WellRobot®

A disruptive solution to enable cost reduction in Well Interventions and P&A

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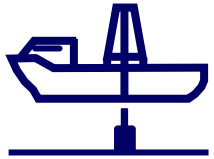
The Problem

Well intervention is often needed to maintain integrity and to extend the life of wells

CHALLENGE:

Traditional tools, such as wireline, tractors and coiled tubing require…

Production stoppage



Heavy infrastructure

Significant crew

Our Solution

WellRobot® – Autonomous robotic platform for in-well logging and operations

- Fusion of embed sensors (developed or commercial)
- Decision-making autonomously
- Electric motorized system
- Modular concept

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Applications

WellRobot® - Timeline

Short term

Onshore

Dry completion

Middle term

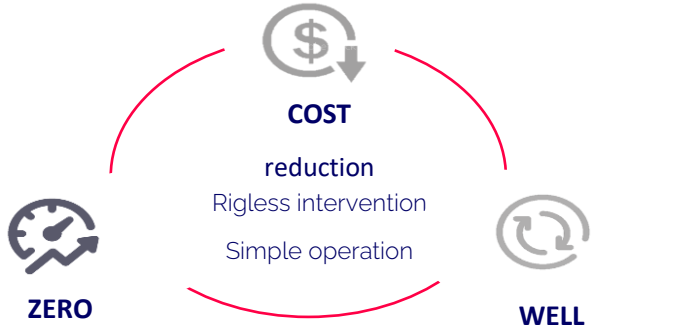
Subsea wells

Long term

Resident robot

Benefits

WellRobot® enables massive well logging and intervention through…



Technology Overview

Scenario Characterization

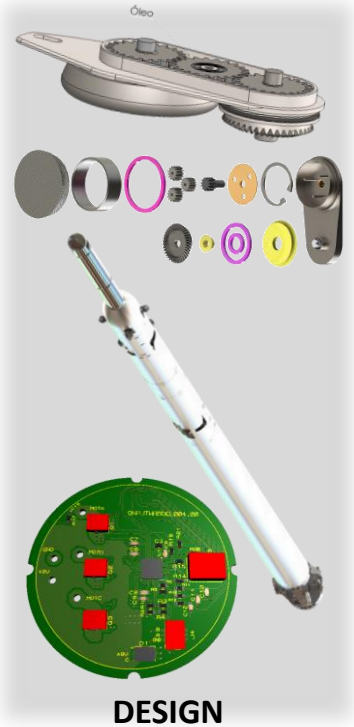
- Dry Completion Xmas Tree
- Vertical, horizontal or deviated wells
- Working pressure: 500 to 5.500 psi
- Maximum working temperature: up to120°C
- Flow Rate: < 10kbpd
- Fluid Viscosity: up to 40cP
- BSW = 85%

Technical Requirements

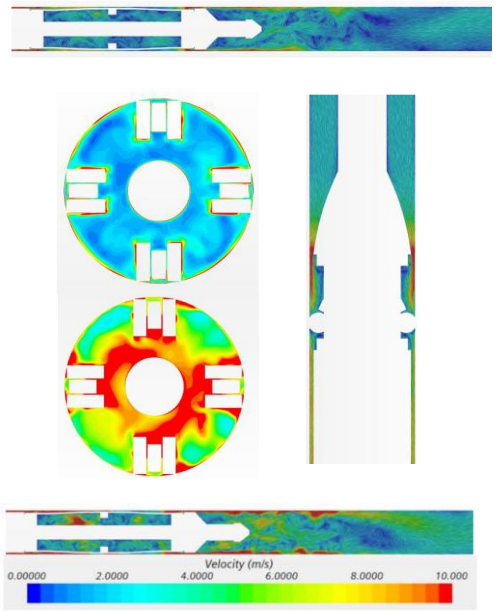
- Autonomy to run up to 7km (total distance)
- Pressure and temperature sensors embedded
- No slickline/wireline needs during runs
- Standard fishing neck
- AI embed for autonomously real-time decision making
- Works in the entire range of 4-1/2” API tubing (3.255” to 4.052”)
- HMI to program, collect data and interact with the robotic platform

Project Phases

WellRobot® concept and functional prototype



DESIGN



NUMERICAL SIMULATION

MANUFACTURING

LAB TESTS

Field Test
Natal - RN

Field Test at training/school well (Natal-RN, Brazil)

Contextualization

- **Objective**

  Perform well run at training/school well.

