



<http://cleanship-project.eu/>

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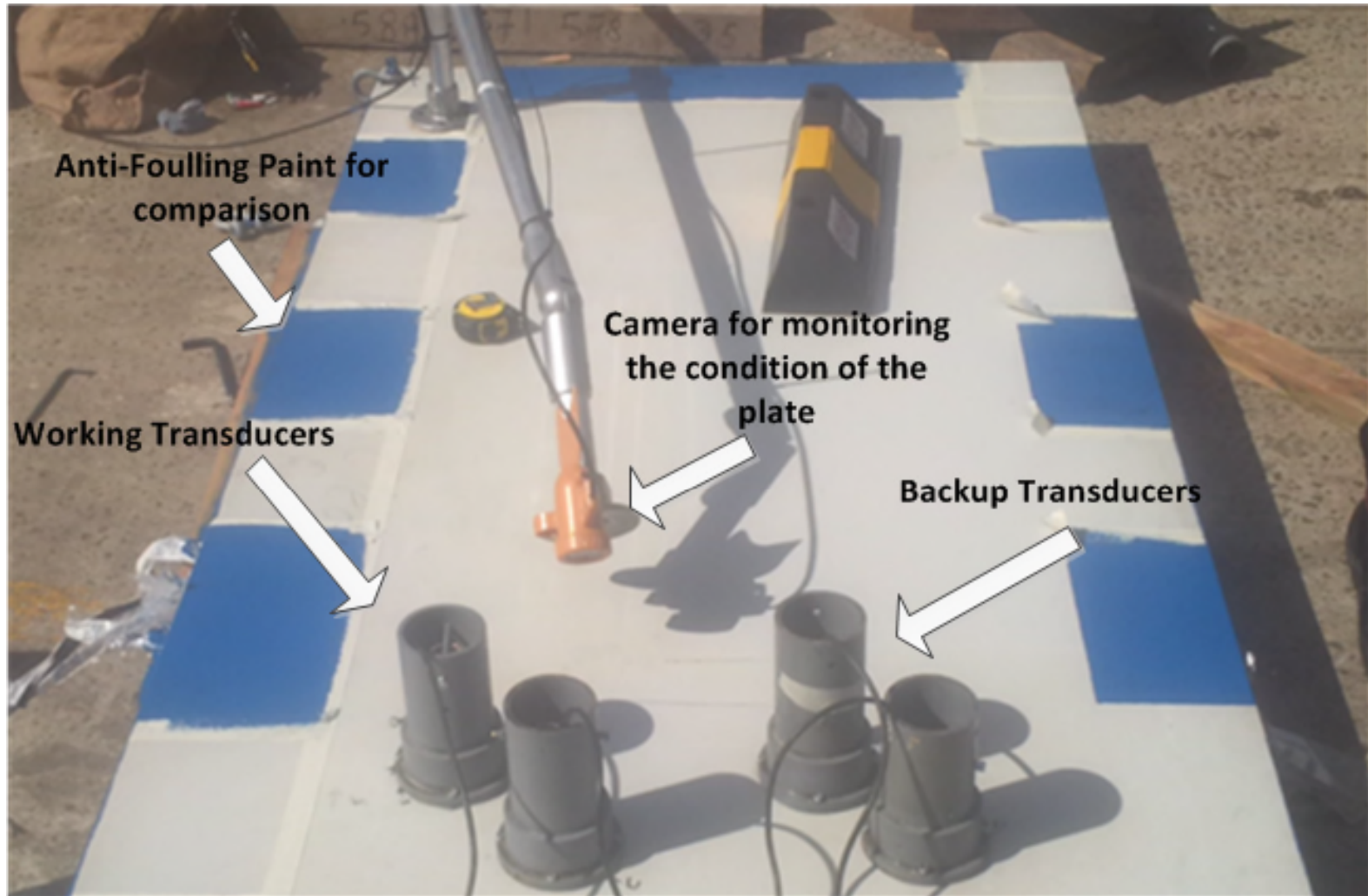
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# Holland Field Trials Introduction

- Test Plate set-up
- Electronic and monitoring systems setup
- Signal Generator Specifications
- Initial Results

# Test Plate Set-up



# Guided wave definition

- A guided wave can be defined as a wave in which the energy is concentrated near a boundary (between two different materials e.g. steel and water) and that has a direction of propagation parallel to the boundaries.

