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Brochure

Aspen GDOT™

For Refineries



Improve margins with **Aspen GDOT**, the Industrial AI-powered dynamic optimization technology that vertically integrates planning, scheduling and advanced process control in closed loop. Dynamically optimize multiple process units in real time, beat the plan and make plants more capable.

Benefits

- Minimize product giveaway
- Increase throughput
- Improve yields
- Improve energy efficiency and reduce emissions

Key Capabilities of Aspen GDOT

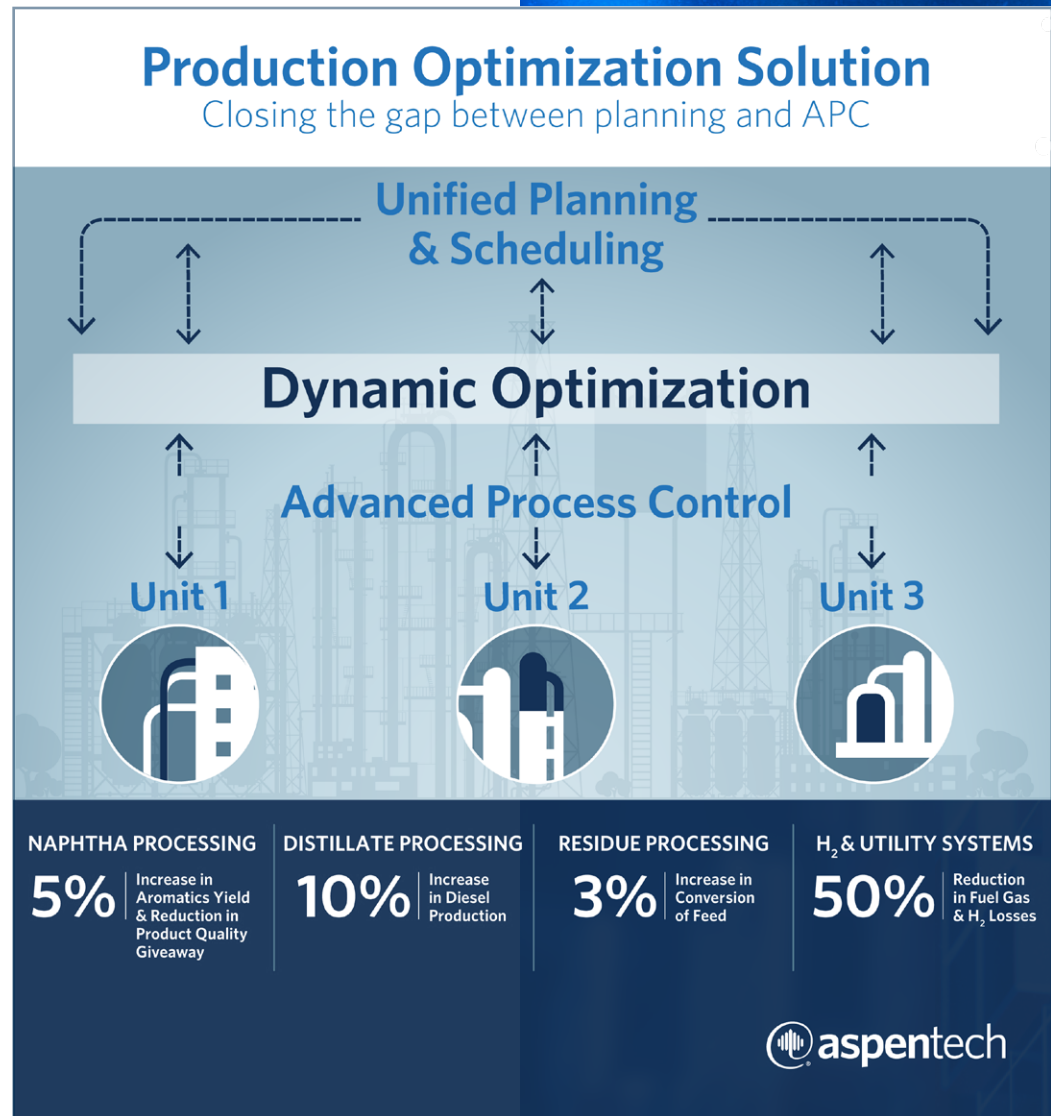
- Optimizes multiple process units in real time
- Aligns planning and scheduling with APC
- Patented dynamic data reconciliation technology that reflects plant actual performance
- Web-based intuitive flowsheet powered by Industrial AI that accelerates value delivery with preconfigured templates

