July 2025

Asso.subsea

Simtec ANSYS Technology Day

ANSYS CFD Success Story

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Mechanical Design Engineer

Bridging the distance - **Connecting the World**

Introduction

We are Asso Subsea

- Formerly known as Asso divers
- **Greek-owned and based company**
- Founded in **1976**
- Providing services to clients for more than **47 years**
- Specialized in **worldwide submarine utilities** installation and repair activities
- **In-house design** of vessels and tools
- **Creative, innovative, reliable and cost-effective solutions** fitted to customer needs

45+
Years
of Excellence

25+
units

860
professionals

9
vessels

Our Organization

Asso Group has been actively involved in offshore and nearshore activities since its establishment in 1976. During its operation, Asso Subsea has maintained a cutting-edge technology-driven profile acting either as a turnkey solution provider or as a subcontractor to major cable installation companies and marine contractors.

Since 1985, Asso Subsea has been the leading contractor for all Greek-related cable projects for both land and sea works. Specializing in submarine cable installation, protection, repair, and support operations, Asso Subsea has established a constantly updated long track record of participation, not only in domestic but also in worldwide projects.

Being capable of providing highly customizable equipment along with top-quality services, even under the most unforeseen circumstances, has enabled Asso Subsea to capitalize by experience and rightfully include in its Clientele some of the leading players of the Telecommunication, Power, and Alternative Energy industry.

Our Mechanical Design Team

At the core of our subsea operations is a highly specialized **Mechanical Design Team**, dedicated to developing the equipment that powers our offshore missions.

What We Do:

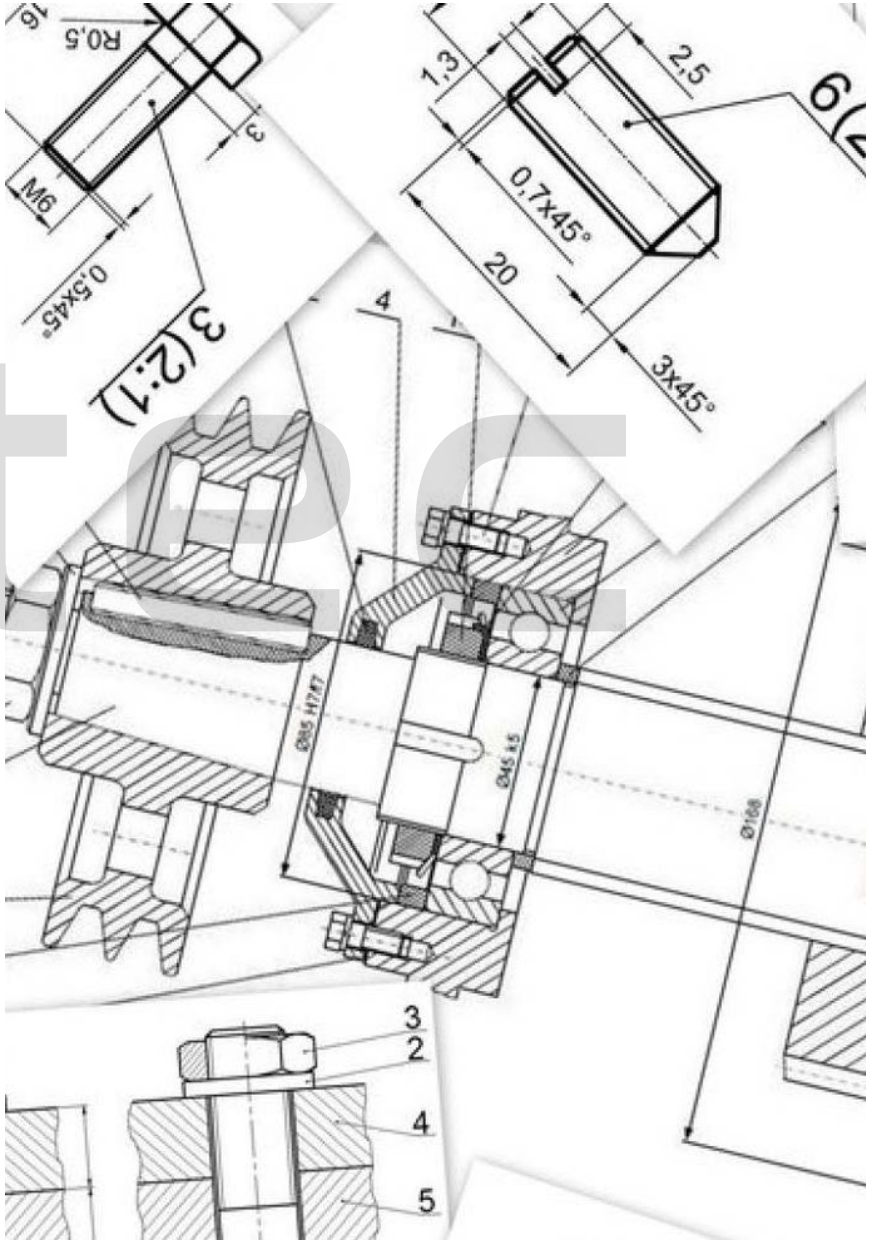
Our team is responsible for the **end-to-end mechanical design and development** of critical subsea equipment, including:

- **Trenchers**: Robust, subsea vehicles designed to cut trenches in the seabed for cable burial, ensuring protection from external damage and environmental exposure.
- **Jetting and Plows**: Equipment that uses high-pressure water jets to fluidize the seabed, allowing cables to settle into place with minimal environmental impact.
- **Support Equipment**: Custom tools and mechanical systems used throughout the cable laying process, from deployment to post-lay burial and inspection.

Our Role in Cable Laying Operations:

We collaborate closely with operations, hydrodynamics, and controls teams to ensure our equipment:

- Performs reliably in **challenging subsea environments**
- Meets project-specific requirements for **depth, soil type, and cable specifications**
- Complies with **industry standards** and **client expectations**



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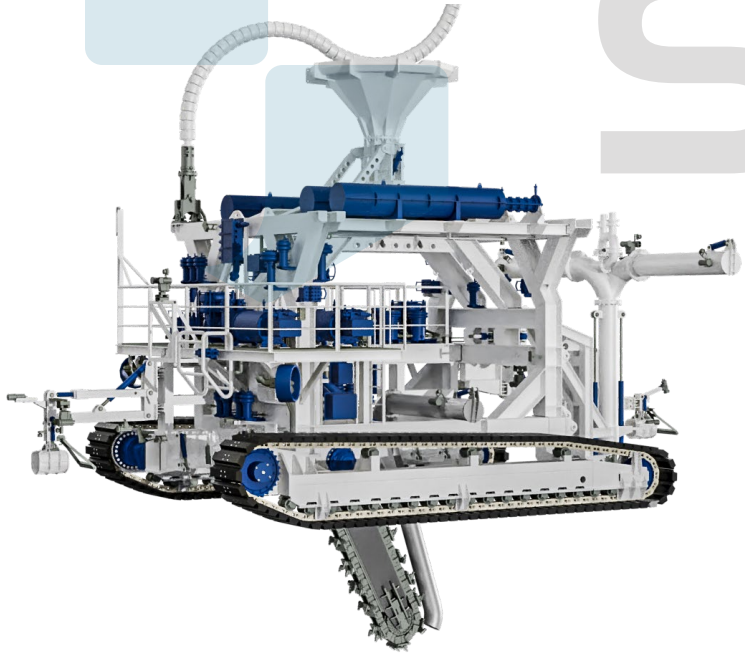
CABLE LAYING METHODS

