

AVEVA PI WORLD

8D Digital Twin

Redefining Digital Twin to drive engineering efficiency & predictive operations

ABOUT KENT



- Founded in 1919 as a small family business in Ireland, Kent is now a 10,000-strong client-centric global business. It delivers sustainable and innovative engineering services and project delivery solutions for the oil and gas, industrial, renewables and low carbon industries.
- Combining our **technological skills** with our traditional **engineering expertise**, we work closely with our clients to identify and develop innovative digital solutions that deliver more efficiency, productivity and insight to reduce costs and offer better business outcomes.



Wassim Ghadban

Vice-President

Global Innovation & Digital Engineering
Kent



Kentz

**SNC-Lavalin
Oil & Gas**

**Houston
Offshore
Engineering**



kent

Kentech

**Atkins Oil &
Gas, Offshore
Wind, Carbon
Capture**

Working across the energy industry spectrum.



Serving conventional energy markets



Upstream
Oil & Gas



Midstream



Infrastructure



LNG



Refining &
Petrochemicals



Chemicals

And into a more sustainable future



Offshore
Wind



Carbon Capture,
Utilization & Storage



Hydrogen



Lower Carbon Fuels
& Chemicals

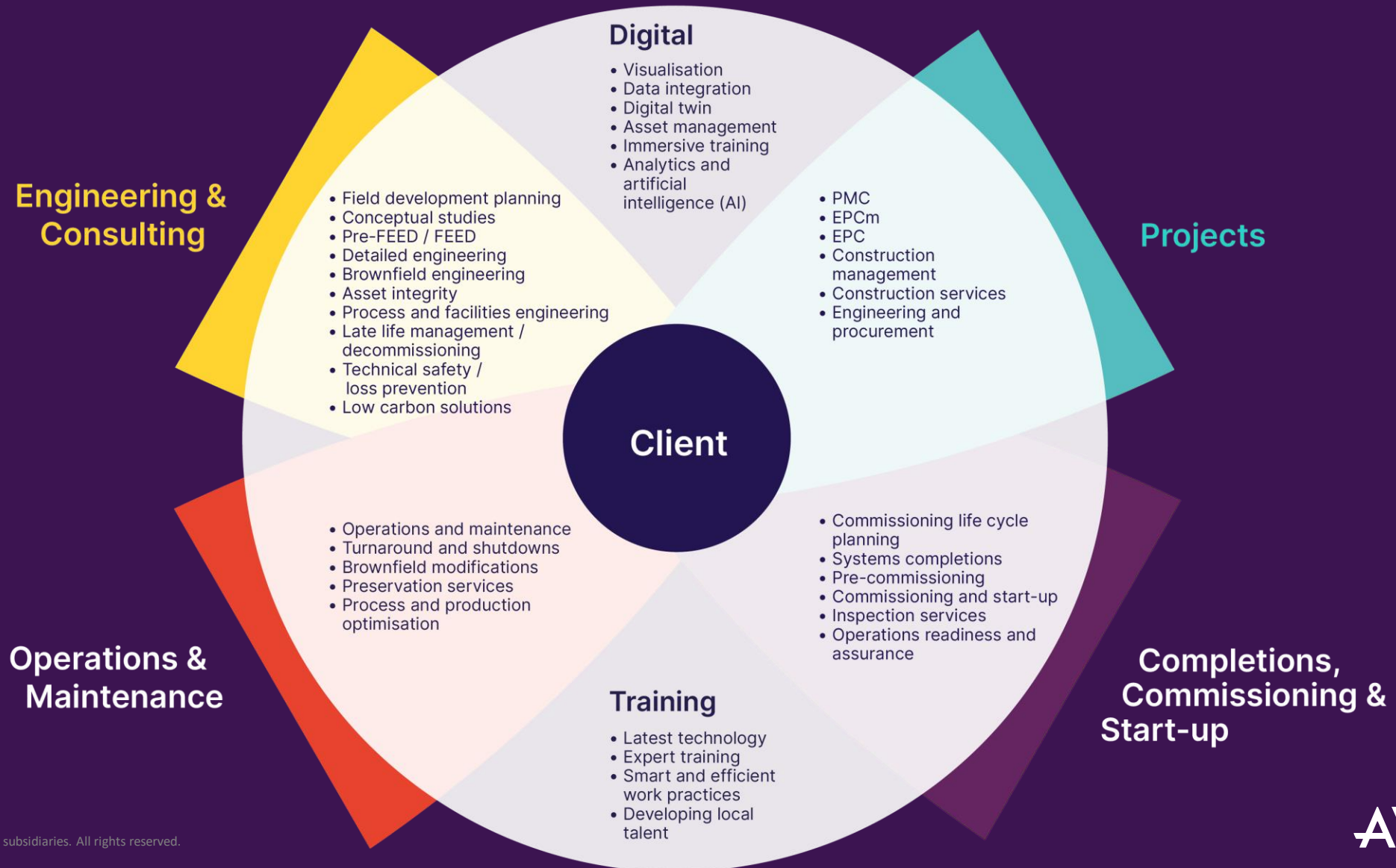


Waste to Energy

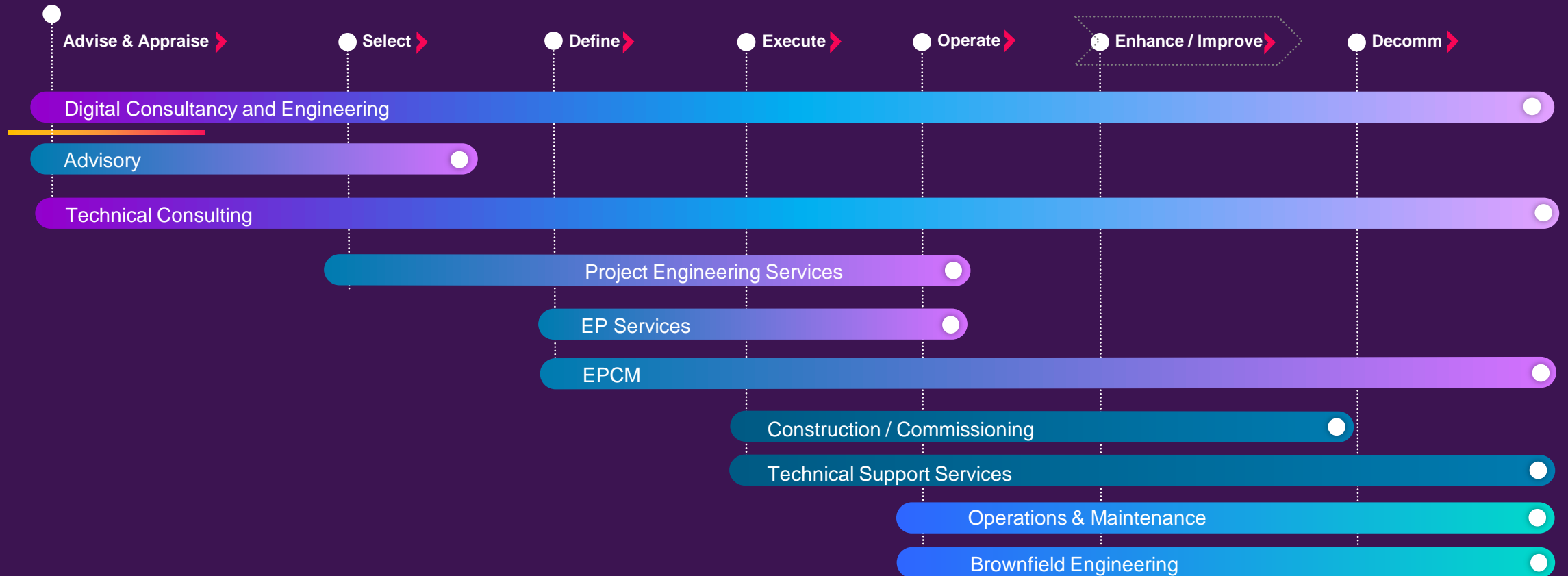


Decarbonisation
(electrification, flare &
methane reduction)

We design, build and maintain the assets that power the world for today and make it future-ready for tomorrow.



From independent consultancy advice or integrated services, we are with you every step of the way





Our
Innovative
Solutions
&
Digital
Offerings

Digital Transformation program, Governance, Specifications and scoping

