Investigation of upstream and downstream flow conditions in a swirling inline fluid separator (IFS)

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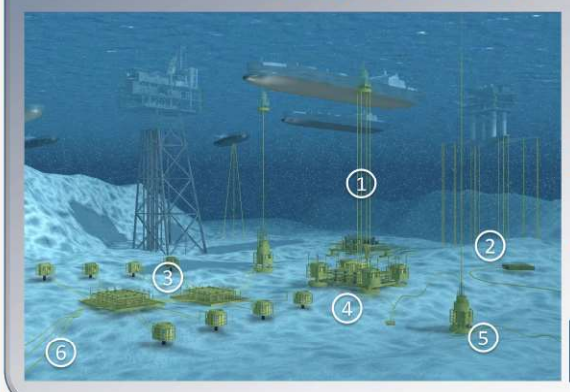
Oil & Gas Industry- State of Subsea Installations

Subsea Installations



1) Riser systems
2) Control installations
3) Subsea manifolds
4) Separation unit
5) Subsea wellheads & Wet tree Systems
6) Flow lines

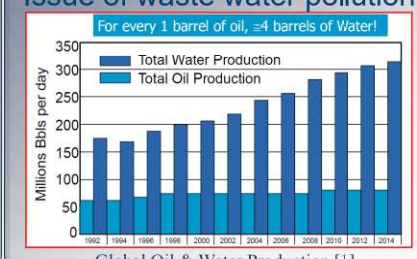
Fluor Corporation (2009)

Industrial Fluid Separator

Pros and cons of different subsea separators

Separator type	Advantages	Disadvantages
Gravity	- Simple principle - Reliable - Efficient	- Large size - Difficult to install - Expensive
Cyclone	- Smaller size - Better in high depth	- Difficulties with small particles
Swirl	- Compact - Easy to install	- Not efficient (oil/water) - Tested onshore

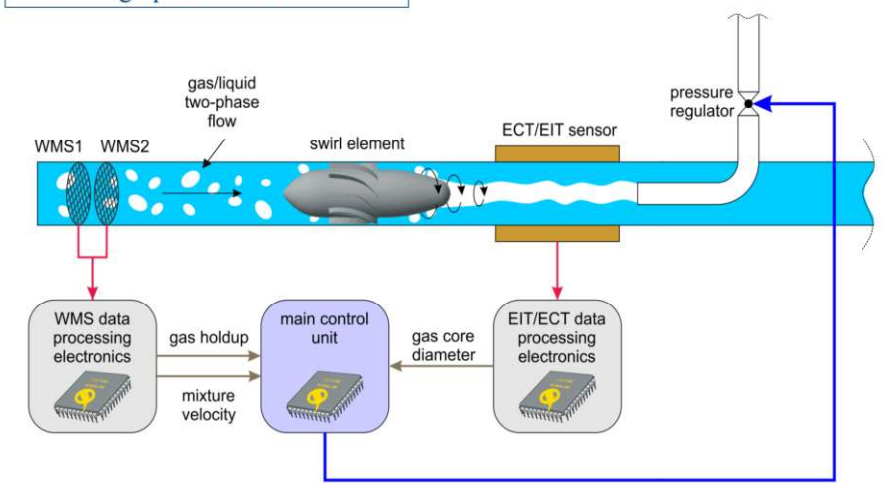
Issue of waste water pollution



Global Oil & Water Production [1]

Control of Inline Fluid Separators

Targeted improvement: Dynamic control of inline fluid separation with tomographic sensors



