Siemens PLM Software offers a complete package of solutions to model and analyze oil and gas systems to predict multidisciplinary performance.

**Summary**

LMS™ Engineering services help you achieve complex product design goals and solve your most critical product development problems. From design refinement and troubleshooting to technology transfer and process development, the experienced, multidisciplinary engineering team integrates test and simulation techniques that support you in all stages of the development cycle.

LMS Imagine.Lab Amesim™ software provides an extensive set of specific solutions that combine strong simulation capabilities and effective interfaces with leading computer-aided engineering (CAE) solutions and advanced tools so you can study the static/dynamic functional behavior of any component or system in a graphical, user-friendly environment.

LMS services and software provide you the unique ability to efficiently evaluate interactions when integrating subsystems at all steps of the design process, from multi-system architecture to the design of systems and components, system integration and controls strategies validation.

**Benefits**

- Accurately predict multidisciplinary performance of intelligent systems
- Make the right choices earlier in the design process
- Connect to controls design, helping you assess and validate controls strategies
- Seamlessly integrate with your company’s existing software environment
- Rely on a single service partner who integrates measurements, 1D and 3D simulation tools
- Re-use engineering knowledge gained during the design phase

www.siemens.com/plm/lms
LMS Amesim and LMS Engineering for oil and gas applications enable suppliers to simulate and validate components and subsystems early in the design cycle, and provide models for their customers who need intellectual property (IP) protection. Moreover, original equipment manufacturers (OEMs) simulate the integration of all components in order to match function specifications and validate design choice.

LMS Engineering has developed a hybrid engineering methodology that gives you a way to combine integrated testing and simulation data for significant gains in productivity efficiency. Working together with you, LMS Engineering technical experts help you evaluate the synthesized data to make test-based design refinements for optimal system performance.

When experiencing undesirable results, you can take advantage of LMS Engineering late-development troubleshooting, using a mix of test and simulation techniques, to identify the root cause and implement design changes.

Renowned for its multi-body and finite element (FE) experience, durability, life-time prediction and more, LMS Engineering accurately simulates the full-motion behavior of complex mechatronic system designs, and helps you design complex structures that meet high system performance standards.

Using its scalable partnering model, LMS Engineering can support your product development at every stage of the cycle, from the smallest outsourcing tasks to full program management. Throughout the co-development process, the team openly shares information on product models, critical data and milestone reports. LMS Engineering also can train your engineers in the latest tools and techniques to increase their knowledge and apply our methodologies as part of your standard design process.

Virtual design and testing
With increased demand for energy sources, the oil and gas industry is challenged with drilling further and deeper while making products and systems safer and more durable.

Virtually design and test under real-world operation conditions:

- Subsea controls systems
- Hydraulic/pneumatic actuation
- Fluid distribution
- Remotely operated vehicle (ROV) systems
- Emergency safety systems
- Electrical power supply
- Drilling and well completion

Features
- Innovative and open platform for mechatronic system design and simulation
- Unique combination of ready-to-use validated physical libraries for a wide range of multi-domain applications
- Efficient transient and steady-state simulations of complete industrial systems
- Built-in scalable and energy-conservative models for which you can fine-tune the complexity level
- Enhanced productivity due to engineering knowledge and technology transfer
- Integrated and proven approach to late-development troubleshooting

Virtual design and testing
With increased demand for energy sources, the oil and gas industry is challenged with
**Subsea control systems**

To design typical subsea applications that involve a high-pressure unit (HPU), umbilical, subsea control module (SCM) and gate/control valves, you can use LMS Amesim for both component-level simulation (gate valves, control valves) and system-level modeling (HPU).

Once the model has been developed and solved, various sequencing of events can be evaluated including startup behavior of the HPU pumps, filling times of the accumulators, umbilical pressurization time, and gate valve dynamics.

You can simulate discrete events such as emergency shutdown (ESD) procedures on the platform to show transient response times of the gate valve closure on the ocean floor.

**Hydraulic and pneumatic actuation systems**

With LMS Amesim you design fluid power actuation systems for clamping devices, balancing of pylons and hoisting applications. The software provides a multi-domain platform approach to virtually test all prototypes before testing physical hardware. LMS Amesim enables you to optimize the various systems to reduce power consumption (variable pumps, load sensing) and to develop new controls strategies (hardware-in-the-loop).

**Fluid distribution systems**

To develop complex and large flow distribution networks, LMS Amesim provides you components you can drag-and-drop to create networks (straight sections of pipes, t-junctions, bends) and solve the overall network for performance characteristics (pressure loss, flow rates, temperature distributions) for transient as well as steady-state operating conditions. You can optimize the geometries of their networks to minimize losses, increase overall efficiency, balance flow rates and achieve desired temperature ranges of the system.

**Electrical power systems**

You can simulate behavior of electromechanical components such as linear actuators and electric motors, from specification to design and controls validation. In addition, LMS Amesim allows you to perform different levels of analysis for electrical systems such as power consumption estimation, thermal loads on components and transient response evaluation.

**Remotely operated vehicle systems**

LMS Amesim provides multi-domain libraries including hydraulics and electromechanical components that allow you to simulate design concepts for ROV systems (shearing, cutting, hoisting, drilling, gripping systems). Validated components enable you to design and develop ROVs without exclusive reliance on expensive prototype testing.

**Drilling and well completion**

LMS Amesim is based on a multi-domain platform approach for design and development of hydraulic multi-service valves, pressure actuating valves (PAC), flow control valves, umbilical systems, pressure- and temperature-monitored control systems. This virtual prototyping provides insight into system design requirements and allows you to evaluate design alternatives quickly and easily, prior to expensive field testing.