

UniSim Optimization

A Combination of Process Models and Advanced Process Control for Plant Optimization in the Oil and Gas and Refining Industries



The Challenge: Optimum Plant Operation



In today's increasingly competitive business environment, oil and gas production, gas processing and petroleum refining industries are faced

with the need to ensure safe plant operations while operating at peak profitability in the face of changing business drivers, process capabilities and environmental factors. The opportunities for plant improvement must be analyzed and implemented in an online, real-time environment that integrates seamlessly with advanced process control applications.

The Opportunity: Leverage Process Models for Improved Operation

Process models encapsulate critical process knowledge and represent a significant time and money investment to build and maintain. Utilizing this knowledge and investment throughout the plant lifecycle to improve process operations ensures that the best return on simulation investments is achieved.

The major business benefits of leveraging process models online for plant improvement using UniSim include:

- Enhanced process control and optimization benefits of up to 25 percent by utilizing non-linearity contained within UniSim process models
- Sustainable optimization benefits in the long term by tight integration with advanced process control
- Lower implementation costs of optimization by reusing models developed for offline design
- A scalable solution that enables additional optimization capability to be easily added only when justified

The Solution: UniSim Optimization

UniSim® Optimization Suite combines Profit® Suite, Honeywell's comprehensive advanced control and optimization technology, with UniSim Design models. This combination results in a high-performing optimization solution that leverages process models to optimize plant operation. It provides a solution that is easy to implement and maintain, while achieving significant, sustainable economic benefits long into the future.

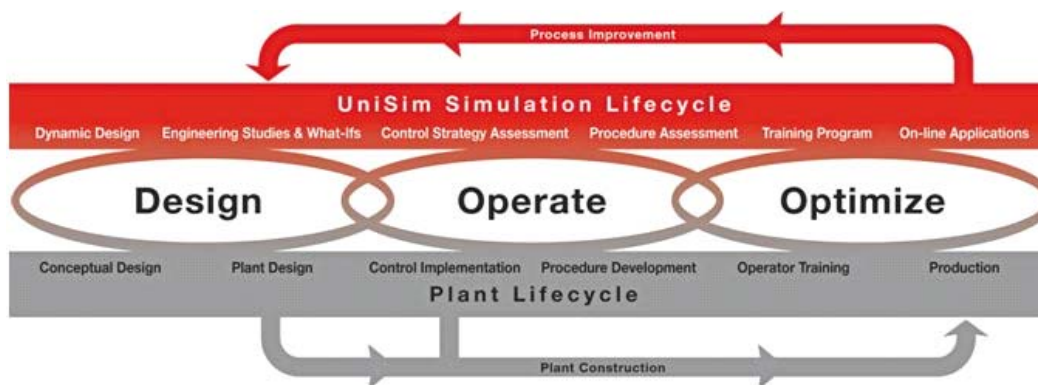
Benefits Offered by UniSim Optimization

UniSim Optimization provides a unique dynamic non-linear optimization solution, resulting in increased profitability and the flexibility to respond rapidly to changing business drivers and process capabilities. UniSim Optimization leverages UniSim models developed throughout the plant lifecycle, providing the following unique benefits.

Tangible Process Improvements. Typical process improvements are 25 percent above APC benefits through increased throughput, improved yields, decreased operating costs, improved quality consistency, increased operating flexibility and improved stability.

Sustainable Benefits. UniSim Optimization's tight integration with advanced control provides an optimization solution that is easy to maintain and typically requires only 5-10 percent of an engineer's time to maintain. The result is a solution that continues to achieve optimization benefits with typical online availability greater than 95 percent.

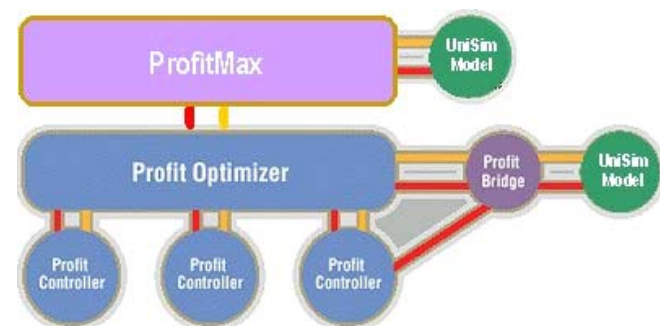
Leverage Offline Design Models for Online Use. UniSim Optimization is able to utilize on-line the same models developed for offline design and optimization. This results in consistent models throughout the plant lifecycle and provides maximum return on simulation investments.



