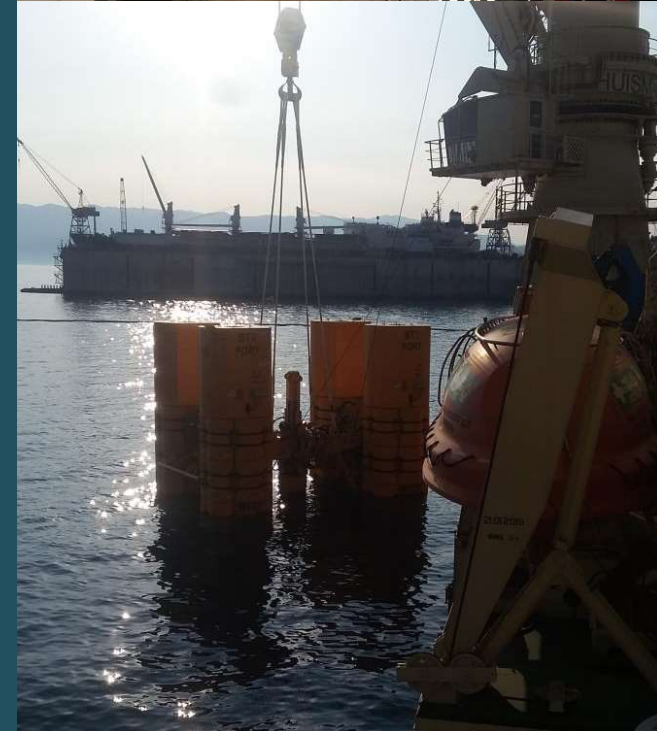




Offset Installation Equipment: intervention system for underwater well emergencies

Roberto Di Silvestro
Head of Sonsub

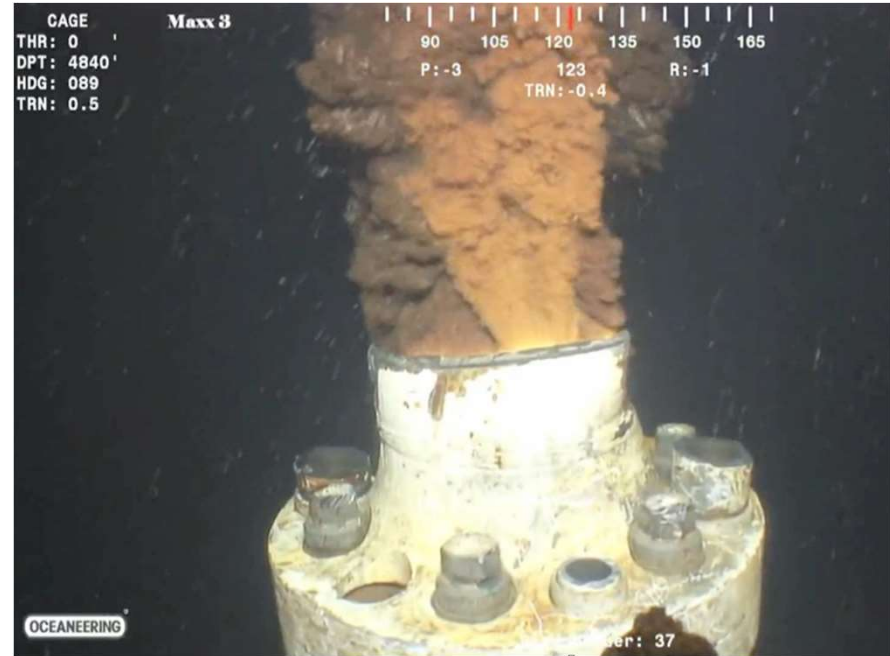
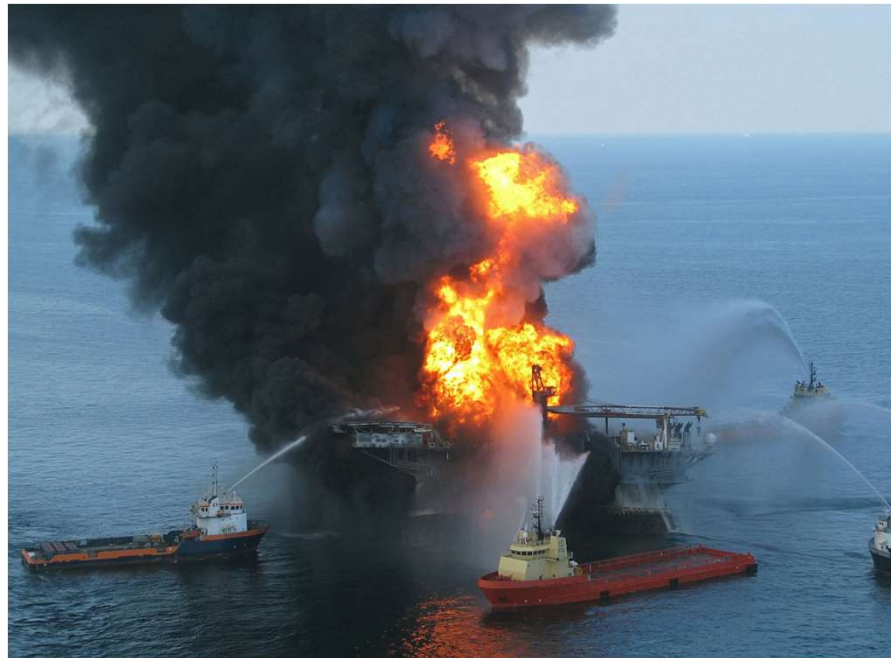
Athens, June 25th 2019



