

## WHO WE ARE

Lummus Digital is at the forefront of transforming the oil and gas downstream sector by offering innovative digital solutions that tackle the complex challenges faced by refineries and petrochemical industries. As a joint venture between TCG Digital and Lummus Technology, we blend decades of process engineering expertise with advanced AI and data science to deliver tailored solutions that deliver measurable outcomes.

Our team, comprising over 500 process engineers and 100+ data scientists, we are committed to developing and implementing solutions that enable refineries and petrochemical units to achieve success in their AI-driven business transformation journey.

## WE GIVE YOUR DATA A PURPOSE!

Through advanced data-driven and AI-powered decision support, we empower refineries/plants to achieve

- Increased Profitability through Optimized Product Yields
- Enhanced Operational Stability
- Optimized economics of Crude Blending
- Enhanced responsiveness to fluctuating demands



# THE SECRET SAUCE "HYBRID PROCESS MODELLING"

Lummus Digital has developed the Hybrid Approach integrating first principles-based process models and domain expertise with Data Science, Machine Learning and advanced AI algorithms. Machine Learning is used to create the model, leveraging process simulation, plant or pilot plant data, while using domain knowledge including first principles and engineering constraints to build an enriched model that delivers tangible business value even under complex conditions!

## 4 PILLARS OF HYBRID PROCESS MODELLING



### Process Expertise

Rich tech know-how & license base, proprietary equation & models, Design & operations knowledge

01



### Big Data

Precise contextualization of high-volume, high-velocity, high-variety unstructured and unstructured data in real time

02

### Proprietary process models

Developed over years, with learnings from experience and process knowledge

03



### AI-ML

Supervised Vs unsupervised learning, pattern recognition, Gen-AI, Hybrid RAG, unexplored dependencies between variables

04



# OUR PRODUCT PORTFOLIO



## Refining

### CDU & VDU Yield Optimizer:

- Maximizes side stream yields
- Optimizes Vacuum Tower Bottom movement
- Reduces costs with real-time data

### HCU Reactor Performance Optimizer

- Provides real-time predictions of downstream feed
- Optimizes hydrogen consumption, and drives efficiency and profitability

### LC-FINING Reactor Conversion Optimizer

- Achieve maximum conversion using real-time data
- Optimizes hydrogen use
- Predicts SHFT values

### FCC Ethylene/Propylene Optimization Advisor

- Maximizes ethylene and propylene yields

### FPU LOBS Yield Optimizers

- Maximizes grade cut yields and lube oil output
- Optimizes viscosity

### Product Stripper Reliability Advisor

- Prevent steam condensation

### REAC Reliability Advisor

- Predicts and prevents fouling and corrosion risks in Hydrocracking units
- Optimizes wash water management



## Petrochemicals

### Ethylene Heater Optimizer

- Enables continuous optimization in real-time
- Yield Improvements of high value products
- Minimizes energy consumption and carbon emissions

### Ethylene Fractionator Optimizer

- Maximizes ethylene yield
- Minimizes slippage
- Optimizes utility use

### CGC Fouling Mitigator

- Optimizes Charge Gas Compressor performance by predicting fouling issues in real-time
- Reduces downtime