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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 GDOTaligns 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 Unified Planning & Scheduling Dynamic Optimization Advanced Process Control 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. Highvalue reactor applications can include fluid catalytic cracking (FCC) units 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.



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

Aspen Unified GDOT Builder's intuitive, web-based flowsheet environment simplifies modelbuilding, 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.



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.





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

At the 220,00-barrel-per-day Pembroke oil refinery, Aspen GDOT delivered an increase of 10% middle distillate production and overall benefits valued at \$10 million USD, 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.



Optimize feed

rate blends and components

HTU1

HTU 2

ULSD specs:

Density95%

Sulphur

Cetate

HTU constraints:

WABT/Sulphur

Coordinate

FCCU operations

HeaterHvdrogen

Stripper

Gasoil import

Gasoil import

FCCU

Hvdraulics

ULSD

ULSD

LCGO

Naphtha

Kero

LGO (LD)

HGO (HD)

VD

VBD

VGO

VBU

CDU

Vacuum unit

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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