

**EypherCrescent**



Innovation Services  
**Brochure**





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SECTION ONE:  
**CypherCrescent  
Profile**



# Cyphercrescent Overview

CypherCrescent is an integrated energy technology company focused on engineering innovation, data-driven technology development and capacity building. We are committed to providing innovative and cost-effective business solutions/services to energy companies to increase production, reduce costs, improve operational efficiency, and enhance HSE across their asset management value chain.

## Our Footprint

For over 10 years, we have partnered with more than 20 E&P companies, delivering innovative technology solutions that drive measurable results across Africa's energy sector. With a footprint spanning across Africa, we combine local insight and technical expertise to help both public and private organisations optimise operations, reduce risk, and accelerate growth.

<b>10</b> YEARS IN BUSINESS	<b>100%</b> NIGERIAN TECH COMPANY	<b>3</b> CONTINENTS	<b>3</b> STRATEGIC BUSINESS UNITS
<b>300+</b> SOFTWARE USERS	<b>15+</b> E&P CLIENTS	<b>40+</b> TRAINING	
<b>700+</b> DEMOCRATISED WELLS	<b>100+</b> COMMERCIAL SOFTWARE LICENSES	<b>20,000+</b> TRAINING HOURS	<b>50+</b> STAFF
	<b>10+</b> PARTNERS		






## Our Team and Partners

CypherCrescent brings together a multi-disciplinary team of engineers, data scientists, and software specialists with deep domain expertise across the oil and gas value chain. With over a decade of experience executing projects in highly technical and data-intensive environments, our team has consistently delivered solutions that enhance operational efficiency, strengthen digital resilience, and unlock new value streams. From concept development and system architecture to deployment and lifecycle support, we operate with the rigour required for mission-critical operations.

We amplify our impact through strategic partnerships and cross-sector collaborations, combining technology delivery with business process optimisation, market alignment, and targeted capacity development. Together with our partners, we are building resilient, future-ready innovation ecosystems across Africa's energy sector.



A hand holding a glowing lightbulb, symbolizing an idea or innovation. The background is dark blue with several question marks in white and light blue, and small glowing particles in red and white. The lightbulb is the central focus, emitting a warm orange and yellow glow.

SECTION TWO:  
**CypherCrescent**  
Innovation Service

Through CypherCrescent Innovation Services, innovative ideas are turned into practical digital and engineering solutions. We develop solutions that tackle complex operational challenges, from optimising production and improving asset reliability to enabling smarter, more efficient field operations. By combining AI, secure software, and modern infrastructure with hands-on industry experience, we help organisations in the energy industry optimise their processes.

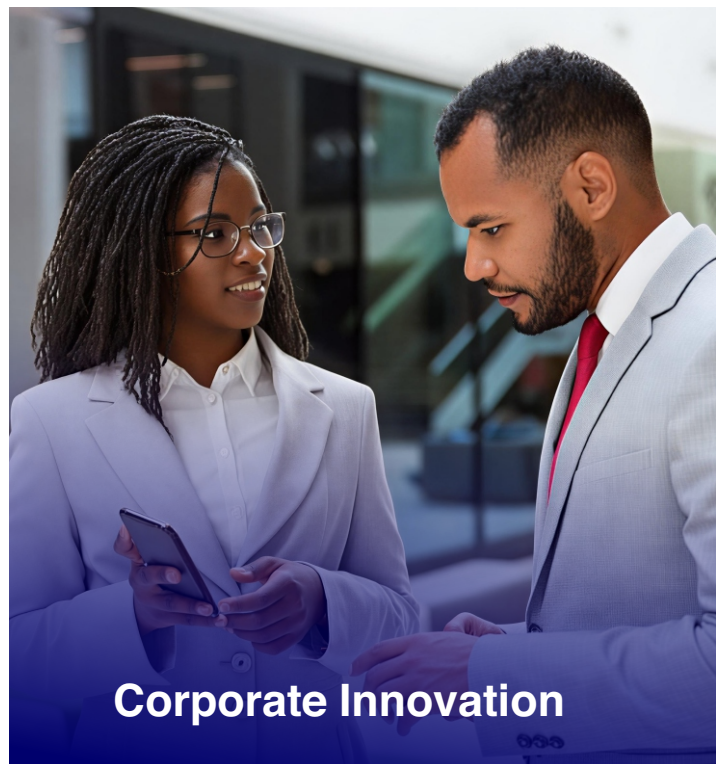


In addition, innovation adoption is strengthened for our clients through targeted capacity development and venture-studio execution, delivering training, hackathons, incubation, and startup-acceleration programmes. This enables organisations to build internal capability, develop market-ready solutions, and de-risk innovation investments while establishing sustainable, high-impact innovation ecosystems.

CypherCrescent Innovation Services creates value through two (2) key service categories, supported by standardised and structured training programmes that enhance operational efficiency and ensure seamless adoption, effective utilisation, and sustained value realisation across all services and product offerings.



**Engineering Innovation**

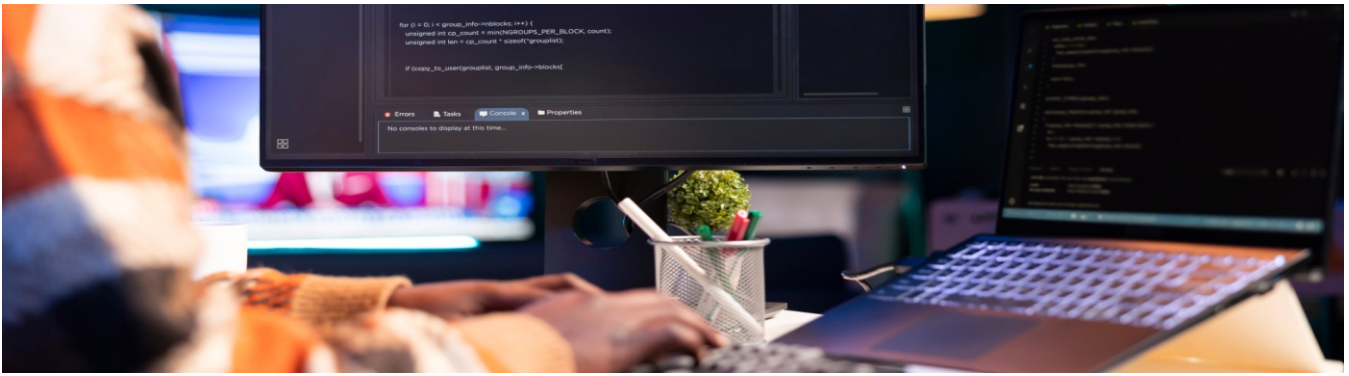


**Corporate Innovation**

A man with a beard, wearing a yellow hard hat, safety glasses, and yellow earplugs, is smiling and looking towards the camera. He is wearing an orange safety jacket and holding a tablet computer. The background is a blurred industrial setting with blue and white elements.

SECTION THREE:

# Engineering Innovation Service



From co-created organisation-specific software to ready-to-demo products and emerging technologies within our innovation ecosystem, our Engineering Innovation product and service category leverages technology and engineering excellence to optimise operations and drive measurable value across the oil and gas value chain. Every solution is grounded in first-principle petroleum engineering, applied mathematics, and systems engineering, and we integrate our technology solutions with our expert-led services to deliver sustainable, impactful outcomes.

#### Custom Solution Development

- System Integration.
- Security and Governance.
- Software Engineering
- Artificial Intelligence & Machine Learning.
- Data, Analytics & Insights.
- Cloud & Infrastructure.

#### Developed (Ready to go) Solutions

- SEPAL Solver
- Virtual Lab
- DocuAI
- eHSAT
- eSturdi

#### Energy Technologies

- Satellite-Augmented Asset Surveillance Technologies
- Robotics and Applied AI

#### Established Solutions

##### Real-Time Data Capture and Reporting Solutions

- Automated Gauge Intelligence (AGI)
- PVT (RMS) Report Management System
- Real-Time Production Surveillance

##### Modelling Simulation Solutions

- Manufacturing Process Simulation & Design
- SMBS (Stochastic Material Balance Solution) Modelling
- SEPAL Well-Sim (Well Modelling and Analytics)

##### Optimisation Solutions

- Production Optimisation
- Gas Network Optimisation
- Real-Time Optimisation of Chemical Processes

##### Integrity Management and Emission Solutions

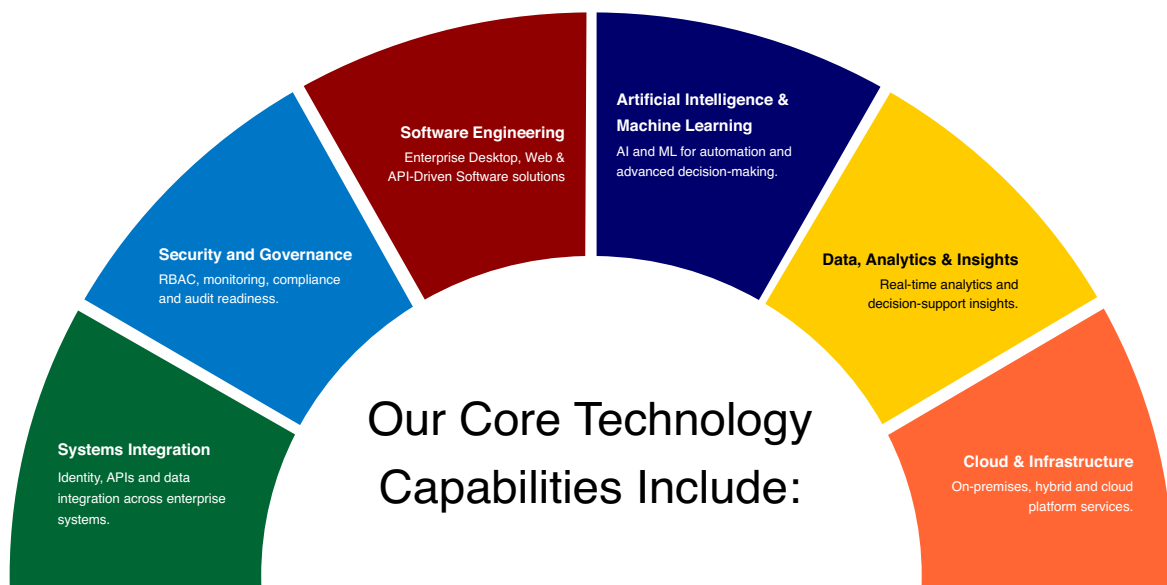
- Pipeline Digitalisation and Integrity Management Solution
- Carbon Emission Platform (Decarbonisation Value Chain)

## Custom Solution Development

We deliver tailored software solutions, harnessing advanced technology capabilities to address complex operational challenges across the oil and gas value chain. Leveraging a robust technology framework, innovative solutions are co-created with our clients that are secure, scalable, and insight-driven, ensuring measurable business and process optimisation outcomes.