SUBSEA MECHANICAL TRENCHERS

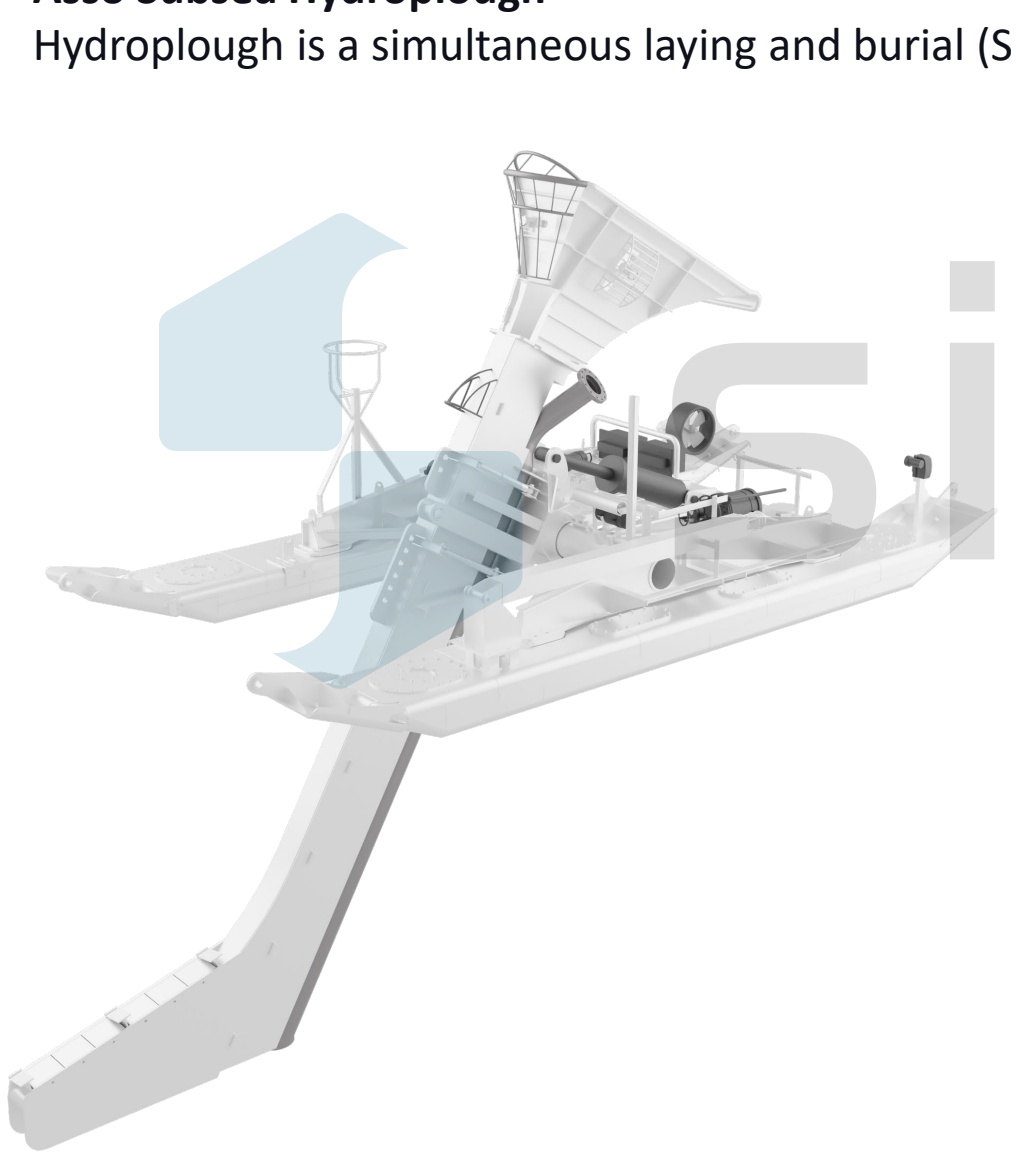


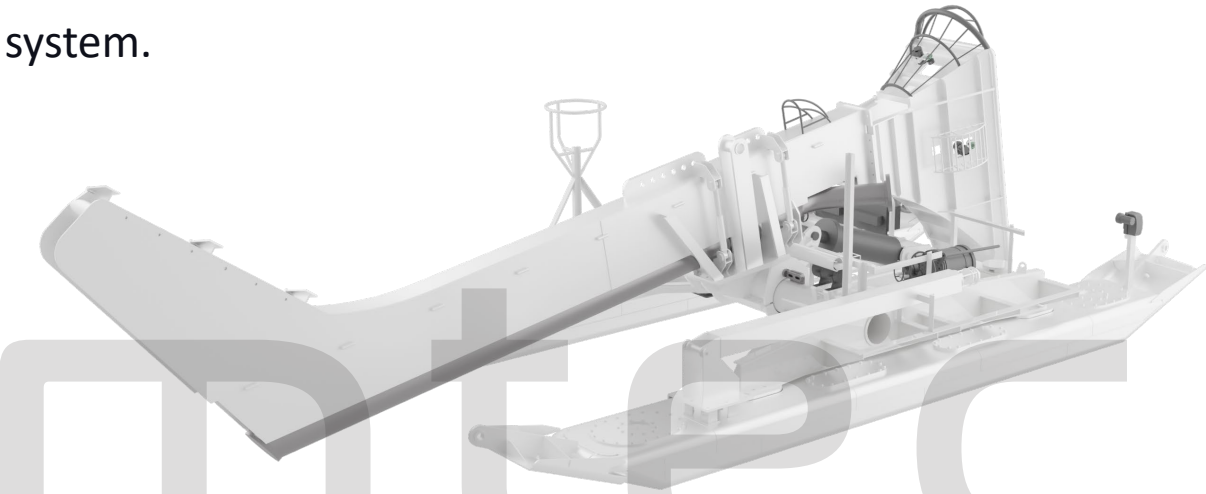
SUBSEA JET TRENCHERS

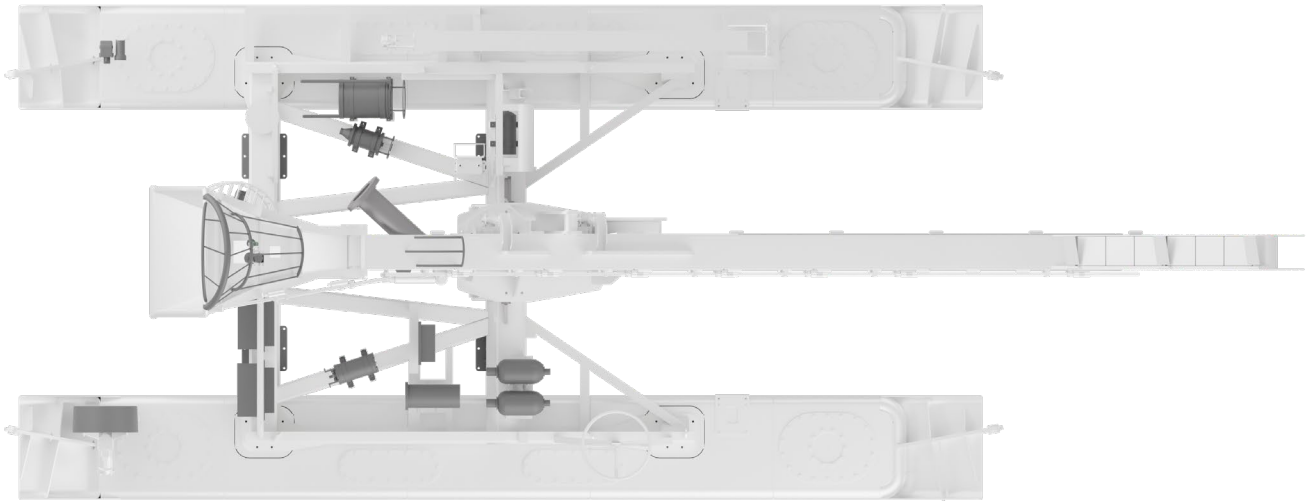
SUBSEA JET-ASSISTED SLEDGES/ HYDROPLOUGH

Asso Subsea Hydroplough

Hydroplough is a simultaneous laying and burial (SLB) system.

