

Single Page Applications

Modular situational awareness tools for data visualization

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In cooperation with:

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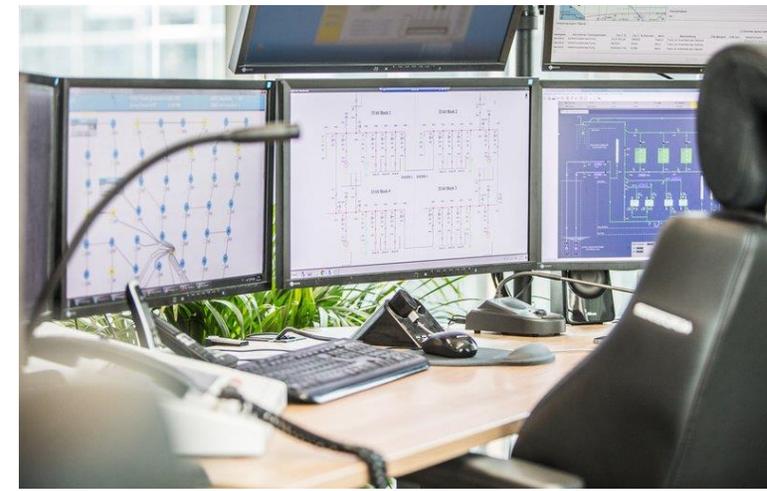
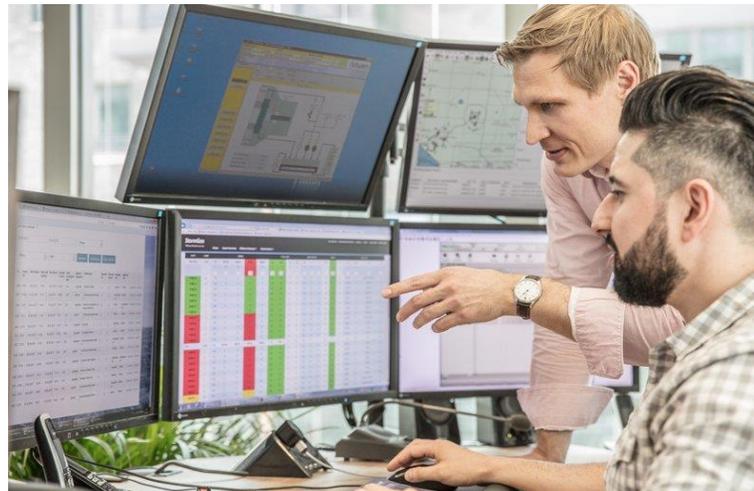


Knowledge for Tomorrow



Introduction KUES

- Core task
 - „Design a GUI that allows to monitor selected indicators of Offshore Wind Farms.“
- For the presentation we will focus on data representation
- Different tasks were important
 - AIS Data
 - Turbine Data
 - Bayesian Network



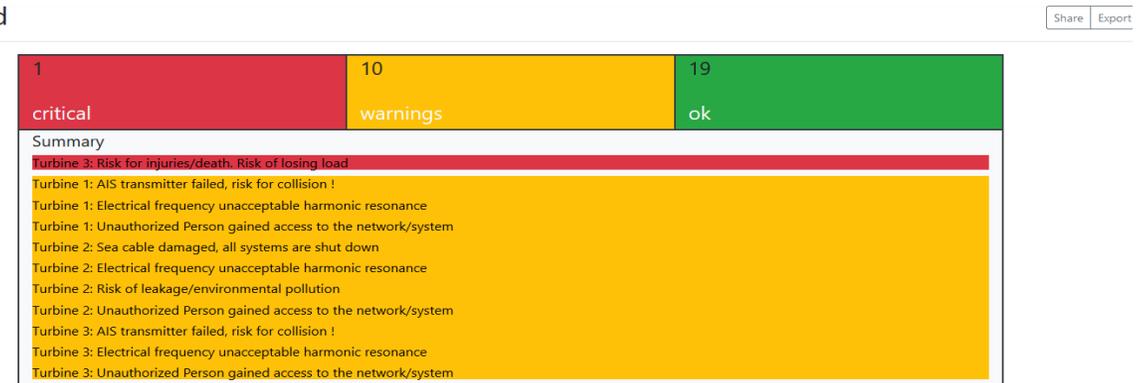
source: Dudgeonoffshorewind.co.uk, Globaltechone.de



