



# Measurement results from FLS (→ two Fraunhofer IWES Wind Lidar Buoys) during the **OBLEX-F1** campaign

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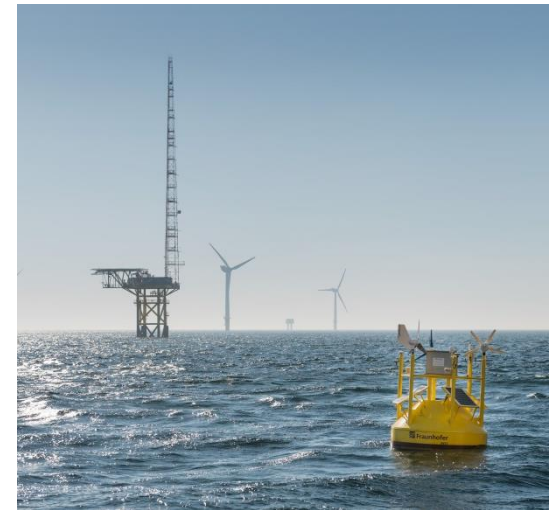
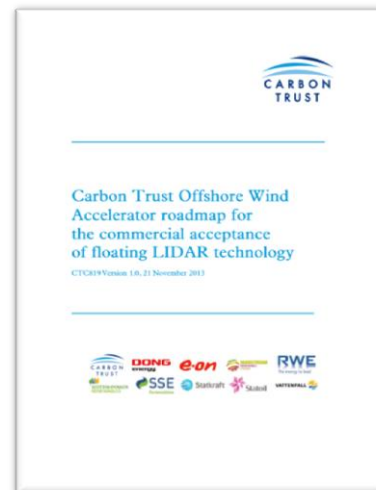
# Overview

- Introduction:
  - FLS (Floating Lidar System) trials next to offshore met. masts
  - Fraunhofer IWES Wind Lidar Buoy as a 'pre-commercial' FLS
- FLS datasets obtained during OBLEX-F1 campaign
- Evaluation of data, differences in relation to external conditions (?)
- Outlook, further activities

# Introduction: FLS trials next to offshore met masts

- Offshore trials\* next to a suitable reference met. mast are an essential requirement for FLS to reach 'pre-commercial' status

\*cf. OWA Roadmap  
requiring explicitly 6-month trial

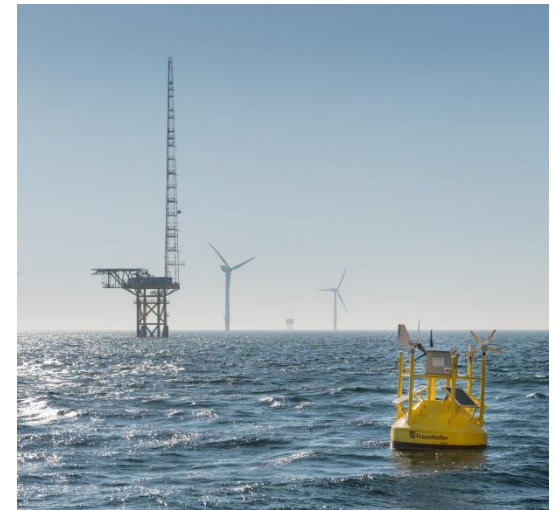
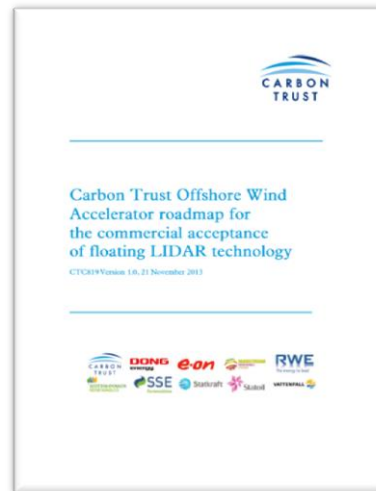