Background:

Macondo: the worst blowout accident in O&G history

On April 20, 2010, the drilling platform DeepWater Horizon was destroyed by a fire caused by the blowout from the Macondo well that was being drilled



Background:

Macondo: the worst blowout accident in O&G history

11 people lost their lives and a further 17 were injured

The Macondo well continued its uncontrolled blowout in the sea for 87 days

Approximately 5 million barrels of oil spilled into the Gulf of Mexico



Finally, a capping stack was installed onto the wellhead by means of a support vessel that stationed on the well vertical

Public reaction

Regulators and the public looked to the industry to reaffirm its ability to operate safely and in an environmentally responsible way

The industry needed to be better prepared in the event of a future serious subsea well control incident

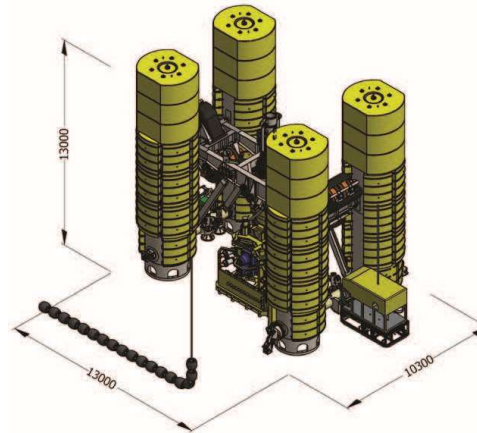
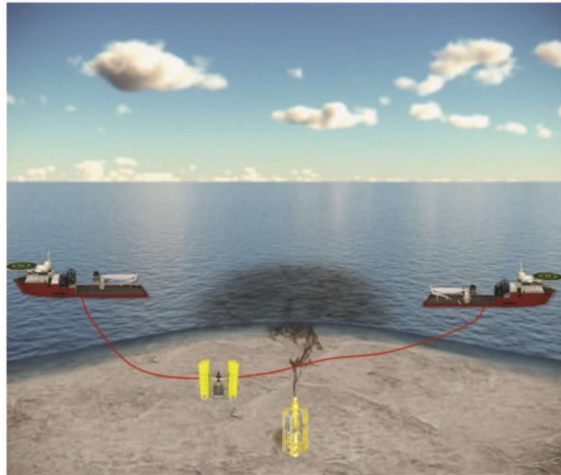
International capabilities were required to respond quickly and effectively



Industry response

The O&G industry, through the IOGP (International Association of Oil and Gas Producers) and 8 major Oil Companies, reacted with the incorporation of a non-profit Consortium, SWRP (Subsea Well Response Project)

The main objective of SWRP is the definition of the methodologies, the development of technology and the set up of organizations ready to be mobilized for a rapid international response and intervention to prevent or limit hydrocarbon dispersion at sea



