AssetSolver™ Software

Overview
Real-time prediction and optimization of the total asset: Defining characteristics of the Digital Asset of the Future

Today’s production operations aim to most effectively exploit their assets. Decisions about production must be made every day, in relatively short time frames, in a complex operating environment, and with consideration of their impact across all aspects of the asset. AssetSolver™ software is a real-time model-based optimization solution that establishes a single integrated asset model which spans the reservoir, wells, network and facilities; and executes in seconds to test actual operating conditions or multiple scenarios, enabling real-time system-wide optimization.

Used online in a collaborative environment, AssetSolver software provides the asset teams with a common, accurate and robust modeling environment with which to balance the multiple competing operating objectives and constraints to assist in maximizing production effectiveness and efficiency. The integrated model can also be connected inline to SCADA or other systems and executed in either closed-loop or supervisory mode.

AssetSolver software provides a unique modeling and optimization environment to support integrated production operations. All aspects of the production value chain are modeled and supported. Historical operating data and existing full physics simulators (e.g., Nexus™ software) are seamlessly integrated into a robust decision support solution.

AssetSolver software establishes a crucial sub-surface/surface interface. By embedding a proxy of the reservoir, wellbore and facility simulator models into a single environment, critical constraints can be respected at all times, uncertainty and risk can be reduced, and optimal decisions can be achieved without sacrificing speed and accuracy, or compromising safety.

The comprehensive, single view of the entire asset can be leveraged within an integrated production operations environment (e.g., AssetObserver™ software) to enable total asset awareness, based on a common understanding of effective performance, to facilitate management-by-exception using real-time monitoring and predictive analytics, and to help achieve sustained production optimization by utilizing interactive, collaborative and advanced process automation technologies.

Benefits

Real-Time, Model-Based Full Asset Integration
The individual full physics models and actual operating history can be seamlessly combined into a single integrated asset optimization model, which supports optimal decision making across the entire subsurface-to-surface production value chain.

Extremely Rapid Solution Speeds Make for Robust Real-Time Decision Support
Execution of prediction and optimization is accomplished in relatively real-time (e.g., a six-reservoir, 15-well, two-train separation and compression asset including two subsea pipelines can execute in less than 10 seconds for a predictive case and in less than 20 seconds for an optimization solution).

Models That Take Uncertainty Into Account
Proprietary, patented artificial intelligence technologies are used to create proxy models of the full physics simulators. In addition to capturing the rigor and accuracy of the simulators, the proxy models implicitly embed the simulator uncertainties. Therefore, optimal decisions generated by AssetSolver software's predictive technology makes the digital asset of the future a reality today with total asset integration and optimization in real time.

AssetSolver software determine the degree of uncertainty without any sacrifice in speed.

Improved Overall Asset Performance
Real-time model-based optimization supports the decisions that are taken routinely during the production work cycle. This is the only practical way to resolve multiple competing operating objectives and constraints to maximize near and long term production effectiveness and efficiency, and to reach the best overall asset performance.
The AssetSolver software utilizes proven technology applied to mission-critical process and financial applications both inside and outside of oil and gas production, with more than 1,000 prediction, control and optimization solutions deployed around the world, some of which have been operating for well over 10 years. Successful case studies and pilot implementations have now demonstrated the application of this technology within the upstream oil and gas field to resolve the problems presented by integration of full physics models, which positions AssetSolver integrated asset optimization modeling software as a key component in the transition toward the digital asset of the future.

**Features**

**Open, Yet Secure**
The integrated asset model can be built from historical data or as a proxy of any combination of available full physics simulation models. Once the full model is built, it is maintained in a robust solution environment to ensure secure, stable and repeatable operation.

**Modular Embedded Objective Function Formulation**
The optimization solver provides all of the necessary tuning functionality to define parameters for individual performance objectives.

**Predictive and Optimization Solutions**
The integrated asset model can be used as a predictive tool, or combined with the optimization solver to generate decisions.

**Closed-Loop Automation**
In order for higher-level system-wide optimization benefits to be realized, it is imperative that the asset control is consistent. Model-based advanced process automation technologies are fully supported by AssetSolver software.

**Sustainable**
It is important to keep the integrated asset model as accurate as possible without full-time supervision of the individual component simulators. To achieve this, several levels of model update routines are embedded in the AssetSolver software. The first level is a Kalman filtering routine to rapidly bias the online models. The second level is automated model tuning of the full physics simulators within the proxy system.

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