## Our core technology capabilities include:

- Systems Integration – seamless connectivity across platforms and enterprise systems.
- Security and Governance – identity management, policy enforcement, and regulatory compliance.
- Software Engineering – custom applications, APIs, and backend services built for performance and maintainability.
- Artificial Intelligence & Machine Learning – predictive and intelligent automation solutions.
- Data, Analytics & Insights – reliable platforms for reporting, analytics, and decision support.
- Cloud & Infrastructure – secure, hybrid, and cloud-native environments optimised for scale and reliability



Leveraging these capabilities, we combine structured delivery methodologies and enterprise-grade operational practices to ensure solutions are implemented securely, efficiently, and aligned with business objectives.

### Our delivery and operational practices cover:

- Low-Code & No-Code Enablement (Power Apps) – rapid deployment for workflow-driven solutions.
- DevSecOps & Continuous Delivery – fully customised, secure deployments.
- Agile Product & Solution Delivery – incremental releases with stakeholder alignment.
- Service Management & Operational Governance (ITILv4) – operational stability and support.
- Cloud Security & Compliance Controls – governance and regulatory adherence.

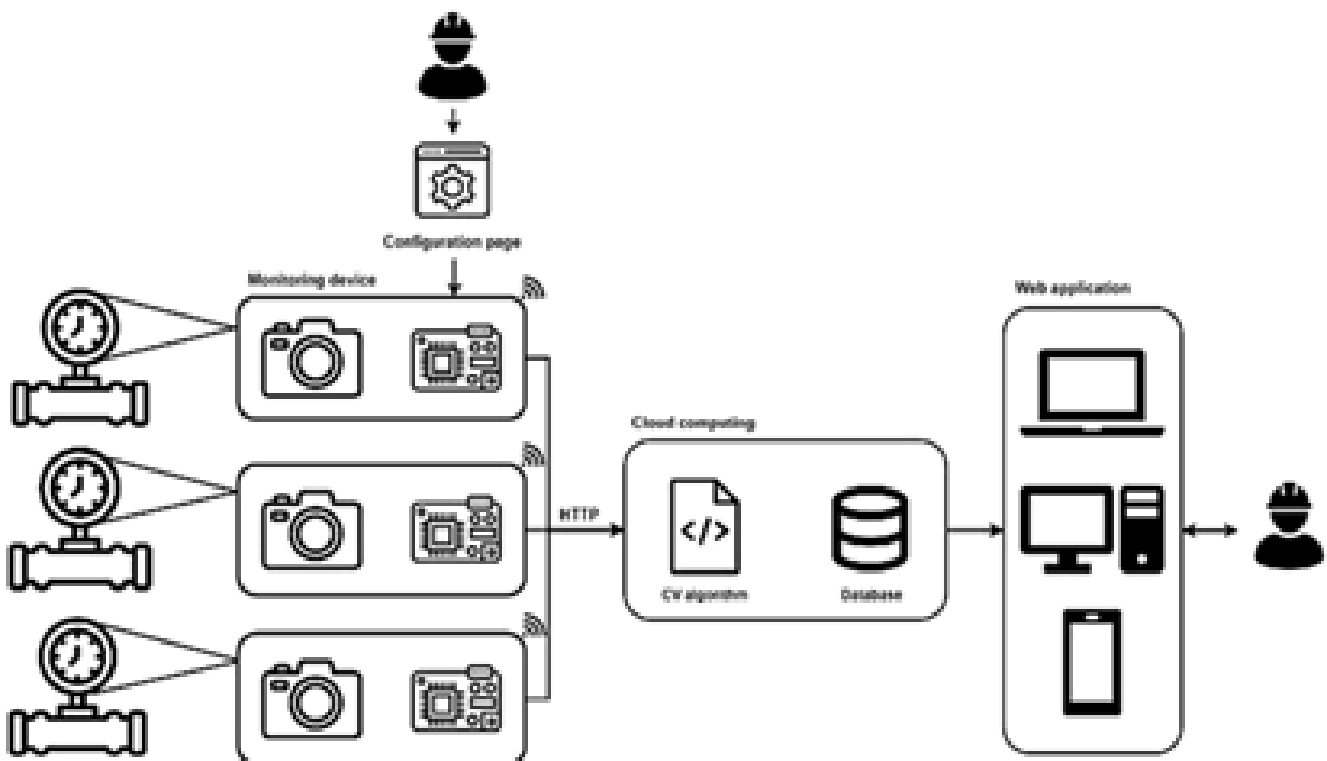
# 1 Real-time Data Capture and Reporting Solutions

## Automated Gauge Intelligence (AGI)

Major operators continue to rely on legacy analog gauges, creating significant business challenges:

- High Cost of Replacement: Upgrading thousands of legacy analog gauges to digital systems represents a prohibitively high capital expenditure.
- High Operational Costs & Inefficiency: Manual inspections are labor-intensive, logistically complex, and introduce operational delays.
- Significant Safety & Compliance Burdens: Personnel must enter hazardous environments, creating safety risks and regulatory compliance burden.
- Untapped Data Potential: Valuable operational data is lost between checks or trapped in error-prone manual logs.

AGI is Turnkey solution to digitize analog gauges via ruggedized, AI-enabled camera units. Analog sensors are digitized using monitoring devices (camera + MCU + Wi-Fi), transmitted via HTTP to the cloud (CV + database), and accessed in real time through a web application by operators.



## Value Proposition:



### **Dramatically Lower OPEX:**

Reduces costs tied to manual inspections, logistics, and safety overhead



### **Enhance Safety & Compliance:**

Eliminates routine human presence in hazardous zones with automated, auditable data logs.



### **Unlock Operational Intelligence:**

Transforms legacy assets into smart, 24/7 data sources enabling real-time alerts and predictive analytics.



### **Client-agnostic, non-invasive retrofit with minimal downtime:**

Works with any existing analog gauge without requiring system modifications or operational shutdowns, ensuring rapid deployment across diverse asset portfolios.

## PVT Report Management System (PVT RMS)

This is a purpose-built digital platform that transforms unstructured, scattered PVT data into a structured, searchable, and analytically powerful digital asset. From reservoir characterisation to regulatory submittals, PVTRMS puts engineers in control of their data.

**1,000+**

**PVT Reports  
Characterised**

*Proven at scale*

**6+**

**Discipline  
Targets**

*Cross-functional  
reach*

**8+**

**Modelling  
Correlations**

*Built-in PVT methods*

**1**

**Platform  
Philosophy**

*Single source of  
truth*

## **PVTRMS delivers a comprehensive suite of capabilities across data management and PVT analysis:**

### ● **PVT Digitisation**

Convert hard-copy PVT reports into structured digital records with full data fidelity including compositional data, fluid gradients, and experimental results.

### ● **Centralised Database Management**

Secure, role-based data repository with controlled read/write access, structured archiving, and efficient PVT query and retrieval procedures.

### ● Data Quality Check & Visualisation

Automated QA/QC of PVT datasets with trend modelling and visualisation tools to detect anomalies, missing data, and outliers.

### ● Black Oil PVT Modelling

Generate field-ready Black Oil tables using 8+ built-in correlations with PVT matching, property estimation, and separator corrections.

### ● Compositional PVT Modelling

Full EOS-based compositional modelling with Plus Fraction Characterisation, Pseudoisation, and physical property regression.

### ● PVT Experiment Simulation

Simulate routine PVT experiments — CCE, CVD, differential liberation, separator tests — and validate against laboratory measurements.

### ● PVT Report Generation

Auto-generate structured, audit-ready PVT reports for internal review, regulatory submittals, and contractor sign-offs.

### ● Model Democratisation

Share characterised PVT models across disciplines with controlled access — from reservoir to wellbore hydraulics to surface facilities.

## Value Proposition:

PVTRMS delivers value across 5 dimensions in petroleum data management:

### ● PVT Management as a Service (PMAAS)

PVTRMS positions PVT data management as a professional, managed service not an ad hoc activity. Operators get a contractual assurance that their PVT data will be digitised, maintained, and made available to the right people at the right time. This shifts PVT management from reactive firefighting to proactive asset stewardship.

### ● PVT Data Digitisation

We turn decades of hard-copy PVT reports into structured digital assets. Our digitisation process captures every data point contractual details, sampling records, experimental results with documented fidelity. Clients get a permanent, searchable digital twin of their PVT archives.

### ● PVT Data Democratisation

PVT data should not live on one engineer's hard drive. PVTRMS makes PVT information available across the project team with the right access controls so reservoir engineers, production technologists, petro-physicists, and economists all work from a common foundation. This is the end of data silos.

### ● Collaborative PVT Model Development

PVTRMS enables teams to build, review, and validate PVT models collaboratively on a shared platform. Whether it is a Black Oil table for a reservoir simulator, a compositional model for a flow assurance study, or EOS inputs for a wellbore hydraulics model the platform ensures consistency and traceability from day one.