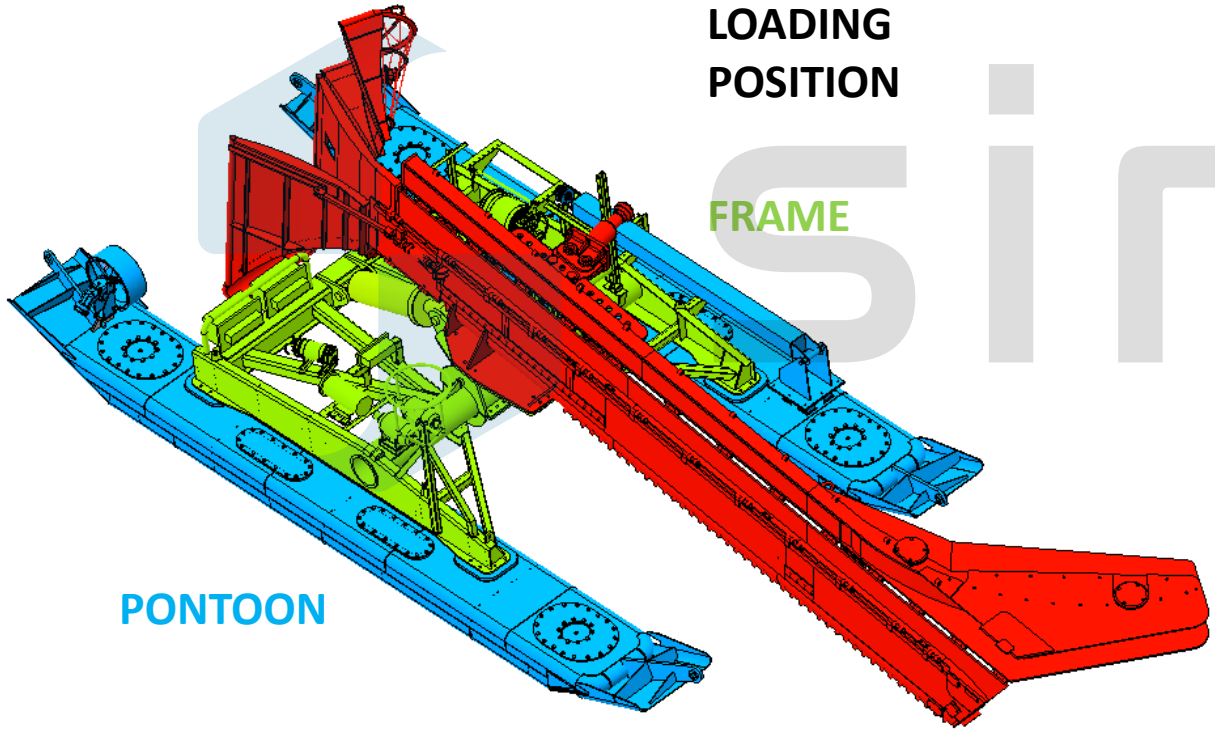


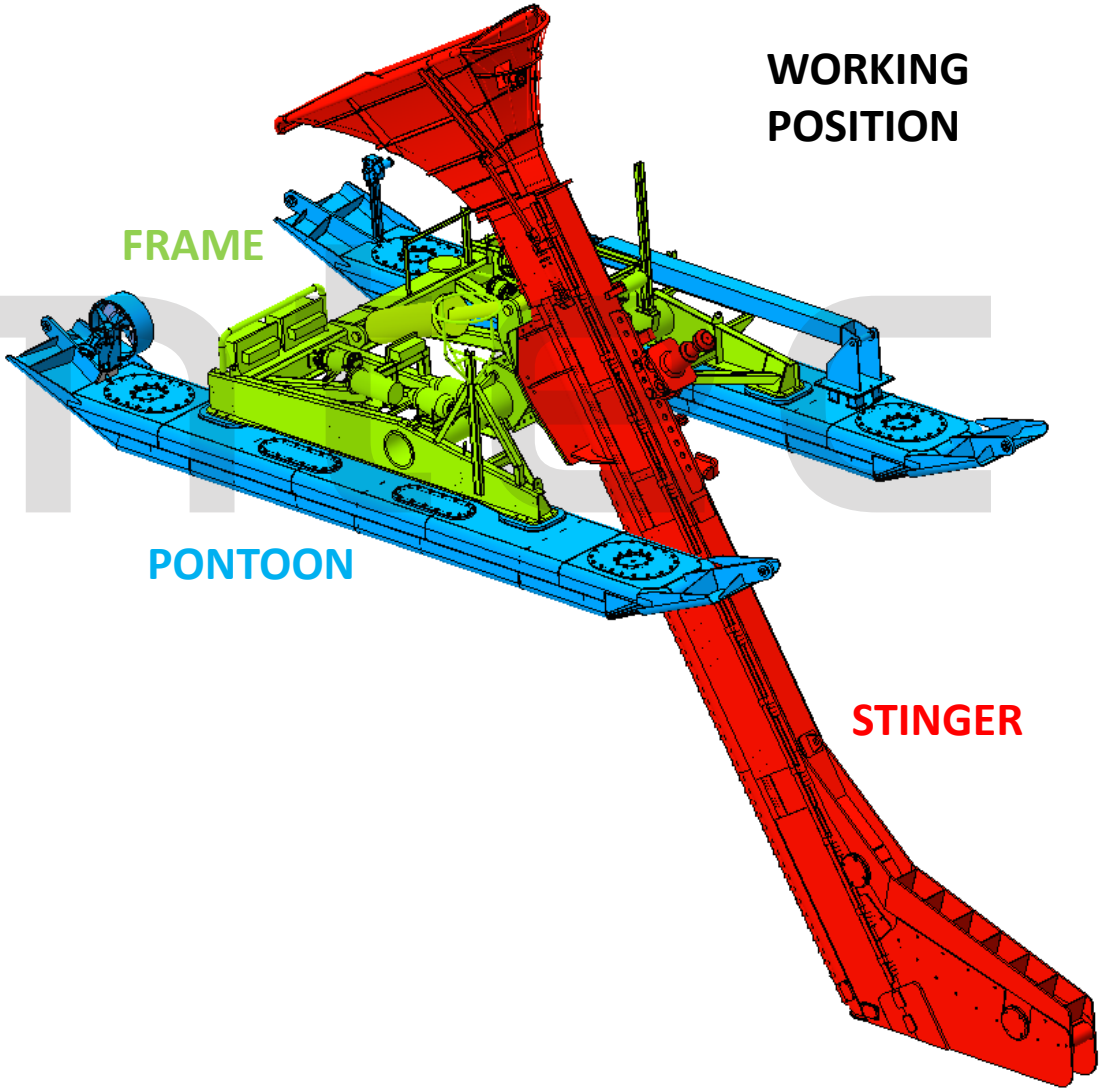




Asso Subsea Hydroplough

Hydroplough working and loading position.





