

# Safe Transfer of Technicians and Avoidance of Motion Sickness

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## Introduction

Crew Transfer Vessels (CTVs) should be of minimum displacement in order to reduce the impact forces at the boat landings. On the other side they should be big, stable and rigid enough to offer a comfortable ride in heavy weathers. This dilemma leads to multiple design approaches, where operational performance can hardly be assessed, evaluated and compared. In order to assist the industry Motion Impact Recorder MIR Maritime has been developed by the German companies SCHRAMM group, J&C Bachmann, SupMar and NavConsult.



## Approach



MIR Maritime sensor box measures and records

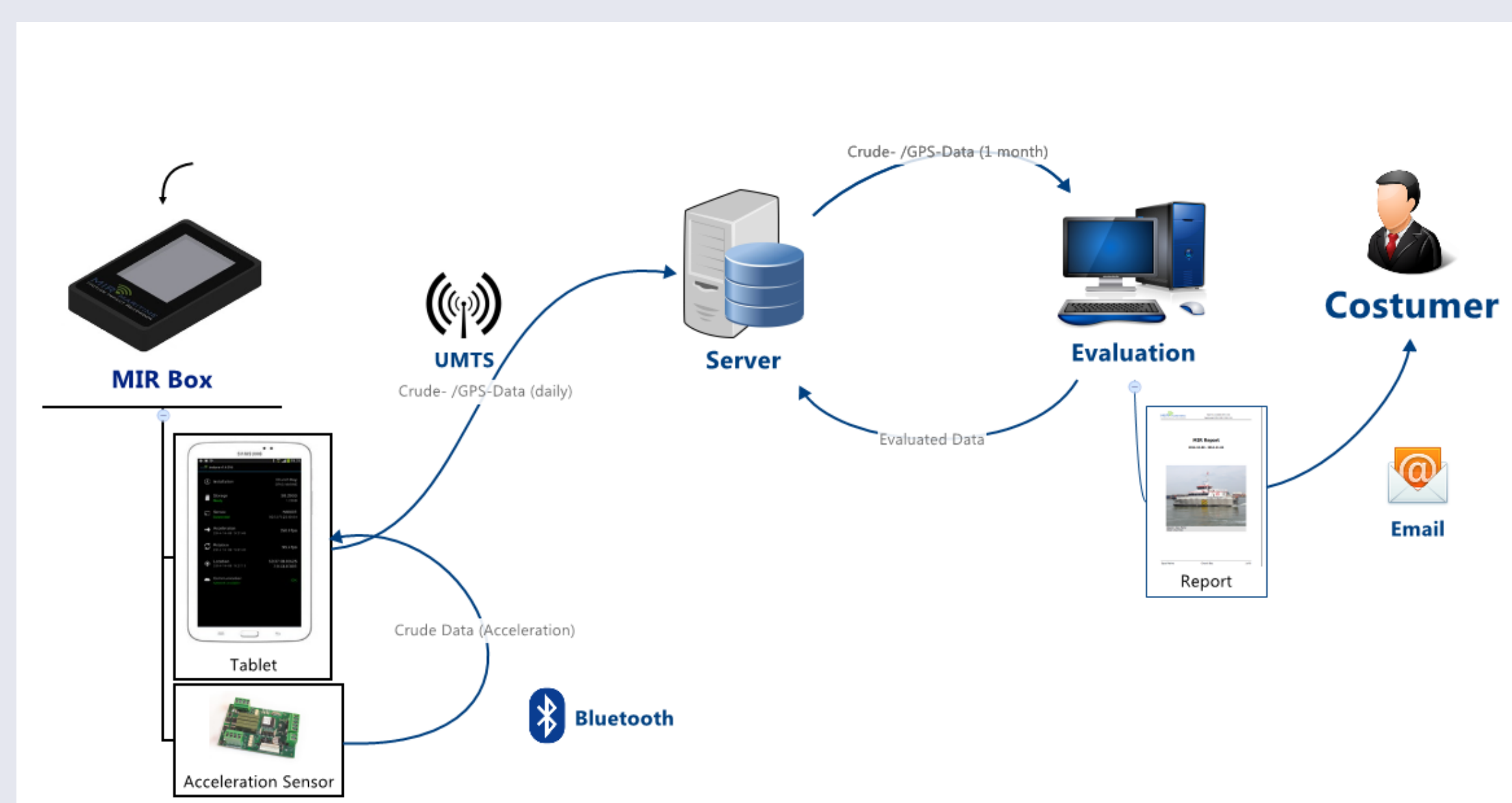
- the accelerations when the CTV pushes against the boat landing of the turbine foundation for personnel transfer
- as well as vessel motions during transit.