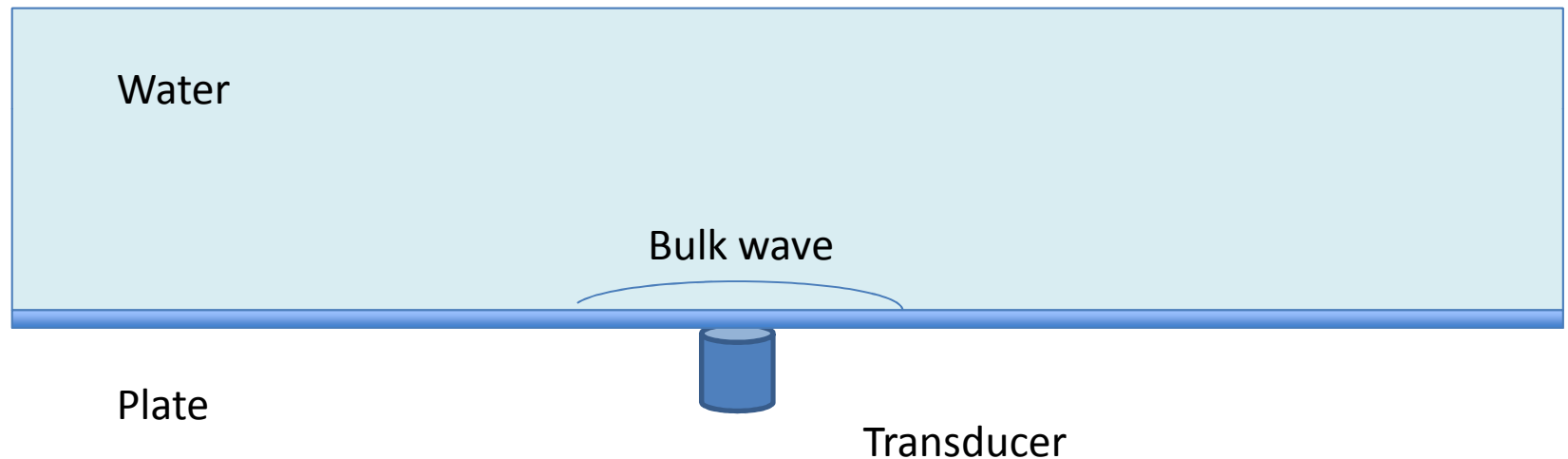


fluid  
IMPACT



# Ultrasonic Cleaning/prevention with one transducer

- Larger amount of energy transfer to the water

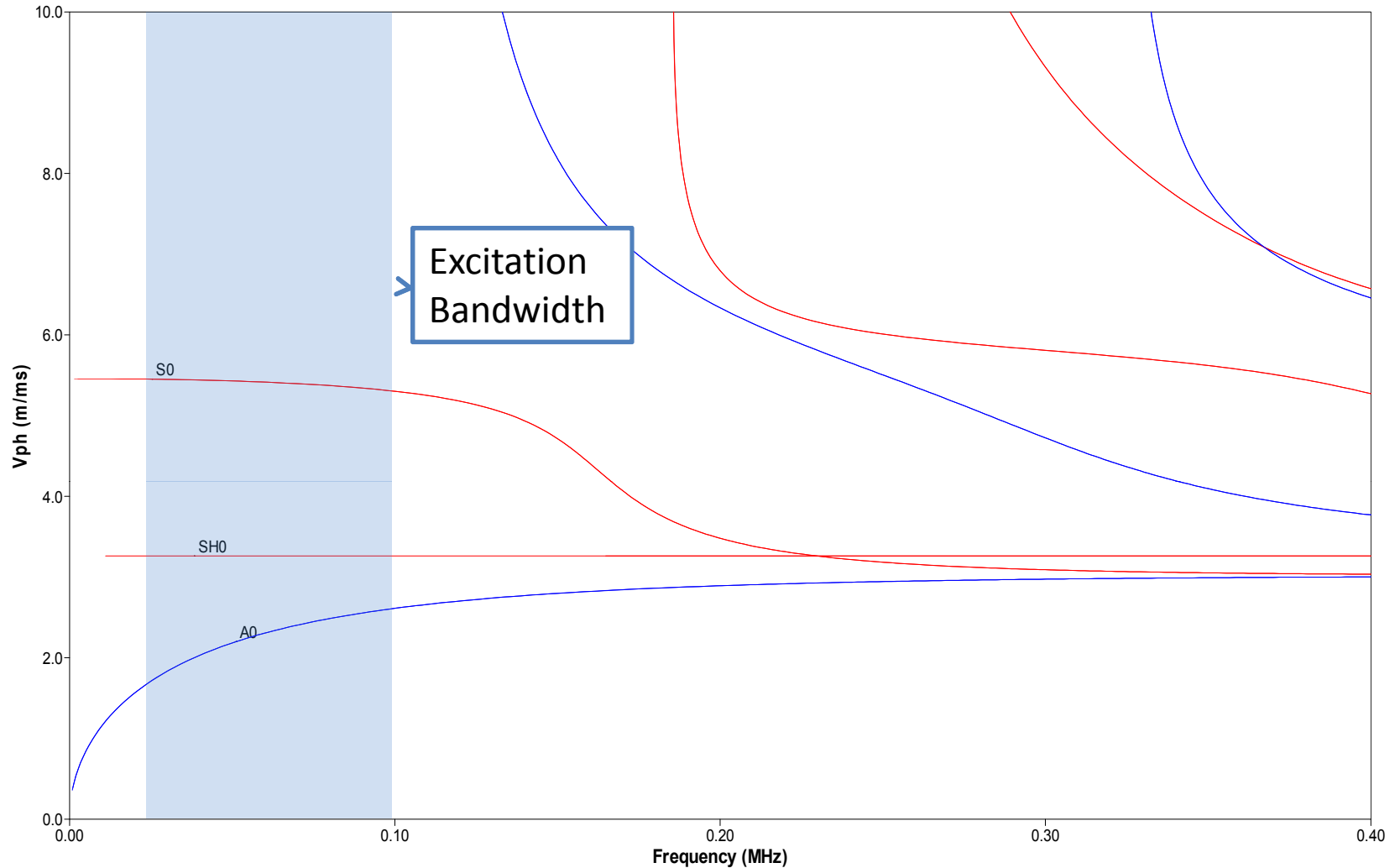