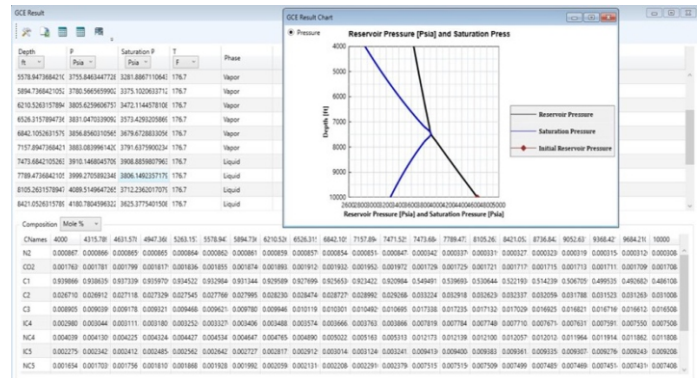
## ● PVT Training & Knowledge Transfer

PVTRMS doubles as a hands-on learning tool for Hydrocarbon Fluid Thermodynamics. Students, graduate engineers, and experienced professionals use the platform to develop real competency in PVT modelling making it both a commercial product and a capacity-building vehicle for the industry.

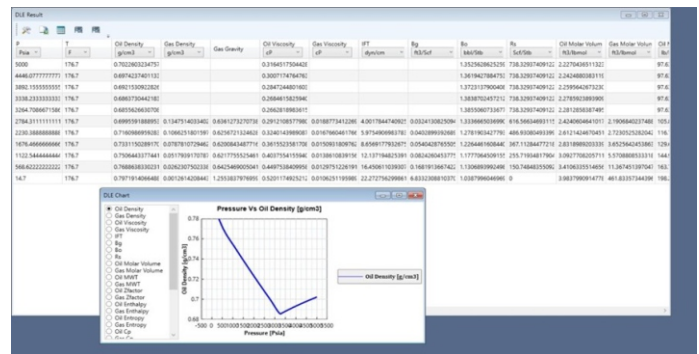


PVTRMS has been applied across a range of real-world scenarios in Nigeria's oil and gas sector:

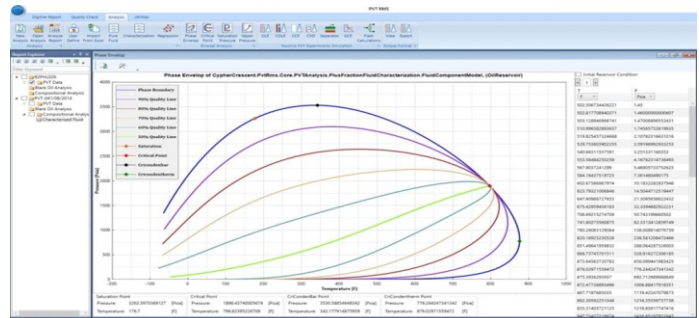
- **Large-Scale Archive:** Characterisation and digitisation of over 1,000 PVT reports for a national operator.
- **Data Audit:** Detection of missing, incomplete, and edge-case PVT reports flagged for targeted resampling.
- **National Programme:** Classification of Nigerian crude oils in line with OPEC quality specifications for a national regulatory project.
- **Simulation Inputs:** Generation of Black Oil and Compositional PVT inputs for reservoir simulation, well test, wellbore hydraulics, and flow assurance studies.
- **QA/QC:** Simulation of routine PVT laboratory experiments for quality validation against existing measurements.
- **Model Sharing:** Democratisation of PVT models across multidisciplinary project teams with role-based access controls.



**Compositional Gradient Analysis (GCE)**  
Reservoir Pressure vs Depth with Phase Identification



**Differential Liberation Experiment (DLE)**  
Digitised GOR Data with Regression and QC



**Phase Envelope**  
Critical Point, Cricondenbar, Cricondentherm and Quality Lines



**CCE Quality Check**  
Log Y Function vs Pressure (Saturation Pressure Validation)

## Modelling and Simulation Solutions Manufacturing Process Simulation & Design

We provide comprehensive process engineering services for modular plants, modular refineries, gas processing units, and separation systems. Capabilities span steady-state and dynamic simulation, batch and continuous operations, heat integration, and control philosophy development.

### Steady-State Simulation

- Aspen PLUS/HYSYS modelling
- Material and energy balance
- Equipment sizing and specification
- Crude assay and batch/continuous distillation
- Heat integration studies

### Dynamic & Advanced Modelling

- CFD analysis (OpenFOAM, Fluent)
- Reactor design and optimisation
- Process control system design
- Dynamic operability and startup/shutdown studies
- Safety studies: HAZOP, LOPA, SIL, QRA

## Manufacturing Design Complementary Services

Beyond our core technologies, we provide specialised engineering and advisory services across the full project lifecycle:

### ● Feasibility Studies

Techno-economic analysis, bankable feasibility reports, market assessment, and financial modelling for project financing.

### ● Technical Due Diligence

Technology evaluation, risk assessment, third-party verification, and independent review and development of manufacturing technical documentation. (MTD)

### ● Process Safety Engineering

HAZOP, LOPA, QRA, SIL studies, and process safety management systems.

### ● Regulatory Compliance

NUPRC, NCDMB, and environmental permit support, regulatory submissions, and compliance documentation.

### ● Technology Partnership & Licensing

Joint development agreements, IP commercialisation and technology transfer programs.

### ● Training & Capacity Building

Process engineering training, simulation software workshops, graduate programs, and technical upskilling.

### ● CCUS Pre-Feasibility Studies

Carbon capture screening studies, reservoir assessment, and techno-economic evaluation.

### ● Flare Gas Capture Studies

Gas characterisation, capture system design, monetisation pathways, and economic assessment.

## Manufacturing Technical Documentation (MTD)

This service supports technical organisations to move from conceptual research and prototypes to commercially scalable and technology driven solutions, with a fully defined, fabrication-ready and regulator-ready engineering packages suitable for manufacturing and field application. Our expertise in the preparation of engineering studies, design definition packages, computational models, and structured technical documentation, for project execution, regulatory standards, and operational deployment.

The objective of the MTD is to bridge the documentation gap by delivering a professional Manufacturing Transfer File (MTF) for each product and translate the existing prototypes into complete, standards-compliant, and fabrication-ready engineering documentation that supports manufacturing transfer, regulatory approval, and eventual commercial deployment.

Starting with a Manufacturing Documentation Readiness and Documentation Gap Assessment Checklist, CypherCrescent's engagement follows a four-milestone progressive framework:

- 1 Physical Inspection & Prototype Assessment:** A physical "teardown" to establish an accurate baseline of existing hardware. build a complete and accurate picture of each prototype as it currently exists its physical configuration, operating principles, component composition, known limitations, and all gaps that need resolution before production documentation can begin.
- 2 Basis of Design (BOD):** Establishing the formal standards, safety philosophies, and material rationales that will govern production.
- 3 Front-End Engineering Design (FEED):** Systematic hazard analysis (HAZOP/DFMEA) and functional architecture.
- 4 Detailed Engineering & Manufacturing Documentation:** The delivery of fabrication-ready drawings (ASME Y14.5), multi-level Bills of Materials (BOM), and floor-level assembly instructions.

Each milestone builds on verified outputs of the previous one. Nothing is assumed every design parameter, material choice, and safety requirement is traced back to the physical prototype and formally justified against applicable engineering standards. The result for each product is a complete Manufacturing Transfer File (MTF): an indexed, revision-controlled documentation package that a qualified fabrication firm can use directly to manufacture, inspect, test, and deliver production units.

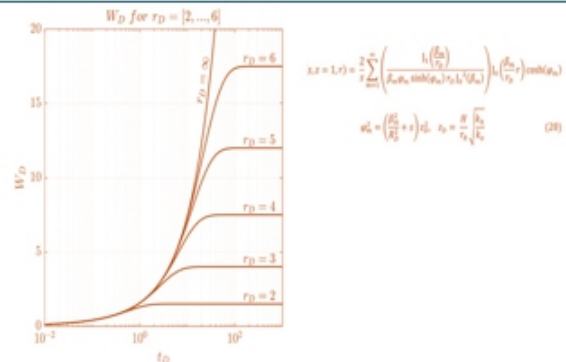
- Working prototype (functional and demonstrable).
- As-built Bill of Materials.
- CAD files (Fusion 360).
- Engineering drawings with dimensions.
- Engineering calculations (sizing, thermal, flow).
- Test data and validation reports.
- Process and functional descriptions.
- Development history and iteration records.
- Critical-to-Quality (CTQ) parameters.
- Design life and duty cycle definition.
- Hazard classification and HAZOP.
- Complete lifecycle documentation (all manuals).
- Regulatory compliance (SON, FRSC, NMDPRA, emissions)
- IP protection

## SMBS (Stochastic Material Balance Solution) Modelling

One of the key challenges is the absence of any existing implementation of Material balance model, to handle all kinds of reservoir fluid and, that is not limited by aquifer size, geometry and boundary conditions.

CypherCrescent developed the Stochastic Material Balance tool that is, based on generalised material balance and water influx model as against polynomial approximations. Our solution is not limited by the relative size of the aquifer, geometry, position or boundary conditions or reservoir fluid type, or flow pattern complexity.