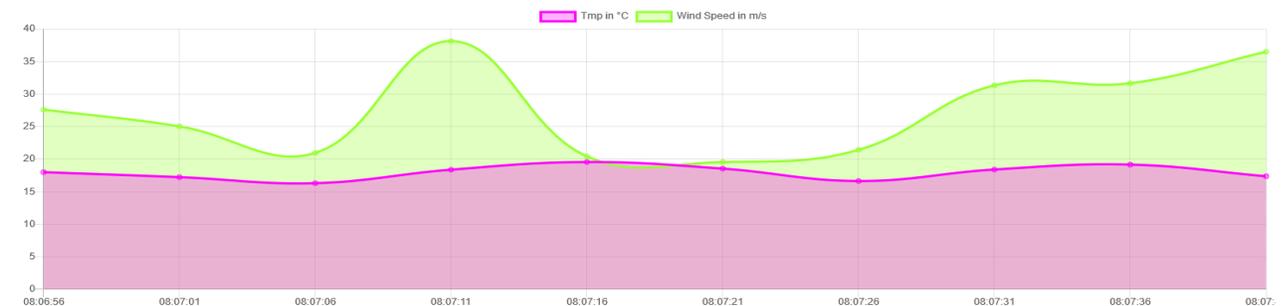
Methodology of the Framework

- Used Angular as a Framework
 - Allows for Single Page Application (SPA) approach
 - „A SPA is a web application that interacts with the user by dynamically rewriting the current web-page with new data from the web-server [...].“
- Also used a small backend
 - Answering calls from the SPA
 - Responsible for pre-processing of data

Dashboard



Weather Data of the Site

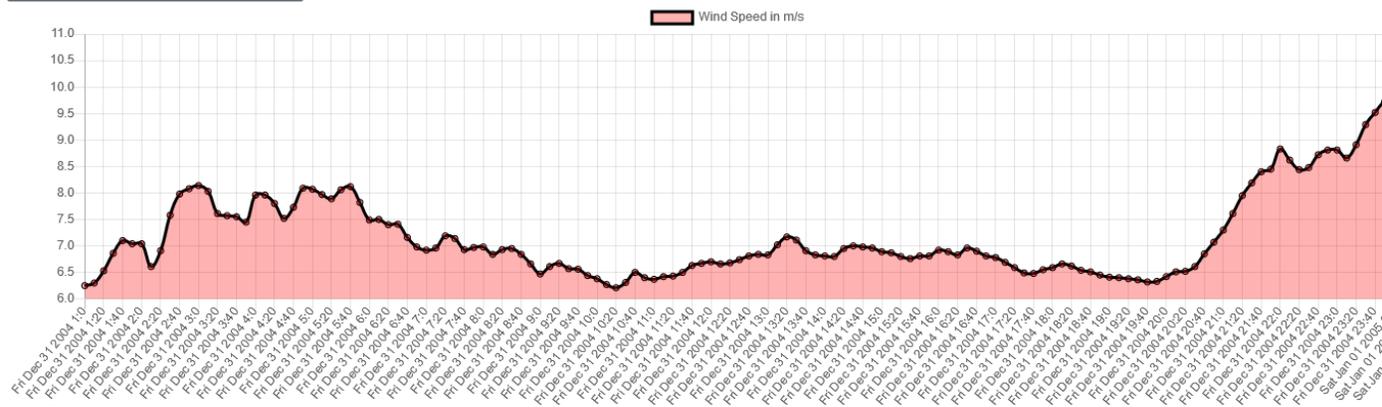


Implementation KUES



Selected Ship
MMSI: 12345678
Name: CTV
Destination: Cuxhaven
Persons: 7 People
Speed: 30km/h
Longitude: 8.718585894094577
Latitude: 53.867742303265835