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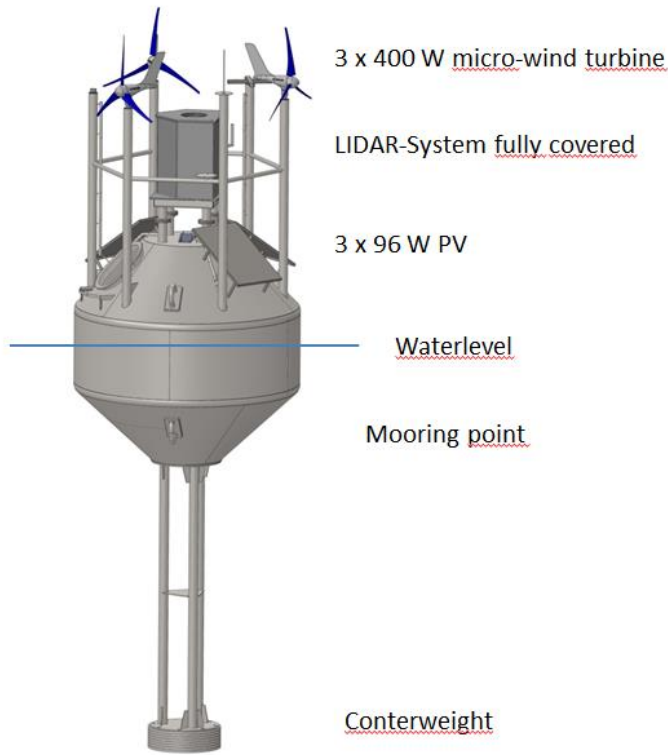
→ 'pre-commercial' –  
why not commercial?



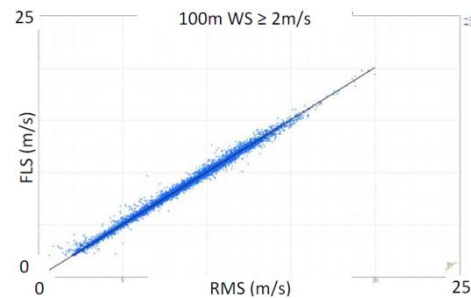
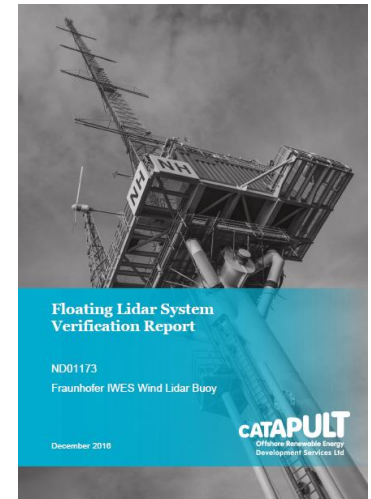
- further evidence for sufficient level of performance wanted,
- complete acceptance of technology,
- full (better) understanding of performance in different environments (under different external conditions) + associated uncertainties