Features

A successful optimization solution must not only result in improved plant operation, but the benefits must be able to be sustained over the long term. UniSim Optimization's unique combination of proven, easy-to-use modeling technology and Profit Suite's comprehensive advanced control technology has the following features to support significant, sustainable benefits.

Single-Unit to Plant-Wide Dynamic Optimization. UniSim Optimization is part of Honeywell's unique layered optimization solution. As a result, UniSim is able to solve the complete set of optimization problems from single-unit, linear, model-based optimization to multi-unit, plant-wide, non-linear, model-based optimization. In addition, this layered optimization approach enables an evolution and choice in optimization technology, rather than a one-size-fits-all approach to optimization. Additional layers of optimization can be added only when justified, ensuring that the highest ROI solutions are implemented.



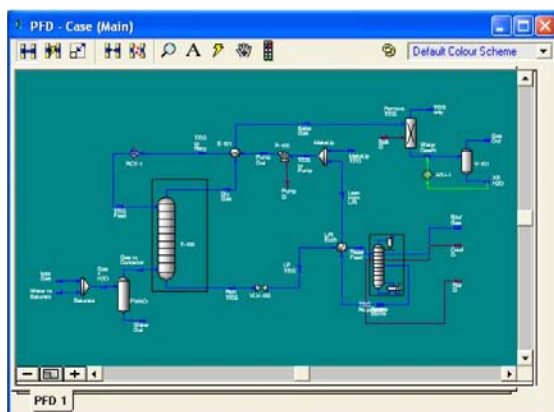
UniSim Optimization utilizes UniSim models within Honeywell's layered optimization solution.

Profit Bridge Socket. UniSim Optimization includes a Profit Bridge socket that enables UniSim models to be easily connected to Profit Optimizer and Profit Controller for dynamic non-linear optimization and control. When used with Profit Bridge, UniSim models provide continuous updated gains to the linear control models used in Profit Controller and Profit Optimizer. These non-linear gains enhance the optimization and control capability of these Profit Suite applications.

ProfitMax® Integration: UniSim Optimization provides integration of UniSim models within Honeywell's ProfitMax real-time optimization system. ProfitMax supports steady-state, non-linear optimization and can download its optimal steady-state targets to Profit Optimizer for implementation in the plant. ProfitMax is best suited for highly non-linear systems or for special optimization problems such as mixed integer non-linear programming applications.

In addition to these features that enable the use of UniSim models in Honeywell's layered optimization solution, UniSim has the following unique features that enable its models to be used for optimization.

Easy-to-Use Windows Environment. PFDs provide a clear and concise graphical representation of the process flowsheet. Productivity features such as cut, copy, paste, auto connection and organizing large cases into sub-flowsheets ensure that the process models utilized in UniSim Optimization can be easily maintained.



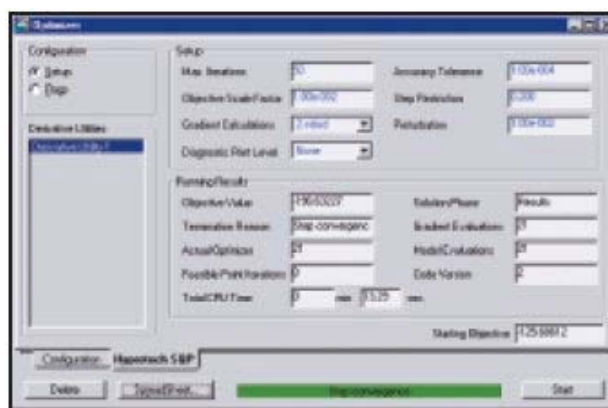
UniSim PFD modeling environment

Active X (OLE Automation) Compliance. Permits the integration of user-created unit operations, proprietary reaction kinetic expressions and specialized property packages. This ensures application of UniSim models for optimization of a wide variety of processes that may represent proprietary technology key to achieving optimization benefits.

Comprehensive Unit Operations. This includes distillation, reactions, heat transfer operations, rotating equipment and logical operations in the steady-state environment. It is proven to deliver quality along with realistic results.

Extensive Optimization Tools. UniSim includes an embedded SQP (Sequential Quadratic Program) optimization utility for optimizing process operations. In addition, a powerfully built-in data reconciliation facility allows bad plant measurements to be eliminated while supporting online parameter estimation.

Built-in Neural Net Model. Enables specialized processes or operations to be incorporated into UniSim by using first-principle models that use actual plant data too difficult to simulate. Additionally, a neural net can be trained using data from a model from a UniSim flowsheet. This closely approximates the first-principle model results, but can significantly increase the calculation speed for the simulation and/or optimization.



UniSim optimization configuration

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More Information

For more information about UniSim,
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