Unified Engineering Solutions (Smartplant, Aveva, Bentley)

Digital Centers (for monitoring/remote operations)

Business Process Automation, Mobile applications & RPA's

8D Digital Twin (Advisory, Design, Implementation, Operations)

Ecosystem applications

ERP configuration and implementation

4D/5D Visualization solutions (AR/VR/MR)

Immersive Training Applications

Laser Scanning & AI data processing

Control/Data centers Design and development

Video Walls solutions

Database & Cloud services

Digital Engineering (Data centric, Class Libraries)

Operations Management Interface

Oil & Gas Real time solutions & Analytics (DCS, VFM)

Data Analysis & Business Intelligence

PMO Digital Ecosystem

Progressive Handover Project Controls & Information Management

Systems Configuration and project start up (Aconex, Ecosys, Primavera, project portals)

EPC4.0 solutions

Process Graphics, Simulations

AI Geofencing

Asset Management solutions

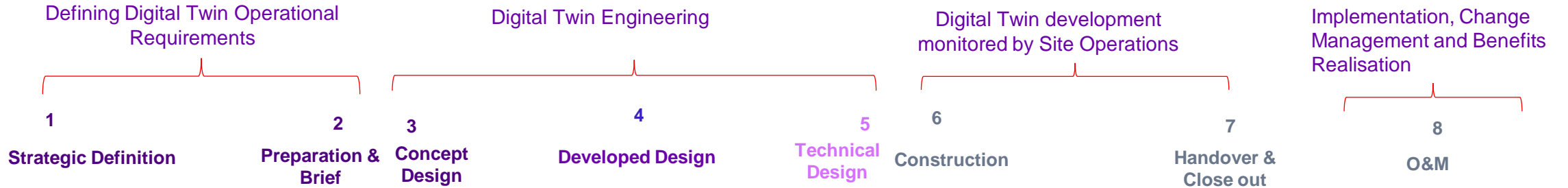


Our Digital Twin current offering covers end to end capabilities

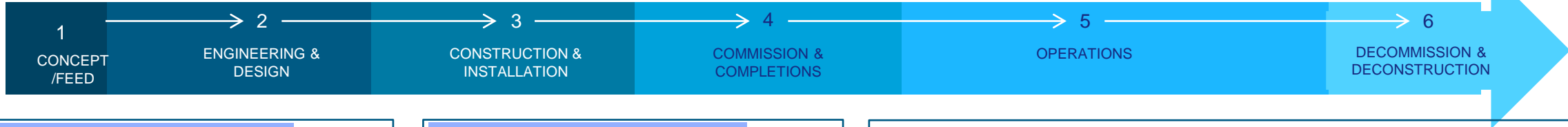
Consultancy Service

Design, Implementation & Management

Operations



Our Digital Solutions Experience



Immersive visualization in engineering (AR & VR)	
Increased efficiency, faster decision making & reduced costs	
Laser Scanning	
£3.5m enabled revenue w/ 12% margin	
Data centric engineering pilot	
Improved project efficiency	
Holistic optimization of offshore wind farms	
Better design & operations, faster execution & lower cost	
Pipeline Optimization	
30% design time reduction	
Saudi Aramco Berri Gas Digital Twin	
USD 2.4M client certified savings from innovative design review process	
ADNOC Al Yasat EPC 4.0 – Belbazem Field	
Digitizing the offshore assets from early stage	

