What's New in OLGA 2015

The industry-standard tool for dynamic multiphase flow simulation

KEY FEATURES

- High-definition technology
  - Default flow model for stratified flow

- Slug tracking
  - New model for hydrodynamic slug initiation
  - Improved model for slug tail velocity

- Interface
  - Piping and instrumentation diagram style for enhanced usability
  - No overlapping components in the diagram
  - Simplified signal connections

- Centrifugal pump and ESP improvements
  - New functionality that accounts for liquid viscosity in rotodynamic pump performance
  - Improved behavior in nonstandard operating modes

- Restructured user manual
  - Restructured manual for quick reference

OLGA simulator's high-definition technology

The 2015 release of the OLGA* dynamic multiphase flow simulator features new enhancements and greater usability for improved simulation. Now the default model for stratified flow in OLGA 2015, OLGA 2015 HD improves predictions for stratified flow, particularly gas-condensate systems. This release incorporates improvements of the model closures and solver to deliver faster, more robust simulations and improved predictions. Flow regimes other than stratified flow are primarily affected by small shifts of the boundaries for transitions between regimes. OLGA 2015 HD has been validated against field and lab data, and OLGA 2015 features a significant improvement in predicting the accumulation point, which is crucial for liquid management.
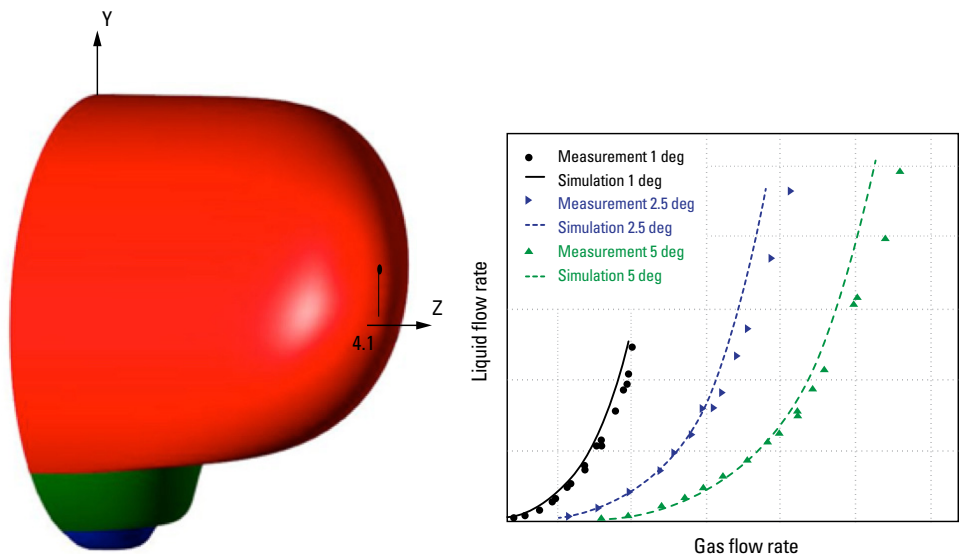
Velocity distribution from OLGA simulator's HD technology (left) and comparison of computed accumulation point to measurements (right).

Slug tracking

OLGA 2015 includes a new model for hydrodynamic slug initiation. It takes a starting point in a population equation that considers the slug density (number of slugs per unit length) which is increased by a slug "birth rate." The birth rate forms the basis for computing the probability of initiating a new slug in a given pipe section at a given time step. Slug initiation through the birth rate model automatically accounts for different flow conditions and fluid properties, eliminating the need to specify and tune the delay constant.

The slug tail velocity model has also been revised to improve dependence on slug length. This provides a better description of the evolution of slug frequencies and slug lengths as slugs propagate along a flowline.

The new models for slug initiation and slug tail velocity are bundled together in the OLGA 2015 upgrade of the slug tracking module. Together, these improvements provide good agreement with lab measurements and show good scalability to field conditions. The user can expect better prediction of slug initiation and slug evolution along the flowline.

What's New in OLGA 2015

OLGA simulator interface

Piping and instrumentation diagram

Models are now presented in a piping and instrumentation diagram (P&ID) format for a cleaner look and enhanced usability. Available conventional P&ID symbols are used (e.g., for valves, pumps, compressors, heat exchangers), and appropriate symbols have been invented where P&ID symbols did not previously exist (e.g., for terminal nodes).

