

Pipeline Damage Prevention Radar (PDPR) 5th Quarterly Report

December 21, 2016

Agreement/Contract Number: *DTPH5615T00017*

Prepared for: *DOT, PHMSA*

Project Title: *Pipeline Damage Prevention Radar (PDPR)*

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For quarterly period ending: *December 31, 2016*

1. Technical Status

In the fourth quarter of 2016, the Pipeline Damage Prevention Radar (PDPR) project team focused on further definition and beginning the execution of the improvements identified following the June flight test in Springville, Utah. Based on the flight testing, several enhancements to Ball's data processing chain were recommended and have commenced. As detailed in the test report included in the previous quarterly report, the testing uncovered a number of technical issues with the current ImSAR system when operating near populated and forested areas. Ball continues to work with ImSAR to resolve these issues. Further testing is planned in 2017 following implementation of identified improvements.

1.1 Recommended Improvements to the System

Based on the results from the June 2016 flight test, we will implement the following improvements to the system prior to re-testing in 2017:

1. The UHF antenna will be modified as shown in the test report (submitted previously) in order to suppress sidelobe corruption from bright objects on the right side of the aircraft. The length of each antenna array element will be reduced to restrict the operation frequency range. We are currently defining specific performance requirements and a statement of work (SOW) for this additional development effort, which will include antenna design, performance simulation, construction, testing on an aircraft fuselage section mock-up, aircraft installation and FAA certification.
2. Inertial Navigation System (INS) error investigation and mitigation plan. It is suspected that drift in the INS data output is a cause of image registration error. The impact of this error source on image quality will be analyzed and needed software improvements will be implemented.
3. Image blurring and mis-registration anomaly resolution – Some of the data was mis-registered and blurred, which caused false alarms in the change detection results. The team continues to identify root causes and resolve these issues.
4. Inclusion of geo-located hi-resolution imagery in the data processing flow – An un-gimballed camera was used in the flight test that showed promise for EO imagery for target classification. ImSAR has upgraded this camera system and is working on geolocation of the imagery.

- 5. Data display of entire image collect (not just area within processing mask) – This will allow users to have better context of surrounding data.
- 6. Data display of potential targets that were identified, but classified as non-threats and improved single point detection processing – This will allow the user to evaluate possible threats that were identified as false positives and therefore automatically suppressed by the algorithm.

2. Business Status

The second flight test (Task 5) is planned for April/May 2017. Accordingly, the project expenditures associated with this task will not be realized until the second and third quarters of Year 2.

3. Payable Milestones

The Project Deliverable and Payment Milestones were completed as summarized in Table 1.

Table 1. Status of the Payment Milestones for Quarter 4, 2016 of the PDPR project.			
Item	Milestone	Status	Comments
11	Task 6, Project Management and Systems Engineering	On going	Milestone completed at 15 months of the project per the agreement