Overview of the Dashboard Limpet Solution

Edition 2

- Flow monitoring / leak detection
- Self-powered system
- Retrofittable design
- Secure wireless communications
- Unique EX-rated ‘collar’ design
- Real-time data via dashboard
- Efficient reporting (by exception)
- Accurate geospatial mapping
- Powerful data analytics engine
Introduction

Dashboard is pleased to introduce LIMPET, a unique approach to the continuous monitoring of pipeline infrastructure.

The 'Digital Oilfield' is upon us, and pipeline operators have a very pressing need to improve efficiency and extract the same amount of oil, for less. A significant way to achieve this is by the effective monitoring of the operational assets, such that leaks are detected quickly, accurately and with minimal process interruption.

In contrast to alternative solutions, each LIMPET appliance will be a discreet unit attaching to the exterior of the pipeline and utilising novel ultrasonic flow rate measurement. The unit density will be determined by a variety of factors for which a mathematical model will be developed (250m is the current expectation).

Each appliance will be fully independent of another, reporting on a pre-determined time sequence in order to mitigate power consumption, and reporting by exception in order to minimise transmission costs. Real-time feeds can be supported in environments in which security will not be a concern, either with or without the availability of mains power.

The units themselves are ruggedised low profile devices (designed for covert monitoring) and are accessed via a geographic terrain-integrated dashboard incorporating real-time security and maintenance alarms.

The result is a fully integrated technology stack comprising resilient field-based hardware, the secure transmission of data, a powerful Data Analytics engine and a real-time and historic Dashboard interface suitable for integration with enterprise systems.

An industrial IoT (Internet of Things) approach that is highly innovative, the solution can be delivered as a completely power-independent unit. Each collar will be uniquely coded to the pipeline, and will carry a unique GPS signature to pinpoint its exact location. The power of the solution lies in the differential analysis of the data being captured - Temperature, Flow Rate, Density and Multi Phase Analysis of the liquid in the pipe. The solution will also be of particular relevance to pigging operations, where lost ‘pigs’ can create lengthy operational delays.

Each LIMPET appliance will report into a customised interface fully integrated with a Google terrain map. Integrated alarms and associated visualisations will ensure that the necessary security personnel are alerted as appropriate, and a full log of all data and events will be stored and available to authenticated users.
How it works

The LIMPET solution is designed to be highly innovative. By minimising communication overheads, the embedded weightless SCADA processes will conduct localised processing prior to compression/encryption, while communications will operate on a reporting by exception basis to increase efficiency. As a complete solution, from device to near real-time data visibility, LIMPET is at the leading edge of improving low cost oil and gas pipeline monitoring.

Designed to be non-intrusive with integrated flow metering, LIMPET’s innovations include the ability for the units to be deployed and retro-fitted with minimal impact and cost and minimising the need for costly field engineers. To achieve maximum accuracy and to ensure transducer alignment, the unit is designed as a collar which will not only be designed to blend with the pipeline, but the utilisation of a collar solution will eliminate the need for low power wireless transmission to bridge the communications between two appliance components.

To achieve the ultimate accuracy and as part of the technical innovation, each LIMPET device will employ a phased array of multiple piezoelectric transducers which will not only provide resilient sensing in the event of a component failure, but their array will enable a high resolution measurement by utilising a market-leading time of flight measurement to capture flow rates.

The LIMPET units will be optimised to take account of variable parameters such as product, pipeline material and thickness and will incorporate fully integrated communications.

Battery options have been subjected to rigorous environmental testing. This has assessed cutting edge battery lifespan, whilst ensuring that the battery technology selected conforms to rigorous EX rating requirements.

LIMPET’s low power consumption will enable each unit to support continuous operation which will have a significant impact on the maintenance requirements for a pipeline monitoring system and regulatory compliance.

LIMPET utilises Internet of Things (IoT) chipsets, taking advantage of the Microcontrollers (MCU’s) to host a range of sensors that will measure a range of metrics, geo-position and temperature. The interoperability of the various IoT standards that the chipset supports, and the vastly reduced dataflow bandwidth will allow for the integration of a range of future monitoring sensors outside of the initial scope of the solution.

Collar Features

- Robust & ruggedised collar
- Intrinsically safe design
- Coded to each specific pipeline
- Designed for retrofitting
Data Analytics

Dashboard utilises an end-to-end approach to creating data collection, transmission, storage, analysis and visualisation systems capable of accurately modelling process performance characteristics and fault detecting on a variety of systems. This data is varied in nature and actually amounts to zettabytes, so the need exists to develop new information management tools and approaches to make sense of the enormous amount of data that organisations are generating.

The capability exists to combine disparate or heterogeneous data sources to create measures or sensors capable of informing us of change better than the individual sources.

Examples include

- Quantitative Data vs. Qualitative Data
- Process Data vs. Business Data
- Data from different individual measurement points
- Data from different systems

Dashboard's custom solutions are integrated into web based open platform systems that are easy to navigate and interrogate. This allows the information to be served directly on to any connected device, allowing enterprises to make better business decisions and act on them faster.

How organisations capture, create and use data is changing the way they approach business processes and management. This approach has several dimensions. Firstly, companies have more data to use than ever before, at a volume and with a variety that are unparalleled in the past. Secondly, by using internal and external data, companies are beginning to understand patterns of how systems behave that had once been impossible to perceive or act upon. And thirdly, companies are using new analysis tools and services to understand their own operations and process behaviour at a previously unattainable level of detail, enabling new questions to be asked and answered.

Dashboard's Data Analytics engine is at the forefront of what is currently possible and is set to transform the manner in which data is acquired, analysed and fed back to the very place it is required the most.

Limpet Video Link below:

Password: Limpet