Industry response

SWRP developed and built

- ✓ 4 Capping stacks
- ✓ Containment system
- ✓ Dispersant Hardware

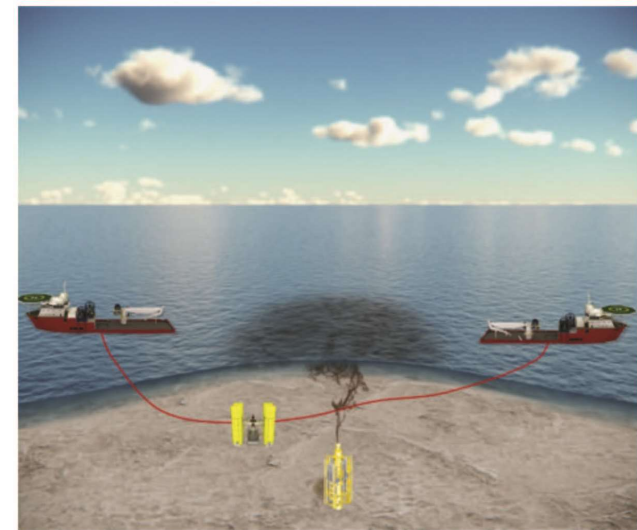


The well capping problem

Several studies and simulations confirmed that the fundamental problem to be resolved for the installation of the capping stack in shallow to mid-water depth (up to 600-700 m) is the safe access of the intervention vessel on the well vertical

Back in 2011 SWRP launched an international design competition to define a solution to the problem

Saipem's proposal was retained as the most promising and in 2012 it was awarded the development, design and construction of a system able to install capping stacks while keeping the support naval spread 1 km (Exclusion Zone) far from the collapsed well

