



# CTS

CREW TRANSFER SUPPORT SYSTEM

by  SkySails

# WHO WE ARE



„Environmental Technology of the Year“ Sustainable Shipping Awards 2011



CleanShipping



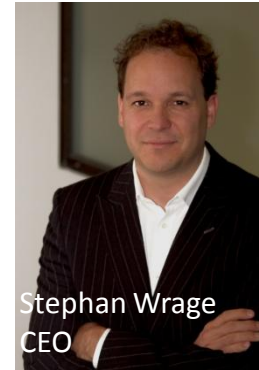
**Lloyd's List**

## We deliver

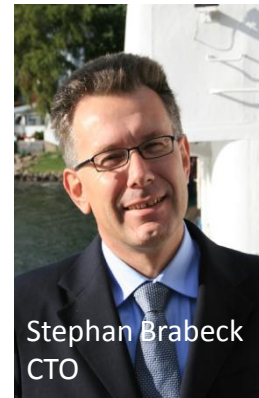
- Unique technologies
- For the energy and marine industry
- That increase profits and reduce emissions

## We have

- Been active in shipping since 2001:  
16 years of practical experience
- A team of ~40 highly qualified employees



Stephan Wrage  
CEO



Stephan Brabeck  
CTO



Customers, e.g.



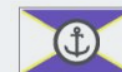
**Cargill**



WESSELS  
Reederei GmbH & Co. KG



ANBROS MARITIME S.A.



Humboldt  
Shipmanagement



# SKYSAILS – BUSINESS UNITS



**POWER**



**SENSOR**



**PROPULSION**

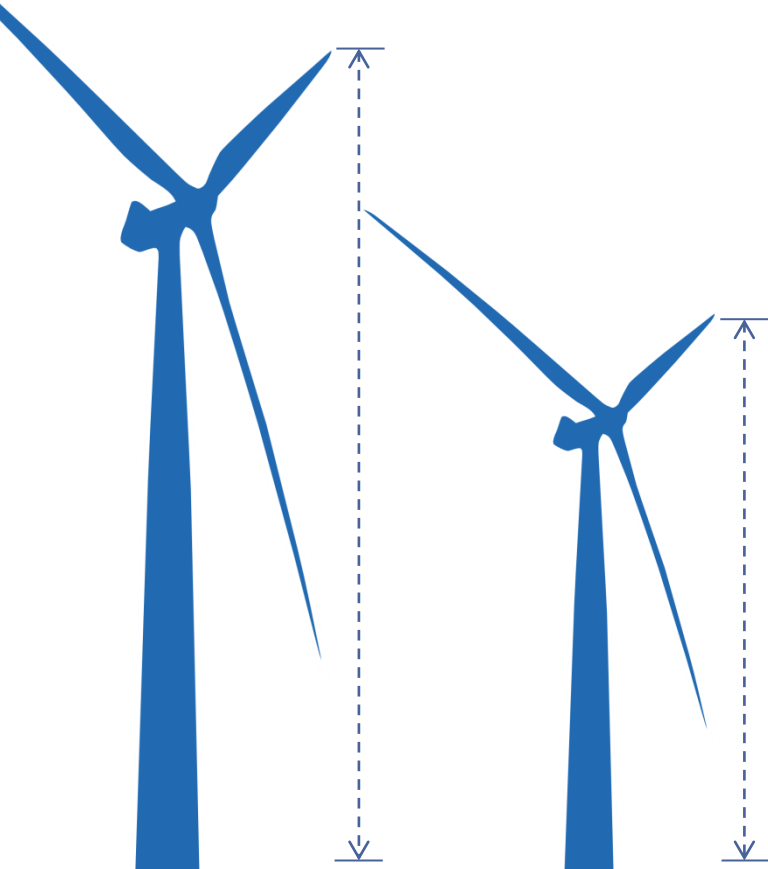


**PERFORMANCE**



**MANAGEMENT**

# Größenentwicklung & Folgen



- Neue Anforderung im Bereich Crew Transfer
- Größere Bauteile = größere Traglast
- Eignung neuer Schiffstypen muss überprüft werden
- Impact an der Turbine ändert sich (Risiko)
- Schadenshöhe bei Beschädigung steigt
- Monetäre Verlust bei Ausfall der Anlage durch mangelnde Instandhaltung oder defekten

