



Delivery Partner



Background

Pure Transfer manufactures high purity fluid transfer components, hoses, and gaskets for Pharmaceutical and Biotech manufacturing facilities. Their hoses are designed to thrive in these extremely sensitive working environments where excellence is necessary. They work tirelessly to ensure all aspects of their hose product range, from design and construction to installation and operation, are free of any elements that could contaminate the final product.

The high purity hoses join two high purity components together. The hoses are used for many reasons, such as ease of assembly and disassembly, the practicalities of daily usage, and the requirements of load cells. As a rule, the hoses are often found where traditional stainless-steel pipework will not fit or where flexibility is paramount to the purity process line.

Challenge

Pure Transfer has identified a need for monitoring and leak detection relating to the pharma and biotech manufacturing systems they support. Through their experience with the specialist pipeline systems and components that they design and manufacture, they wish to prototype and test a novel design of bolt that will incorporate tensile measurement and data transmission technology that can be used to measure, monitor, and determine the mechanical health of joints and other mechanical interfaces within these manufacturing systems.

This will support the monitoring of bolt health, which relates to the integrity of the joint in real-time, predicting joint failure before it happens and enabling new market exploitation.

Solution

Although the design and testing of the novel bolt will indicate and predict future joint failures, the collection and analysis of data from multiple metrics has the potential to optimise the production process.

The Horizons LJMU team of experts suggested a two-phase approach:

1. Determination and Practicality through basic validation and testing of the bolt monitoring technology.
2. Investigate the potential for a longer-term project to develop an MI/AI system monitoring approach to improve the reliability and failure prevention of such systems.

The initial approach was to undertake the testing and validation of the system to ensure the bolt system is fit for purpose, in terms of strength and accuracy, and associated electronic communication protocols work to satisfactory levels. This is expected for delivery in the Spring of 2024.

The successful validation will enable Pure Transfer to move towards the development of a market ready MVP.



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LJMU's experts and Knowledge Base have undertaken the following work to validate the technology and the development of an intelligent monitoring system:

- Design, test and validation of the proposed Bolt Condition Monitoring Technology.
- Identification of delivery mechanism to develop monitoring system architecture.
- Identification of future funding opportunities and access to knowledge base expertise as necessary.
- Initial investigation into AI/ML systems (architecture, structure, scale, cost etc).

LJMU Innovation Support Teams will continue to assist Pure Transfer alongside the LJMU Knowledge Base Assets and Experts, to create the outline system architecture to enable further development of the proposed system, improving reliability and failure prevention of such systems, particularly mechanical joints.



Impact

The testing and validation by LJMU's Engineering Teams are expected to demonstrate fitness for the iBolt system. Data collected during the validation testing will be used by the Knowledge Base Academics to develop the ML/AI system architecture via Student Projects.

The Validation Testing will create a custom data set, as specified by our Knowledge Base Academic Experts, to be used as the basis to develop the architecture and data analysis/ML/AI methodologies that could lead to the creation of an innovative ML/AI based predictive joint failure and monitoring system. This system has the potential to significantly improve the reliability, capacity and productivity of Pharma and Biotech manufacturing processes.