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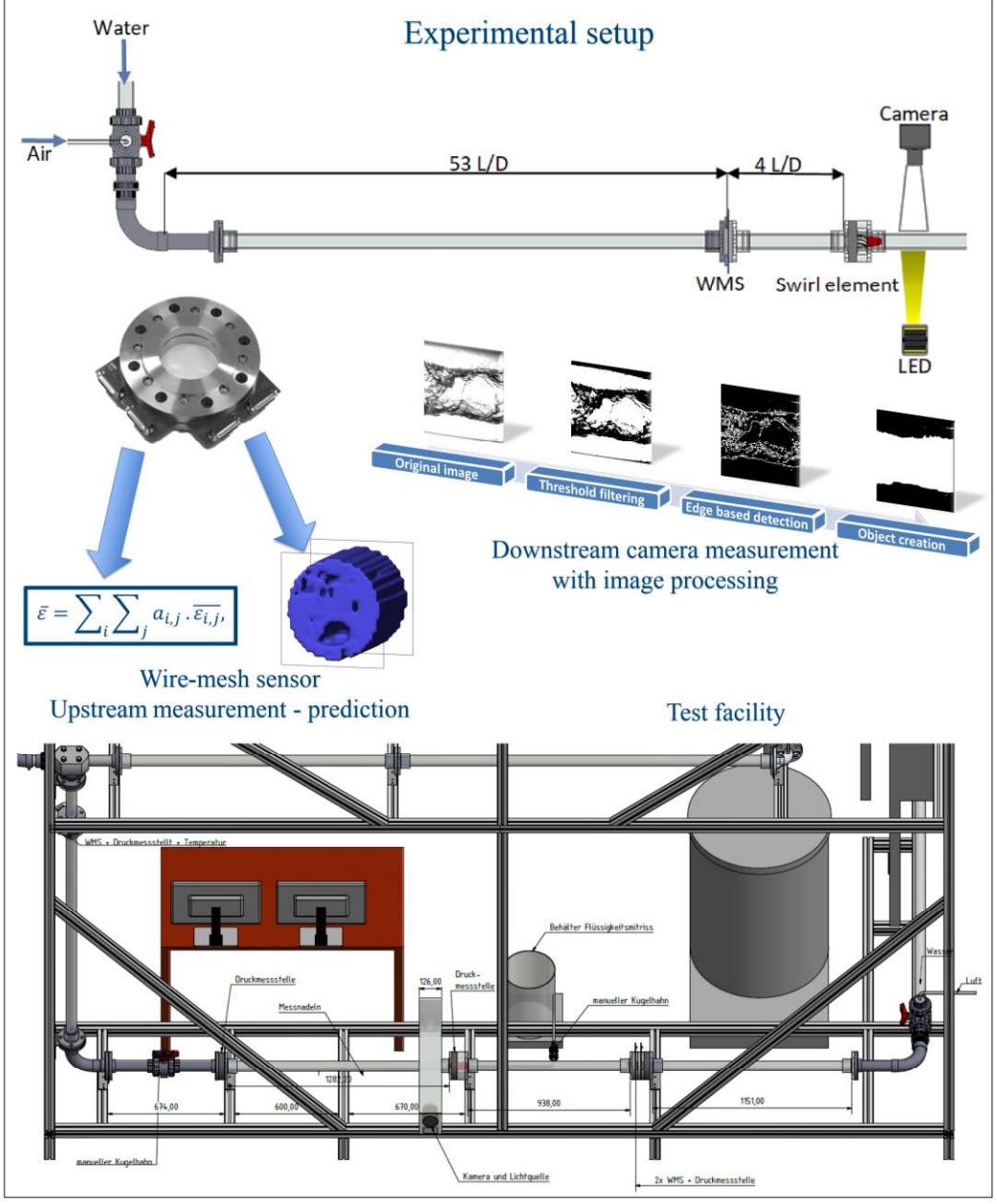
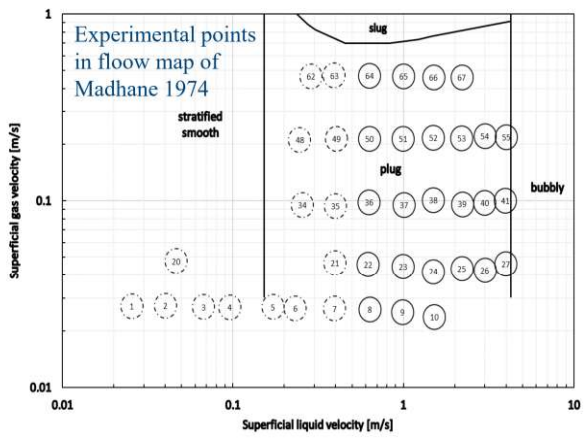
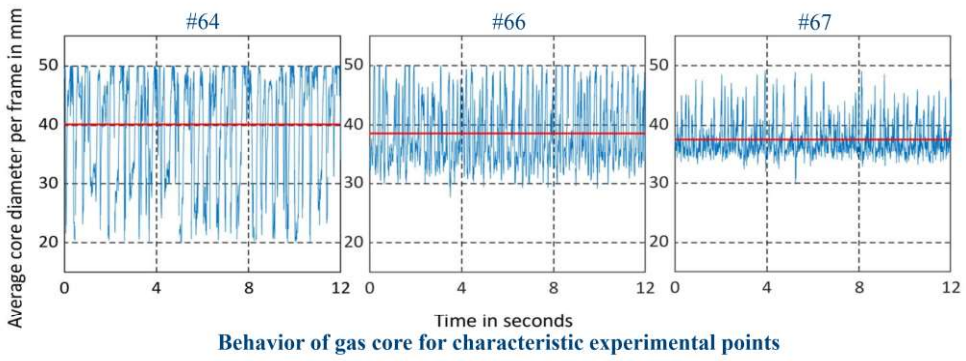
Experimental Setup and Measurement Techniques



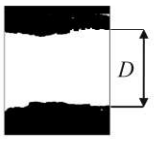
Results



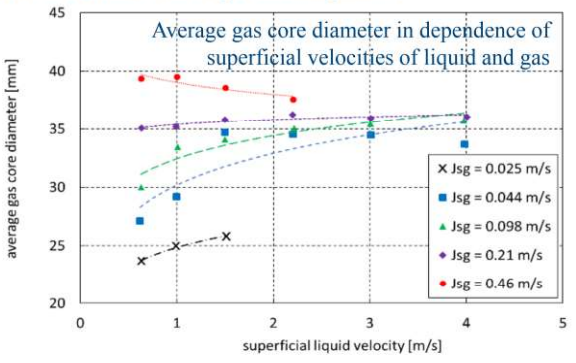


Behavior of gas core for characteristic experimental points

Important parameters:
- Upstream: void fraction, superficial gas and liquid velocities
- Downstream: average gas core diameter, standard deviation and fluctuation of gas core



$$SD = \sqrt{\frac{\sum_{i=1}^{N}(D_i - \mu)^2}{N}}$$



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References

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