### Mathematical Model



$$s_D = 1, r_D = \frac{2}{r_D} \sum_{i=1}^n \left( \frac{h_i \left( \frac{r_D}{r_{Di}} \right)}{h_i \left( \frac{r_D}{r_{Di}} \right) + h_i \left( \frac{r_D}{r_{Di}} \right)} \right) h_i \left( \frac{r_D}{r_{Di}} \right) \cos(\theta_{iD})$$

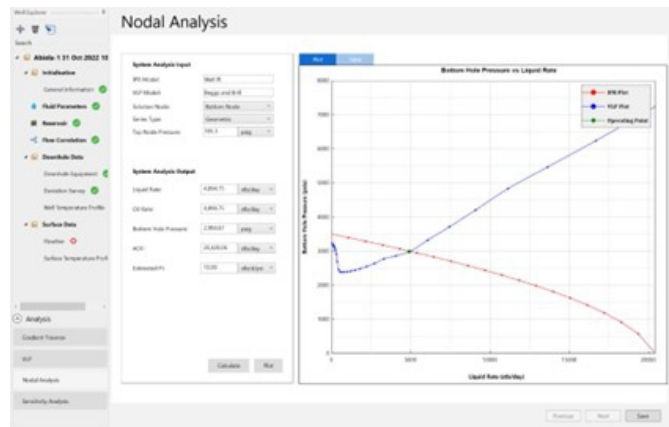
$$s_D = \left( \frac{r_D}{r_{Di}} \right) s_{Di} \quad s_{Di} = \frac{h_i}{h_i + h_i} \quad (28)$$

$$G_{fg} E_g + N_{foi} E_o + W E_w + V_{pi} E_f + W_e = (G_p - G_I) \left( \frac{B_g - B_o R_v}{1 - R_v R_s} \right) + N_p \left( \frac{B_o - B_g R_s}{1 - R_v R_s} \right) + (W_p - W_I) B_w$$

## ● Production Optimisation

**Challenge:** Determination of Optimal rate a well can produce considering the reservoir, well and surface flowline

**Solution:** We developed a tool that calculates the Inflow Performance Relationship (IPR) and Vertical Lift Performance (VLP) of wells, from which the optimum system equilibrium flowing point is obtained.



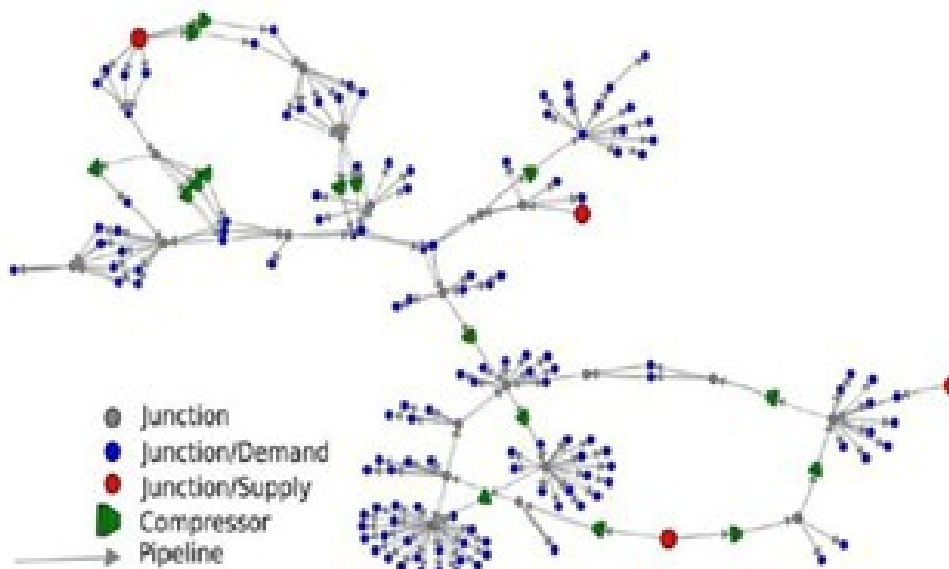
## ● Gas Network Optimisation

### Challenges:

- Increase utilisation of gas to power in Nigeria.
- Expansion of gas transmission and distribution network.
- Inability to meet gas transmission and distribution network demands in accordance with contractual obligations.

### Solutions:

- Network modeling and simulation
- Optimisation Algorithms
- Real-Time Monitoring and Control Integration
- Reporting and Analysis
- Custom Software solution
- Rich User Interface and System Architecture
- Business and Economic Features

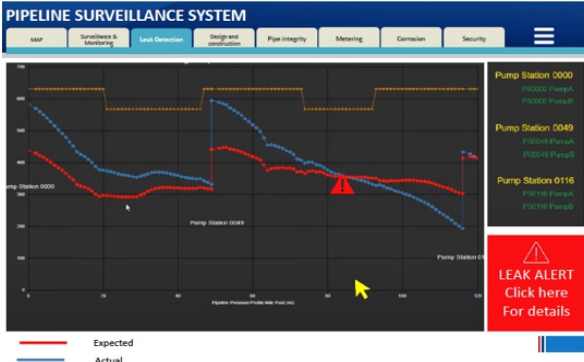
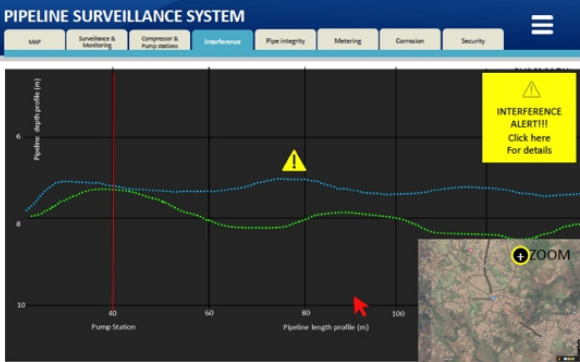
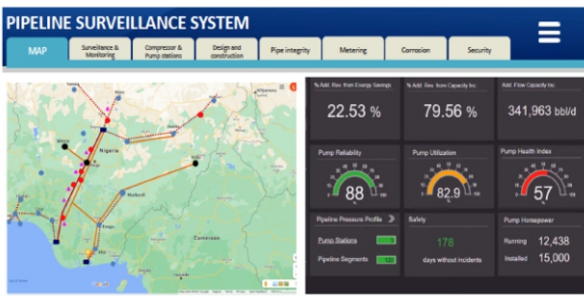
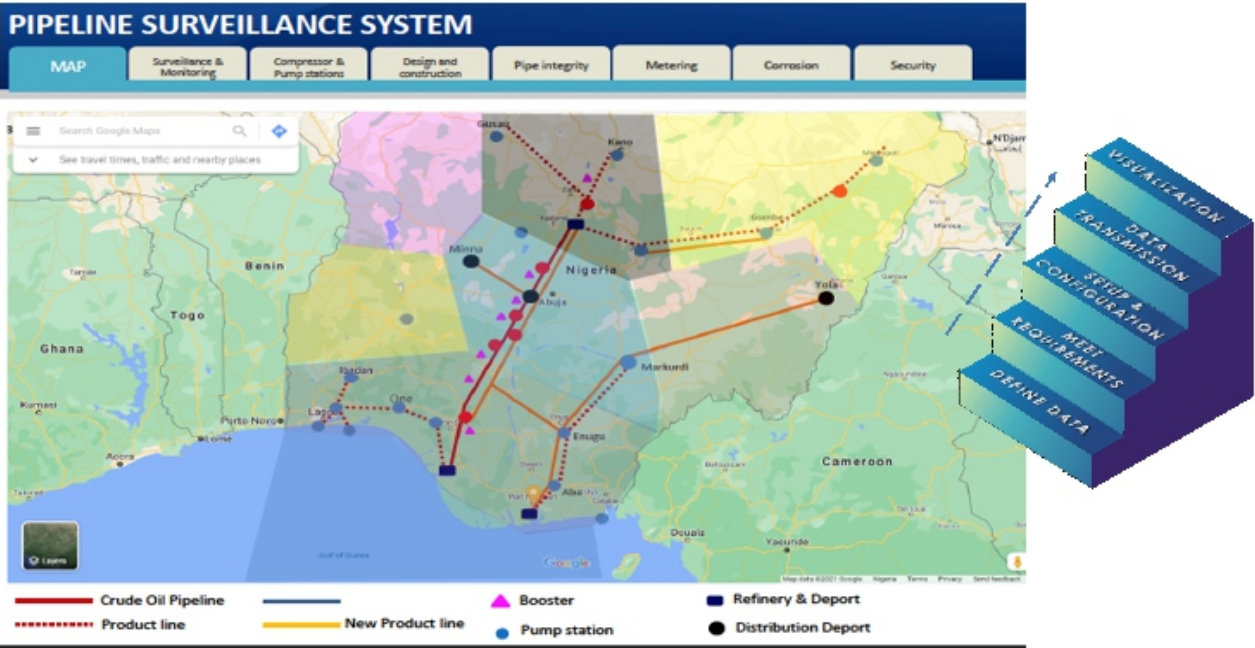


# Integrity Management and Emission Solutions

## ● Pipeline Digitalisation and Integrity Management Solution

Our Leak Detection System (LDS) uses Electromagnetic wave along pipeline to detect exact spot of theft, or leak and send signal to a software. It measures only single phase of the fluid present.

Data can be extracted from the PLC and transferred to the cloud in several ways. Outlined below are steps to connect, transfer and visualize data from the PLC:



## Carbon Emission Platform (Decarbonisation Value Chain)

Carbon Prism™ is CypherCrescent's proprietary emissions accounting and carbon footprinting solution for the oil and gas industry. It provides comprehensive GHG accounting across Scope 1, 2, and 3, aligned with GHG Protocol, IPIECA Guidelines, ISO 14064, and API Compendium.

### Platform Capabilities

- Data ingestion from operational systems, meters, invoices, and third-party sources.
- Industry-specific emission factors and API Compendium mass-balance calculations.
- Real-time dashboards, regulatory reports, and decarbonisation scenario modelling.
- Full audit trail for third-party verification and ESG disclosure (TCFD, CDP).
- Asset-level emission baselining for facilities, projects, and operations.

### Use Cases

- Corporate carbon footprint and annual emissions inventory.
- Project-level emissions assessment for new developments.
- Decarbonisation pathway scenario analysis.
- Regulatory reporting.
- Investor-grade ESG disclosure.

## Developed (Ready-to-go) Solutions

We also offer a suite of ready-to-go solutions designed to address critical challenges across the oil and gas value chain. Built on proven technologies and domain expertise, these solutions are readily deployable, easily adaptable, and engineered to deliver immediate value, enabling faster adoption, improved operational efficiency, and data-driven decision-making.