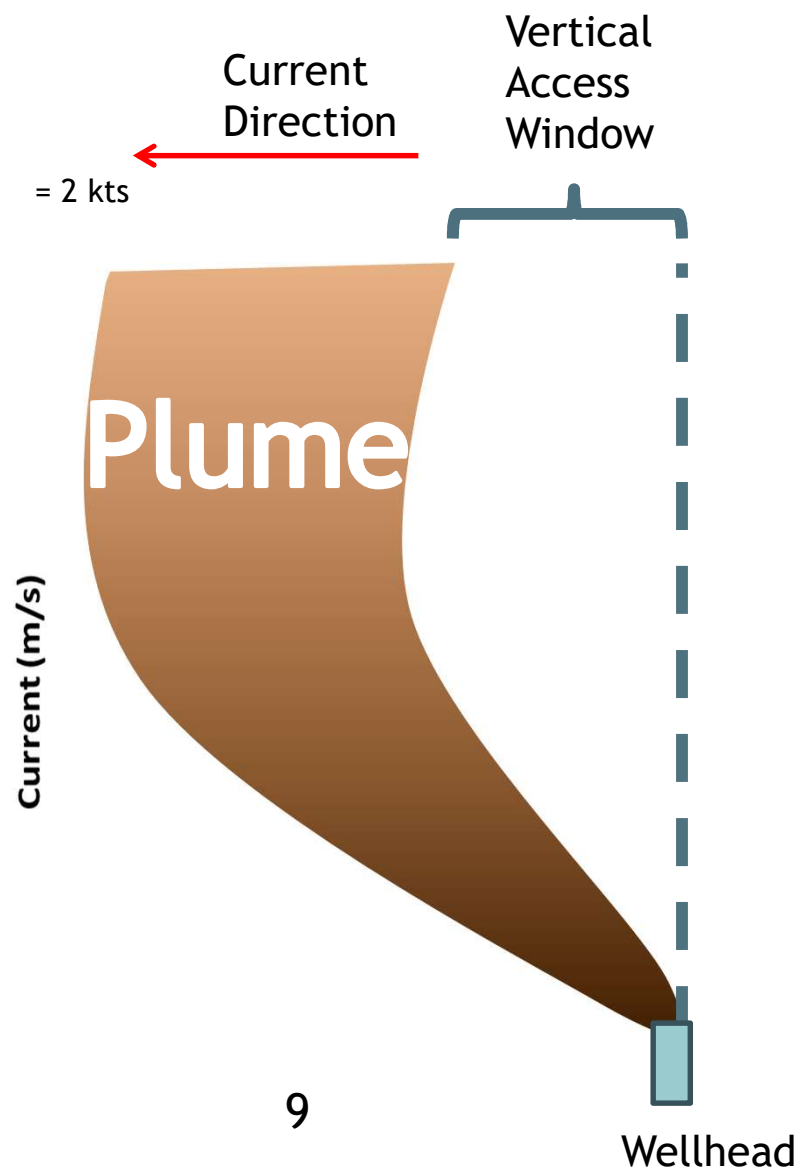
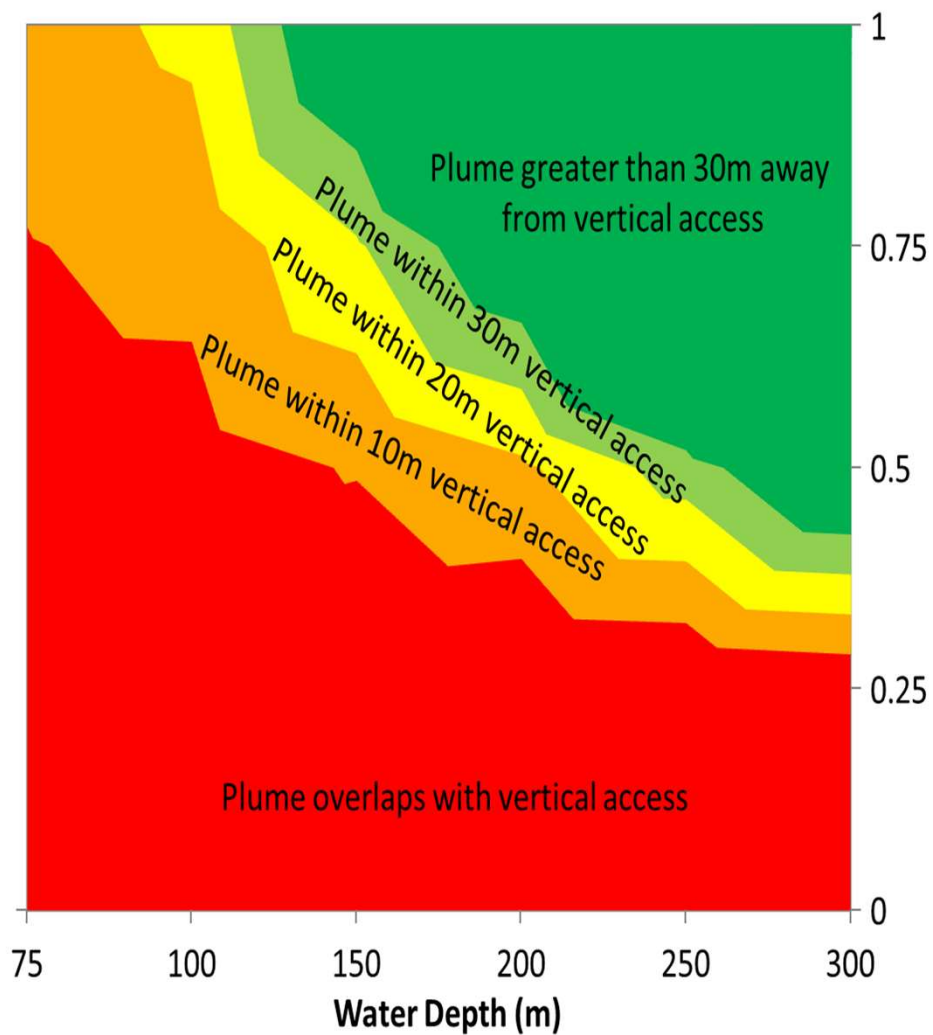


Blow out

Actinia Well, Vietnam (1993)