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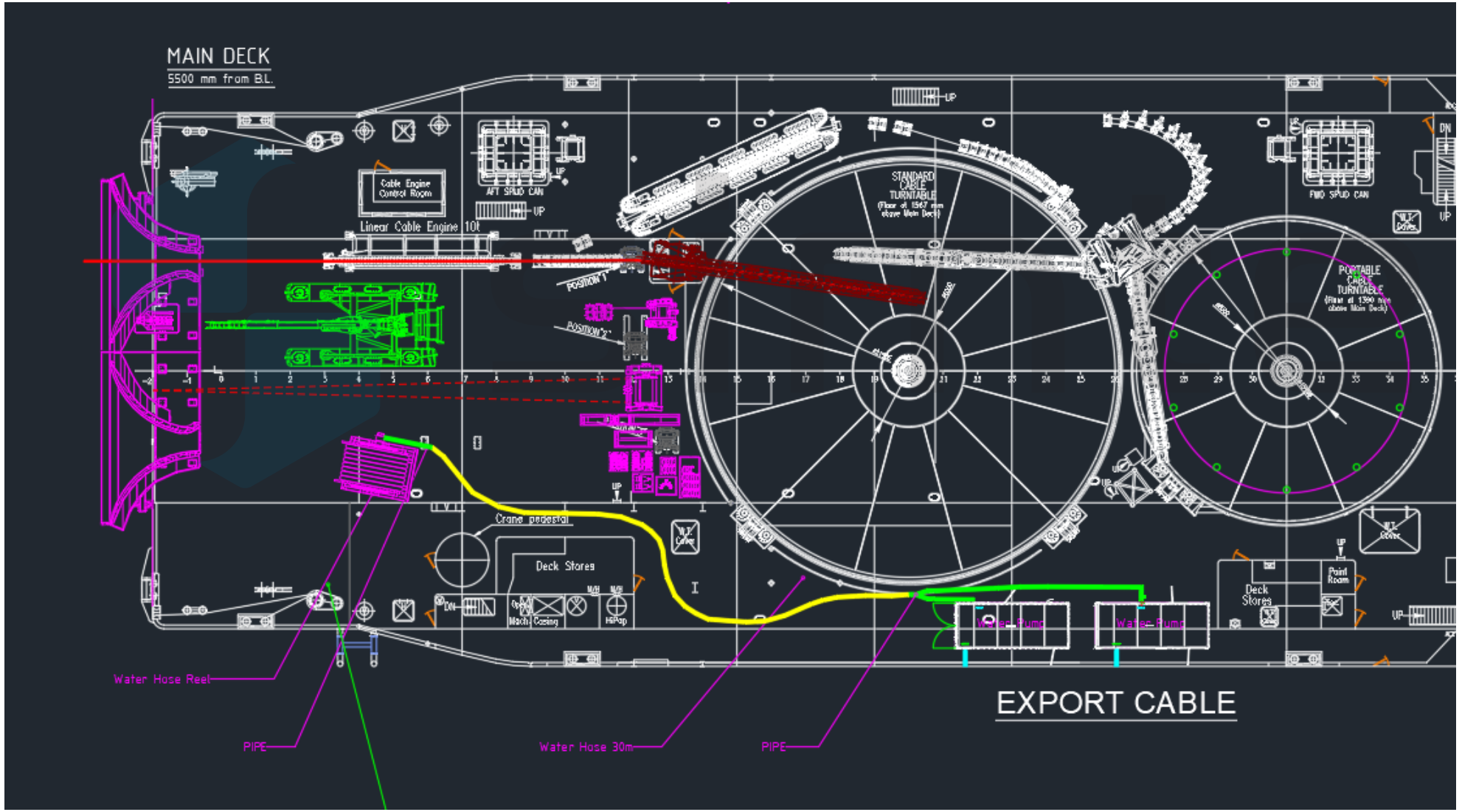
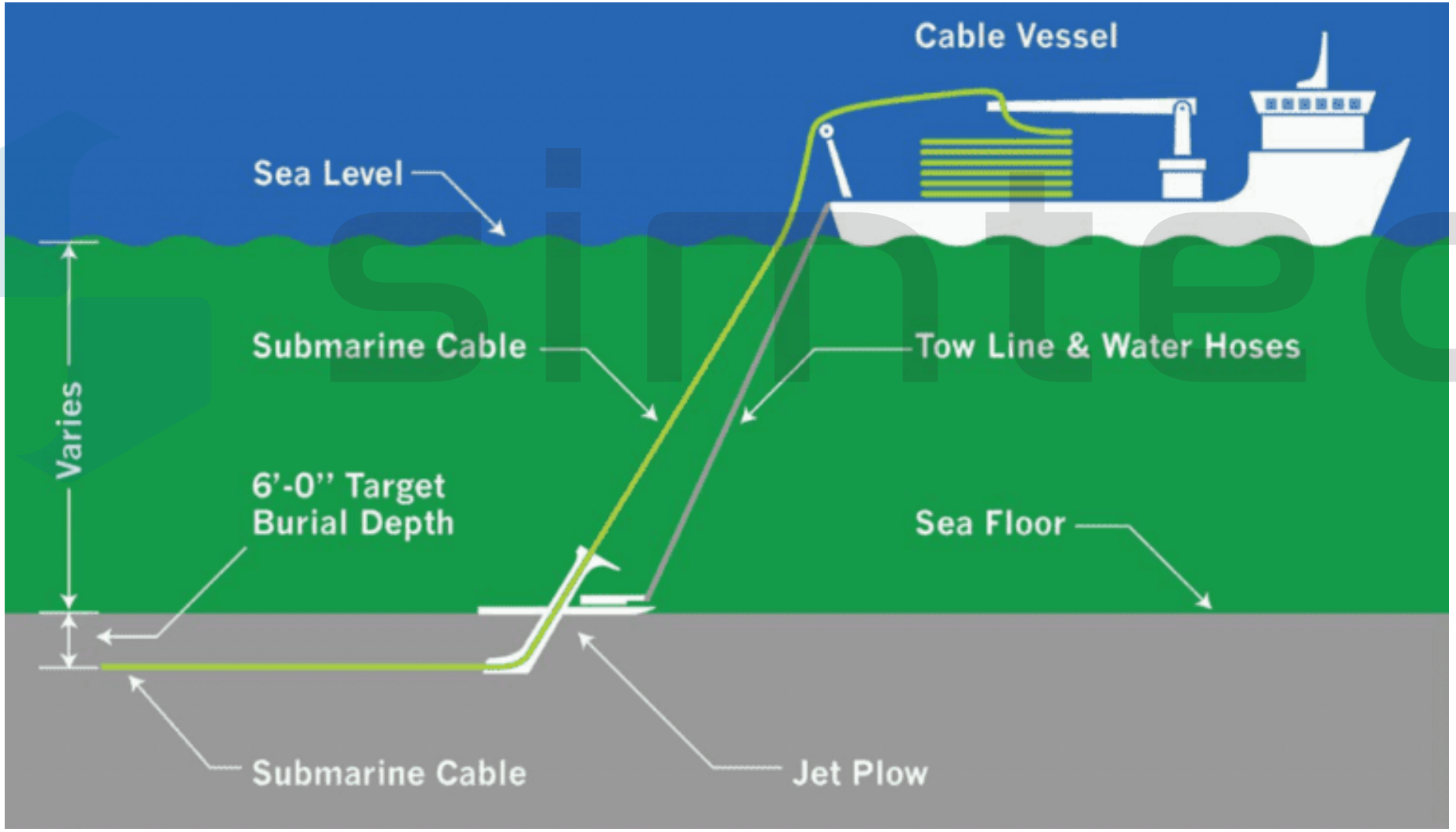
Hydroplough deck spread on support Cable Lay Vessel



