DNV·GL

DIGITAL SOLUTIONS

MAROS

Powerful RAM analysis tool tailored for the upstream oil and gas industry

A successful design configuration, profitable operation and maintenance strategy relies on a clear understanding on how to quantify and fully optimise productivity factors.

■ **Return on investment**
Maros™ allows users to include financial aspects to perform cost/benefit analysis to investigate different design alternatives.

■ **Optimising**
Identification of critical events in the system and quantification of system constraints allow users to optimise the design.

■ **Extensive**
The simulator allows users to capture a wide range of conditions and configurations, such as flaring and time varying flow rates, to accurately model real life systems.

■ **Flexible**
The simulator allows users to set up very complex configurations using powerful Boolean logic.

■ **Usable**
The Maros interface and reports are designed to be intuitive and useful to industry professionals focusing on representing reality in the most recognisable way possible.

■ **Long experience**
Maros has been developed for 30 years to solve problems faced by our consultants working with major companies worldwide. Continuous efforts into addressing industry specific problem have made Maros uniquely well suited for the upstream oil and gas industry.

■ **Extendable**
Maros can be run through scripts and have results exported to different output formats, allowing users to create highly customised input structures and to post-process and present the results in any imaginable way.

Predicting the performance

Maros™ is an advanced RAM tool with extensive features for modelling networks, maintenance, operations and demand scenarios that allows users to make the right decisions for maximum return on investment.

Predicting the performance of a system hroughout its life is a complex task. Processes rarely remain constant over their design life as production capacity changes, products and process conditions change. Likewise, new technologies continually offer opportunities to improve the efficiency of the system. Add to this the complex nature of dependencies and constraints in equipment configuration and maintenance found in large scale upstream oil and gas systems, and the challenges of finding a successful design and efficient operating procedure are evident.

Maros predicts the performance of a system using simulation techniques. An "Event-Driven" algorithm is used to create life-cycle scenarios of the system under investigation accounting for its reliability, maintainability and operating policies. The simulator is inherently incorporated with a specially designed algorithm to analyse the impact of each individual scenario on how the system performs.

By studying performance results and how they respond to altering specific parameters in the design or its logistics, it is possible to optimise the system with respect to given constraints.

By considering key parameters, for example, well e.g. branch flows, product ratios and export operation constraints, accurate estimations of production efficiency can be determined.

The simulation package can capture all the inter-related para-meters that have an impact on system performance.

KEY FEATURES OF MAROS

- Discrete event driven simulation - a very powerful platform
- Extensive flow modelling capability
- Highly intuitive graphical user interface - asset view, reliability block diagram view, table views and symbol view
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- Well management with phase-in and phase-out capability
- Reservoir/production profiles for up to ten products including production rates - access/Excel import facility
- Demand and boosting profiles to control flow during compensation operations
- Compensation mechanisms (boosting, line packing, storage, third party substitution)
- Storage tanks defined as feed, intermediate and export assets
- Storage tank operating rules such as called-up, suppress bulk transport and event-triggering
- Bulk transport modelling with modelling constraints related to berths, storage tanks and ship availability
- Ships defined by size, frequency, probability of delay, travel time
- Planned events with Gantt chart view to easily assess overlaps
- Unplanned events with more than ten different failure and repair distributions
- Conditional logic - powerful Boolean logic enables most operational scenarios to be modelled
- Operability factors modelled such as process re-starts and production ramping
- Extensive flaring analysis (Governmental type restrictions and impacts, i.e. South America, Gulf of Mexico and North Sea) – multiple flare units with different bottlenecks
- Operations & Maintenance (O&M) modelling with resources constraints
- Spares optimisation analysis
- Life-cycle cost analysis with revenue calculation based on probabilistic estimate of production, discount factor, capital expenditure and operational expenditure
- Multi-criticality level indicating production loss related to operations and equipment, system and unit reliability
- Interactive graphical and tabular output with drill-down facility
- Extendable and easy to manipulate set of results
- Results viewer application exported, no need for license
- Production efficiency/ production availability
- Plant/unit statistics and utilisation
- Multi-customer contract shortfalls analysis (size and frequency)
- Plant shutdown analysis (size and frequency)
- Powerful multi-product dynamic animation
- Multi-core processing for fast calculation performance
- Batch run - to run multiple studies using each core of the multicore processor, suitable for Sensitivity Analysis
- Automation scripting (Excel Macro support)