

Date of Report: 2nd Quarterly Report Ending March 31, 2020

Contract Number: 693JK31910006

Prepared for: USDOT PHMSA

Project Title: Validation of Remote Sensing and Leak Detection Technologies under Realistic and Differing Conditions

Prepared by: GTI

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For quarterly period ending: March 31, 2020

1: Items Completed During this Quarterly Period:

Figure 1. Payable Milestones Completed this Quarter

Technical and Deliverable Milestone Schedule						
Item #	Task #	Activity/Deliverable	Title	Federal Cost	Cost Share	Total
3	2	Establish a validation testing framework that includes both a quantitative and qualitative test matrix of technologies.	Summary table of testing criteria	48,039.00	8,938.00	56,977.00
4	9	2nd Quarterly Status Report	Submit 2nd quarterly report	6,179.00	2,245.00	8,424.00
Second Payable Milestone				SUBTOTAL	54,218.00	11,183.00
						65,401.00

This table was populated with Items from Attachment #3, Technical and Deliverable Payable Milestone Schedule (in the contract) that were completed during this reporting period and are the corresponding Items included on our next invoice.

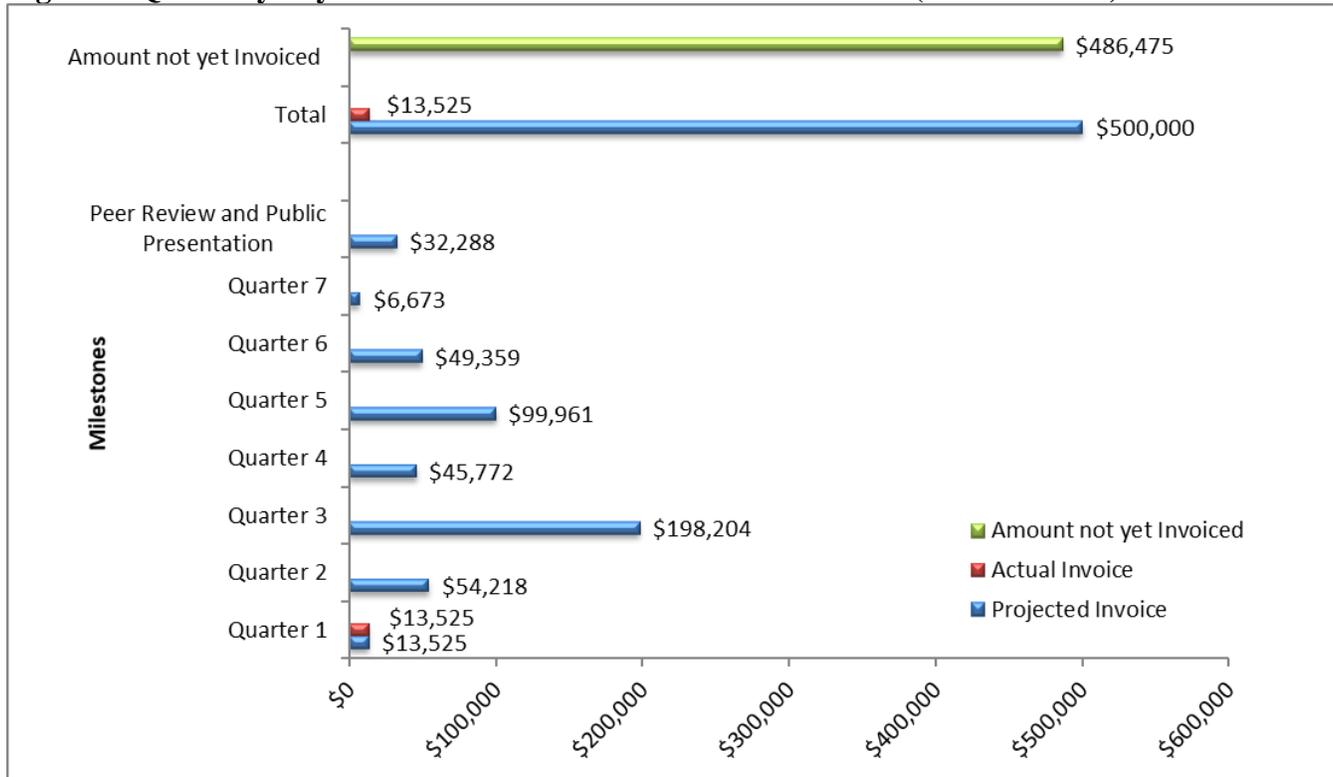
2: Items Not-Completed During this Quarterly Period:

All payable milestones were completed this quarter.