Hydroplough operation principals



Fluid dynamics play a vital role in the success of ASSO's offshore installations.

ASSO has developed specialized in-house tools that utilize high-pressure fluid flow to cut seabed soil and protect subsea cables by embedding them within trenches.

A critical part of the tool development process involves detailed analysis of the internal fluid dynamics to determine essential design parameters, including:

- Nozzle shape
- Number and arrangement of nozzles
- Required inlet flow rates and pressure
- Cutting efficiency and soil removal rates

This comprehensive analysis ensures the tools deliver optimal trenching performance while providing reliable protection for subsea installations.

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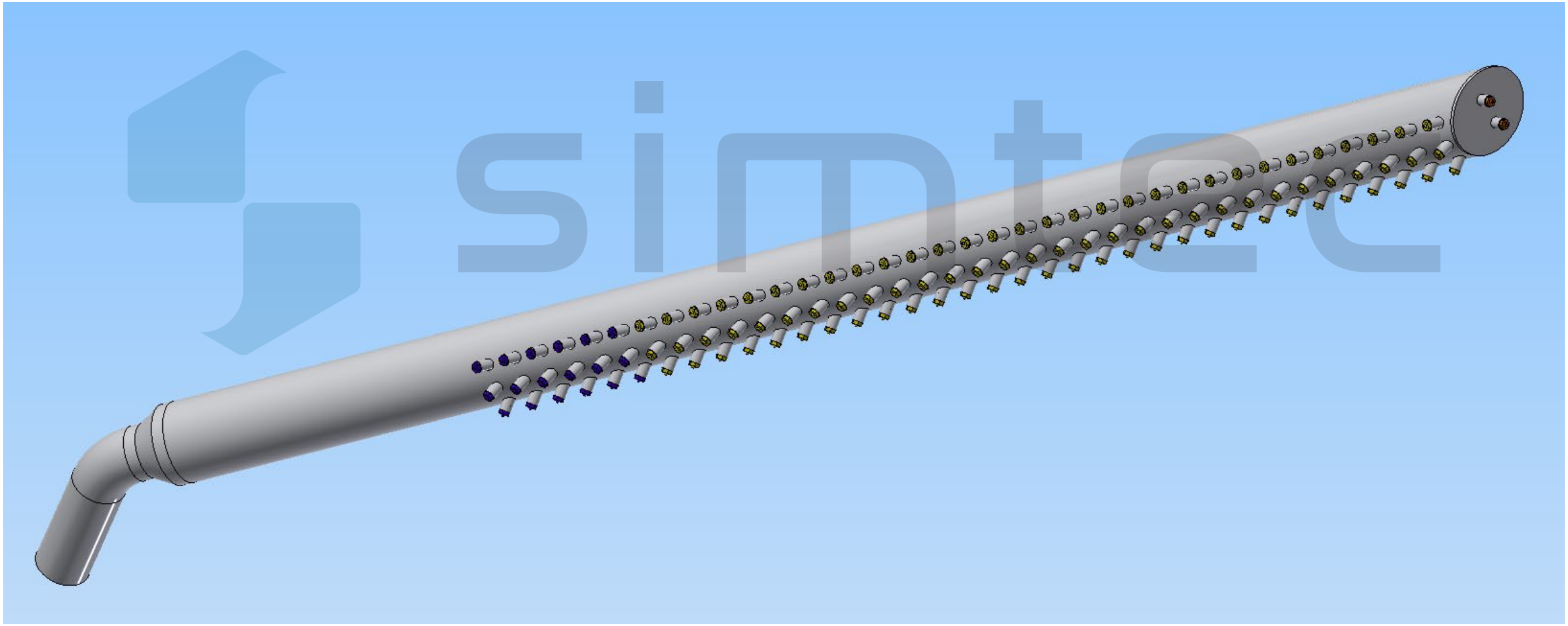
From 3D model to ANSYS FLUENT environment.