Network Infrastructure–as-a-Service for construction comms	
Rapid deployment, lower CAPEX and OPEX	
Connected Worker - Pharos	
Improved site productivity and safety	
UAV / drone surveys	
Reduced site work requirements	
De-risking installation (digital scanning)	
\$50m Savings	
3D/4D constructability review	
20% downtime reduction	
Visualisation – construction animation and project status.	
Executive level visualisation	
Digital Engineering & Progressive Handover	
5D integrated design and progressive handover	

Digital Industrial Solutions	
Connectivity, IoT and data collection	
IoT Sensor Deployment Engineering	
Operational Awareness	
Critical Infrastructure Protection & Cyber Security	
Increased security	
Optimization using OLGA and Meascap	
Simulation and analysis for business improvement	
Operational efficiency with interactive training (FieldOp3D)	
Reduced on-boarding cost & time, increased safety	
Connected Worker on de-manned offshore assets (VR/AR)	
Reduced on-site time, increased safety & greater accuracy	
Turnaround Worker Safety and Productivity Solution	
Improved safety, productivity	

Digital site survey & inspection tool (ASSIST)	
20% reduction in site inspection time	
Immersive technology for asset management (AR & VR)	
Increased efficiency & reduced cost across facility lifecycle	
Web-centric asset inventory (VUEWorks®)	
Minimized failure risk, optimized expenditures & service delivery	
Spares inventory optimization using data analytics	
\$150m Savings	
ARIA / AIM Toolkit	
Coordinated integrity management	
Asset investment planning (Direxyon Infra)	
Controlled risk and optimized investment	
Digital Transformation: Digital Command Center	
Provide real time production data in single fully integrated platform	





DIGITAL TWIN



VIRTUAL FLOW METERING



AI GEO FENCING



HOLOGRAPHIC DISPLAY





R92-D-0X52- Butane Receiver (D - Vessels)

Key Information

ID	R92-D-0X52	Name	Butane Receiver
Type ID	CL10002	Classname	D - Vessels
Aliases	R92-D-0X52	Plant	R92
Area		Unit	

Attributes

R92-D-0X52 Dataset

ID	R92-D-0X52 Dataset
Design Temperature	350 °F
MSDT	48 °F
Orientation (Horizontal / Vertical)	Horizontal
P&ID Number	BA-P&ID-2001
Qty	1
Specific Gravity Of Liquid	0.515 No Unit

R92-D-0X52 P&ID Data

ID	R92-D-0X52 P&ID Data
Diameter Internal	5' 6.1"
Insulation Spec	NULL
Item Tag	R92-D-0X52
Length Flan To Flan	16' 6.0"
Liquid Level High	44.0.0 in
Liquid Level Low	1.9.0.0 in
Liquid Level Normal	23.9.9 in
Accessories (All Process Piping)	4474

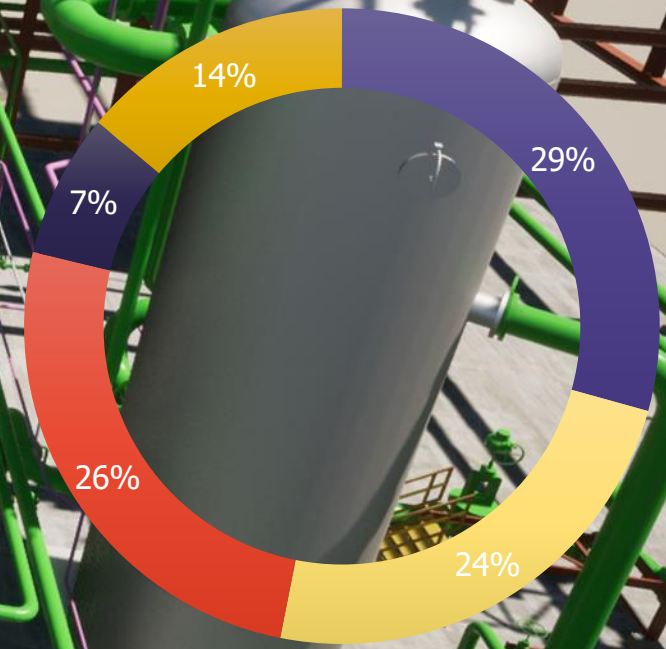
Related Documents

Document Type	Name	Revision
DAT - Data Sheet	SEP0002002	0
DOC - Scope Of Work	SEP0002147	0
DOC - Scope Of Work	SEP0002002	0

P&ID BA-P&ID-2001

3D View R92

Completeness



Design Review

- Data Integration

Construction Sequence

- Interactive model

Automated Validation

- Gateways

DIGITAL ASSET REWARDS

75% reduction in unplanned shutdowns

50% cut in the duration of planned turnarounds

10% extension to asset life

INDUSTRY CHALLENGES

- ▶ Missing class libraries and data dictionary for asset lifecycle
- ▶ Data quality and presentation in context
- ▶ Lack of systems integration, disconnected information
- ▶ Handover of information from projects to Operations
- ▶ Access to real time information at the right time by the right team
- ▶ Lack of analysis and insights
- ▶ Pressure to Reduce Emissions
- ▶ Lack of Unified operations