# PLAN-DO-CHECK-ACT

## PLAN

- ✓ Planung
- ✓ Wettervorhersage
- ✓ Vermeidung von Claims



## DO

- ✓ Echtzeit Datenübermittlung
- ✓ Eine Datenquelle
- ✓ Hochpräzise Messung



## CHECK

- ✓ Alarm via mail
- ✓ Automatisierte Dokumente
- ✓ Tailored Reports

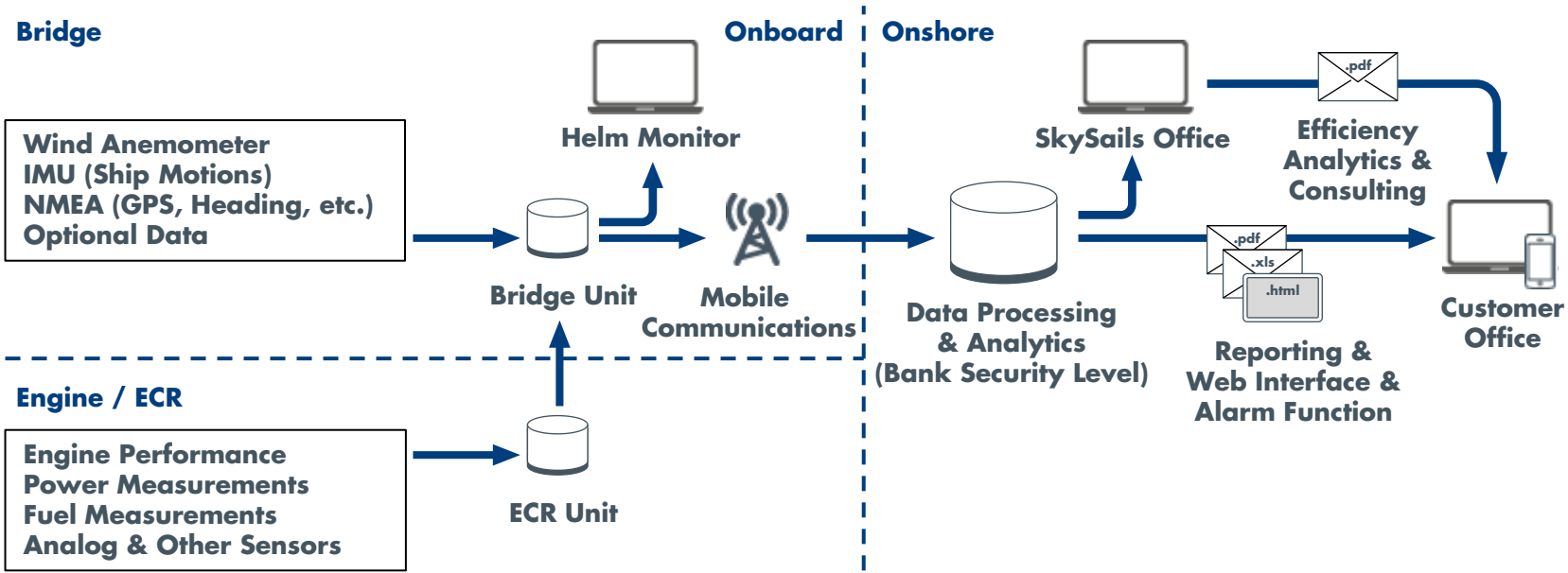


## ACT

- ✓ Optimierte Performance
- ✓ Evaluierung der Prozesse
- ✓ Profilerstellung der Schiffe