# Ultrasonic Prevention with a transducer array

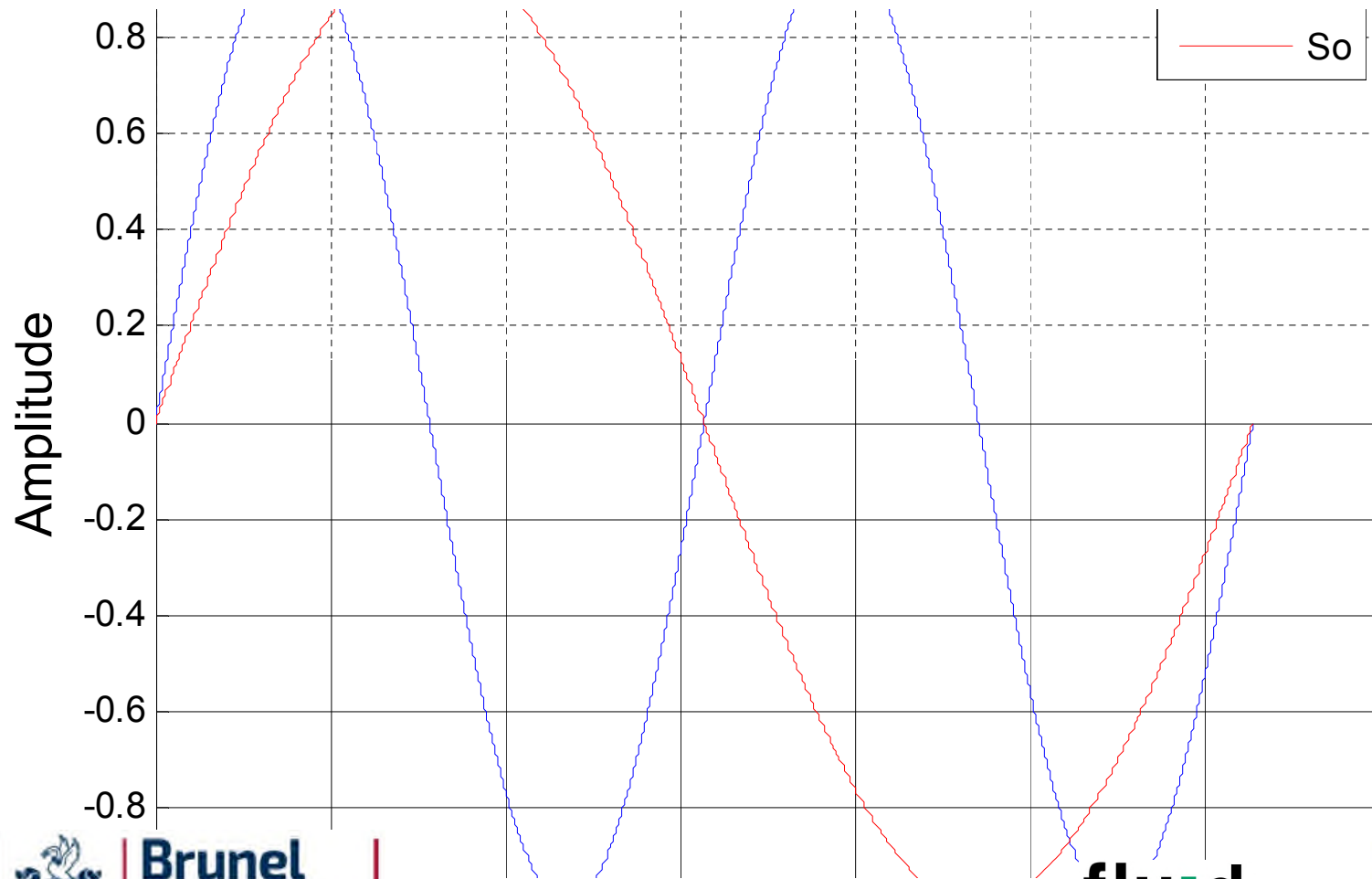
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# Dispersion curves