Note: so far no 'commercial' FLS available on the market

# Introduction: Fraunhofer IWES Wind Lidar Buoy as a 'pre-commercial' FLS

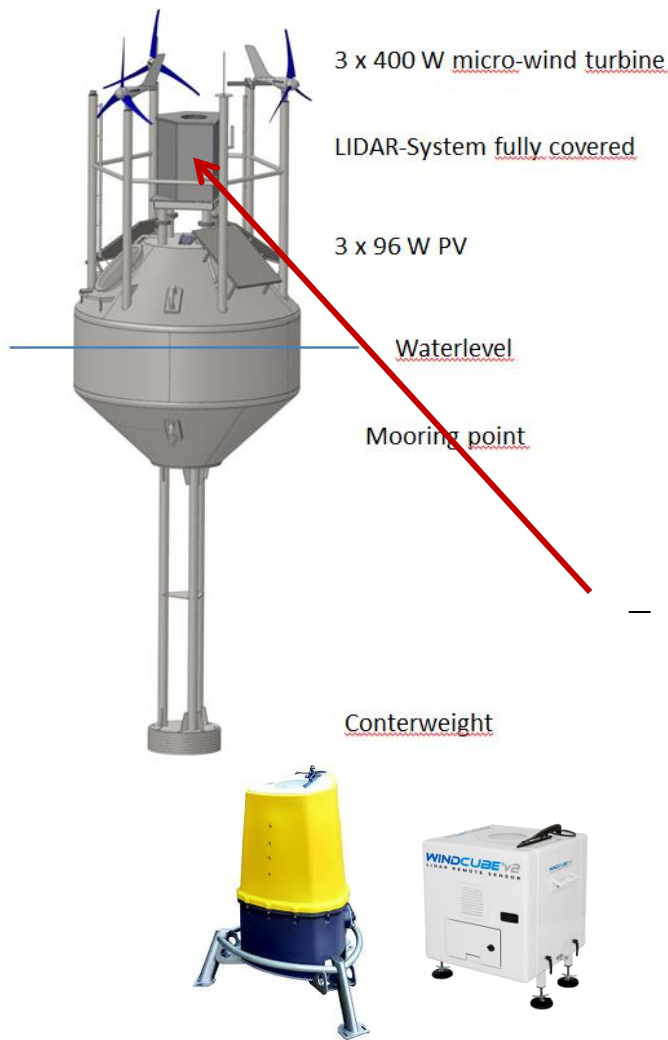


- Successful 6-month offshore trial at FINO1 location completed in 2016
- All best-practice (KPI) criteria according to OWA Roadmap (for 10-min wind speed, wind direction, system and post-processed data availability) met

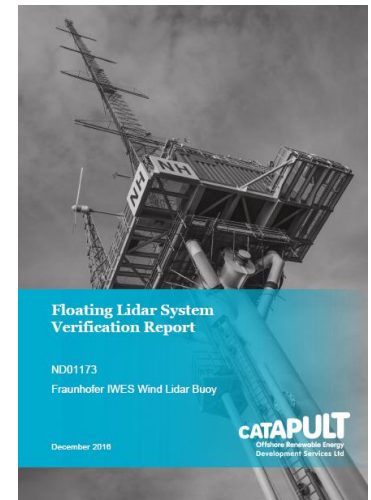


	Wind speed at 100 m (WS>2)		Wind direction at 100 m (WS>2)		
	Slope	R <sup>2</sup>	Slope	Offset	R <sup>2</sup>
OWA Roadmap Minimum Requirement	0.97-1.03	>0.97	0.95-1.05	<10°	>0.95
OWA Roadmap Best Practice Requirement	0.98-1.02	>0.98	0.97-1.03	<5°	>0.97
Fraunhofer IWES Wind LiDAR Buoy Result	1.006	0.992	0.996	1.7°	0.991

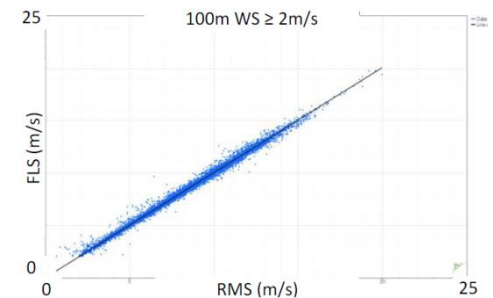
# Introduction: Fraunhofer IWES Wind Lidar Buoy as a 'pre-commercial' FLS



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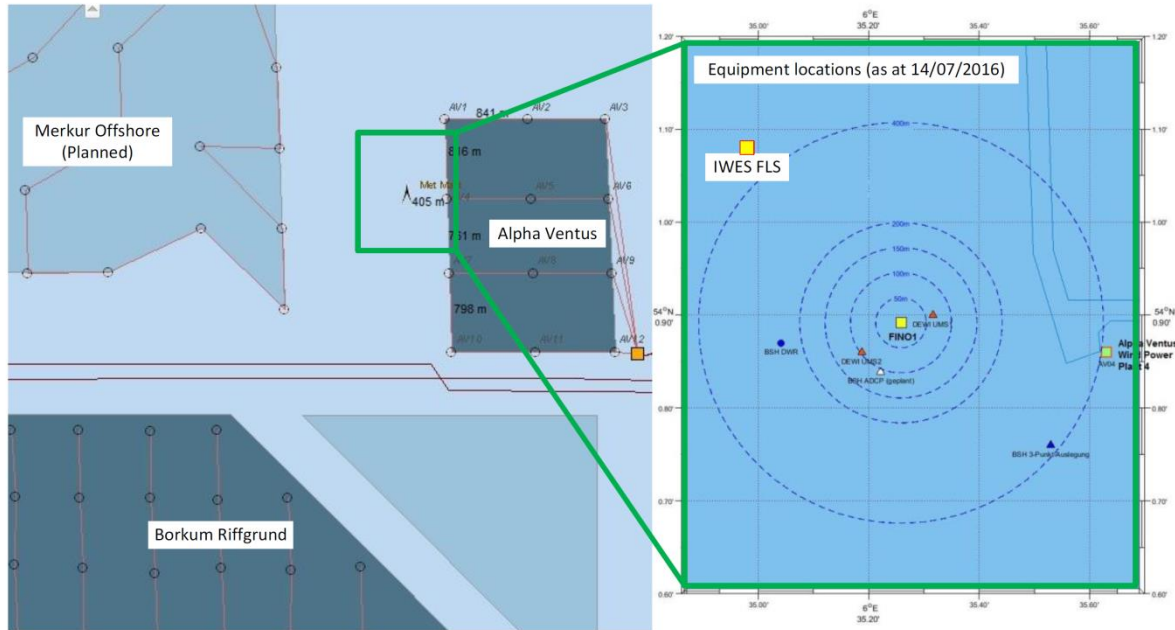


