

TECHNICAL BRIEF: MAIC+ DIGITAL TWIN

Automated Multi-Threat Flow Assurance Platform

Status: Patent Pending (Application No: BR 10 2026 022440 5) | TRL Level: TRL 4

Executive Summary

MAIC+ is a disruptive, cloud-based, closed-loop Digital Twin platform developed to eliminate costly oil well production shutdowns caused by flow assurance threats (asphaltenes, hydrates, waxes, and scales). By merging existing platform telemetry with specific proprietary sensory data, the system achieves autonomous, real-time prediction and mitigation with zero human intervention, protecting client revenue by ensuring continuous hydrocarbon (HC) production and uptime.

Core Technology & Architecture

1. **Sensory & Data Fusion:** MAIC+ integrates standard default platform telemetry (such as PDG, multiphase meters, temperature, and pressure sensors) with two newly designed hardware sensors specified and recommended by MAIC+ to be installed by the operator on the production platform, introducing a novel sensory capability currently absent in global oilfield infrastructures.
2. **Algorithmic Engine & Real-Time Analytics:** The centralized, encrypted cloud algorithm processes this unified dataset in real-time. For instance, it dynamically computes the exact onset of asphaltene precipitation and quantifies the mass about to precipitate.
3. **Closed-Loop Autonomous Mitigation:**
 - * Instantly triggers specific chemical injection skids based on the identified threat.
 - * Modulates the precise chemical dosage required for active remediation.
 - * Continually monitors parameters until well stabilization is achieved.
 - * Automatically logs an "OK" status back to the central operations desk.

Algorithm Calibration & Global Scalability

The core algorithmic model was built and thoroughly calibrated using comprehensive historical field data from diverse operational environments across multiple global basins:

- * Brazil: 6 oil basins and 14 reservoirs (including public ANP data).
- * Peru: 5 oil basins and 11 individual wells (including public Perupetro data).

Note: Having achieved complete mathematical calibration across these diverse, highly complex fluid profiles, the MAIC+ algorithm is fully validated and market-ready to scale globally to any production well, utilizing identical standardized input protocols.