Cyphercrescent  
**Sepal Solver**



## High-Performance Computation Engine for Modelling, Simulation, and Optimisation

SEPAL Solver is CypherCrescent's proprietary mathematical computation engine, built to deliver fast, accurate, and scalable solutions to complex engineering problems across the oil and gas value chain. It enables organisations to execute advanced modelling, simulation, and optimisation workflows with precision and efficiency.

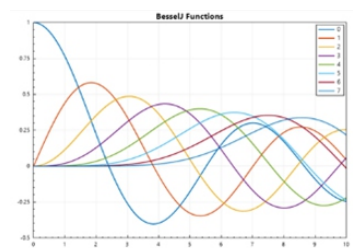
## Core Capabilities

- Numerical Modelling & Simulation – dynamic system modelling and time-series forecasting
- Optimisation Algorithms – linear, non-linear, and metaheuristic (GA/PSO) optimisation
- Statistical Modelling & Uncertainty Analysis – data-driven insights and risk evaluation
- Advanced Mathematical Solvers – differential equations, linear algebra, and special functions
- Sensitivity & Parameter Analysis – robust evaluation of system behaviour under varying conditions
- Available on GitHub, NuGet, and Microsoft Excel

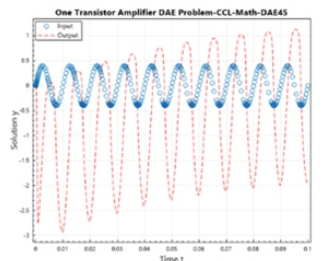


## SEPAL Solver Applications Across the Value Chain

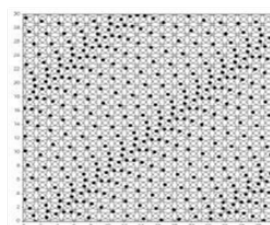
- **Reservoir Engineering** – pressure-transient analysis, material balance, water influx modelling
- **Production Engineering** – IPR–VLP optimisation and artificial lift performance
- **Field Development** – well placement optimisation and production forecasting
- **Petrophysics & Geoscience** – property evaluation and structural modelling
- **PVT & Fluid Modelling** – phase behaviour and fluid property calculations



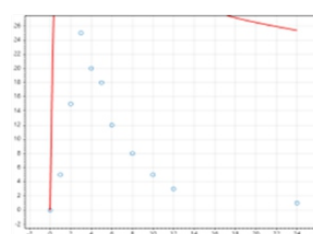
Water Influx Calculations



Dynamic simulation of physical systems and time series forecasting



Wave Propagation



Pharmacokinetics

## Why does Sepal Solver Matters?



“

Sepal Solver exemplifies African Innovation and demonstrates the continent's potential to tackle complex, real-world challenges with solutions that are globally competitive.

”

- Promotes university technology development
- Reduces reliance on foreign software solutions
- Strengthens local capacity for research and innovation
- Enables data-driven decision-making in academia and industry

## Virtual Labs

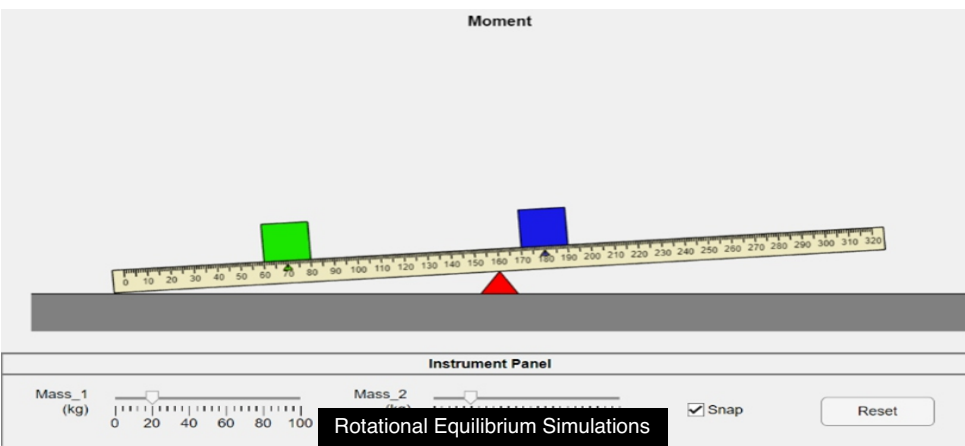
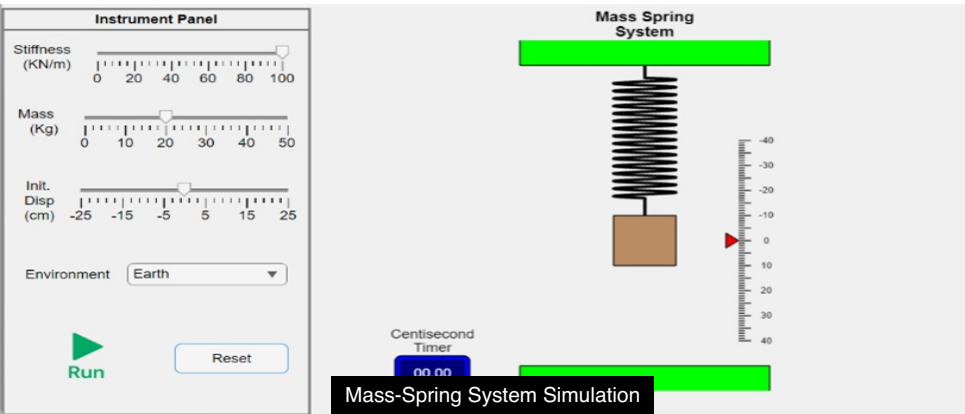
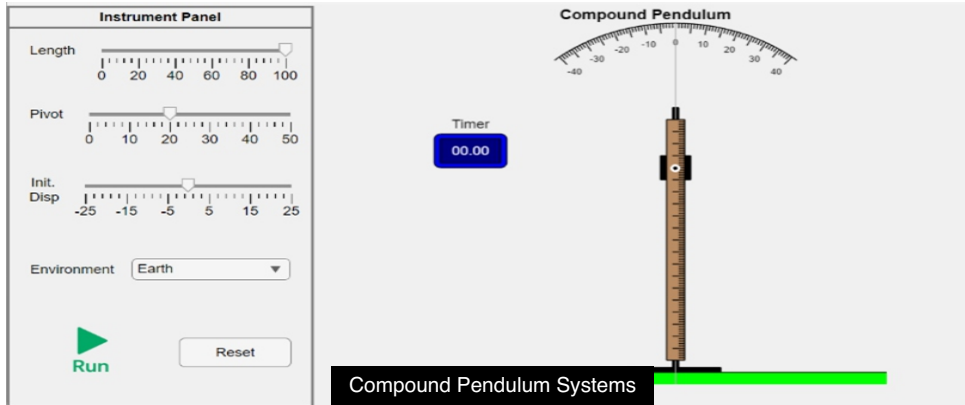
CypherCrescent's Virtual Physics Laboratory is designed to bridge the gap between theoretical learning and practical experimentation. Recognising the limitations of traditional laboratory infrastructure, the platform provides an interactive, simulation-based environment where students engage with core physics concepts through hands-on digital experimentation. Built on a robust, open-source architecture, it replicates real-world experimental conditions using accurate mathematical models, enabling visual, repeatable, and scalable learning while eliminating the cost and accessibility constraints of physical labs.

## Core Capabilities

- Interactive Experiment Simulation – real-time modelling of physical systems with adjustable parameters and visual feedback.
- Concept Reinforcement – bridges theory and practice through immersive, experiment-driven learning.
- Scalable & Accessible Deployment – lightweight system compatible with standard computing environments.
- Safe & Repeatable Learning Environment – enables multiple experiment iterations without physical constraints.



## The platform supports a range of experimental modules, including:



By enhancing experiential learning and improving access to laboratory environments, the Virtual Physics Laboratory strengthens the delivery of STEM education and better prepares students for engineering, technology, and scientific careers.

Transform data overload into a strategic asset with DOCU; faster insights, stronger governance, and a foundation for digital innovation



The CypherCrescent AI DOCU Engine is an enterprise-grade document intelligence platform that transforms vast archives of technical and operational documents into structured, searchable knowledge, accelerating insight, improving compliance, and powering smarter decisions at scale. Built for energy, industrial, and engineering operations, DOCU unlocks institutional knowledge trapped in reports, contracts, logs, and legacy files without manual effort.

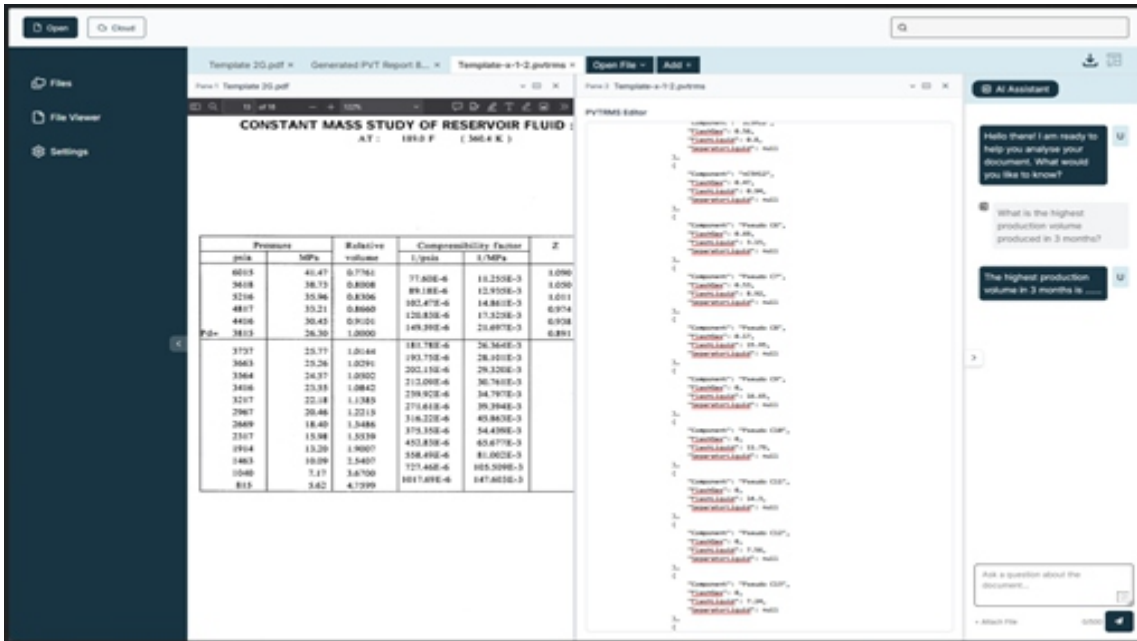


Figure : Our Enterprise-Grade Docu Engine Editor Environment for Document Intelligence (Left: PDF PVT Report, Right: PVT Property extraction)