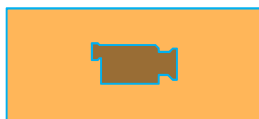
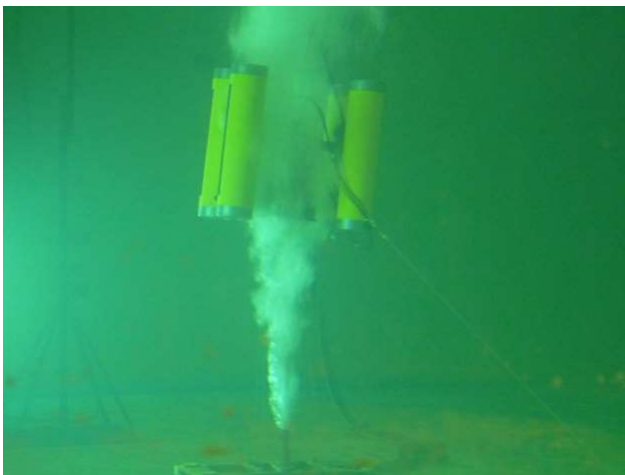
Vertical Access Restrictions



The solution: Offset Installation Equipment (OIE)

OIE works like a submerged «hot air balloon», with an in-air weight of approx. 250 t, remotely controlled via a Work Class ROV, able to carry and position the 100 t heavy capping stack within 10 cm of precision

Its effectiveness was demonstrated through several numerical simulations and in a full scale simulation test in water, offshore Croatia



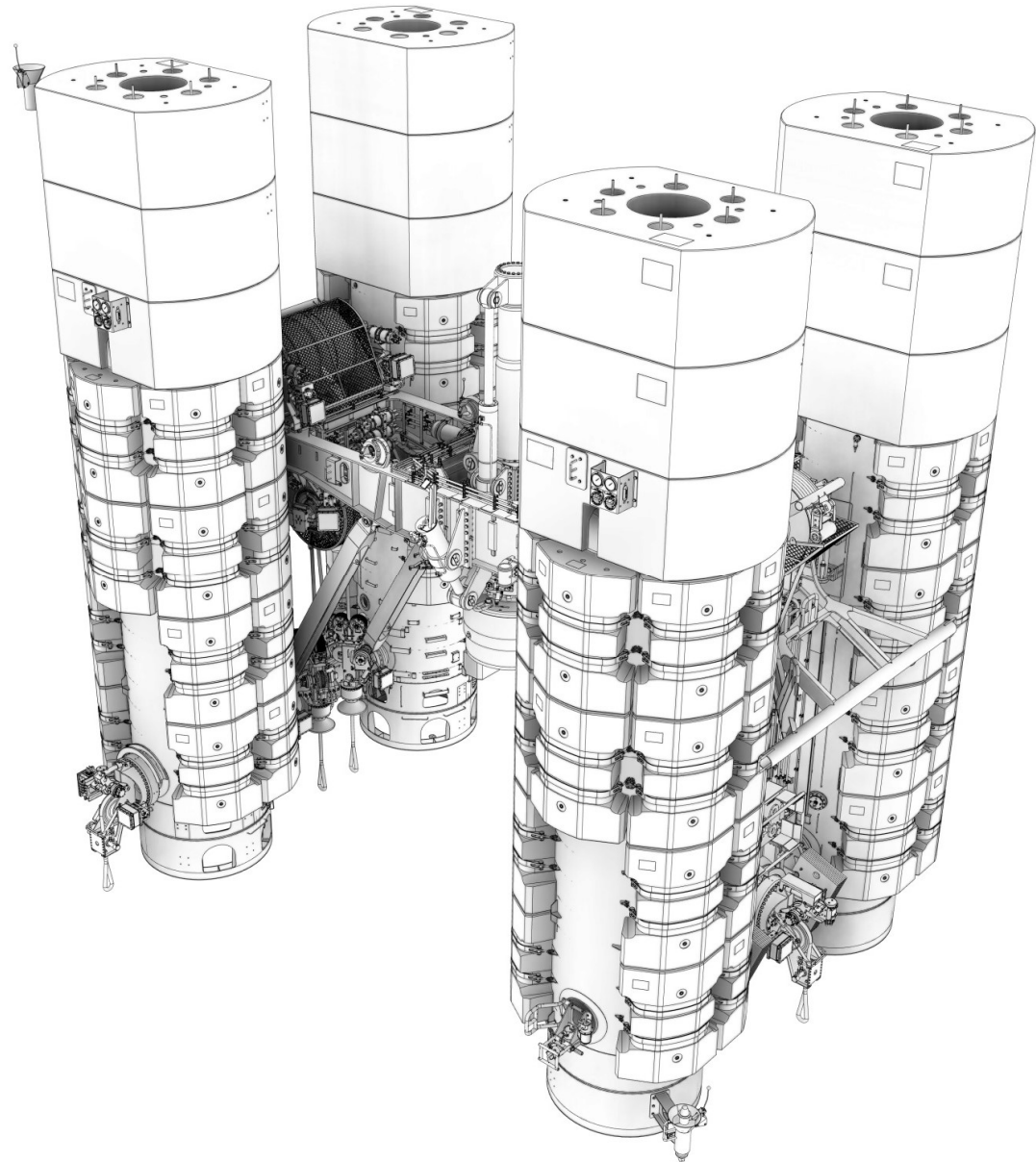
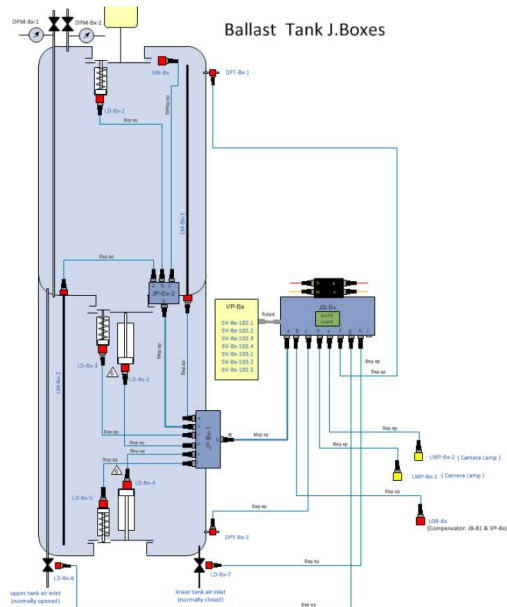
OIE: the Carrier