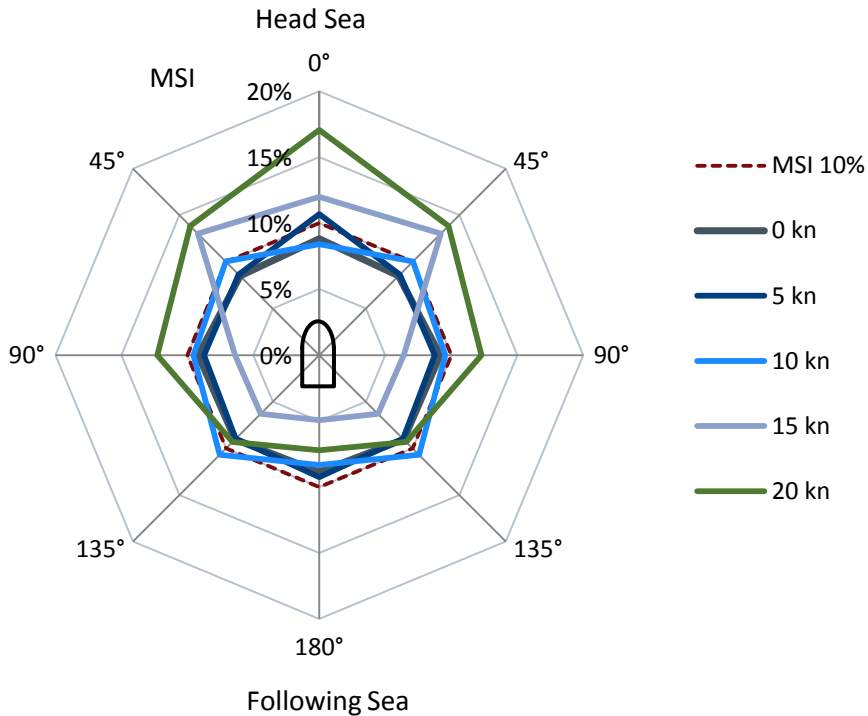
# SYSTEMSTRUKTUR



# MOTION SICKNESS

ISO 2631/3

Motion Sickness Index (MSI) [%] at Hsig = 1m

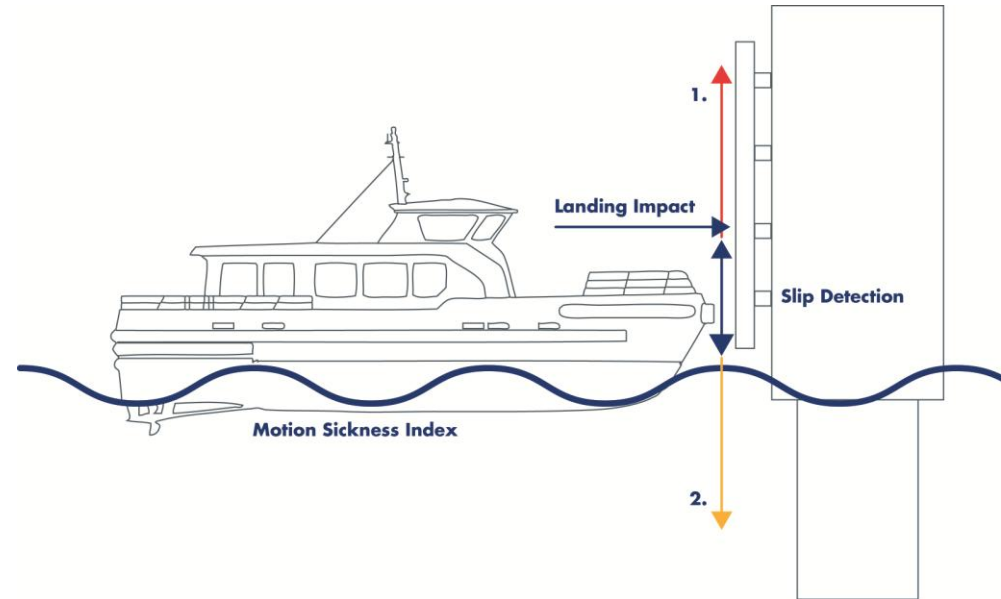