- Accelerate interpretation with machine learning
- AI seismic analysis

- Optimize field architecture with smart and integrated modeling (**EPC 4.0**)
- Synchronize project build using digital twins and building information modeling
- Optimize for constructability and cost

- Achieve faster well delivery with closed-loop automation
- Improve well design using data analytics
- AI Geosteering

- Optimize production with real-time data and advanced model enabled by industrial Internet of Things
- Improve uptime using predictive maintenance and **digital twins**
- Implement Machine Learning for Virtual Metering and Flow Assurance

50% - 60%
Reduction in data interpretation time and cost

Up to 70%
Reduction in engineering hours plus higher-value field concepts

20% - 30%
Faster well delivery and more productive wells

3% - 5%
Increased Production
20% - 40%
Reduced maintenance cost

THE MOVE TOWARDS DIGITAL ASSETS



OIL & GAS DIGITAL ASSET ROADMAP

Data Centric Design

Digital Asset

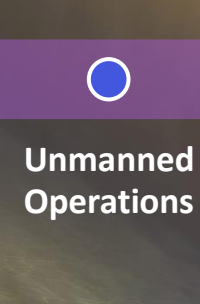
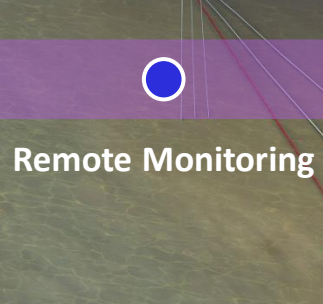
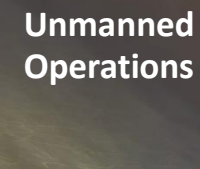
Remote Operations