It encompasses 4 tanks that may be filled with compressed air in order to produce a lift up to 150t

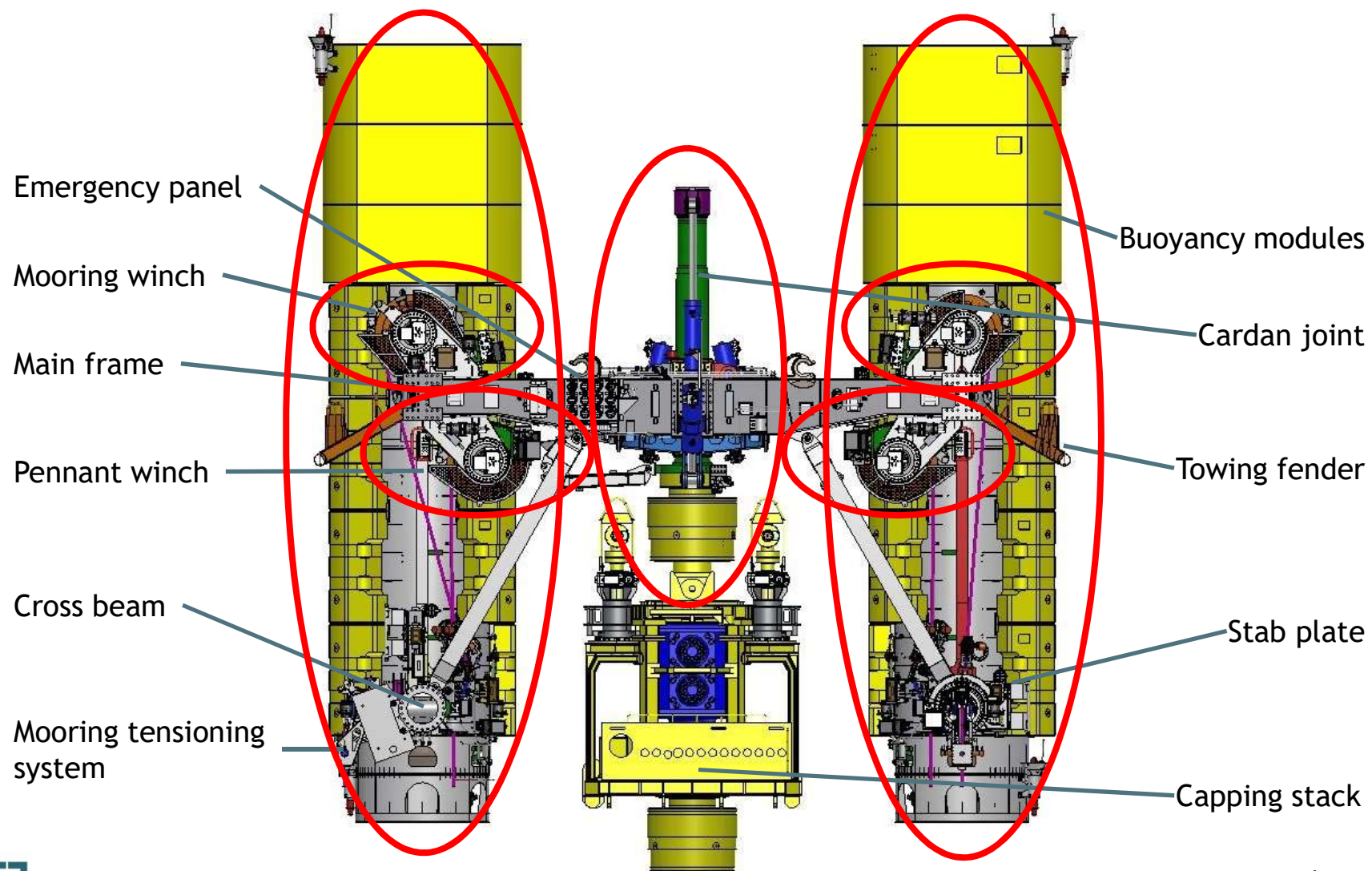
14m H x 11m W x 13m L