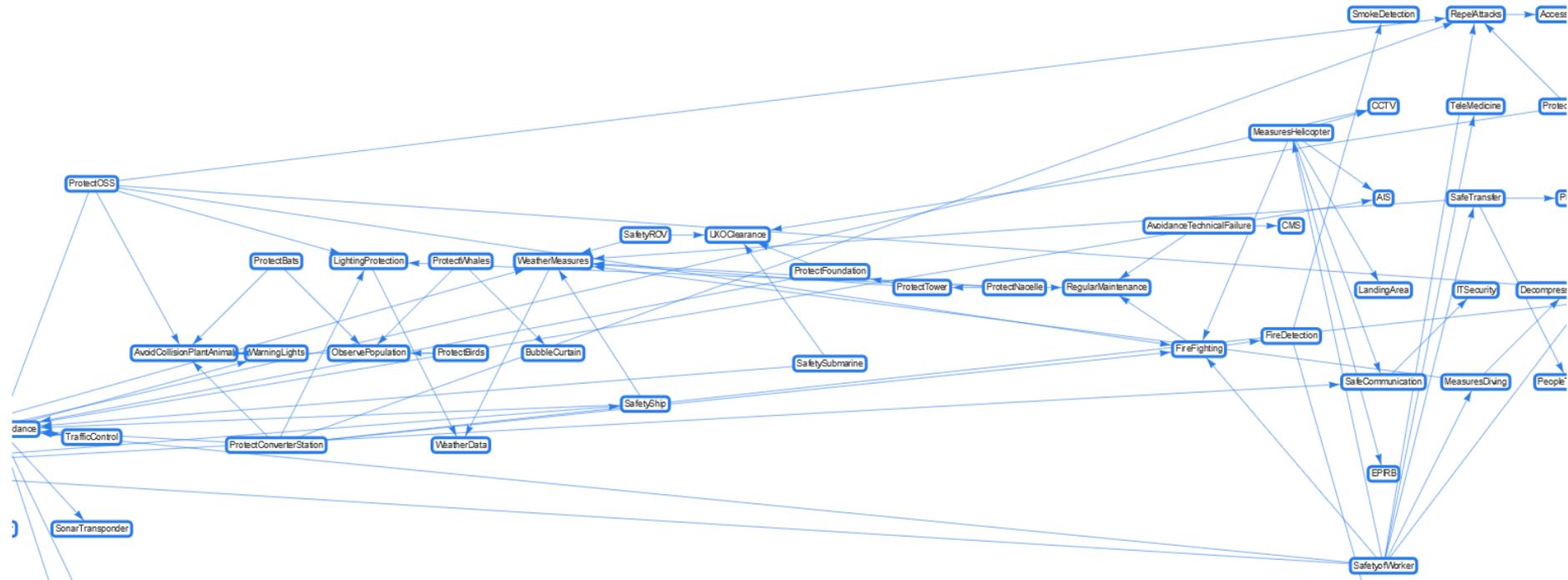
Wind Speed Rated Power Output Score Power Output Corrected Score
1 Day 3 Days 7 Days 14 Days



[go back](#)



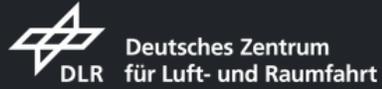
Implementation KUES



#	Node Name	Failure Rate	#	Node Name	Failure Rate	#	Node Name	Failure Rate	#	Node Name	Failure Rate
1	ProtectFish	0.0050	17	RegularMaintenance	0.0050	33	SafeCommunication	0.0151	49	SafeTransfer	0.0050
2	ProtectBats	0.0050	18	PLB	0.0150	34	Trainings	0.0050	50	PreventEspionage	0.0050
3	MeasuresHelicopter	0.0051	19	AvoidManipulation	0.0050	35	ProtectCable	0.0050	51	CollisionAvoidance	0.0050
4	LightingProtection	0.0050	20	TrafficControl	0.0050	36	PPE	0.0150	52	ProtectNacelle	0.0151
5	SafetyROV	0.0201	21	ProtectBirds	0.0050	37	EPIRB	0.0050	53	ITSecurity	0.0150



Implementation Risk Register



[Search Database](#) [Add data](#)

>> [Personnel member](#)

Entity: Personnel member

A person who is present in a professional context.

—	Report: Quantification of Occupational Safety for Offshore Wind Farms	Scenario: A member of personnel is hit by ice falling from a wind turbine blade
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Domain	Likelihood	Impact	Risk
Personel safety	Rarely occurs	Fatality, extensive or catastrophic damage	RGB: 255000000 description: Unacceptable residual risk which requires further safety measures

[Report: Quantification of Occupational Safety for Offshore Wind Farms](#)

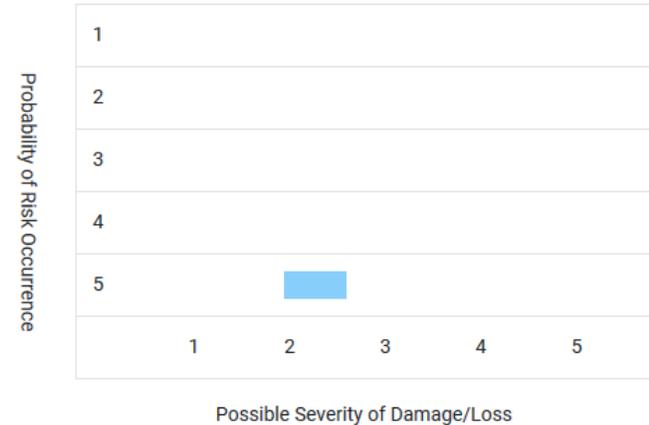
[author: Jennifer Mielniczek](#)

[school: Jade University of Applied Sciences](#)