Closing the Gaps Between Planning and Actual Operations

A key to AspenTech's production optimization solution is the unique and proven Aspen Generic Dynamic Optimization Technology (GDOT). Aspen GDOT aligns planning and scheduling objectives by dynamically optimizing and coordinating multiple process units in real time to ensure the best site-wide economic results consistently and on a minute-by-minute basis.

Energy companies are continuously faced with the challenge of reducing margin leakage that occurs between various levels of production execution—from production planning and scheduling to actual operations. Aspen GDOT addresses these challenges by using an innovative modeling and optimization approach that combines fundamental planning models with dynamic APC models. This unique approach uses a model that is consistent in material and quality balances while incorporating dynamic models from the APC layer. This results in the ability to have consistent models, economics and objectives between offline planning and online optimization.

Aspen GDOT models include dynamics of the system, enabling the optimizer to run at higher frequencies, manage inventories and take advantage of valuable frequent feedback from the plant. It also does not have to wait for units to be at a steady state to perform optimization.



Flexible Optimization Scope

Aspen GDOT's innovative modeling approach offers flexible online optimization, catering to a wide range of applications. This includes broad envelopes, unit optimization of high-value reactors and small-scale column optimization. This flexibility allows refineries to select the optimal scope for their needs, maximizing resource availability and accelerating value delivery.

Typical optimization envelopes for refining include middle distillates, naphtha, residue processing and hydrogen and utility systems. High-value reactor applications can include fluid catalytic crackers (FCCs) and cat reformers, while column optimization can be for a single or multiple columns.

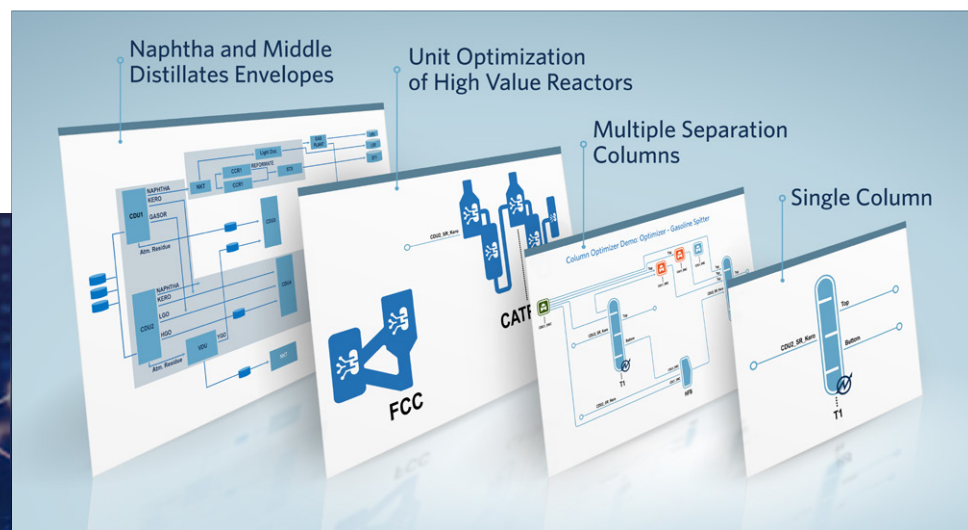


Figure 2. Aspen GDOT high-fidelity and robust dynamic optimizations maximize product margins with minimal resources expenditure and optimum resource utilization.

Consistency With Planning and APC Models

Aspen GDOT combines fundamental models from planning with empirical APC models, while preserving model consistency. This enables the execution of global optimization targets minute-by-minute, closing the gap between planning and actuals by aligning planning/scheduling objectives and economics with actual operations.

Automatic Model Adaptation in Closed Loop

Aspen GDOT's patented dynamic data reconciliation technology continuously keeps models up to date and in line with actual performance of the units. One of the product's main benefits is a low model maintenance requirement, which enables GDOT models to be managed by existing APC resources.