- Buoy equipped with ZephIR lidar device – but we provide FLS with Windcube lidar as well





# FLS datasets obtained during OBLEX-F1 campaign

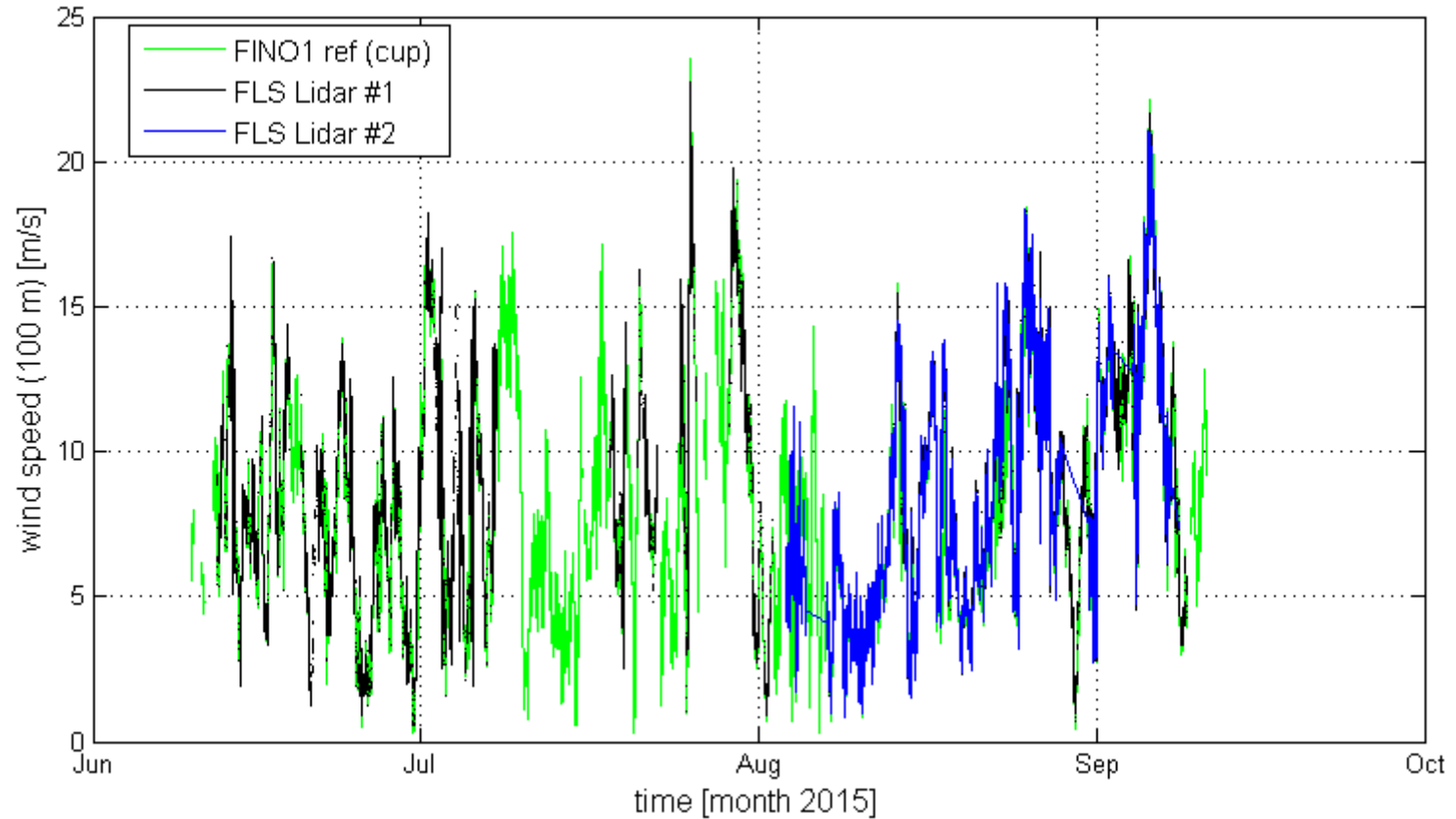


Coordinates of IWES buoys:  
 (#1) N 54° 01.07' E 6° 34.98'  