Back in the harbour, automatic data transfer to the company's server starts. After detailed evaluation, the customer will receive a monthly report showing the impact forces, the Motion Sickness Value acc. ISO2631 and other KPIs.

Patents rights have been applied for.

The new approach is to develop a low-cost solution to improve health and safety of the personnel maintaining the turbines. It should also serve as an impartial prove of adherence to the maximum impact loads by the vessel operator and thus be a sound basis for charter decisions.

Principle lay out :



## Methods

The new system has recently been installed first time on a number of ships in North and Baltic Sea. The hardware consists of a black-box to be mounted on board the vessel, no interfaces, no cabling, only power supply is required. The sensor technology is based on micro-electro-mechanical systems (MEMS), measuring acceleration and rotations, i.e. ship's movements in all six degrees of freedom. Location on board is irrelevant, only window view is needed for receiving the GPS signal. Calibration is done automatically, as gravity is always 1g. Data communication works via 3G.

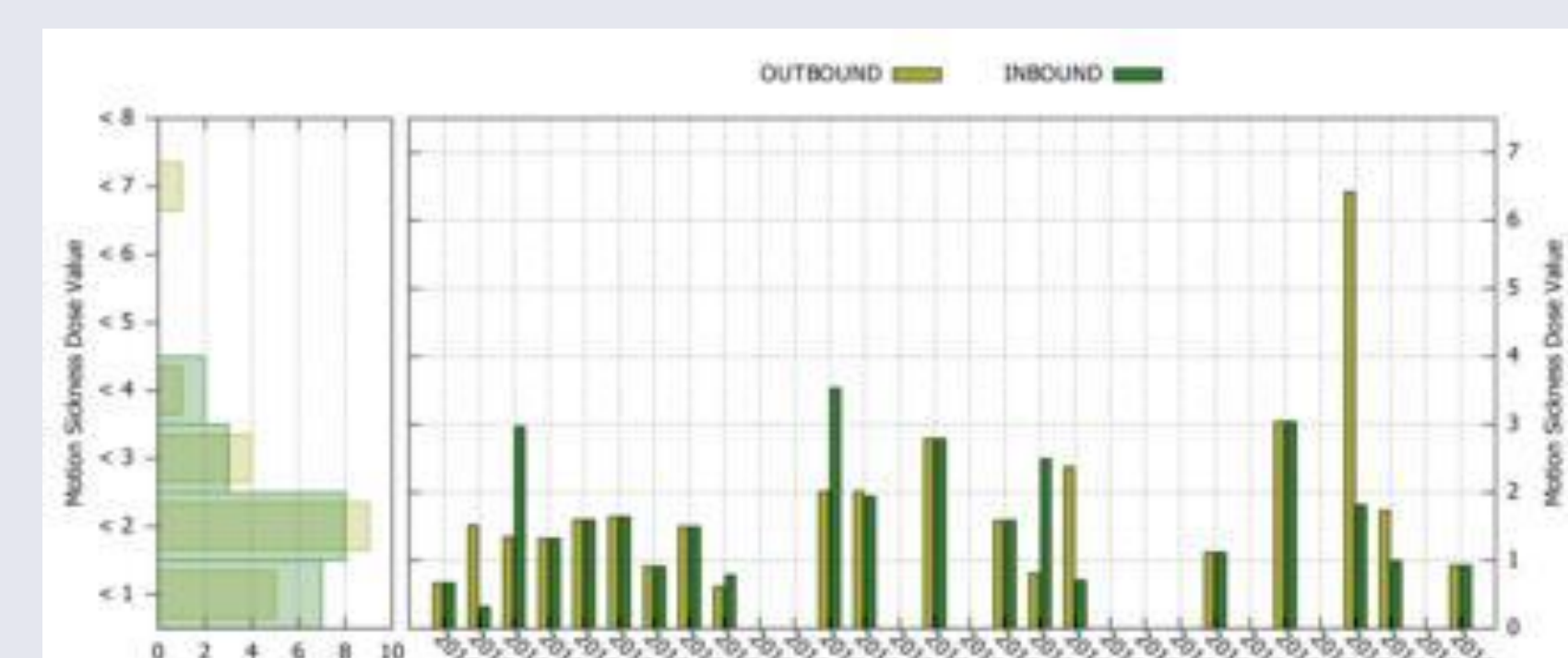
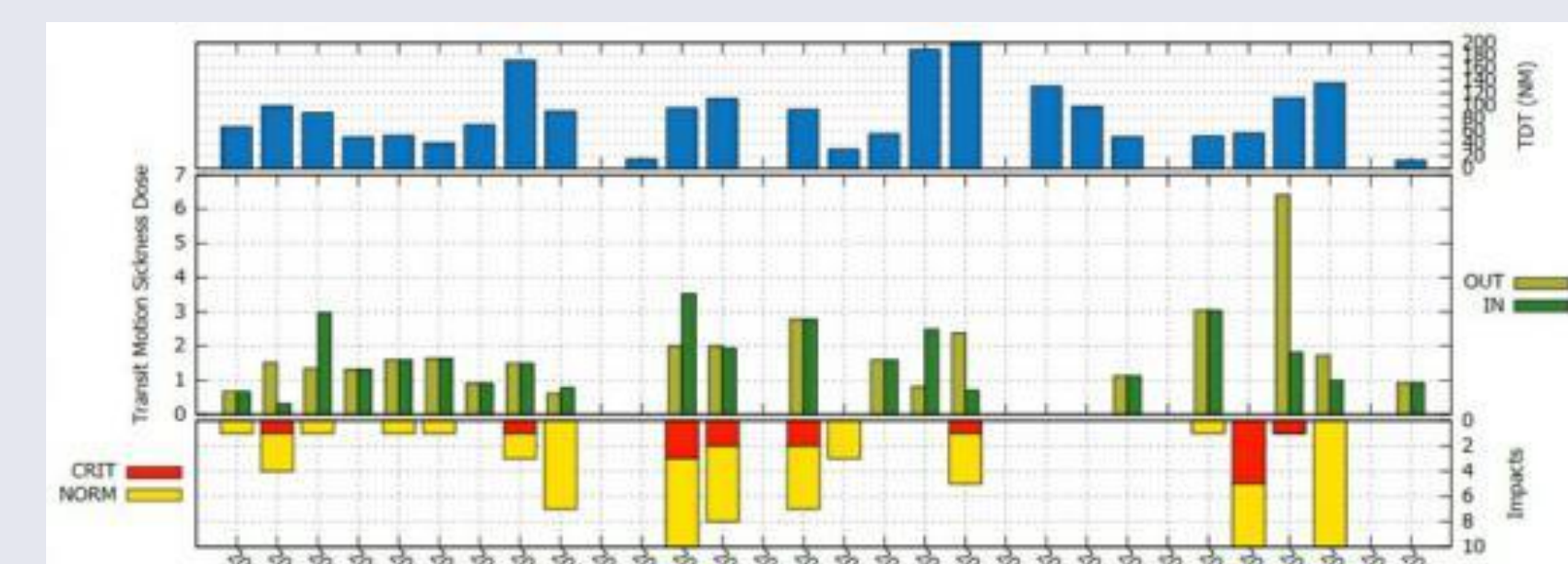
## Results

MIR Maritime issues a report every four weeks showing the CTV's performance. Layout and contents are adapted to customer's requirements. Also additional data, e.g. daily weather and wave height recordings, can be displayed.

In the summary the reader gets an overview of number of days of operation, total distance sailed, number of impacts above the limits, and motion sickness value MSDVz in transit.

Impact loads are precisely allocated to the WTG / OSS foundation and only those are depicted, which exceed the given limits, e.g. 20t for WTG boat landing and 40t for OSS boat landing.

A traffic light indicator simply shows the events of importance.