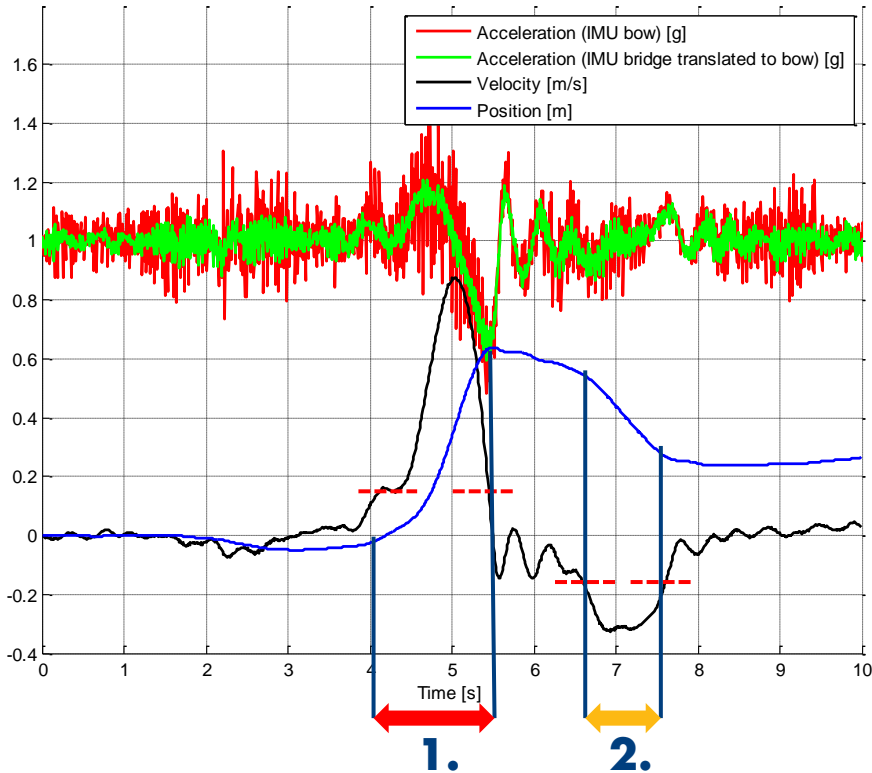


PROFIL Hsig= 1m					
	0°	45°	90°	135°	180°
0 kn	✓	✓	✓	✓	✓
5 kn	✗	✓	✓	✓	✓
10kn	✓	✓	✗	✗	✓
15 kn	✗	✗	✓	✓	✓
20 kn	✗	✗	✗	✓	✓

# SLIP

Vertical motion of Bow (15m/s):