 (#2) N 54° 01.11' E 6° 34.89'

Figure 1 - Map view of trial location, including proximity to nearby wind farms



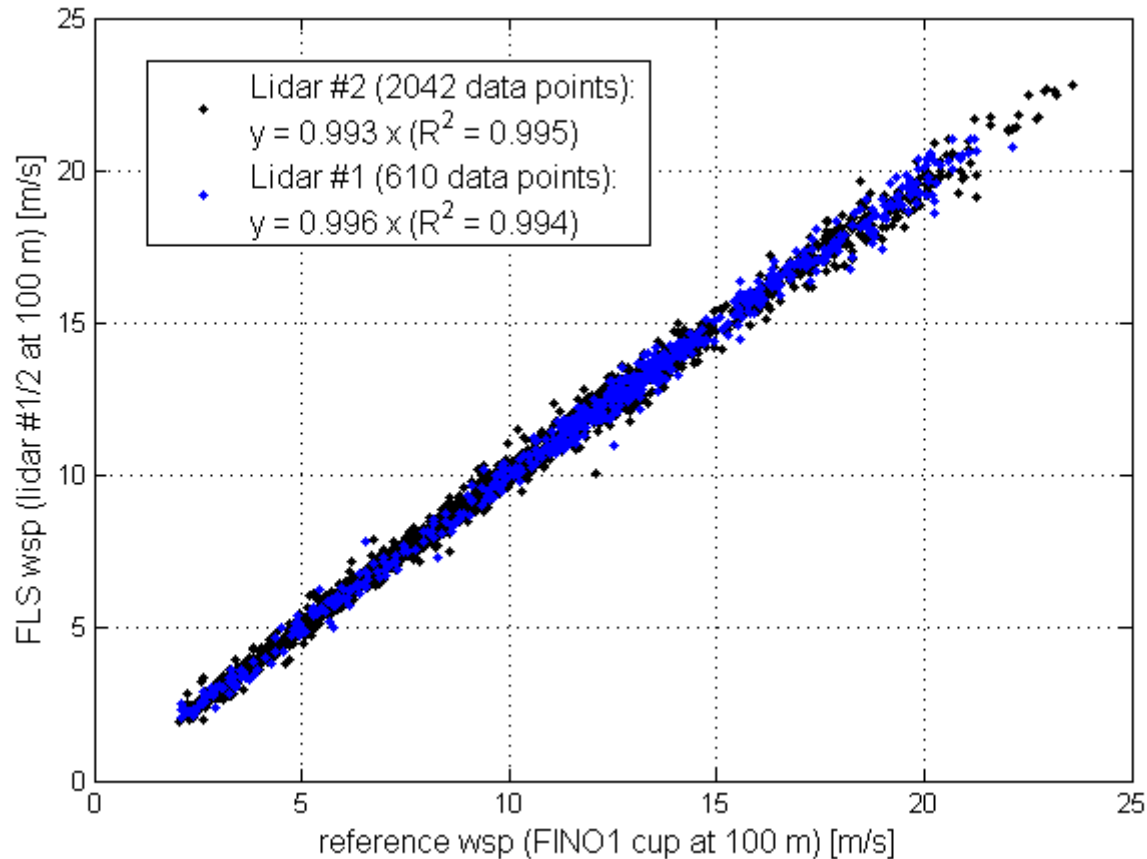
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# Evaluation of data:

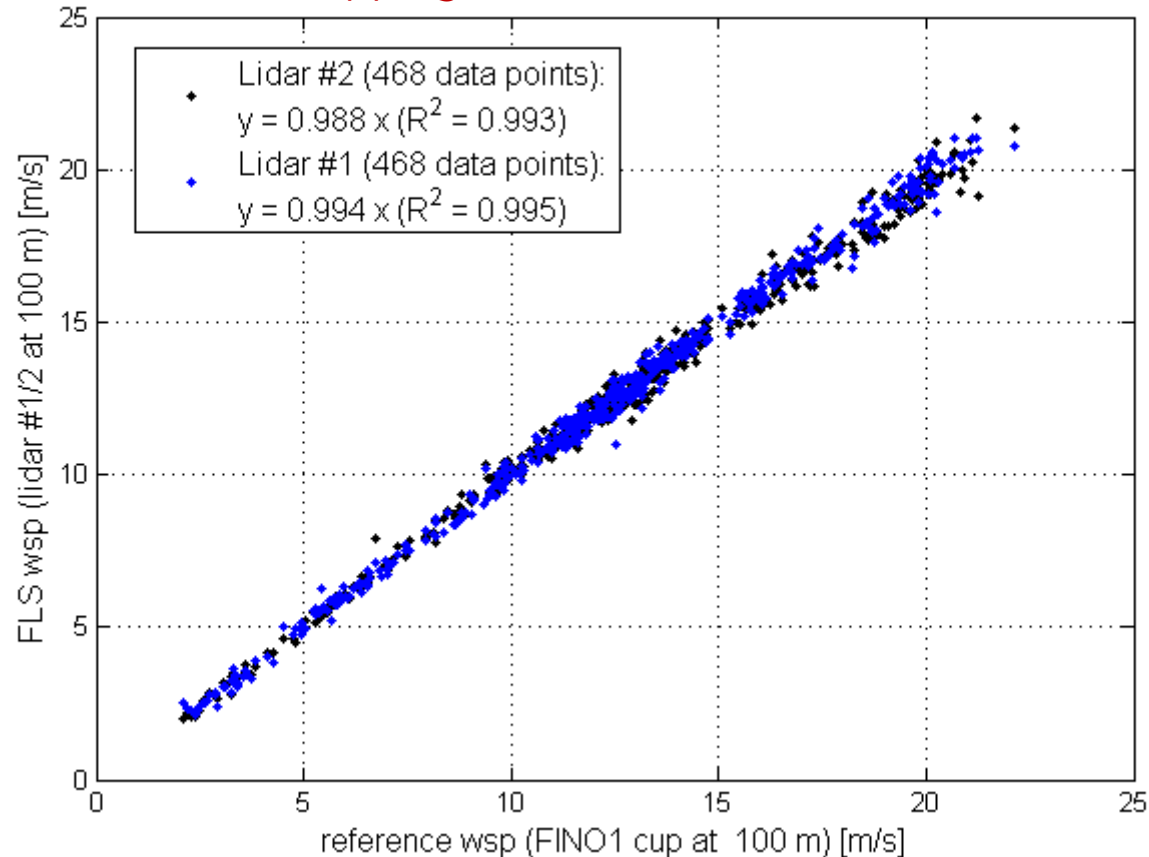
correlation of wind speed data between FLS and reference (I)



# Evaluation of data:

correlation of wind speed data between FLS and reference (II)

[overlapping dataset from #1 and #2]



# Conclusions

- Offshore trials next to suitable met. masts are essential to (further) development of FLS
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- Deeper understanding of FLS performance as prerequisite for 'better' application (→ system behaviour, measurement accuracy and associated uncertainties, acceptance of technology), and as one requirement for 'commercial' status (!)

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... in line with  
OWA Recommended Practices for  
Floating LiDAR Systems  
(Issue 1.0 25 October 2016)





# Thank You For Your Attention

## Any questions?

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