3D CAD MODEL

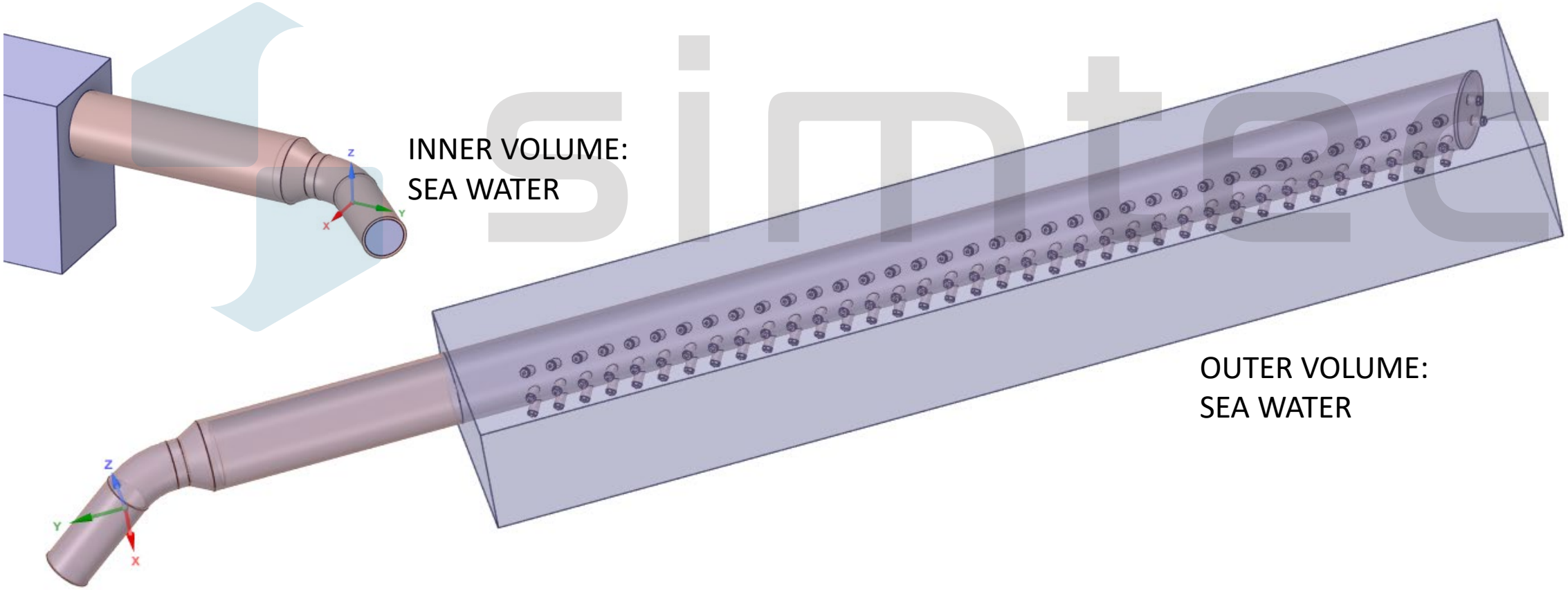


FROM 3D MODEL TO ANSYS FLUENT ENVIROMENT.

CFD MODEL PREPERATION TO SPACECLAIM ENVIROMENT.