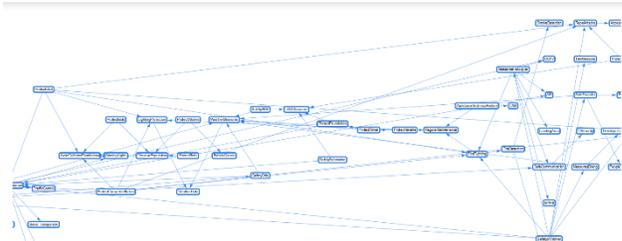
[type: Master Thesis](#)

[year: 2019](#)

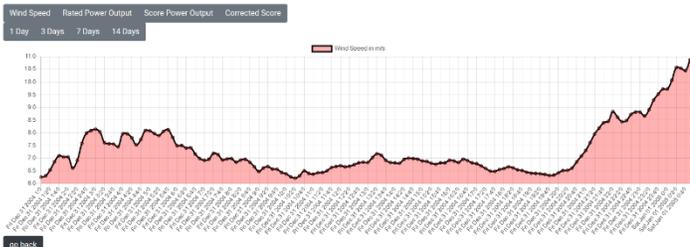
[Scenario: A member of personnel is hit by ice falling from a wind turbine blade](#)



Visualization of the Framework



#	Node Name	Failure Rate	#	Node Name	Failure Rate	#	Node Name	Failure Rate	#	Node Name	Failure Rate
1	Protection	0.050	17	SupportMaintenance	0.050	33	SupportMaintenance	0.011	48	Site-Inspector	0.050
2	Protection	0.050	18	IT	0.050	34	Storage	0.050	50	Time-Management	0.050
3	Measurements	0.050	19	AcousticMeasurement	0.050	35	Protection	0.050	51	Collaboration	0.050
4	LightingProtection	0.050	20	TrafficControl	0.050	36	IT	0.010	52	Project-Team	0.010
5	Security	0.020	21	PhysicalRisk	0.050	37	IT	0.050	53	IT-Security	0.010



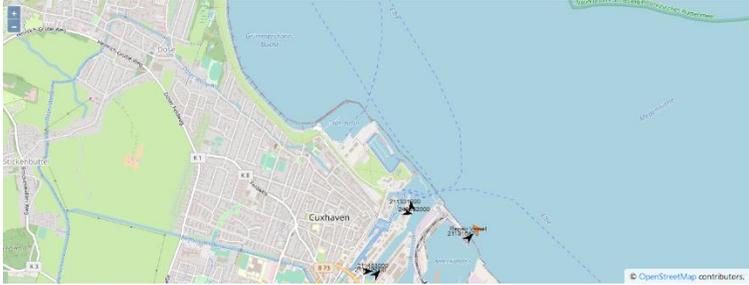
go back

Framework



Selected Ship

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Deutsches Zentrum für Luft- und Raumfahrt

Entity: Personnel member
 A person who is present in a professional context.

Domain	Likelihood	Impact	Risk
Personnel safety	It rarely occurs	Fatality, extensive or catastrophic damage	RGB: 255000000 description: Unacceptable residual risk which requires further safety measures

Report: Quantification of Occupational Safety for Offshore Wind Farms
 author: Jennifer Medeiros
 school: Jade University of Applied Sciences
 type: Master Thesis
 year: 2019

Scenario: A member of personnel is hit by ice falling from a wind turbine blade

Dashboard

critical 10 warnings 19 ok

Summary

Warning 1: Risk for unauthorized access to the network/system

Warning 1: 400 transmitter failed, risk for collision

Turbine 1: Unauthorized Person gained access to the network/system

Turbine 2: Sea cable damaged, all systems are shut down

Turbine 2: Electrical frequency unacceptable harmonic resonance

Turbine 2: Risk of leakage/environmental pollution

Turbine 2: Unauthorized Person gained access to the network/system

Turbine 3: 400 transmitter failed, risk for collision

Turbine 3: Electrical frequency unacceptable harmonic resonance

Turbine 3: Unauthorized Person gained access to the network/system

Weather Data of the Site

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Search Database Add data

EntityName - Type your search here Search Search All

- Boat
- Cargo ship
- Coastal region
- Passenger ship
- Personnel member
- Project
- Project planning and preparation
- Project stage
- Ship
- Subsea electricity cable
- The Titanic



Conclusion

- Web applications are very flexible
 - As an example the map could also be used for (air) traffic visualization
- Allows for more interaction with data
- „Low“ entry level
 - Requires a bit of knowledge in TypeScript and Python
 - After this a lot of existing librarys can be used
 - JavaScript for easy front-end visualization

Thank you for your attention!



Questions

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