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Aramco - FalconScan

A pioneering hybrid drone-robot inspection system, codenamed FalconScan, was developed by Aramco and designed to address one of the oil and gas industry's most significant safety challenges: inspecting elevated piping without exposing workers to fall hazards. Traditionally, these inspections require the construction of extensive scaffolding, placing personnel at height while increasing project costs, equipment requirements, and operational downtime.

Utilizing this innovative technology replaces such a high-risk process with a fully remote inspection solution. The system combines an aerial drone capable of magnetically attaching to elevated pipelines with a crawler robot that performs comprehensive 360-degree ultrasonic inspections. Unlike conventional inspection drones that are typically limited to visual assessments or isolated spot checks, this solution delivers full non-destructive testing and scanning capabilities covering the pipe surface, providing a more complete understanding of asset integrity and catching small defects.

The technology was developed through years of research, collaboration, pilot programs, and operational validation. Supported by more than 30 patents, the robotic system was engineered to meet both the safety and operational demands of large-scale industrial facilities. A key innovation is its magnetic perching capability, which allows the drone to conserve battery power while attached to the structure, overcoming a common limitation of drone-based inspections.

Since deployment across Aramco facilities, this hybrid drone-robot system has significantly reduced worker exposure to fall hazards while lowering inspection costs, minimizing downtime, and improving operational efficiency. In many applications, the technology delivers a return on investment within months and, in some cases, after a single inspection project.