Ansys 2024 R2

Ansys 2024 R2



INNER VOLUME:
SEA WATER

OUTER VOLUME:
SEA WATER

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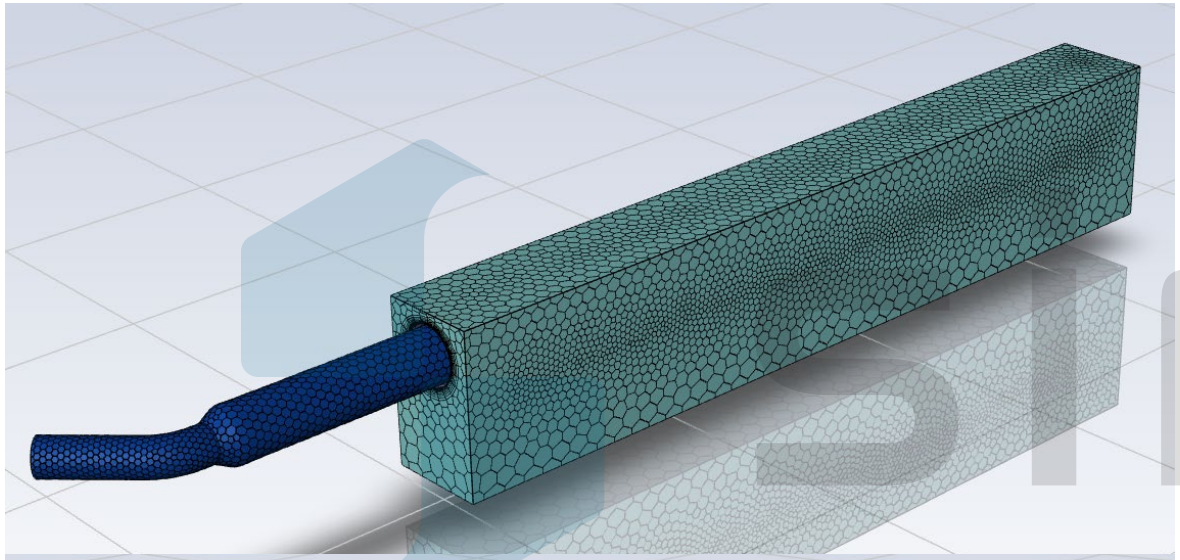
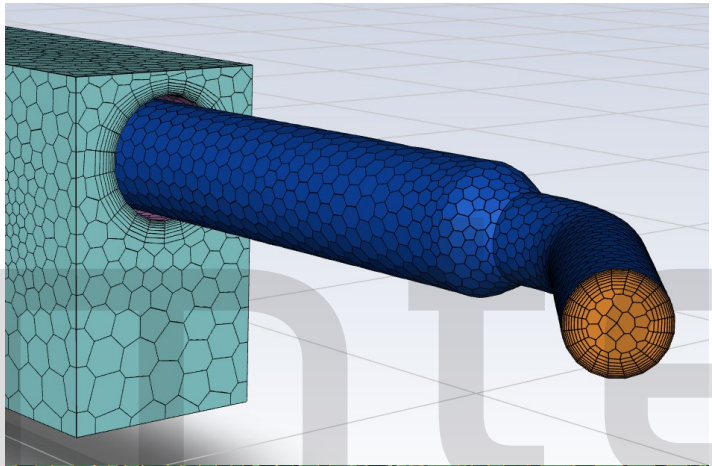
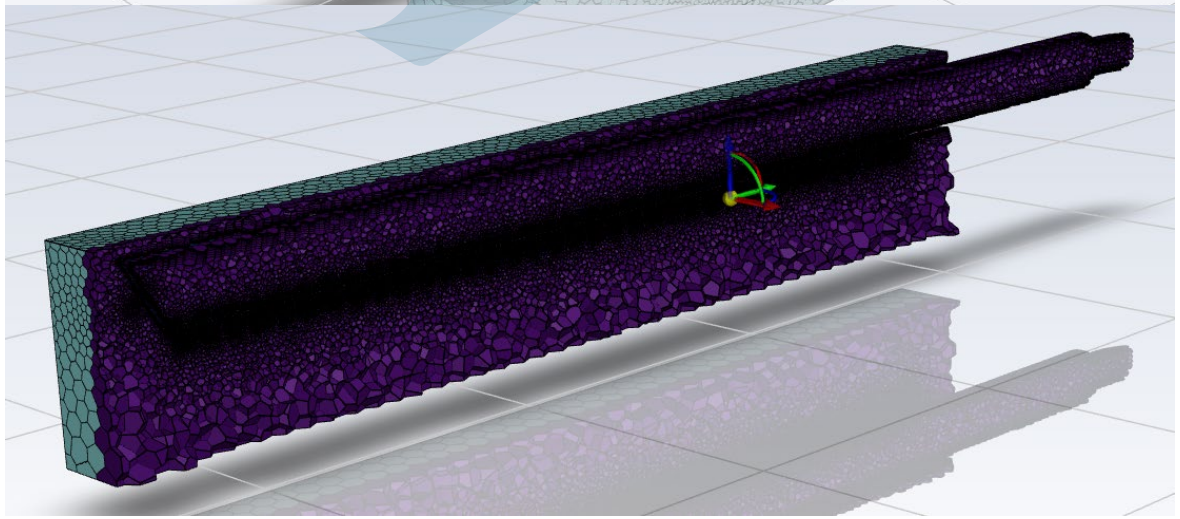
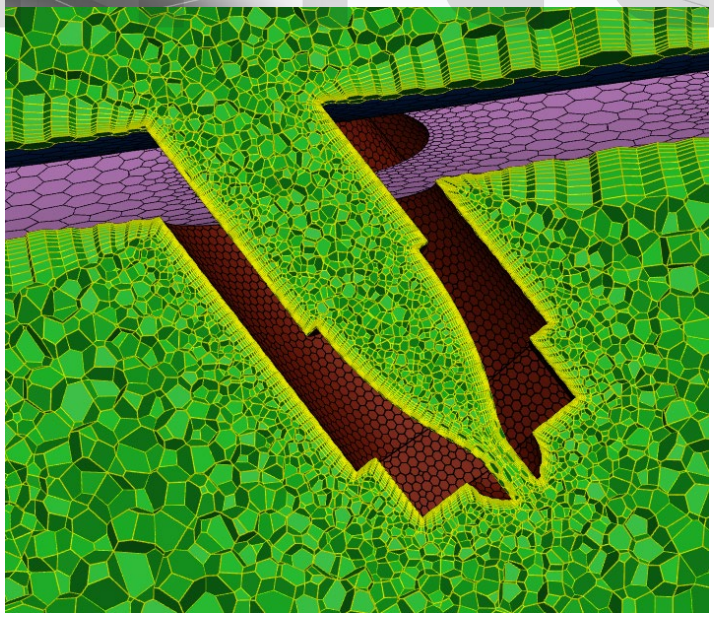
FROM 3D MODEL TO ANSYS FLUENT ENVIROMENT.

CFD MODEL MESHING IN FLUENT ENVIROMENT.









