Oil & Gas

Background

Process operating companies are under increasing pressure to do more with less; more than ever there is a need to exploit every opportunity to maximise asset productivity and to ensure that associated processes are as efficient as possible. Spiro Control's process control, optimisation and analytics solutions ensure you get the most from your resources.

Our edge device solutions distribute data processing and analytics to the edges where sensors and data sources are located. By processing and analysing data in real-time, oil & gas companies can make improved decisions that deliver reduced costs, optimised investments and increased resilience.

Spiro MPC

Spiro MPC is a multivariable model predictive control application. The application comes embedded on a small footprint edge device, designed to connect to any control system easily. When embedded with Spiro MPC, the edge device is able to automate control of connected assets and can maintain processes at their optimal operating point.

The Spiro MPC solution is easy to implement, and can be effectively upgraded, generating good ROI with low total cost of ownership.

Using Spiro MPC, oil & gas manufacturers can significantly reduce the standard deviation of important control variables and increase ease of operation.

When relying on conventional controls, human operators have to be highly focused in order to maintain the reliable, consistent and stable running of processes; they must manage in real-time a highly complex, highly correlated, dynamic environment. However, given the complexity, there are limits to what a human operator can process in real-time. Using highly efficient state space control algorithms which achieve millisecond execution frequency, Spiro MPC can analyse multiple variable scenarios and make real-time adjustments to optimise control combinations on a continuous basis. As a result of this careful and constant fine tuning, the variance of key variables are reduced and process capability is increased.

Increased stability of the process, in turn, allows for increased production, improved product quality, and reduced operating costs.

Spiro MPC & plant-wide optimisation

In continuous process industries, like the oil & gas industry, there is a need for a control strategy that addresses the challenge of optimising an entire integrated manufacturing facility as a complete holistic solution rather than optimising individual sub-systems. For example, an ethylene plant can increase operating capacity by 2-4% through plant-wide optimisation compared to localised unit optimisation, with a financial benefit of £ 2-6 million per year (Reference: audited benefits of projects implemented by Spiro Control team e.g. TOTAL's cracker in Gonfreville, France). The Spiro MPC solution achieves plant-wide optimisation through cooperative distributed control. Each unit operation has a separate controller, preserving simplicity, but each controller is aware of subsystem interactions so that all controllers in the network cooperate to ensure that a plant-wide objective is achieved.

A solution consisting of distributed edge devices that cooperate holds many advantages over a centralised or composite control solution. The benefits lie in how the solution facilitates deployments that are 'plug & play', secure, scalable, reliable, continuously available and exhibit the characteristics of easy serviceability, easily programmable and high agility.

Estimated benefits from plant-wide optimisation

Upstream oil & gas production	1-5% increase in production

Estimated benefits from plant-wide optimisation (petrochemicals)

Ethylene	2-4% increase in production
Aromatics	3-5% increase in production / 4-6% reduction in specific hydrogen consumption
Ammonia	2-4% increase in production / 2-5% less energy/ton
Polyolefins	2-5% increase in production

A plant with centralised steam utility supplying reboilers, evaporators and turbines can reduce specific energy consumption by approximately 10% by optimising the whole utility network (G Shinskey). Depending on the size of the plant this can have a benefit of £ 0.1-1.0 million per year.

Spiro Analytics

Spiro Control offers a range of analytics applications that come ready installed on a small footprint edge device designed to connect to any control system easily and capture real-time plant data. Our data analytics applications can be used to analyse process performance, diagnose faults and to infer hidden properties without the need for expensive on-line analysers.

Edge intelligence provides onsite, real-time delivery of advanced analytics and enables immediate responses to ensure maximum production and safety.

Massive amounts of data are generated at each step of the oil & gas production process, but all too often are not well analysed or made visible enough for useful decision support. The digital

transformation of the oil & gas industry only serves to amplify this problem as the volume of data being created is increasing exponentially.

Part of the problem is that traditional approaches to analytics have built-in delays. For example, data may be stored in a data historian or data warehouse for days, weeks, or months before being analysed (if ever). Our solution is based on processing, analysing and responding to data right where it originates - at the edge of the network. Edge analytics allows data to be analysed in real time, immediately after the data are generated. Consequently, any issues in the production process can be identified quickly, alerts generated, and corrective action taken.

Because of the way our solution is configured it means that data applications can be easily used and customised by control and process engineers at site, not just data scientists and software specialists.

In an oil platform application studied by McKinsey, 99 percent of data collected from 30,000 sensors on an oil rig was lost before reaching operational decision makers – McKinsey 2015

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