Elimination of overlapping components

To further enhance readability, new functionality now prevents flow paths and signal connections from overlapping with components in the diagram. Furthermore, equipment located at the same position (e.g., multiple sources in the same section) is grouped together without overlapping, as is equipment placed adjacent to nodes.
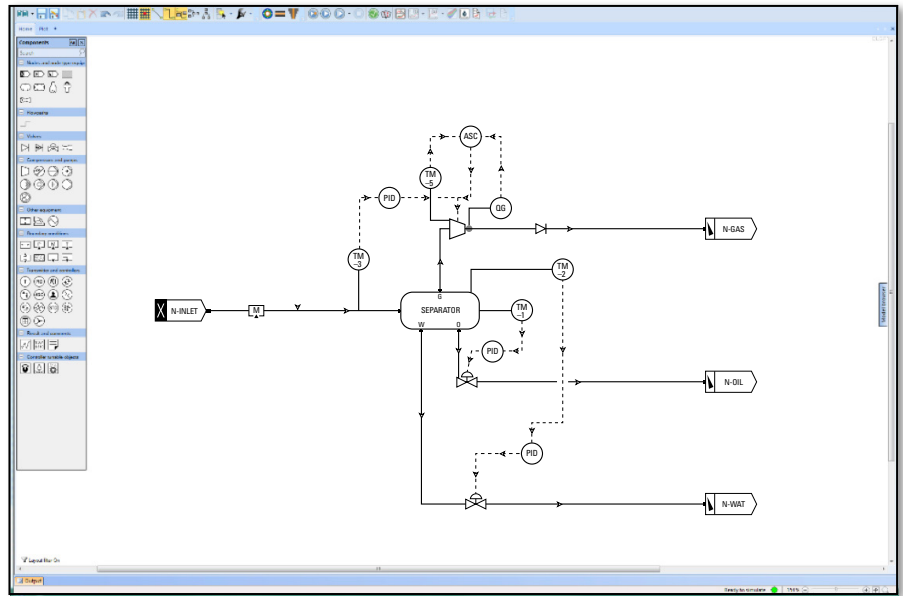
Improvements to signal connections

The definition of signal connections has been made easier. When creating a new connection, a dialog box shows the variables available to connect. Similarly, double-clicking on an existing signal connection brings up the same dialog box, simplifying the process for editing connections.

Centrifugal pump and ESP improvements

- Pump vendors typically provide performance curves for water. To account for higher liquid viscosities, corrections are now available per American National Standards Institute (ANSI) and Hydraulics Institute (HI) Standard ANSI/HI 9.6.7-2010.

- Performance curves for pumps are often given only for the standard operating regime (i.e., positive flow and positive pump speed). However, transient behavior can cause pumps to enter nonstandard operating regimes, such as locked-rotor or locked-turbine mode. In OLGA 2015, modeling of the transition between the standard and nonstandard operating regimes has been improved to ensure better behavior in transient simulations.

Restructured user manual

The OLGA User Manual now has a hierarchical structure. Related topics are grouped to make navigation more intuitive, and information is consolidated to reduce duplication. Context-sensitive help through the OLGA simulator's graphical user interface remains the same.

The new P&ID display improves readability.
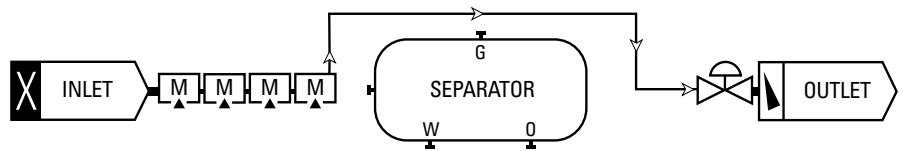
Components, flow paths, and signals are displayed in a simple format.
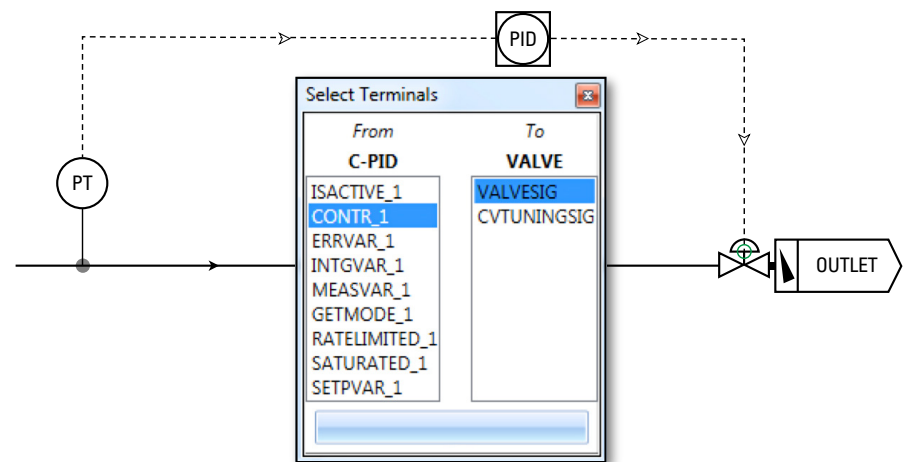
A drop-down dialog box simplifies the creation of new signal connections.

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