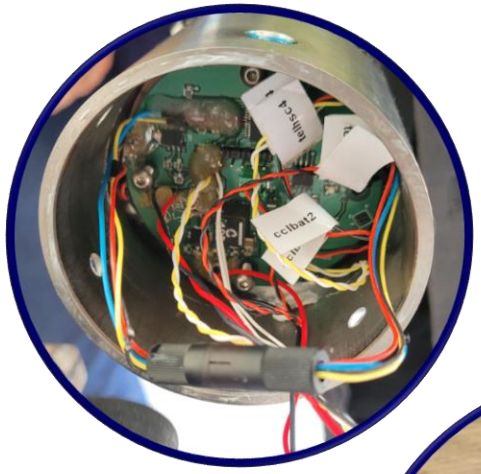
- **Well Caracteristics**

  Depth: 100 m / 328 ft
  Tubing ID: 3,92" – 4-1/2" Tubing
  Well Fluid: Water , 8.32 ppg
  Temperature: 40°C

Field Test at training/school well (Natal-RN, Brazil)

Resume of results

Category	ID	Difficult observed
Project	P1	TEL - Issues in the installation process
Mechanic	M1	Sealing / connection design
	M2	Assembling process
Electronic	E1	Current circuit spikes
	E2	Assembling process (wiring)
	E3	Assembling process (circuit boards)
Autonomous system	A1	Definition of sequence (runs)
	A2	Logic of fault (protection triggers)

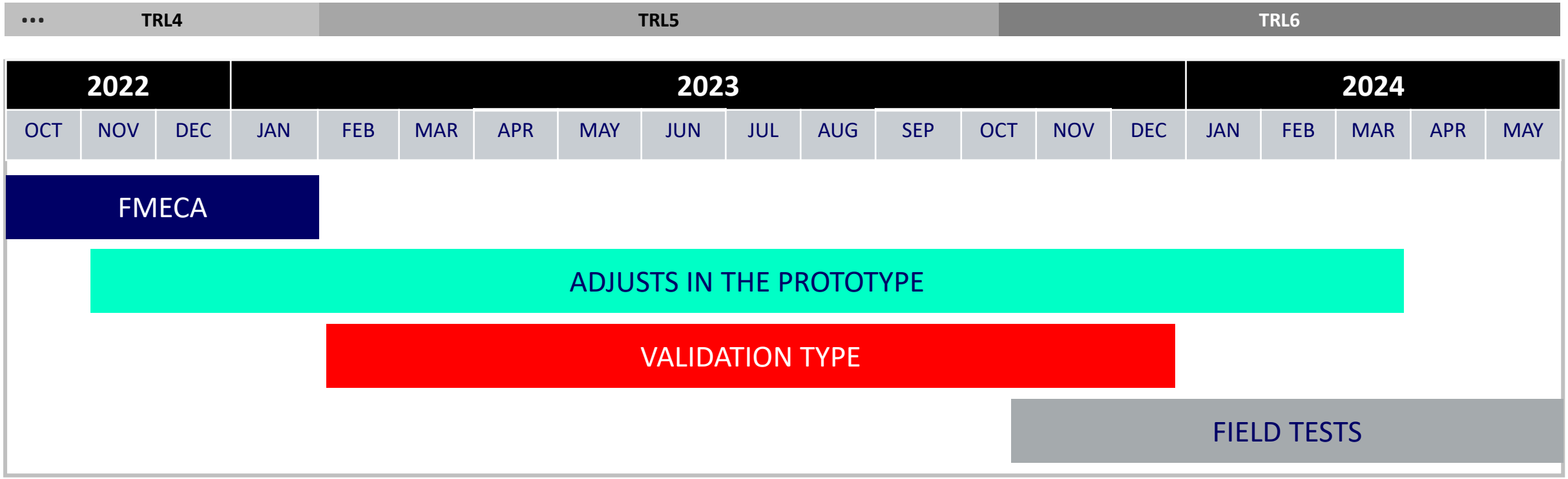


Conclusions

- The test executed in the training/school well was of great value to build the learning curve of the tool and for its operation:
    - Validation of concepts and functionalities of the prototype;
    - Simulation of the operation of the installation in the well without the docking station;
    - Communication test between IHM and prototype;
    - Anticipation of operational problems;
    - Integration between development team and field operation;
- All adversities encountered were addressed with viable solutions

Next steps

Original Plan



we are on it!

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