Autonomous Operations

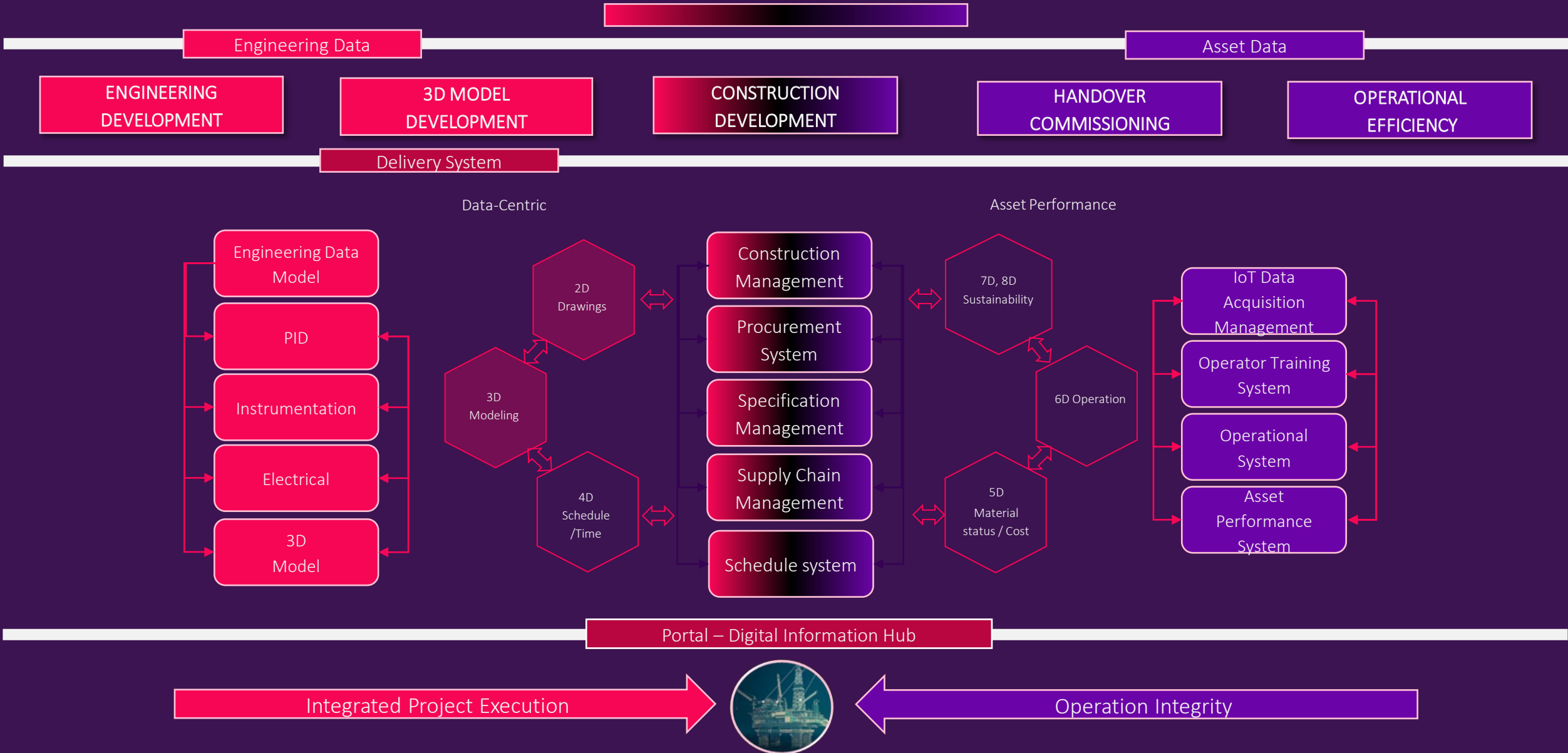
EPC 4.0 Smart Construction

Remote Monitoring

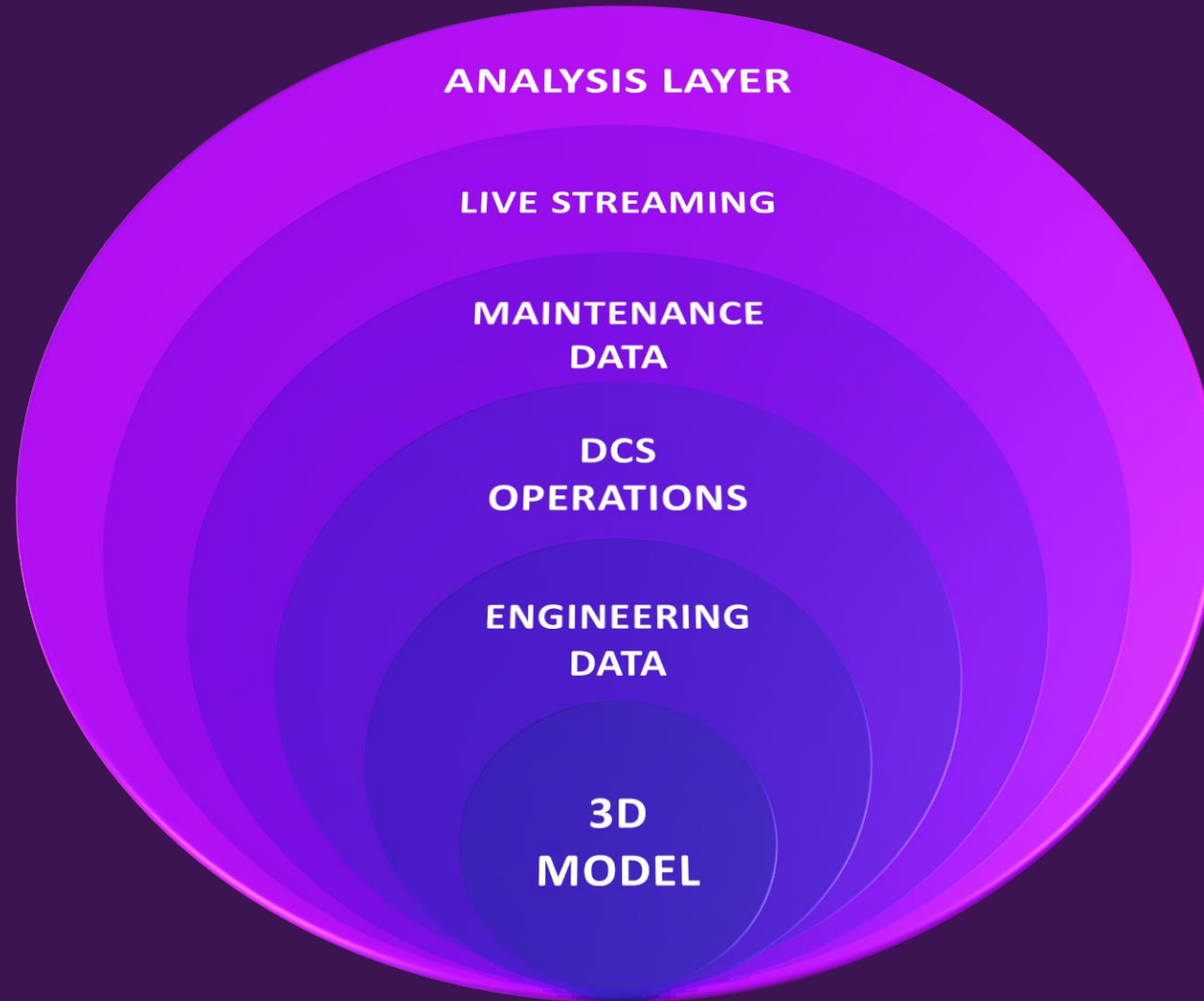
Unmanned Operations



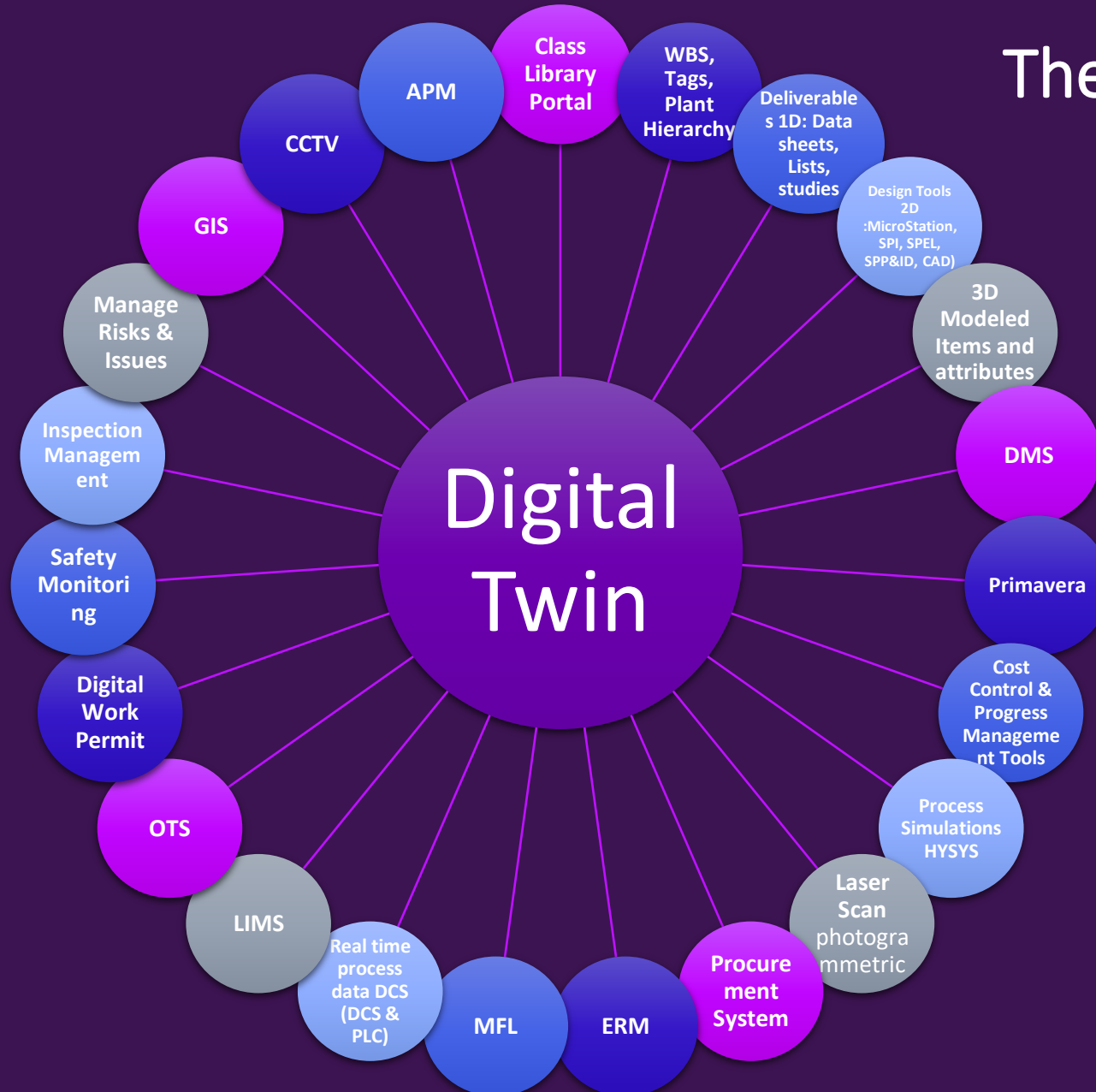
ASSET LIFECYCLE ECOSYSTEM



DIGITAL ASSET 4.0

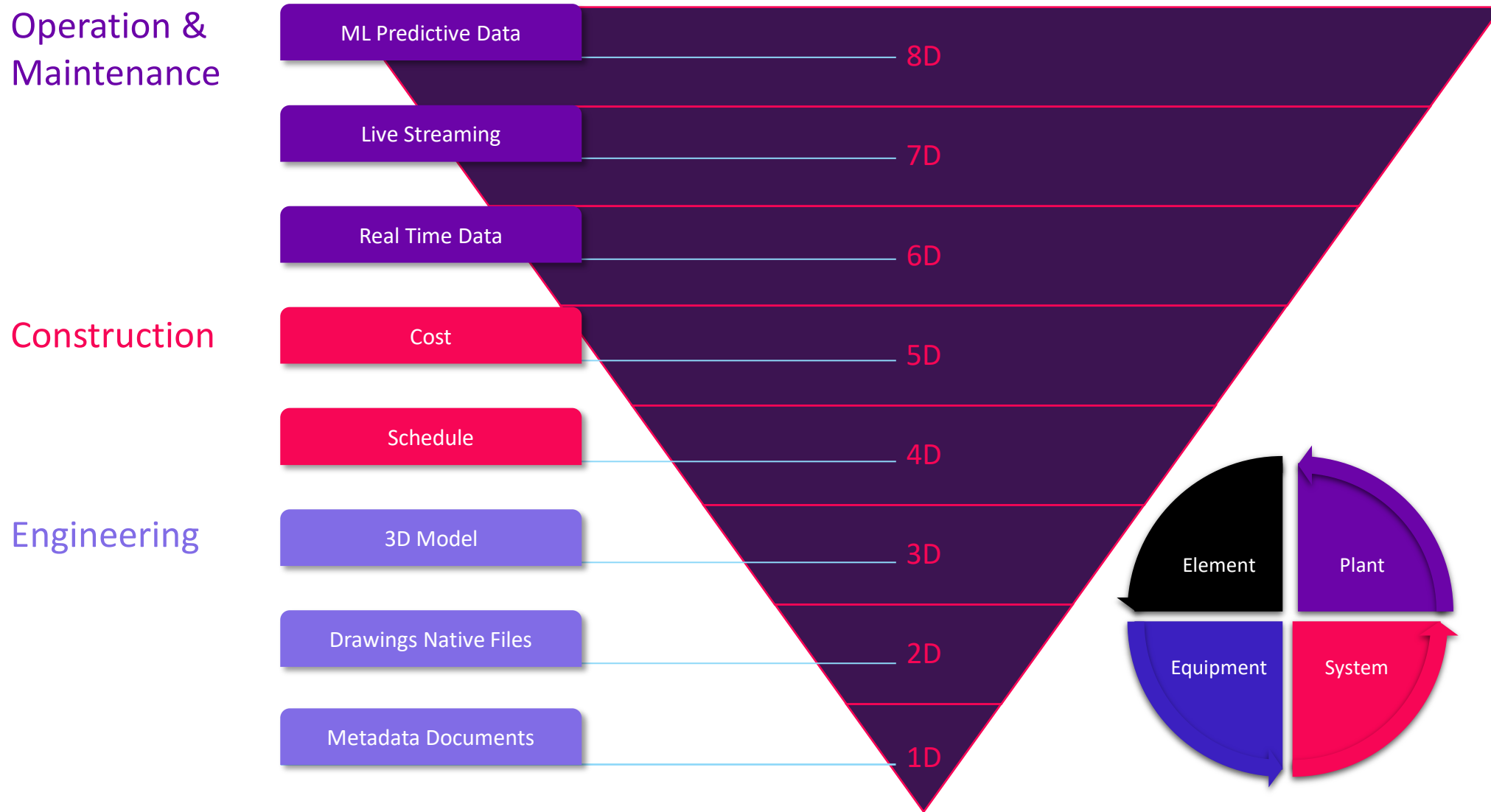


The Brain of Data

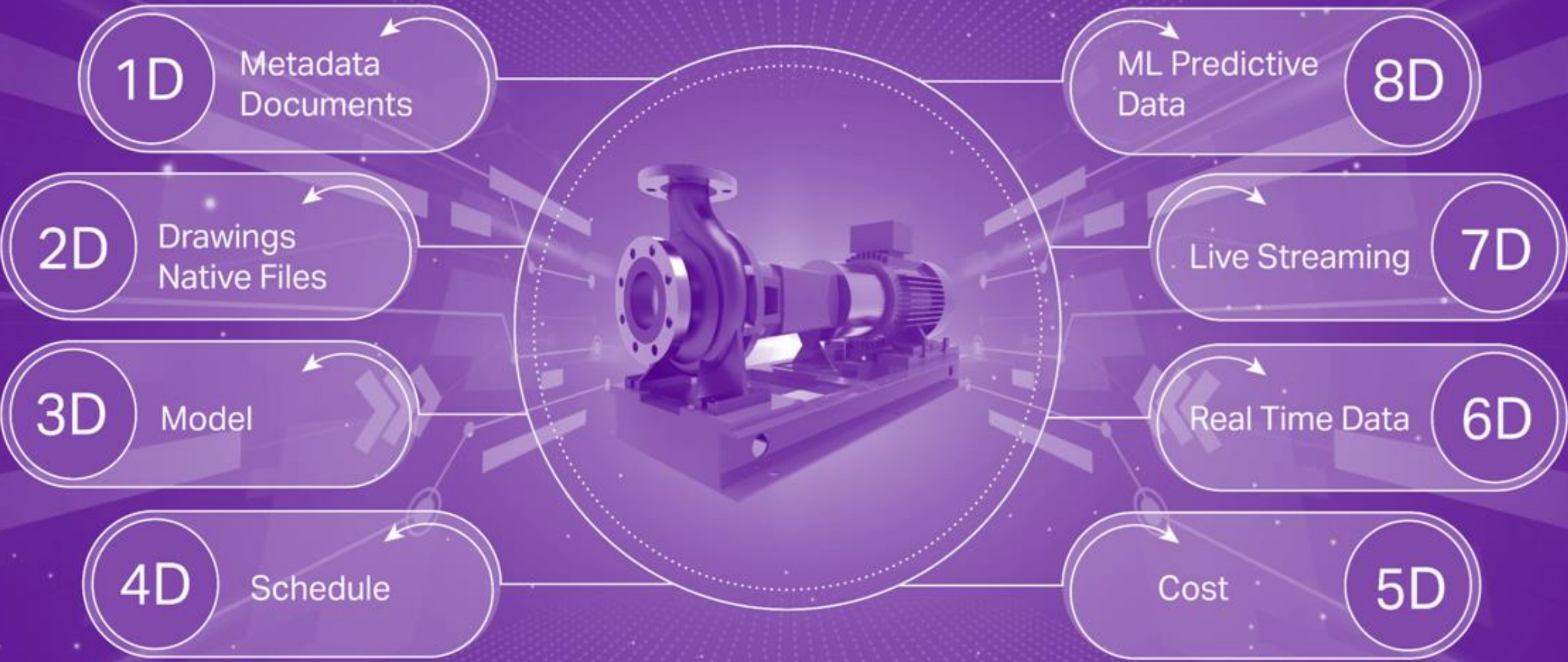


The System of Systems

8D DIGITAL TWIN DIMENSIONS



8D Digital Twin Concept





Due Date Cross Without Completion					
TagName	Work Order No	Planned Date	Due Date	Completion Date	
726-P-101	MA00121	07-10 00:00	07-20 00:00	07-20 00:00	
726-PU/P-101A	MA00122	07-05 00:00	07-15 00:00	07-15 00:00	
726-PU/P-101B	MA00123	07-01 00:00	07-08 00:00	07-08 00:00	
726-PU/P-102A	MA00124	07-15 00:00	07-27 00:00	07-27 00:00	
726-PU/P-102B	MA00125	08-23 00:00	08-29 00:00	08-29 00:00	

- Between Planned Date And Due Date
- Plann Date Coming in This Month
- Plann Date Coming in Next Month

08-E-V-5878

Parameters

- Delta P across Demister: 548.0
- Oil Level: 79.0
- Water Level: 82.0
- Temperature: 102.0
- Pressure: 300.0