≈ 0.6 m

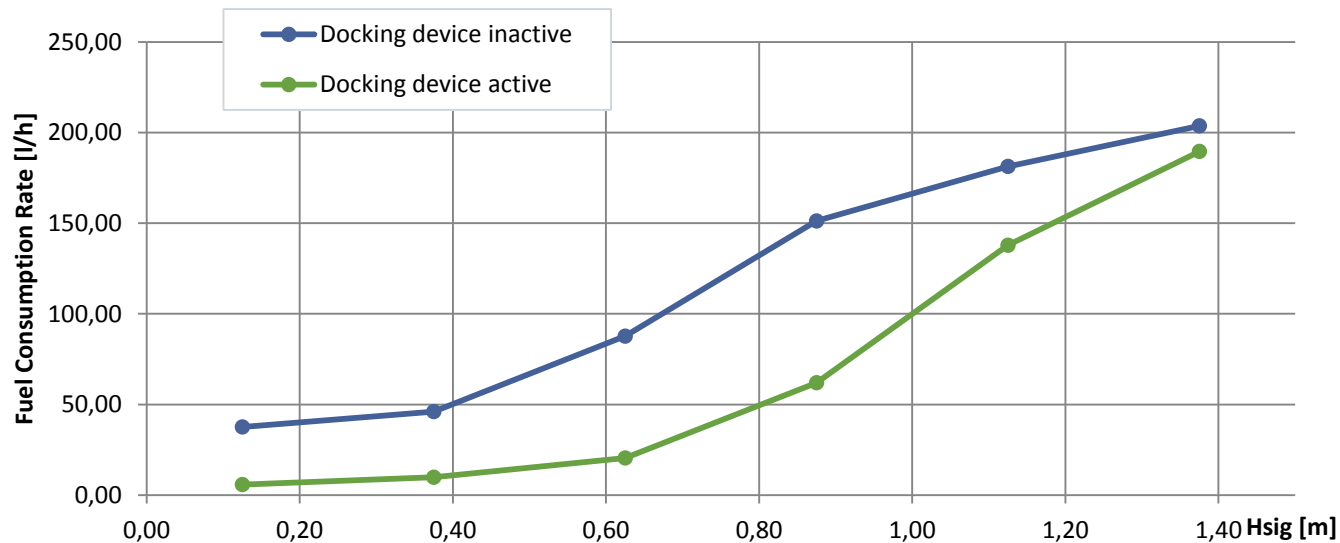




# KRAFTSTOFFVERBAUCH DOCKING

Vessel: CTV Catamaran Example

Average Fuel Consumption Rates (FCR) [l/h] over Significant Wave Height [m]



Hsig from incl [m]	0,00	0,25	0,50	0,75	1,00	1,25
to	0,25	0,50	0,75	1,00	1,25	1,50
<b>FCR [l/h]</b>						
Docking device inactive	37,58	46,05	87,67	151,21	181,32	-
Docking device active	5,82	9,84	20,47	61,99	137,83	-

# USPs (1)



- Einsatzplanung wird vereinfacht
- Einzelbetrachtung der individuellen Schiffparameter (Bewegung, Verhalten, Profil, etc.)
- Erweiterung des operationellen Spektrums
- Vermeidung von unnötigen Fahrten
- Bessere Auslastung der Schiffe und bessere Erreichbarkeit von Windenergieanlagen
- Ertragserhöhung der Windparkbetreiber
- Erhebliche Kosteneinsparung
- Weniger Emissionen

# USPs (2)

- Dokumentation:
  - Automatische Erfassung und Dokumentation von Schiffsbewegungen
  - Automatische Erfassung und Dokumentation der Aufprallkräfte während der Landung
  - Qualitätssteigerung
- Erfassung und Analyse von Energieeffizienzvariablen, wie:
  - Drehzahl
  - Pitch
  - Geschwindigkeit
  - Maschinen und operative Daten
- Ausschöpfen des Potenzials
- Verringerung der Kosten