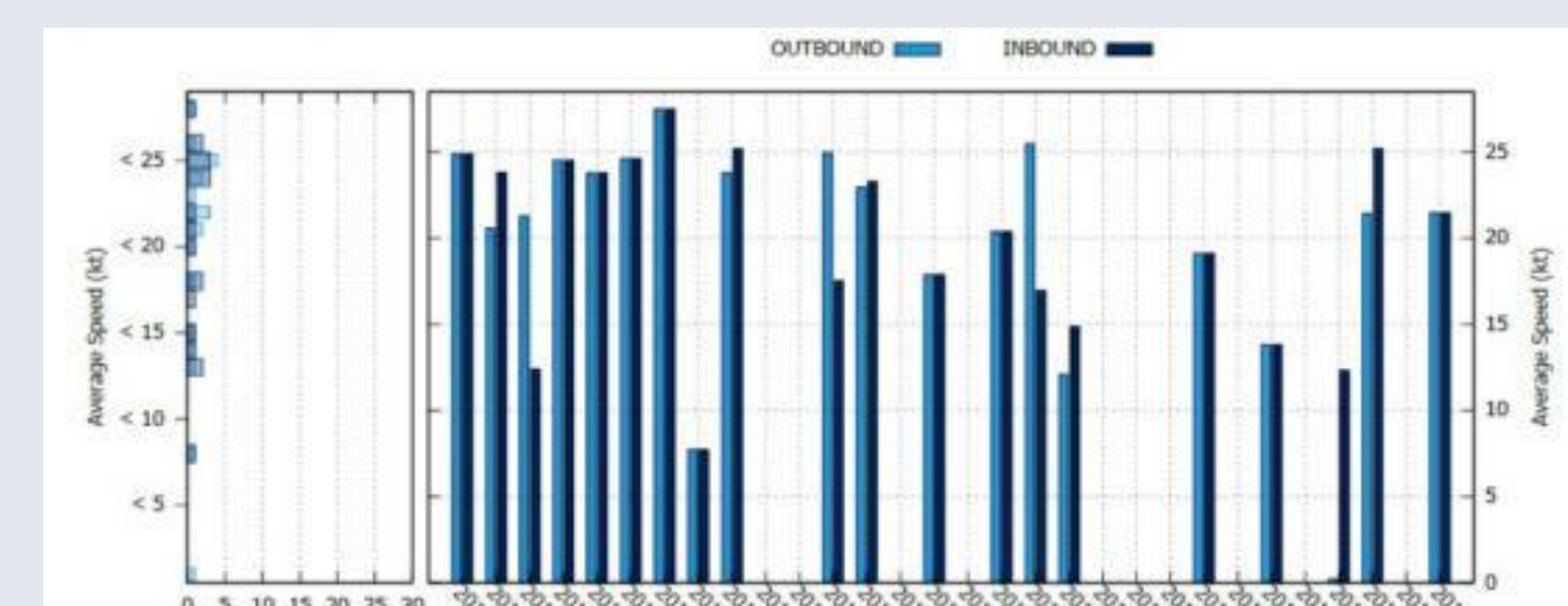


Date	Time	Impact	Location
2014-	14:28:29	18.1 t	WTG 1
2014-	14:28:40	16.0 t	WTG 2
2014-	14:57:18	19.6 t	WTG 3
2014-	09:56:00	17.5 t	WTG 4
2014-	09:56:03	22.6 t	WTG 5
2014-	10:14:51	24.8 t	WTG 6
2014-	10:14:54	34.5 t	WTG 7
2014-	10:18:55	13.3 t	WTG 8
2014-	10:19:00	14.8 t	WTG 9
2014-	10:32:18	16.5 t	WTG 10

Same graphics are used for MSDVz, where transits inbound and outbound are evaluated.

Date	MSDV <sub>z</sub> outbound	MSDV <sub>z</sub> inbound	Date	MSDV <sub>z</sub> outbound	MSDV <sub>z</sub> inbound
2014-	0.67	0.67	2014-	1.59	1.59
2014-	1.51	0.32	2014-	0.81	2.49
2014-	1.34	2.97	2014-	2.37	0.71
2014-	1.32	1.32	2014-		
2014-	1.60	1.60	2014-		
2014-	1.64	1.64	2014-		
2014-	0.91	0.91	2014-		

Finally average speeds inbound and outbound are shown.



## Conclusions

CTV operators receive evidence which impact forces their ships have applied to which turbine structure, and they will get a guidance up to which sea state the vessel can sail to the wind park without endangering the well-being of the service technicians. The wind park operators will benefit as they obtain in sight-view in key performance criteria of the ships they have chartered in. They can judge, which vessels are worth the charter rate and should be preferred for daily operations.

