \frac{\text{Distance}}{\text{Performance speed}}$$

Consumption

(When the term 'about consumption' is used the allowance is interpreted as 5%.)

Good weather consumption = Charter party consumption (+ Allowance) x Good weather time

$$\text{Good weather consumption extrapolated} = \text{Charter party consumption (+ Allowance)} \times \frac{\text{Maximum warranted time}}{24}$$

$$\text{Good weather consumption extrapolated voyage} = \text{Average daily good weather consumption} \times \left(\frac{\frac{\text{Distance}}{\text{Performance speed}}}{24} \right)$$

$$\text{Deviation voyage (over consumption)} = \left(\frac{\text{Distance}}{\text{Performance speed}} \times \frac{\text{Good weather consumption}}{\text{Good weather time}} \right) - \left(\frac{\text{Distance}}{\text{Minimum warranted speed}} \times \frac{\text{Charter party consumption w/ allowance}}{24} \right)$$

$$\text{Deviation voyage (under consumption)} = \left(\frac{\text{Distance}}{\text{Performance speed}} \times \frac{\text{Good weather consumption}}{\text{Good weather time}} \right) - \left(\frac{\text{Distance}}{\text{Minimum warranted speed}} \times \frac{\text{Charter party consumption}}{24} \right)$$

$$\text{Deviation voyage (fuel saved vs. time lost)} = \left(\frac{\text{Distance}}{\text{Performance speed}} \times \frac{\text{Good weather consumption}}{\text{Good weather time}} \right) - \left(\frac{\text{Distance}}{\text{Minimum warranted speed}} \times \frac{\text{Charter party consumption w/ neg. allowance}}{24} \right)$$

Appendix B

RouteGuard performance assessment methodology

The methodology used in RouteGuard complies with maritime arbitration standards. The good weather analysis method is based on the same principles set out by "The Didymi (1987) 2 Lloyd's Rep. 166" and "the Gas Enterprise (1993) 2 Lloyd's Rep. 352." DTN uses a minimum of 75% good weather between consecutive daily noon positions according to the good weather definition, as described in the charter party.

Based on the principles as set out by "The Gaz Energy (2012) Lloyd's Rep. 852," in cases where an about clause is included and where time loss is set-off against an under-consumption on vessel bunker consumption, a -5% allowance is applicable on the daily charter party consumption.

In cases where good weather is not specified within the charter party, the analysis will be based on the upper limit of wind force 4 Beaufort and a significant wave height of 2.0 meters (based on the upper limit of Douglas Sea State 3). When no good weather days occur during a passage or voyage, the good weather, speed, and bunker analysis cannot be calculated. When the charter party includes an about clause, DTN will use an allowance of 0.5 knots on the charter party speed and an allowance of 5% on fuel consumption.

DTN uses the analyses of three worldwide weather models to calculate performance analysis. Current information is obtained from the Mercator models and the U.S. Naval Research Laboratory.

Appendix C

RouteGuard definitions

General

Sea passage	A trip or track of a ship between the position associated with the start of a sea passage and the position associated with the consecutive end of a sea passage.
Voyage	A trip or track of a ship consisting of one or more consecutive sea passages.

Time & speed analysis

Charter party time	Figure representing the theoretical time the vessel needs to cover the voyage distance when traveling at charter party speed.
Minimum warranted speed	Charter party speed minus the allowance (about).
Maximum warranted time	Figure representing the theoretical time the vessel needs to cover the voyage distance when traveling at the minimum warranted speed.
Good weather definition	Definition of good weather as specified in the charter party agreement in force. In cases where good weather is not specified in the charter party agreement, it is assumed to be up to and including wind force 4 Beaufort and up to and including Douglas sea state 3.
Sea passage distance (All weather distance)	The (accumulated) computed distance sailed over one or more sea passages, between the positions associated with start of sea passage and the positions associated with end of sea passage reports i.a.w. the ship's position reports, polling information following the established routes and fairways.
Good weather distance	The computed (accumulated) distance sailed under good weather conditions (according to the good weather definition), between the positions associated with start of sea passage and the positions associated with end of sea passage reports, i.a.w. the ship's position reports, polling information, and the established routes and fairways.

Good weather analysis	Analysis of the sailed track related to the good weather distance.
Weather factor	The calculated influence of the weather on the ship's speed through the water. By definition, the weather factor during good weather conditions is zero.
Performance speed (Good weather)	Calculated speed, through the water, based on good weather analysis.
Time gained	The figure representing time gained for the voyage, based on the extrapolation of time gained during the good weather part of the voyage. For calculations, DTN uses the charter party speed as the benchmark.
Time lost	The figure representing time lost for the voyage, based on the extrapolation of time lost during the good weather part of the voyage. For calculations, DTN uses the minimum warranted speed.

Bunker evaluation

Actual consumption (All weather)	The total number of consumed bunkers during the voyage, based on the master's position reports.
Actual consumption (Good weather)	The total number of consumed bunkers during good weather, based on the master's position reports.
Actual average per day (All weather)	The number of consumed bunkers divided by the all-weather time, multiplied by 24.
Actual average per day (Good weather)	The number of consumed bunkers in good weather divided by the good weather time and multiplied by 24.
Allowed consumption total voyage	The range between the minimum and the maximum number of bunkers allowed to be consumed during the entire voyage, based on the total voyage time, including time lost or gained, multiplied by the daily charter party consumption (+/- the allowance).
Good weather consumption total voyage	The extrapolated good weather consumption, based on the good weather consumption per day divided by 24, multiplied by the total voyage time.
Deviation total voyage	The amount of under or overconsumption in mT during the total voyage. It is the difference between the allowed total consumption total voyage and the good weather consumption total voyage.