## Docu Engine Core Capabilities

Smart Document Intake

Automated Knowledge Extraction

Enterprise Search Across All Documents

Single Knowledge View for Decision Making

Built-In Traceability and Confidence

Scales Across Assets and Regions

Ready for Reporting and Analytics

## Docu Engine Strategic Value

- Accelerates asset understanding and subsurface decision-making by turning historical documents into actionable intelligence.
- Enables enterprise-wide knowledge unification across regions, partners, and joint ventures.
- Reduces operational risk by improving visibility, consistency, and compliance.
- Lays the foundation for AI-enabled workflows, digital transformation, and future autonomous decision systems

# Digital Platform for HSE Compliance, Risk Assessment, and Workforce Competency

eHSAT is a robust cloud-native platform designed to enhance Health, Safety, and Environment (HSE) compliance through comprehensive assessment and risk gap analysis. It enables organisations to identify safety gaps, strengthen workforce competency, and prevent accidents and occupational ill health, supporting a proactive, data-driven approach to HSE management.

Client Challenge: How to Improve the HSE Competence Level of Workers

**eHSAT** - A New Training Revolution

eHSAT enables you to:

A robust digital HSE compliance assessment and risk gap analysis platform - eHSAT to help you realise your organisational HSE objectives.

**eHSAT features:**

- Competency assessment
- Incidence management and reporting
- Gap analysis
- HSE learning management system

## eHSAT Admin Dashboard

## eHSAT User Dashboard

## Core Capabilities

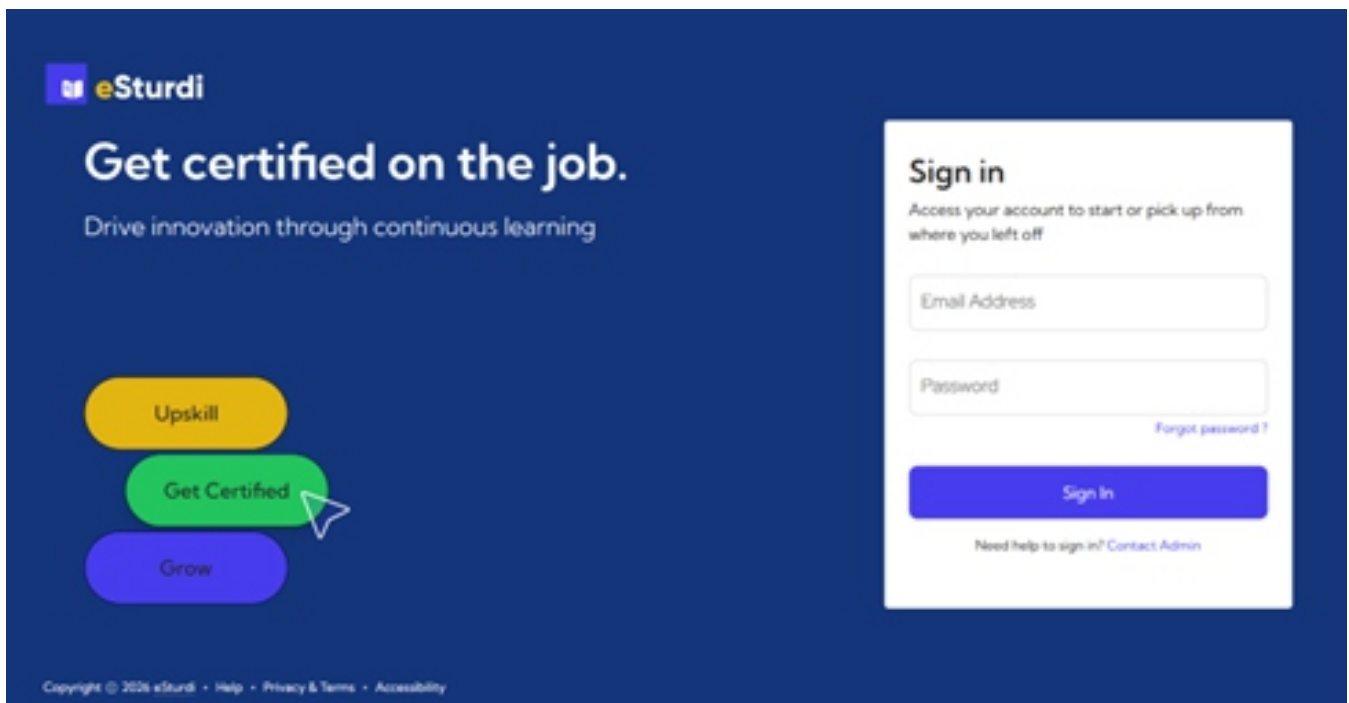
- Competency Assessment – evaluates workforce readiness in health and safety practices
- HSE Gap Analysis – identifies and addresses weaknesses in HSE management systems
- Incident Management & Reporting – supports timely, structured reporting and response to safety incidents
- HSE Learning Management System (HLMS) – delivers continuous training and skill development
- Expert Access – connects organisations with HSE specialists for guidance and support
- VR-Based Training & Assessment – immersive simulations for realistic safety training scenarios

eHSAT provides organisations with a centralised, technology-driven approach to HSE, enabling safer operations, improved compliance, and continuous workforce development.

## Workforce Capacity Development and Learning Intelligence Platform



eSturdi is a cloud-native enterprise learning solution designed to enable organisations to build workforce capability through structured training, skill gap identification, and continuous professional development. It provides a centralised platform to design, deliver, and manage learning programmes while tracking performance and outcomes across individuals and teams.



## Core Capabilities

- Customisable Learning Paths – tailored training journeys with defined prerequisites, modules, and completion criteria.
- Skill Gap Analysis – assessment-driven identification of organisational and individual capability gaps with linked learning recommendations.
- Interactive Content Delivery – support for videos, PDFs, quizzes, and live sessions, with gamification features such as badges and leaderboards.
- Assessment Management – multiple evaluation formats including quizzes, essays, case studies, and peer reviews, with automated and manual grading.
- Progress Tracking & Analytics – real-time monitoring of learner engagement, performance, and training outcomes.
- Certifications – issuance and tracking of verifiable certificates with renewal and expiry notifications.
- Collaboration Tools – discussion forums, group workspaces, and peer-to-peer learning.



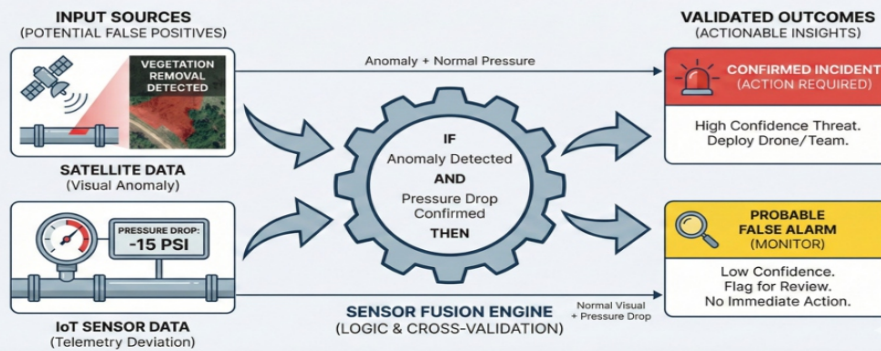
CypherCrescent Innovation Services' emerging technology pipeline represents our commitment to applied R&D and building future-ready digital infrastructure capabilities that enhance asset integrity, operational resilience, and intelligence-led decision-making across the energy value chain.

### **Satellite-Augmented Asset Surveillance Technologies**

The Satellite-Augmented Asset Surveillance system is a next-generation technology, designed to deliver real-time, high-fidelity monitoring of critical infrastructure across pipeline networks and remote energy assets.

The system integrates satellite connectivity, IoT sensing, and autonomous drone verification into a unified surveillance architecture, enabling continuous monitoring and rapid validation of field conditions. It is designed to move asset surveillance from reactive inspection models to proactive, intelligence-led operations.