3: Project Financial Tracking During this Quarterly Period:

The nature of the contract for this research effort is fixed price, with clearly defined milestone/deliverable payments. **Figure 2** below outlines projected invoicing, as well the invoice submitted upon delivery of the first quarter payable milestone. **Figure 3** outlines invoicing to our cost share partners.

Figure 2. Quarterly Payable Milestones/Invoices - 693JK31910006 (Federal Costs)



4: Project Technical Status

ACTIVITY: COMPLETION OF PAYABLE MILESTONE: SUMMARY TABLE OF TESTING CRITERIA

Item Title: Summary Table of Testing Criteria

Item Number: 3

Task Number: 2

During this quarter, GTI completed the summary table of testing criteria and began framing performance distribution procedures which cumulated into *Interim Report 1: Summary Table of Testing Criteria*. Interim Report 1 is a payable milestone and will be submitted in parallel with this Quarterly Report.

The purpose of Interim Report 1 was to develop a summary table of testing criteria for the validation of drone-mounted remote sensing technologies to 1) accurately identify right of way (ROW) integrity threats, and 2) accurately detect natural gas leaks under operational conditions within natural gas transmission and distribution pipeline systems in urban, suburban, and rural terrain settings. The testing criteria were designed to inform a validation framework that provides a comprehensive yet flexible, and efficient approach to evaluation.

Even with the expansive literature and guidance available today, approaches for performance testing of leak detection sensors and imaging systems are rapidly becoming outdated as instruments continue to enter the market that possess ever increasing amounts of complexity. For example, some leak detection systems possess a series of integrated sensors to include multiple methane detectors, optical imagers, real-time analytical software, geospatial and modeling algorithms, as well as advanced data logging, and management features that can be combined in multiple ways to create a unique result depending on the situation. Additionally, technology developers may have both leak detection and integrity threat monitoring systems that require a suite of technology systems to detect and confirm pipeline leaks and/or other hazards during the same survey – meaning that a pipeline survey system may include the

leak detection system discussed above plus optical imagers, meteorological sensors, and global positioning systems (GPS) to detect and localize potential hazards from remote distances and at high speeds (i.e. aircraft surveys). This can often cause a problem when trying to determine overall performance of a system. Although each individual sensor may perform well in a laboratory setting, they perform quite differently when combined with other sensors, and when deployed on different platforms.

By focusing performance testing on the *methods* used (rather than individual sensors), it is possible to achieve a more effective and standardized framework for validation. In fact, validation is no longer just about *instrument* detection, but about the *process* of detection and how instrument analytics, algorithms, and data output are used to improve the probability of a positive result.

Therefore, the testing criteria developed in Interim Report 1 will ultimately feed a framework that will advance beyond “Pass/Fail” metrics to validation techniques which distribute detection results across a range of performance parameters. Interim Report 1 includes a discussion of specific site characteristics, key variables for field testing, and the procedural framework for analyzing the probability of performance.

ACTIVITY: COMPLETION OF PAYABLE MILESTONE: SUBMIT 2ND QUARTERLY STATUS REPORT

Item Title: Submit 2nd Quarterly Status Report

Item Number: 4

Task Number: 9

The second quarterly status report (this report) will be completed and submitted on schedule (on or before March 31, 2020).

ACTIVITY: PROJECT STATUS UPDATE WITH OTD COST SHARE PARTNERS

Item Title: Summary Table of Testing Criteria

Item Number: 3

Task Number: 2

The project status meeting was held on March 26, 2020 with 26 OTD members that represent 16 utilities providing cost share to the project. The participants included: GTI, OTD, Ameren, APGARF, Atmos, Duke/Piedmont, Intermountain, National Grid, National Fuel, NiSource, NYSEG/RGE, ONG, PG&E, PSNC/Dominion, SoCal, Spire, SWGas, and WGL.

ACTIVITY: PROJECT MANAGEMENT

Item Title: N/A

Item Number: N/A

Task Number: 9

During this quarter, GTI conducted project scheduling, budgeting, establishment of data management strategies, preparation of reports, and organization of required meetings. Subcontracting with SeekOps is currently underway. A 3-month NCE was submitted to give SeekOps additional time for Drone System Integration. Details regarding the NCE are described in Section 5 below.

5: Project Schedule

The project schedule through July 30, 2020 is shown below. The project is on schedule with exception of Task 3 – Drone System Integration which being performed by our subcontractor - SeekOps and who have experienced delays with contracting. A no-cost extension of 3 months has been submitted to DOT PHMSA for review.