Unified GDOT Builder: An Intuitive, Flowsheet-Based Modeling Environment Powered by Industrial AI

Aspen Unified GDOT Builder's intuitive, web-based flowsheet environment simplifies model-building, deployment and maintenance. This new environment improves usability via simple drag-and-drop of template blocks from a library into the model flowsheet. This reduces the skillset required for building and maintaining models enabled by visual checks and balances in a flowsheet view.

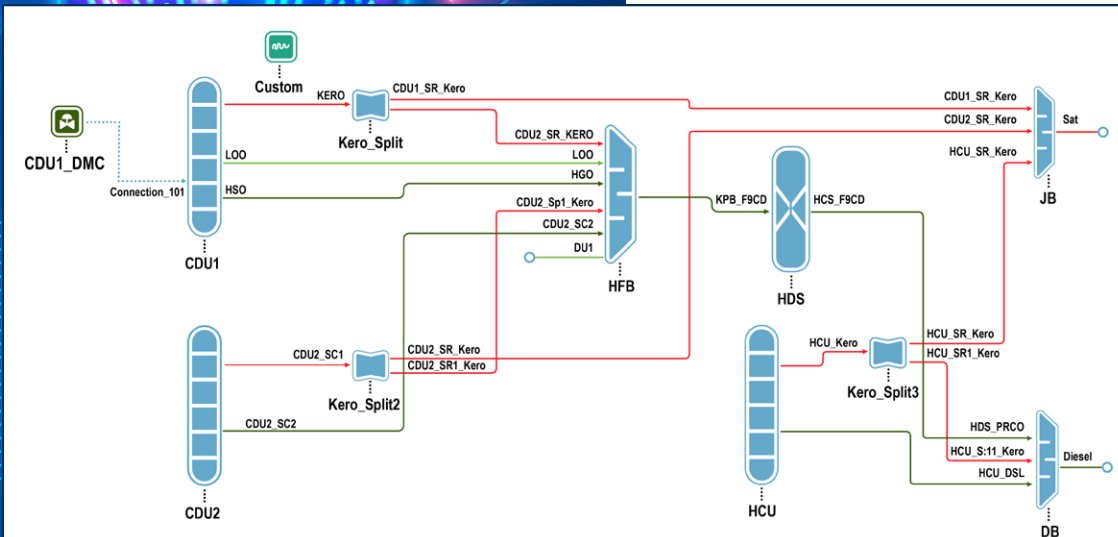


Figure 3. Aspen Unified GDOT Builder enables improved usability with an intuitive flowsheet environment.

These standardized templates include the domain expertise needed to optimize processes in petroleum refining, covering middle distillates, naphtha envelope management, conversion units and separation columns.

Among the list of available templates are:

- Reactors and hybrid models with embedded AI
- Distillation columns
- Heat integration
- DMC3 models
- Compressors
- Flow mixers, splitters and others

Aspen Unified GDOT Builder also supports direct import of Aspen DMC3 APC models into the flowsheet environment making it easier to maintain consistent models and strategy between GDOT and APC layers. In addition, GDOT model maintenance is made easy during any updates to Aspen DMC3 models.

Aspen Unified GDOT Builder enables online GDOT reconciled data to be available to Aspen Unified PIMS, providing planners with a more accurate view of current unit performance and actual constraints.



AVA: Unlock More Value With an AI Decision-Support Advisor in Aspen GDOT

Extend the power of Aspen GDOT with **AVA**, an AI-assisted decision support advisor embedded directly in the operational workflow. AVA delivers actionable guidance and real time intelligence across multiple units, constraints and operating objectives to help users achieve higher efficiency and maintain optimal operations.

By leveraging Aspen GDOT's ability to coordinate and optimize multiple process units simultaneously, AVA provides operators and engineers with global optimization level insights into how process variables and control actions interact across the plant. This broader perspective helps users understand trade offs and constraints beyond individual units, enabling better plant wide control decisions aligned with site-level economic objectives.

Available 24x7 and easily accessible via the GDOT Viewer, AVA enables operators and APC engineers to perform at a higher level. As a trusted AI advisor, AVA helps train users, lowers dependency on specialized control engineering resources and makes advanced optimization knowledge available on demand while respecting GDOT guardrails and engineering intent.