# BEISPIEL REPORT (CTV)

## Weekly Overview Page 1/2

CTV Illustration Date 2018-04-09 to 2018-04-15

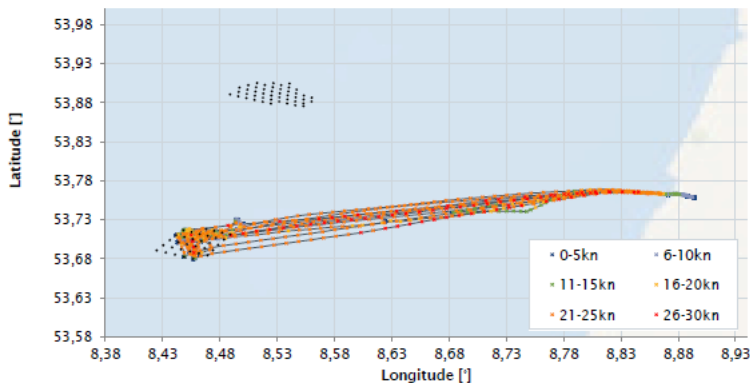
### Fuel Consumption

Date	FC [l] total	FC by Mode [l]			Efficiency	
		out of park	in park	docking	out of park [l/nm]	docking [l/h]
2018-04-09	468,4	257,0	104,8	106,7	9,2	17,678
2018-04-10	152,8	152,8	0,0	0,0	9,6	-
2018-04-11	555,6	274,0	154,7	127,0	10,0	28,117
2018-04-12	587,7	273,9	182,1	131,6	10,0	23,997
2018-04-13	440,4	255,1	84,4	101,0	9,5	110,147
2018-04-14	420,0	265,6	85,4	69,1	9,5	36,998
2018-04-15	0,0	0,0	0,0	0,0	-	-

### Operation

Date	Dist. [nm] total	Distance by Mode [nm]		Turbines Approached
		out of park	in park	
2018-04-09	39,1	27,9	11,2	6
2018-04-10	15,9	15,9	0,0	0
2018-04-11	44,0	27,4	16,6	8
2018-04-12	46,5	27,5	19,0	7
2018-04-13	36,1	27,0	9,2	5
2018-04-14	37,0	28,0	9,0	5
2018-04-15	0,0	0,0	0,0	0

### Map View: CTV Speed



Generated: 2018-04-25 confidential Crew Transfer Support System

## • Wöchentliche Übersicht:

- Kraftstoffverbrauch in verschiedenen Betriebsmodi
- Kraftstoffeffizienz während des Transits
- Kraftstoffeffizienz während des Dockings
- Wetterinformationen  
(Wind, Seegang (Welleninformation, Strömung,...))
- Anzahl der angefahrenen Turbinen
- Zurückgelegte Strecke

## • Einhaltung der Richtlinien:

- Maximale horizontale Beschleunigung
- Anzahl der Landung über 0,5g
- Maximaler Motion Sickness Index (Betrachtung über 2h)