# Second transducer location





# Back to Holland space



# Experiment In Holland

## Description of the system

- Signal Generator

Maximum Power	300W
Maximum Output Voltage	1000V
Frequency Range	20-50 kHz
Frequency Tracking	Yes
Sweep	Yes with variable
Current/Voltage Protection	Yes

# Experiment In Holland

## Description of the system

- 2 High Power Transducers
- Signal Generator
- Laptop for monitoring
- 2 High Power Transducers for back-up
- One backup signal generator

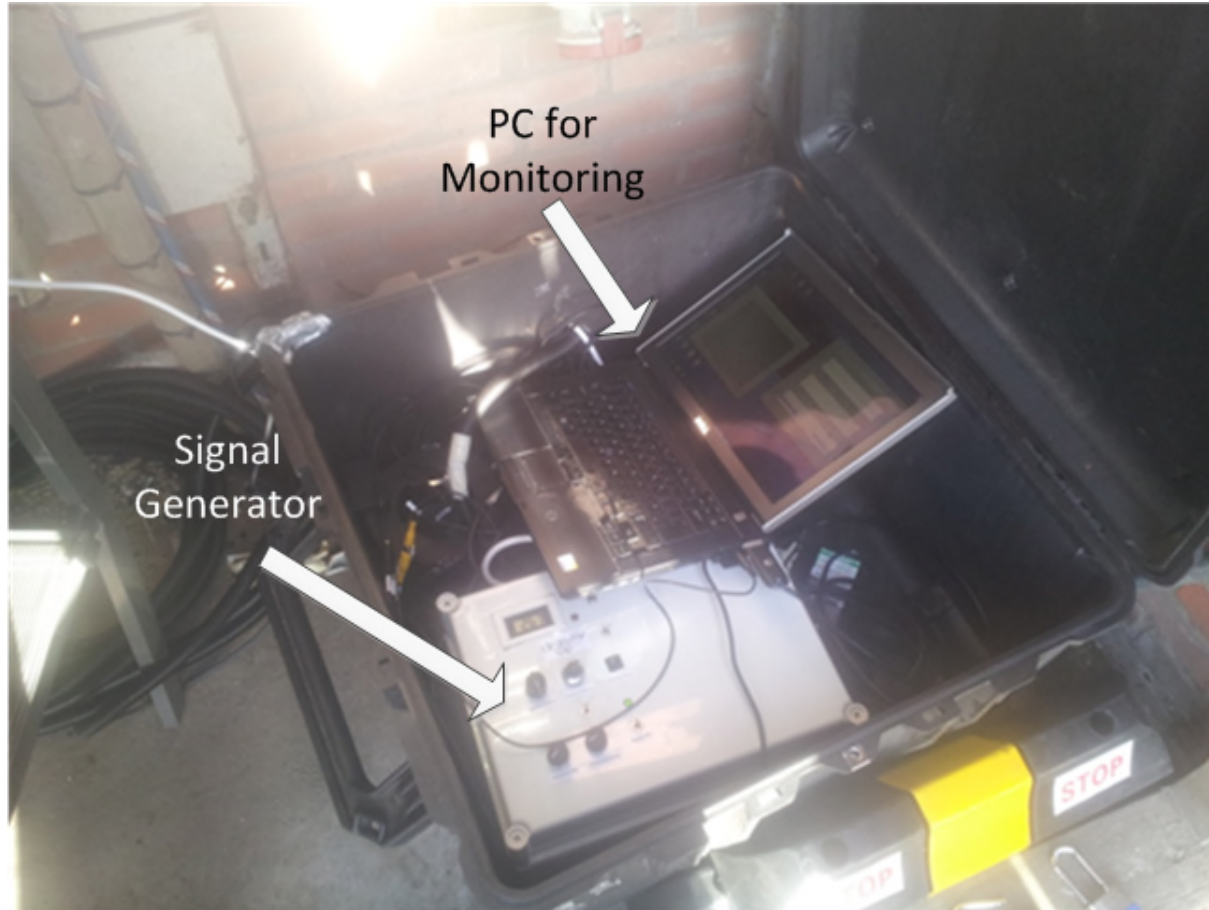
# Experiment In Holland System Set-up



# Electronic and monitoring Set-up

- Signal Generator for driving the Transducers
- PC for monitoring the functionality of the System
- 3G modem for sending data and for remote surveillance

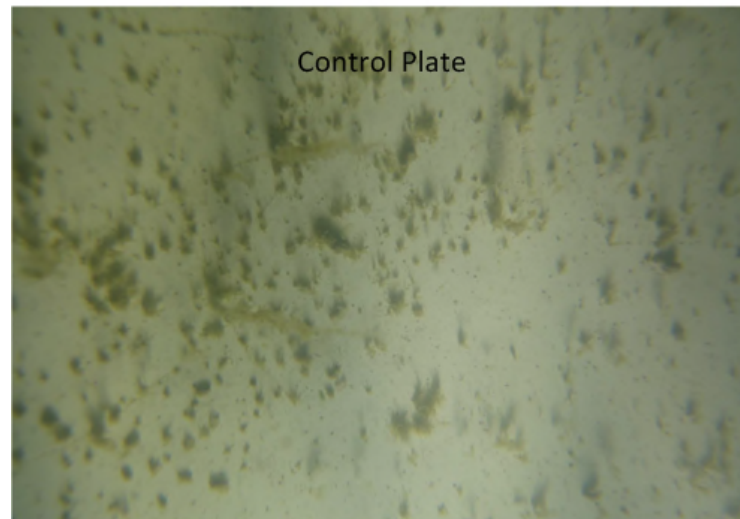
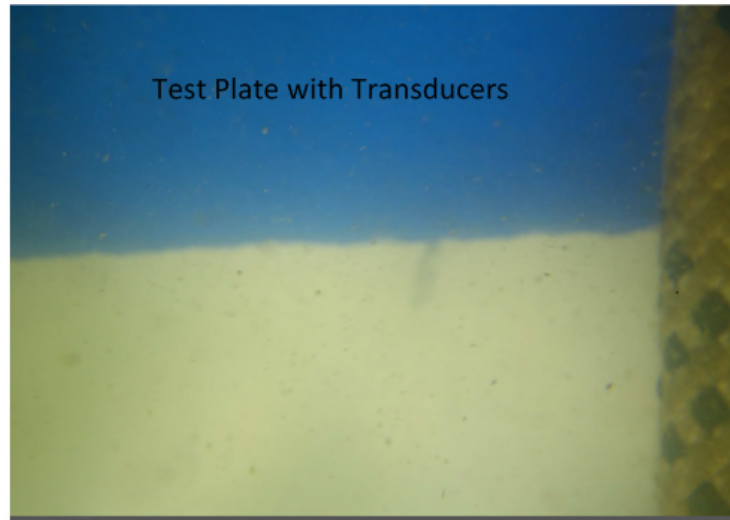
# Electronic and monitoring Set-up



# Signal Generator specifications

Parameters	Description
Input Supply	240V, 50 Hz
Output Voltage	Adjustable: 0 to approximately 1000V AC RMS over current protected (300 V max without resonance)
Output Frequency	Variable (About 23- 45 kHz dependent on transducer) Can be extended to about 100 kHz.
Frequency Sweep	Adjustable frequency sweep
Wave form	Internal square wave inverter output is filtered to produce sine wave at transducers. Continuous wave.
Output power	Approximately 300 Watts max (20 - 40 kHz), 100 Watts (40 – 100 kHz option)
Protection	Over voltage and current protection





Initial  
results  
after  
one  
and  
half  
month



# Cleanship system (main features)

- Guided wave generation
- Low power ( $\sim 15\text{W}$  per transducer; based on a two transducer array) vs typically  $50\text{W}$  per transducer in a convention HPU device
- Low frequency capability ( $\sim 20\text{-}45\text{ kHz}$ ) for prevention of fouling
- Working prototype