## Cross-Validation for Digital Redundancy & Reduced False Positives



### How It Works

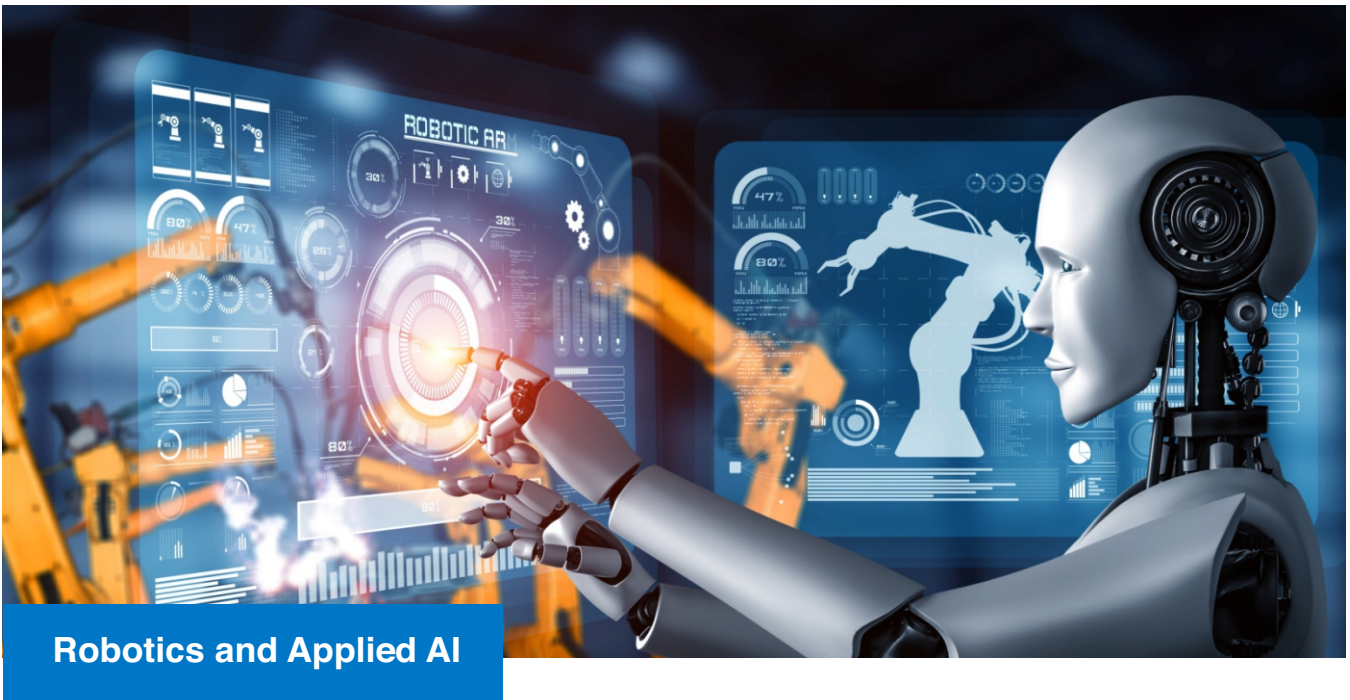
- Broad-Area Satellite Monitoring – continuous geospatial observation detects environmental changes, ground deformation, vegetation stress, and encroachments along pipeline corridors.
- IoT-Based Anomaly Detection (L-Band) – field sensors capture pressure, vibration, and access anomalies, transmitting alerts via satellite connectivity in remote or off-grid locations.
- Autonomous UAV Verification (Ku-Band) – drones are deployed to flagged locations to capture real-time visual and sensor data for rapid confirmation.
- Intelligence Fusion Layer – satellite, IoT, and UAV data are integrated into a unified analytics environment for validated alerts and prioritised operational response.

### Proposed Value Proposition

- Extends monitoring coverage across vast and remote infrastructure corridors
- Enables faster detection of leaks, encroachments, and environmental risks
- Reduces reliance on manual patrols and improves operational safety and efficiency
- Ensures continuous monitoring even in areas without terrestrial connectivity

### Why Does Satellite-Augmented Asset Surveillance Matter?

- **Comprehensive Coverage, Anywhere:** Satellite monitoring extends across vast distances and extreme terrains, from desert pipelines to offshore receiving terminals, ensuring no segment goes unmonitored, without the need for costly field teams or helicopter surveys.
- **Faster Detection, Reduced Risk:** Automated change detection and anomaly triggers accelerate identification of risks such as soil movement, unauthorised access, and emerging leaks, helping prevent failures before they escalate into costly incidents.
- **Integration with IoT & UAV Technologies:** Combining satellite imagery with local IoT sensors and drones brings the best of strategic and tactical surveillance together. Remote sensing triggers tactical verification, lowering false positives and enabling informed responses with minimal human exposure to hazardous areas.
- **Operational Resilience:** Satellite connectivity ensures that monitoring and alerting continue regardless of local communication infrastructure, making it ideal for LNG processing plants, remote pumping stations, and long transmission routes where cellular or terrestrial networks are limited.



## Robotics and Applied AI

CypherCrescent is advancing its Robotics and Applied Artificial Intelligence capability. This initiative focuses on redefining industrial operations through intelligent automation, improving safety, precision, and productivity across complex and high-risk environments in the energy sector.

Our robotics systems go beyond conventional automation by integrating robotic engineering with real-time AI-driven intelligence, enabling adaptive and context-aware performance in mission-critical facilities.

### Core Capability Areas

- Advanced Robotic Manipulation Systems – precision control for industrial tasks such as valve operations, mechanical assembly, and pipeline interfacing using intelligent perception and leader–follower control architectures.
- Applied AI for Robotics Systems – real-time interpretation of sensory data to enable adaptive behaviour, anomaly detection, and intelligent task execution using learning-based models.

### Why It Matters

- Improves operational safety by minimising human exposure to hazardous environments
- Enhances precision, repeatability, and reliability in critical industrial tasks
- Enables adaptive automation, shifting from scripted actions to intelligent response systems
- Supports predictive and responsive maintenance workflows across facilities
- Built on a modular and scalable architecture suitable for integration into existing industrial systems

## Why Does Satellite-Augmented Asset Surveillance Matter?

- **Domain-Driven Engineering:** We combine energy and industrial engineering expertise with robotics and AI to build systems that understand both the machine and the mission.
- **Safety First: Our solutions prioritise safety through:**
  - Collision avoidance and failsafe control
  - Environmentally aware navigation
  - Compliance with industrial safety standards
- **Practical Intelligence for Real Environments:** Robots aren't just automated, they are intelligent. Our AI models interpret sensory input, adapt behaviours, and support frontline decision-making.
- **Scalable and Extensible Architecture:** Whether deployed for a single task or an entire plant workflow, our platform supports modular expansion, future AI enhancements, and interoperability with site automation systems.
- **Value-Driven Outcomes:** From reduced downtime and operational risk to improved compliance, our robotics solutions deliver measurable impact and rapid return on investment

## Predictive Maintenance



SEPAL<sup>®</sup>  
eHMS

CypherCrescent's Equipment Health Monitoring Solution (EHMS) is a cloud-based data management application that helps in managing real-time data frequency, and visualization. This makes use of IoT, sensors and real time cloud computing to manage large volume of real-time data from field sensors.

A comprehensive tool for ingesting, storing, and analysing time-based sensor data

- Scalable, high-performance time-series database
- Graphical data visualisation capabilities
- Data resampling to different intervals
- CSV export functionality for resampled data

eHMS solution significantly improves operational efficiency and reduce the equipment downtime through predictive maintenance. This resolves the challenge of managing and deriving value from high-velocity large-volume of real-time data from field sensors and data streams for effective equipment monitoring and maintenance planning.





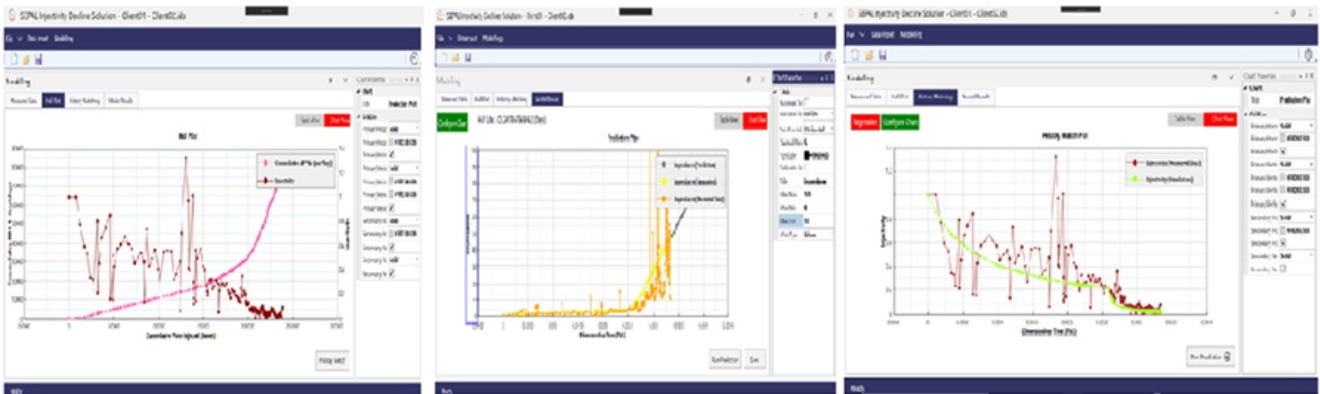
## Injectivity Decline Solution

### Challenges:

- Continuous loss of Injectivity during produced water reinjection (PWRI).
- Inadequate data for planning PWRI

### Solutions:

We developed a software that simulates injectivity decline and calculate the half-life of the injectivity process.



## Forecasting

### Mathematical Model

$$\phi \frac{\partial c}{\partial t} + \frac{q}{2 \pi r} \frac{\partial c}{\partial r} = -\frac{\partial \sigma}{\partial t}$$

$$\frac{\partial \sigma}{\partial t} = \lambda' U c$$

$$U = -\frac{k_0 k_{r, \text{over}}}{(1 + \beta \sigma) \mu} \frac{\partial p}{\partial r}$$



SECTION THREE:

# CORPORATE

Innovation Service



We enable organisations to systematically discover, develop, and scale innovation through structured corporate innovation programmes. By combining strategic advisory with execution-driven initiatives such as hackathons, incubators, and accelerators, we help transform ideas into commercially viable solutions, foster internal innovation capacity, and drive sustainable growth in a rapidly evolving business environment.

## Hackathons and Innovation Challenges

High-impact hackathons are designed to solve real business and operational challenges within compressed timelines, enabling rapid ideation, prototyping, and validation. By bringing together domain experts, engineers, and innovators, these programmes deliver actionable solutions aligned to industry needs.

Innovation outcomes are extended into structured incubation ecosystems, covering infrastructure design, curriculum development, cohort selection, and startup acceleration, creating a clear pathway from concept to scalable, market-ready ventures..

