

# PIPESIM Steady-State Multiphase Flow Simulator

The new generation in multiphase flow simulation to overcome fluid flow challenges

## APPLICATIONS

- Accurate flow modeling over the complete lifecycle of a system

## BENEFITS

- Provides comprehensive and sophisticated sensitivity analyses of the hydraulic system
- Enables fast well-model construction, with interactive graphical schematics and templates
- Allows switching easily between well- and network-centric layouts through a simplified work environment
- Enables design and operation optimization by addressing potential flow assurance challenges for the entire production system

## FEATURES

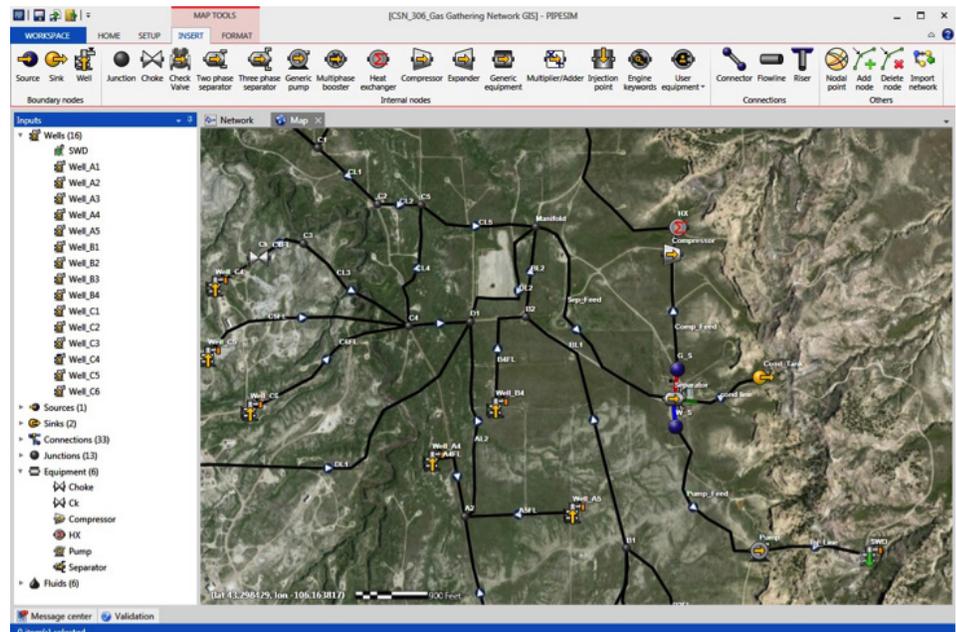
- Comprehensive steady-state flow assurance workflows
- GIS canvas to build networks and capture pipeline elevation profiles
- Converter tool for streamlined steady-state/dynamic flow assurance modeling
- Consolidated results viewer, including results from multiple simulation runs
- Customizable workspace layout, including input and task panes for easier navigation, as well as a message center for improving simulation progress feedback
- Parallel network solver to distribute computational processing for significant performance improvements
- Continuous model validation
- Automated network building from a GIS shape file

PIPESIM steady-state multiphase flow simulator incorporates the three core areas of flow modeling: multiphase flow, heat transfer, and fluid behavior. For over 30 years, the PIPESIM simulator has been continuously improved not only by the latest science in these areas, but also the latest innovations in computing, and oil and gas industry technologies.

The PIPESIM simulator includes advanced three-phase mechanistic models, rigorous heat transfer modeling, and comprehensive PVT modeling options. The ESRI-supported GIS map canvas helps deliver true spatial representation of wells, equipment, and networks. Networks can be built either on the GIS canvas or automatically using a GIS shapefile. Rapid well model building and analysis are done with an interactive graphical wellbore. The implementation of a new parallel network solver, which spreads the computational load across all processors, has also resulted in faster simulation runtime.

## Steady-state flow assurance: from concept to design

The PIPESIM simulator offers the industry's most comprehensive steady-state flow assurance workflows for front-end system design and production operations. Engineers can ensure safe and effective fluid transport through sizing of facilities, pipelines, and lift systems, effective liquids and solids management, and well and pipeline integrity. In addition, there is a converter tool to enable rapid conversion of models between the PIPESIM simulator and OLGA dynamic multiphase flow simulator. Shared methodologies for heat transfer, multiphase flow, and fluid behavior ensure data quality and consistency between the steady-state and transient analyses.