Key Benefits

- 24x7 virtual AI advisor delivering actionable, plant-wide guidance
- Improve operational decisions with global insight across multiple units and constraints
- Quickly identify key constraints/limits that are preventing maximum profit
- Faster training and higher performance for operators and engineers
- Improve efficiency of control engineering resources

Real-World Success With Aspen GDOT

Aspen GDOT has been widely used by many global companies. Those that have implemented Aspen GDOT and enabled a closed-loop real-time solution report minimizing product giveaway, increasing throughput and making their plants more capable.

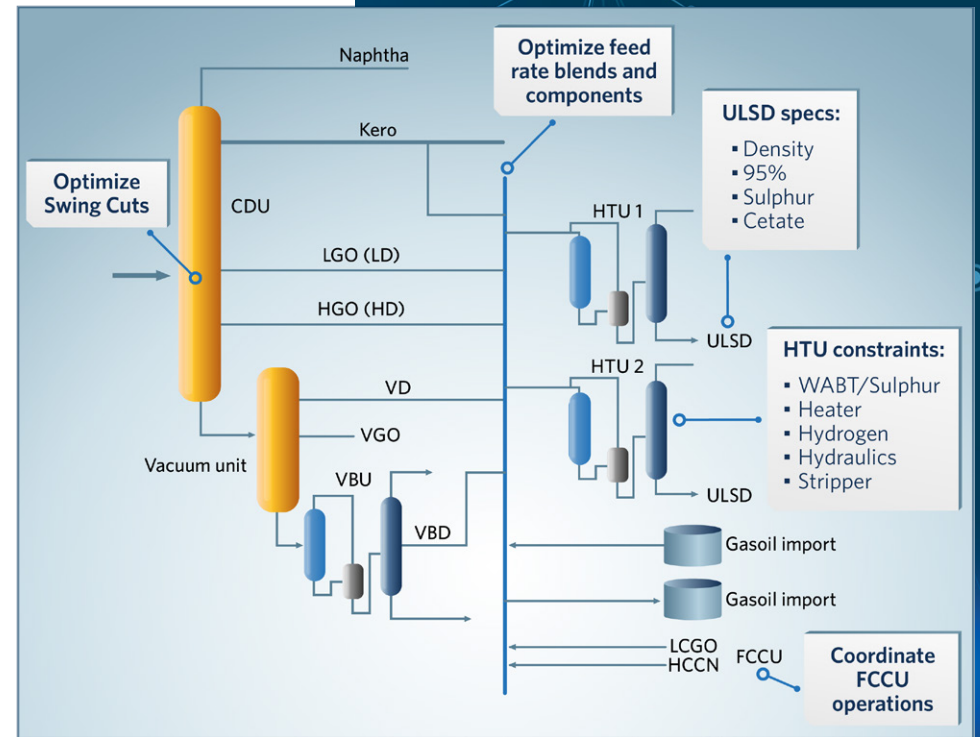
At the 220,000 barrel-per-day Pembroke oil refinery, Aspen GDOT realized an increase of 10% middle distillate production and overall benefits valued at \$10 million, with project payback achieved in a few weeks. The majority of the benefits were achieved by coordinating several underlying APC controllers to optimize cut points of primary producers, feed blend components to individual HTUs, reactor parameters and import streams.

The result was a significant increase in ULSD production and reduction in product quality giveaways.

A refinery leader explained that the system “allows operational instructions and strategies to be consistently implemented, minute by minute, day and night, driving the units toward more profitable operation and improving the competitive position of the refinery.”

Conclusion

Aspen GDOT is the key to production optimization, enabling companies to close the gap between planning, scheduling and operations. By coordinating multiple process units in closed loop and optimizing broad envelopes in real time, Aspen GDOT helps plants run to the limits of performance 24x7, to increase throughput and reduce margin leakage.





About Aspen Technology

Aspen Technology, now part of Emerson, is a global software leader helping industries at the forefront of the world's dual challenge meet the increasing demand for resources from a rapidly growing population in a profitable and sustainable manner. AspenTech solutions address complex environments where it is critical to optimize the asset design, operation and maintenance lifecycle. Through our unique combination of deep domain expertise and innovation, customers in asset-intensive industries can run their assets safer, greener, longer and faster to improve their operational excellence.

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