# EXAMPLE REPORT (CTV)

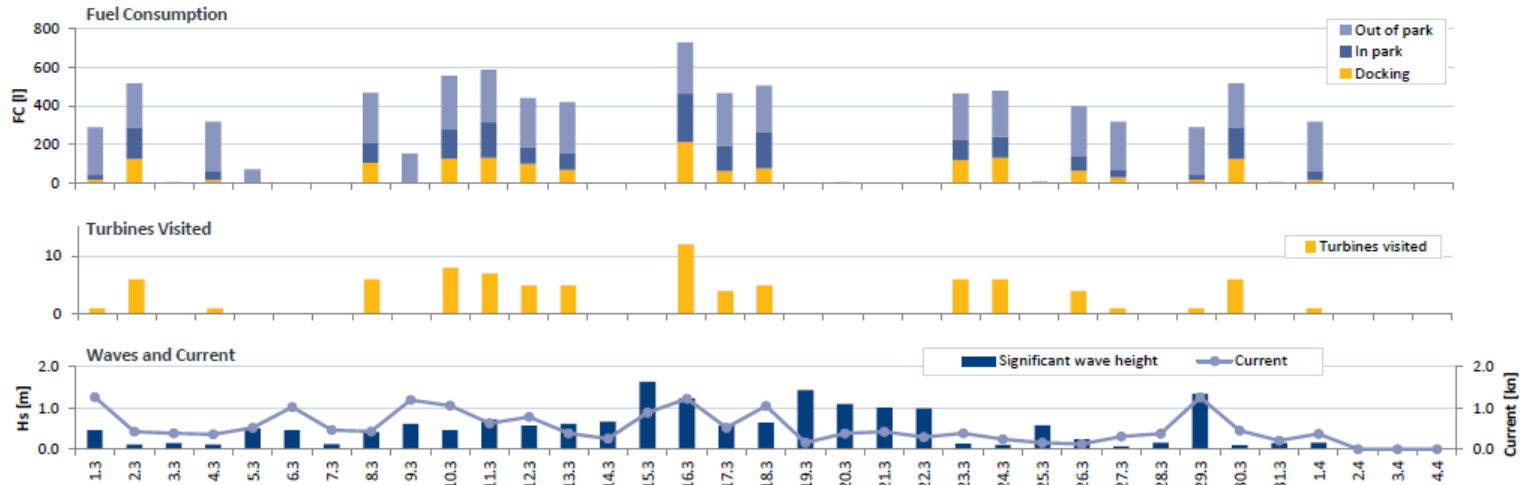
## Monthly Report

Page 1

CTV: Illustration

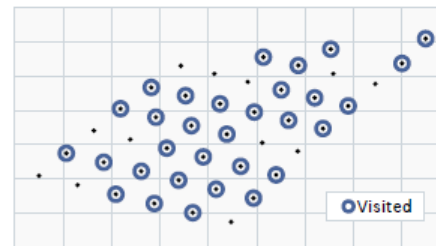
Month:

March 2018

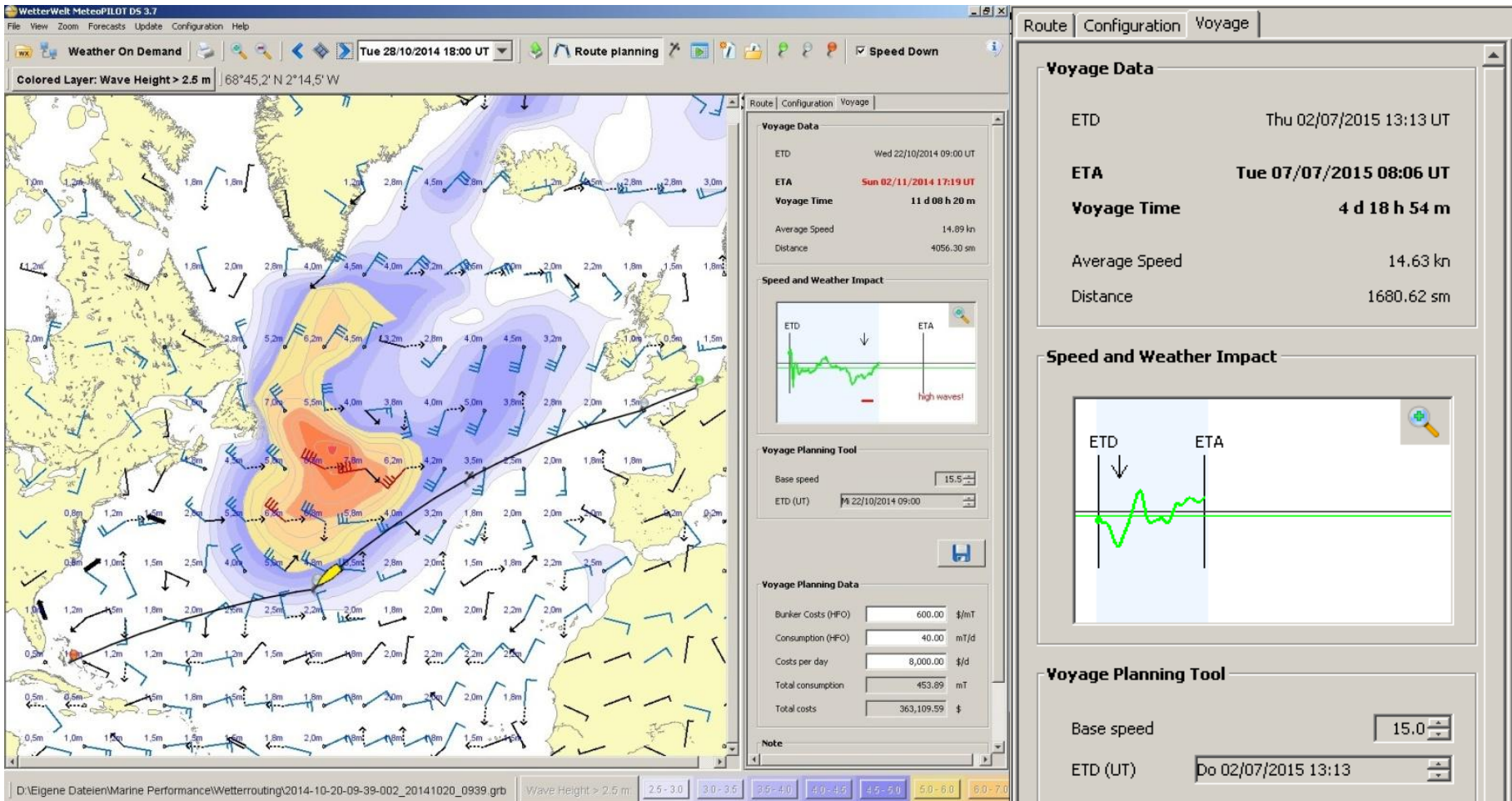


Average Fuel efficiency  
 Out of park: 9.17 l/nm  
 In park: 9.01 l/nm  
 Docking (No Windgrip): 48.30 l/h  
 Docking (Windgrip): 18.12 l/h

Park overview



## Optimierte Route mit Wetterdaten (Beispiel Frachtschiff)



The screenshot displays the WetterWelt MeteorPILOT D5 3.7 software interface. The main window shows a weather routing map of the North Atlantic, with a route planned from the West Coast of North America to Europe. The map is overlaid with wave height contours and wind vectors. The interface includes a menu bar (File, View, Zoom, Forecasts, Update, Configuration, Help) and a toolbar with various navigation and planning tools. The status bar at the bottom indicates the current wave height filter is set to > 2.5 m.

On the right side, there are three panels:

- Voyage Data:**
  - ETD: Thu 02/07/2015 13:13 UT
  - ETA: Tue 07/07/2015 08:06 UT
  - Voyage Time: 4 d 18 h 54 m
  - Average Speed: 14.63 kn
  - Distance: 1680.62 sm
- Speed and Weather Impact:**
  - Graph showing speed impact over time, with a peak labeled 'high waves'.
- Voyage Planning Tool:**
  - Base speed: 15.5
  - ETD (UT): Thu 22/10/2014 09:00
  - Voyage Planning Data:
    - Bunker Costs (HFO): 600.00 \$/mT
    - Consumption (HFO): 40.00 mT/d
    - Costs per day: 8,000.00 \$/d
    - Total consumption: 453.89 mT
    - Total costs: 363,109.99 \$

At the bottom of the interface, there is a file path: D:\Eigene Dateien\Marine Performance\Wetterrouting\2014-10-20-09-39-002\_20141020\_0939.grb and a row of buttons for selecting wave height ranges: 2.5-3.0, 3.0-3.5, 3.5-4.0, 4.0-4.5, 4.5-5.0, 5.0-6.0, 6.0-7.0.

# WELCOME ON BOARD

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[WWW.CTS-SYSTEM.COM](http://WWW.CTS-SYSTEM.COM)

The logo for CTS (Crew Transfer Support System) features the letters 'CTS' in a bold, blue, sans-serif font. The 'C' is stylized with a wavy line underneath it, and the 'S' also has a wavy line underneath it. The background of the logo is a white circle that overlaps the top right corner of the image.

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