120 remote actuations

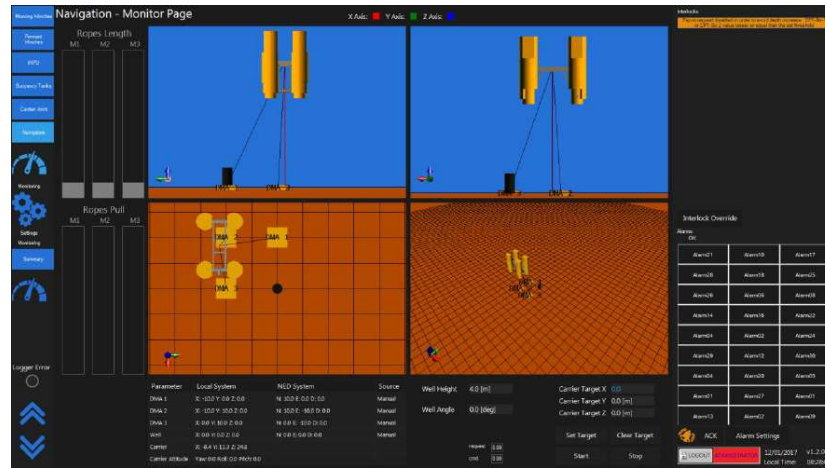
> 200 instruments



OIE: the Carrier

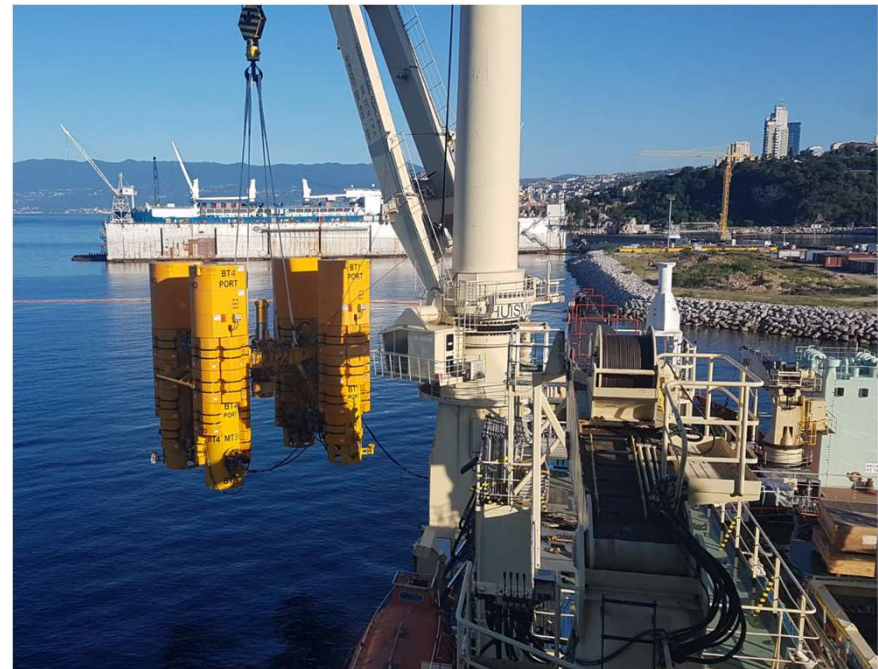
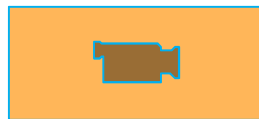