### **Uncover your organisation's innovative potential with our expertly designed Idea-to-Impact Initiatives, Hackathons, Incubators and Accelerators**



## AGIS Hackathon and Startup Technologies Pitch

Following the widely publicised call for pitch submission from start-ups across Africa, we received submissions from about 17 young, vibrant start-ups across three different countries in Africa who were mostly still in the ideation phase. The virtual hackathon was held on June 12, 2025, with an 11-hour bootcamp providing participants with practical knowledge on the key components of a standard pitch.

The Conference began with a Pitch session, showcasing the 8 shortlisted groundbreaking projects addressing Africa's gas-sector challenges. The entrepreneurs presented their ideas, ranging from carbon, gas, and LPG businesses, to real-impact problems.

The pitches were scored and ranked, and the top four start-ups emerged. The winning start-up won the grand prize, and the top start-ups also had business interactions with thought leaders who were interested in partnering with them to further expand their business.

The top start-ups were announced, recognised, and congratulated during the summit, with the winning start-up taking home the grand prize. Dr. Al-Banna emphasised that innovation must be intentional, not accidental, and the showcase reinforced that African innovators, if empowered, can transform the gas sector with scalable, inclusive technologies.



Congratulations to the winners of the Startup Pitch at African Gas Innovation Summit C Hackathon, Abuja 18-19 June 2025. Out of 16 Startup founders from Nigeria and Cameroon, 8 shortlisted startups present their best ideas on Gas Innovation, and 4 Startups came out on top! Congratulations to Conix, MyGaz, Trashformas and CarbonWize. <https://africagasinnovationsummit.org/>

Emmanuel Michael, Founder of Conix :” This was my first pitch competition, and I'm thrilled that Conix won. The solution we offer in the oil and energy sector is critical, and we're not surprised we won, given the massive validation and traction we've already gained. Aside from the prize, we've won hearts, gained more customers on our waitlist, attracted prospective investors, received coaching from mentors, and secured collaboration opportunities. Plus, many have expressed interest in joining our team as co-founders and volunteers - this is massive!” <https://www.linkedin.com/feed/update/urn:li:activity:7342811857063174144/>

Thara Atta, TrashFormas: “ The AGIS Hackathon was indeed a learning experience! And this is a statement of fact! Grueling. Testing. Mind Shifting. Helpful feedback. These were my experiences. And ultimately, the opportunity to come 3rd place in the pitching competition where we won a grant prize of ₦1,000,000 and a chance to be mentored by industry experts. If this is not Grace, I don't know what it is”. [https://www.linkedin.com/posts/thara-atta-48297513b\\_the-agis-hackathon-was-indeed-a-learning-activity-7341631116270784515-RS-?utm\\_source=share&utm\\_medium=member\\_desktop&rcm=ACoAAA4fipsBibr-2OcCJTLLAAZJ-](https://www.linkedin.com/posts/thara-atta-48297513b_the-agis-hackathon-was-indeed-a-learning-activity-7341631116270784515-RS-?utm_source=share&utm_medium=member_desktop&rcm=ACoAAA4fipsBibr-2OcCJTLLAAZJ-)

## Incubator for Early-stage ideas

We conceptualise, set up, and manage fully functional incubator programs, from infrastructure planning and curriculum design to cohort selection and startup acceleration. The design below is a suggestion that can be customised as per client requirements and stakeholder alignment.

The format below depends on weekly workshops with industry experts, hands-on sessions within a co-working space) to develop their technology and business, and get feedback from experts

### Phase 1: Selection & Onboarding (Week 1)

- Aligning startups with program goals and assessing their key needs

### Phase 2: Discovery & Validation (Weeks 2 - 3)

- Validate the problem-solution fit and assess market readiness

### Phase 3a: Product Development (Weeks 4-5)

- Build or improve MVP and define go-to-market strategy.
- Technical prototyping support (hardware/software).

### Phase 3b: Market Strategy (Week 6-7)

- Customer feedback loop setup

### Phase 4a: Pilot (Week 10-11)

- Customer acquisition and marketing workshops
- Go-to-market strategy.

### Phase 4b: Traction (Week 12-13)

- Partnership and supply chain strategy.
- Pitch deck 7 investor readiness bootcamp.

### Phase 5: Business Growth & Fundraising (Week 14-15)

- Strengthen business case and prepare for investment.
- Investment landscape workshops.  
Data room & due diligence prep.  
Legal structuring & IP support.

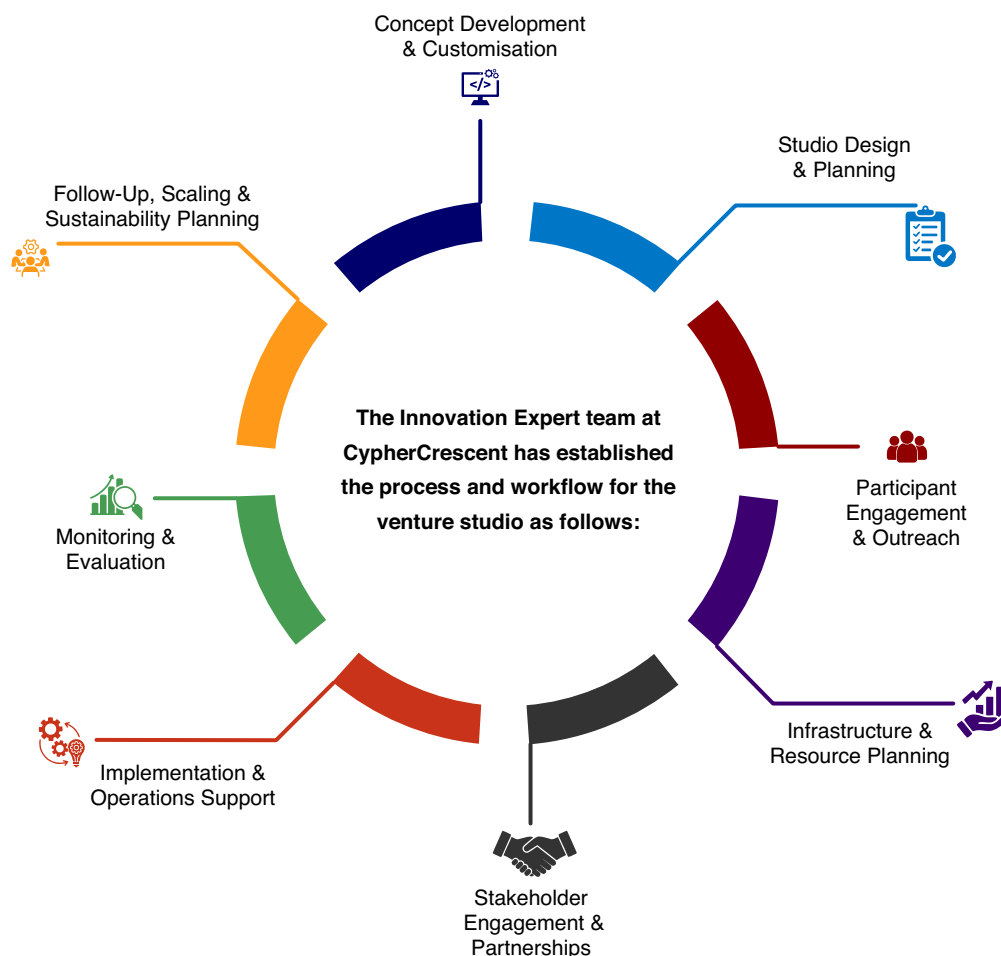
### Phase 6: Demo Day & Post-Incubation (Week 16-17)

- Public Demo Day with 50+ attendees (investors, press, gov't).

## Corporate Venture Studio

Venture Studios tackles the fragmented, underfunded Venture ecosystem in Africa and addresses the lack of critical infrastructure for successful startup growth. As CypherCrescent, we are your experienced partners, dedicated to aligning the technology drive, the standards of industry and the need to de-risk startup investments, and build successful companies for Africa to be proud of. Leveraging best practices of the globally renowned “Venture Studio Forum™” (VSF), we support establishing a Venture Studio programme, whereby our client plays 3 roles:

- An operator with a high-involvement approach,
- Aco-founder with 30-50% shareholding and
- Aco-investor with financial and non-financial support



The goal is to partner with startup ideas and collaborate to turn an idea into a strong company with a strong product and market traction, a lower risk profile and higher return on investment. This is best suited for ideas that are “already advanced” and identified after the hackathon or after the incubator phase. This structure provides our client with an opportunity to:

- Create new businesses outside your core operations to avoid disruptions
- Access different markets and develop new growth opportunities
- Leverage core competencies & bring fresh perspectives to the corporate setting.

Once the Studio starts, it partners with and supports advanced ideas that have been presented during the hackathon and/or developed at the incubator stage. Ideas would go through the following process:

## 1. Due Diligence: evaluate the ideas or companies worth accepting into Studio, as follows:

- Technical Feasibility (within timeframe)
- Organisational Fit
- Market Validation & Business Model:
- Traction & Progress: What evidence shows the startup's progress?
- Other factors

## 2. Ideation: Business Strategy & Governance Planning

- Business model analysis
- Market Opportunity Report

## 3. Company Formation: Operational & Legal Structure

- Governance and stakeholder management plan
- Planning roadmap milestones
- IP development

## 4. Rebuilding: Technology and Product Development

- Prototype/MVP Development & Testing
- Solution Development & User Testing

## 5. Validation: prove market demand and adapt ideas

The goal is to test technologies in real environments and prepare for commercialisation, and engage industry for pilots & refining products to fit the market.

- Solution Pilot Deployment
- Solution Customisation.

## 6. Scaleup and Market Adoption

### A. ScaleUp & Business Plans, which include:

This involves a scale-up operational plan, business model planning, regulatory roadmap, market segmentation and pricing strategy development, investor Readiness & market outreach.

### B. Commercial Path Decisions:

This involves aligning with intended partners on the feasibility of the commercial path decisions.

## 7. Commercial Launch: Marketing, Partnerships and Fundraising

The goal is to secure market entry and growth financing, with various activities, depending on the type of technology and the commercialisation path decision taken in the previous phase.

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