

FINAL PROJECT SUMMARY REPORT

1. BUSINESS AND FIRM ADDRESS

ULC Robotics, Inc.

88 Arkay Drive

Hauppauge, New York 11788

2. DOT SBIR PROGRAM

U.S. Department of Transportation/OST-R

3. DOT CONTRACT

Contract # 6913G618P800092

4. PERIOD OF PERFORMANCE

Start: Sep 10th, 2018

End: Mar 9th, 2019

5. PROJECT TITLE

Combined Cleaning and Guided Wave Inspection System for Hazardous Liquid Pipelines

SUMMARY OF COMPLETED PROJECT

Guided wave EMAT was tested and evaluated for inspecting hazardous liquid pipelines. Studies performed during this project showed that guided wave EMAT is an excellent screening tool for detecting corrosion and cracks. While metal loss and crack-like defects are currently being inspected by industry using two different ILI tools ULC's single guided wave EMATs can be used for inspecting both. It was demonstrated that guided wave EMAT's combined ability to scan from a remote clock position, tolerate lift-off from the pipe wall, and provide good coverage of defect types makes the NDE technique a preferred choice for a dual-purpose cleaning and inspection tool. The lightweight sensors and electronics pave the way for a lightweight tool that can be handled and operated by fewer field personnel. During the project, data processing algorithms were developed that can be used for automatic generation of defect reports, which would require minimal post inspection analysis.

Two tools - a dual-purpose pigging tool and a dual-purpose robotic tool were conceptually designed for simultaneous operation of guided wave EMATs and cleaning tools. The conceptual design and feasibility study show that the dual-purpose pigging tool can provide improved cleaning action while reducing the time for both cleaning and inspection. The dual-purpose robotic tool can operate in low pressure, low flow as well as high pressure and full flow conditions. One particular application where such a robotic tool can be used is for tank line inspections wherein pipeline operators need to inspect their tank lines on an ongoing basis to minimize chances of leaks and hazards to people, property, and the environment.

The small size of both dual-purpose tools allows them to be launched using existing launchers and received using existing traps. Easy exchange of cleaning tools, EMATs, and batteries increases the versatility of both dual-purpose tools.

It has been concluded that both the dual-purpose pigging tool and the dual-purpose robotic tool are viable products. The tools will give pipeline operators more choices in using cleaning tools and far more configurability to find defects of their choice. ULC's dual-purpose pigging tool and dual-purpose robotic tool will reduce the cost of operation and deployment by minimizing the footprint of trucks and heavy vehicles. This will also reduce the carbon footprint of deploying cleaning and inspection tools. Costs will be further reduced by using existing launchers and retrievers, and by being able to detect both metal loss and cracks using a single tool. Pipeline operators will also be able to collect integrity data on a more frequent basis by deploying the combined cleaning and inspection tool.

APPROVAL SIGNATURES

Baiyang Ren 04/15/2019  4/15/2019

PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR (Signature)

Print Name

Baiyang Ren

Aalap Shah

Principal Investigator

Project Director