67-M2-6461

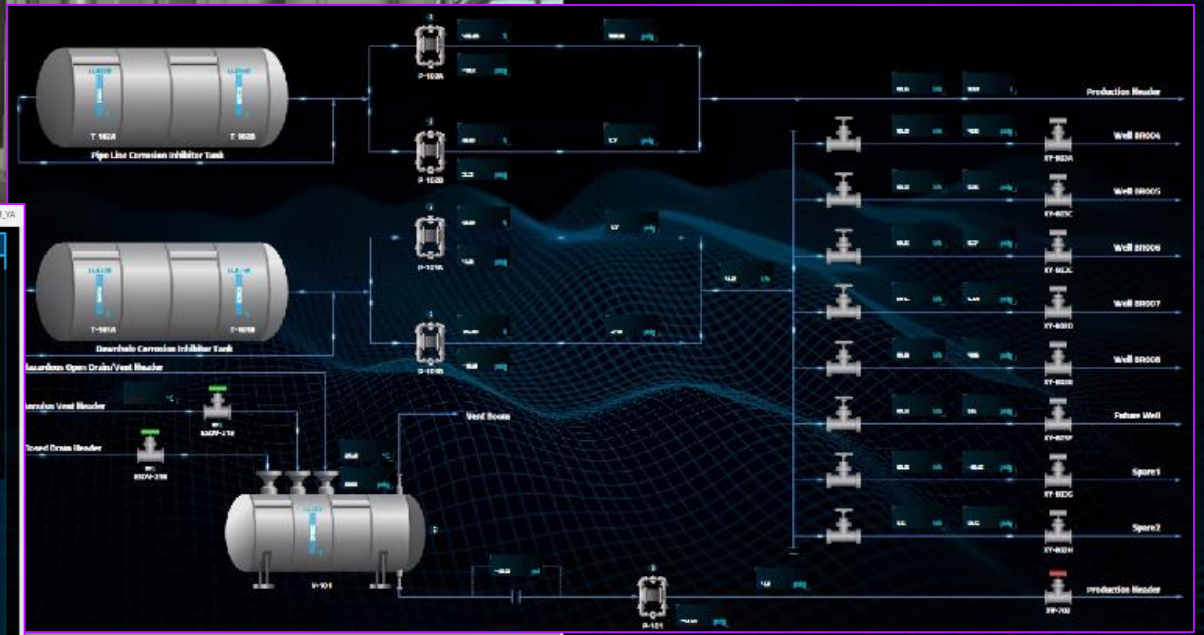
Parameters

- Seal Low Pressure: 521.0
- Seal Temperature: 101.0
- Flow Rate: 110.0
- Discharge Temperature: 150.0
- Discharge Pressure: 570.0
- Suction Pressure: 542.0

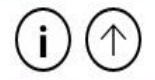
67-M2-6461

Parameters

- Density: 219.0
- Oil Flow: 457.0
- Water Cut: 94.6
- Temperature: 117.8
- Pressure: 518.8



Maintenance W...



Filters

Work Order

All

5 Results



- 726-P-101 1
- 726-PU/P-101A 1
- 726-PU/P-101B 1
- 726-PU/P-102A 1
- 726-PU/P-102B 1



Line Size



11 Results

- 1.5 2
- 1.0 32
- 2.0 185
- 3.0 15
- 4.0 59
- 10.0 2
- 12.0 1
- 6.0 21

Process Services



18 Results

- Closed Drain Hydrocarbon 4
- Chemical Injection 2
- Crude Oil 6
- Drain Non-Hydrocarbon 5
- Fuel Gas 2
- Fire Mains 6
- Gas Condensate 2
- Glycol 1



8D DIGITAL TWIN EXPERIENCE



HoloLens



Digital Twin on tablets



DT on Video Wall



Autonomous Engine



Mixed Reality



Virtual Reality



Panorama

8D DIGITAL TWIN USE CASES

EPC
4.0



1

Design & Simulation



2

Project Management



3

Construction

Lifecycl
e



4

Monitoring Operations &
Maintenance



5

Remote Operations &
Maintenance



6

Autonomous operations

EPC 4.0

OM 4.0



Image: static point cloud laser scan	3D model: object based	Enriched 3D model: persistent (static) data	Real-time (dynamic) data	Two-way data integration and interaction	AI enabled (autonomous) operation
Laser Scanning, As Built Validation					
Drones / UAVs					
Immersive Visualisation (VR)			Virtual / Assistive Visualisation (VR / AR)		
Data centric engineering					
		Immersive Training			
		Information & Progress Management			
		Design Review & Data Engineering			
		Safety Management / Inspections Mobile Applications / Mobility			
			Remote Support		
			Connectivity / Infrastructure/ IoT Ecosystem		
			Connected Worker		
			Remote Process Monitoring		
			Digital Asset Management / Integrity Management		
			Predictive Maintenance		
Value Engineering, Design Optimisation			Simulation / Process Optimisation		
			Operational Efficiency		
			Descriptive Analysis / Business Intelligence		
		Supply chain integration			
			Remote Operations	Immersive Operations	Autonomous Operations

GLOBAL ECOSYSTEM



Wassim Ghadban

Vice President – Digital and Global Innovation

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Follow our social media channels for more updates:



THANK YOU

謝謝

DZIĘKUJĘ CI

NGIYABONGA

TEŞEKKÜR EDERİM

DANKIE

TERIMA KASIH

GRACIES

WHAKAWHETAI KOE

DANKON

TANK

TAPADH LEAT

SALAMAT

SPASIBO

GRAZIE

MATUR NUWUN

ХВАЛА ВАМ

MULŢUMESC

PAKMET CIZGE

고맙습니다

GRAZIE

شكرا

FAAFETAI

ESKERRIK ASKO

GO RAIBH MAITH AGAT

HVALA

HVALA

БЛАГОДАРЯ

GRACIAS

MAHADSANID

TEŞEKKÜR EDERİM

ТИ БЛАГОДАРАМ

DANKJE

EΥΧΑΡΙΣΤΩ

GRATIAS TIBI

OBRIGADO

TAK DANKE

AČIŪ

SALAMAT

MAHALO IĀ 'ŌE

TAKK SKALDU HA

МЕРЦИ

RAHMAT

MERCI

GRAZZI

PAKKA PÉR

ありがとうございました

DI OU MÈSI

ĐAKUJEM

HATUR NUHUN

PAXMAT CAĠA

SIPAS JI WERE

TERIMA KASIH

CẢM ƠN BẠN

UA TSAUG RAU KOJ

ТИ БЛАГОДАРАМ

СИПОС

WAZVIITA

FALEMINDERIT