*A new GIS canvas delivers rich visual references and information to build networks. Map services can be used to augment this information—for example, a topographical map service that allows pipeline elevation profiling to be included in the model.*

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## Complete system simulation

Through advanced network modeling, engineers can analyze complex production and injection networks to optimize well, pipeline, and facility design for the complete system. Production bottlenecks and constraints can be identified. The network solver tool can be applied to networks of virtually any size and topology, including complex loop structures and crossovers.

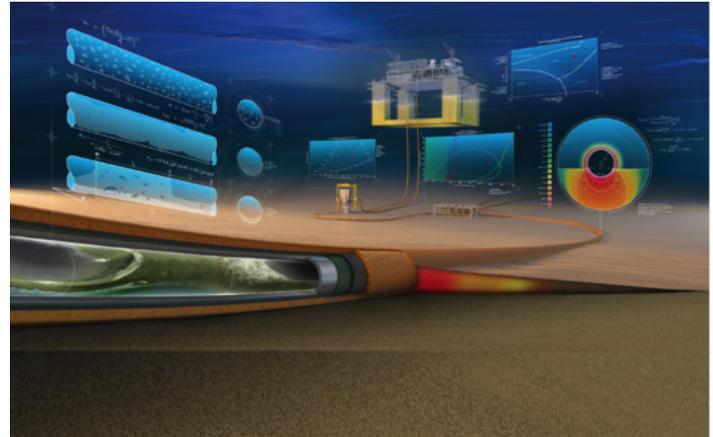
Modeling the entire system allows engineers to properly account for the interdependency of wells and surface equipment and determine the deliverability of the system as a whole. Typical network simulation and optimization applications that can be achieved with the PIPESIM simulator include

- operating oil and gas gathering systems, while honoring multiple system constraints
- quickly identifying locations in the system most prone to flow assurance issues, such as erosion, corrosion, and hydrate formation
- determining the optimal locations for pumps and compressors
- designing and operating water or gas injection networks
- analyzing hundreds of variables, such as pressure, temperature, and flow assurance parameters through complex flow paths
- calculating full-field deliverability to ensure contractual delivery rates are met.

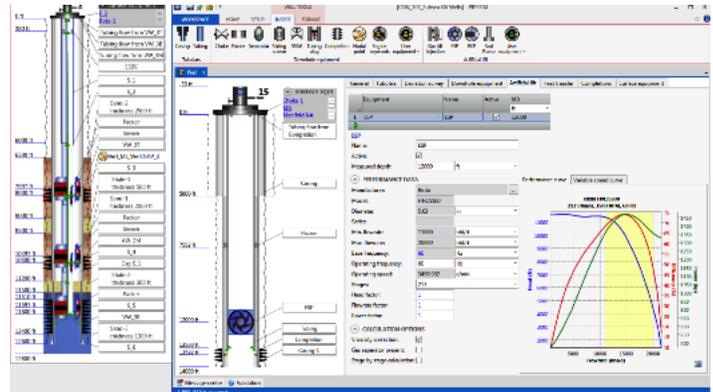
## Production optimization

Addressing all the potential flow assurance challenges a production system might encounter over its productive life is essential for maximizing rates and recovery. The PIPESIM simulator provides critical insight into pipeline and facility sizing, well performance (including nodal analysis, liquid loading, lift requirements, and well modeling with multiple layers and crossflows), and flow assurance (including pipeline integrity, fluid behavior characterization, and risk of slugging and solids formation).

Once a system design has been completed in the PIPESIM simulator, the operability of the system can be verified under transient conditions using the OLGA simulator. Some of the operational procedures that can be examined in more detail are shut-in, startup, ramp-up, and wellbore cleanup. Together, the PIPESIM and OLGA simulators provide the most comprehensive modeling solution for studying multiphase flow systems and flow assurance phenomena.



*Leveraging the latest science with the PIPESIM simulator.*



*Building wells has been made easier with a new, interactive graphical wellbore schematic shared by other Schlumberger software applications.*

[www.slb.com/Pipesim](http://www.slb.com/Pipesim)

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