Mesh Characteristics

cells: 8.165.348

faces: 39.077.665

nodes: 24.673.254

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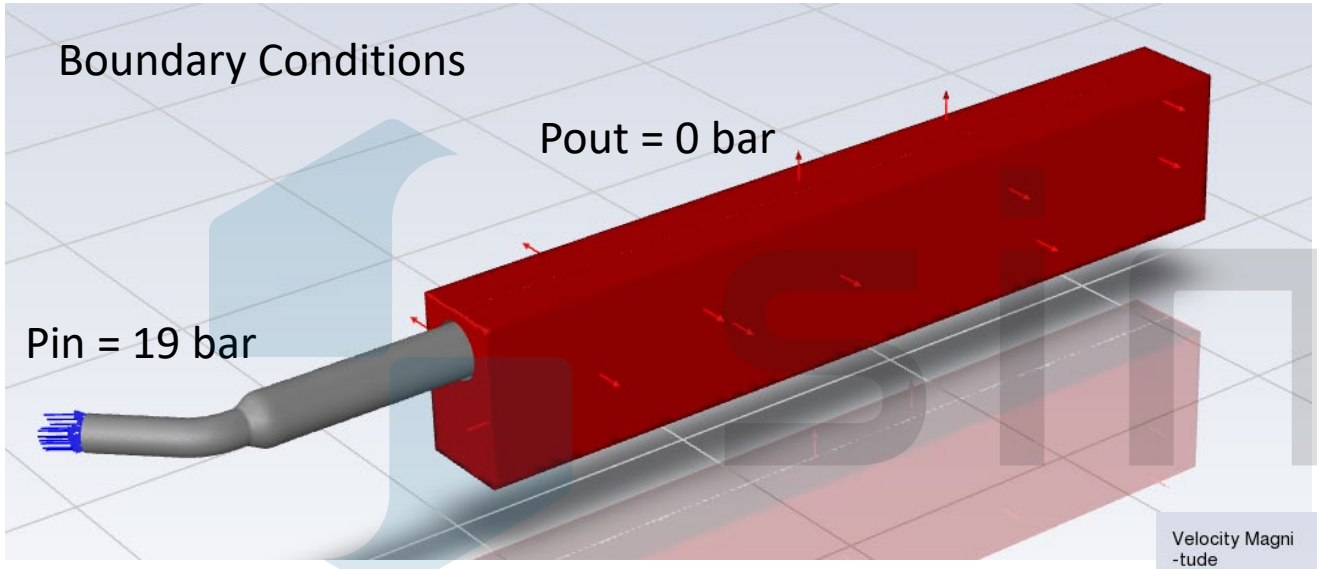
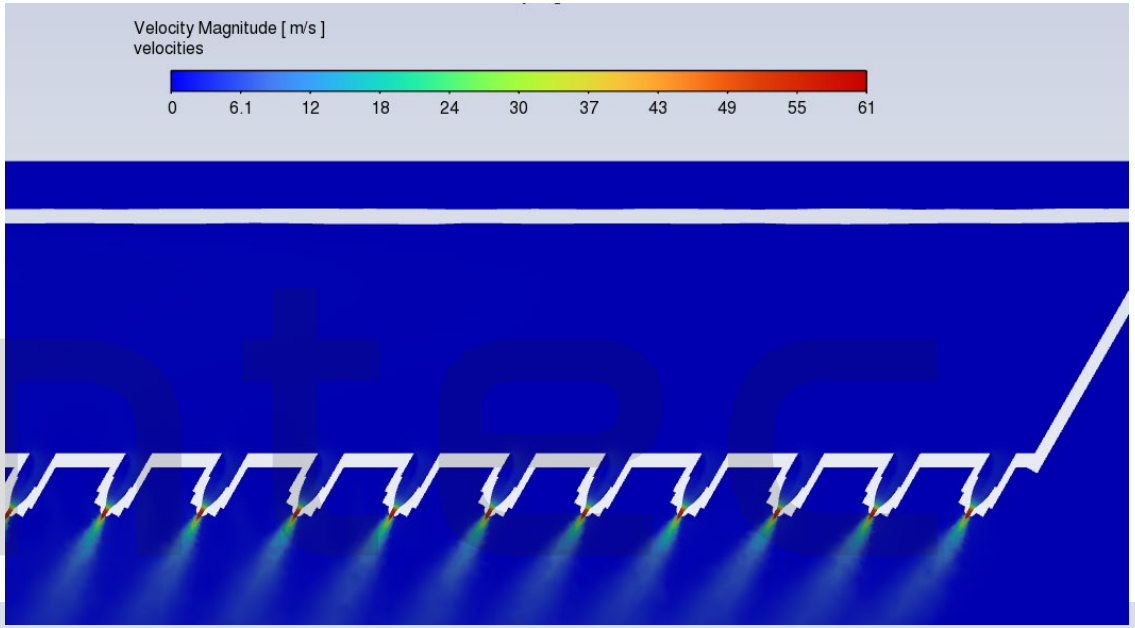
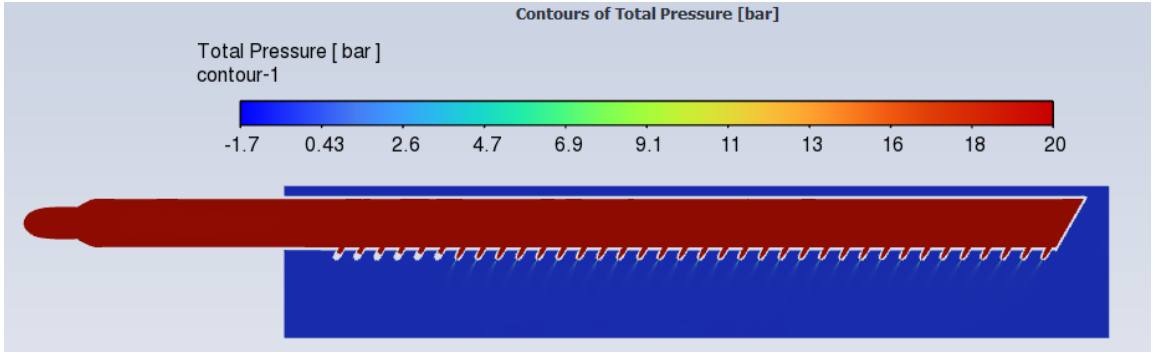
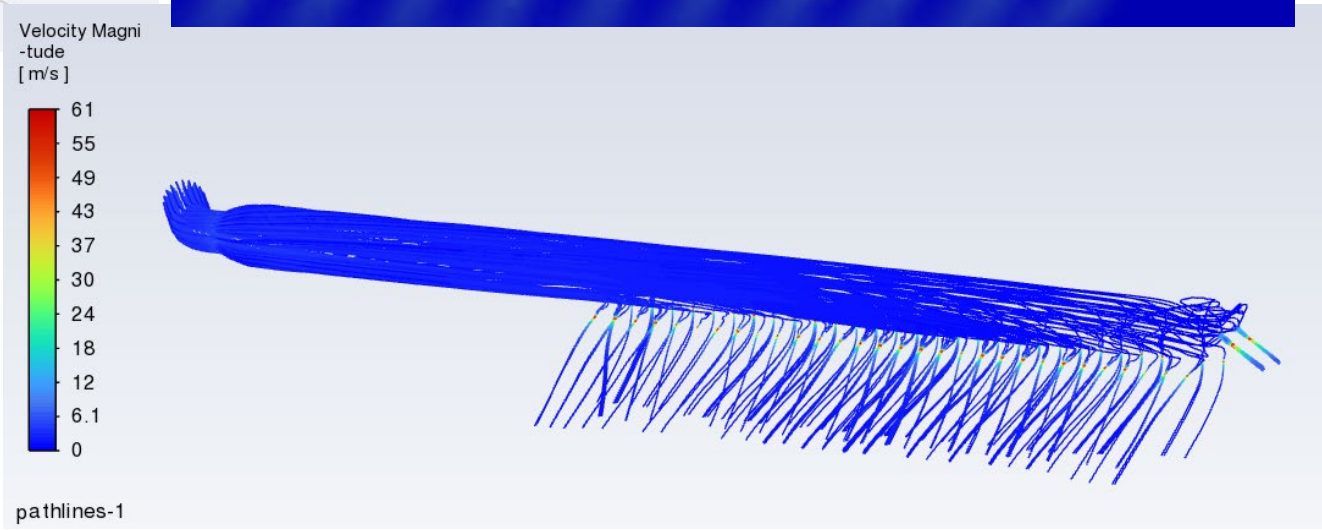
FROM 3D MODEL TO ANSYS FLUENT ENVIROMENT.

CFD MODEL SOLVING AND RESULTS IN FLUENT ENVIROMENT.









Key Benefits of CFD Integration

1. Tool Efficiency & Performance

- Increased overall efficiency of jetting tools
- Optimized internal flow within jetting components

2. Data-Driven Subsea Modeling

- Hydrodynamic coefficients derived from CFD rather than conservative literature values
- Reduced design conservatism and improved accuracy

3. Enhanced Offshore Design Capabilities

- More realistic and reliable designs for offshore installations
- Improved dynamic analysis outputs
- Increased operational workability and safety margins

Future CFD-Driven Projects

1. Expansion of Hydrodynamic Database

- Broaden the library of CFD-derived coefficients for all vessels and subsea assets

2. Continued Tool Optimization

- Refine and improve the performance of existing trenching and protection tools

3. Modeling of Complex Physical Phenomena

- Asset on-bottom stability under environmental loading
- Two-phase transient flow behavior
- Wave-induced oscillatory flows
- Advanced seabed trenching dynamics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Questions?
ARIADNE

Thank you

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