OIE: the System



OIE, The Performance Test

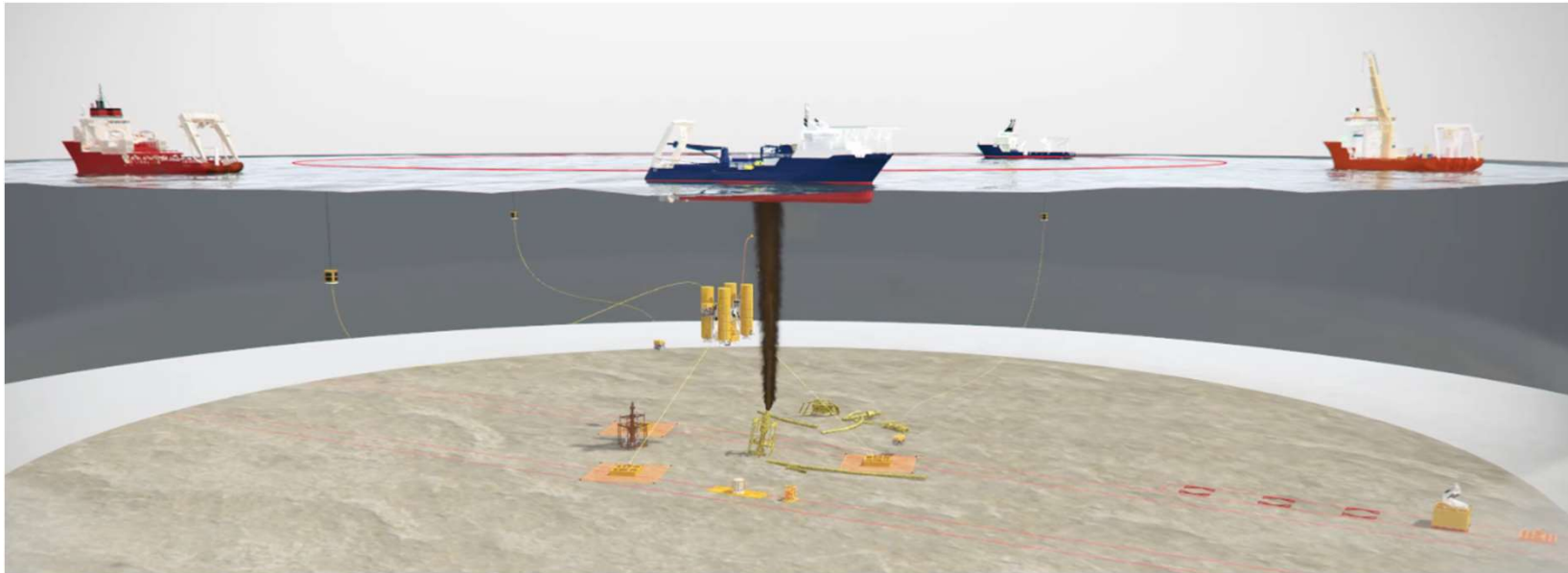
- From February to July 2017
- Test made in air and subsea



OIE: Readiness

The OIE is stored at Saipem Marine Base in Trieste harbour, where the system is maintained in full efficiency, ready for mobilization and intervention and where the ongoing training of offshore operators and personnel of OSRL subscribers takes place.





On May 6th 2019, OTC granted OIE and Saipem the
“Spotlight on New Technology Award”

