

Date of Report: 4th Quarterly Report Ending September 30, 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: September 30, 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
6	4	Field test logistical planning	Interim report on the validation test framework	39,355	9,608.00	48,963
7	9	4th Quarterly Status Report	Submit 4th quarterly report	6,417	2,003.00	8,420
Fourth Payable Milestone			SUBTOTAL	45,772	11,611.00	57,383

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.

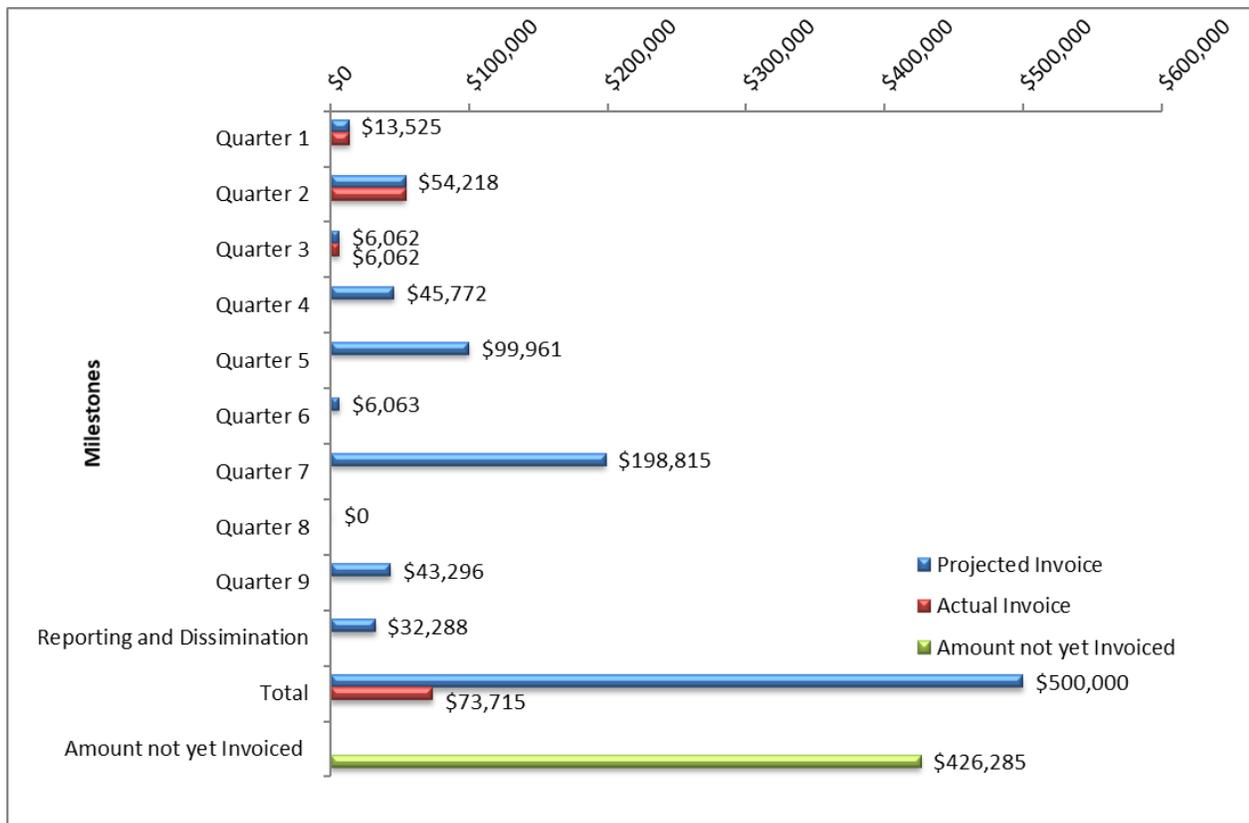
2: Items Not-Completed During this Quarterly Period:

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: FIELD TEST LOGISTICAL PLANNING

Item Title: Interim Report on Validation Test Framework

Item Number: 6

Task Number: 4

A preliminary field trial of the newly acquired DJI M300 RTK quadcopter drone platform was performed by SeekOps in an open field in Austin on August 28th, 2020. A member of the GTI project team was present onsite. The purpose of the test was to evaluate the flight stability of the drone platform after integration with the SeekIR methane sensor and optical sensors. As can be seen in Figure 6, the SeekIR methane sensor is installed on a carbon rod at a distance away from the aircraft body in order to position the methane sensor away from the propeller wash areas. Having a payload far from the center of gravity may adversely impact the stability of the drone and it is critical to ensure that the safety of the drone is not compromised during flights.

Additionally, the ability of the drone platform to capture aerial images was put to the test in the trial. Having good quality aerial imagery is essential for the threat detection function. Birds-eye view images will be fed into a threat detection algorithm software for automated flagging of potential threats. GTI is currently in discussion with University of Dayton for a possibility to leverage their threat detection systems in this project.



Figure 3. Aerial imagery captured using the M300 quadcopter



Figure 4. Birds eye view image captured using the M300 quadcopter

The large-scale controlled field testing was initially planned for Q2 2021 at a leak facility such as METEC at Colorado State University. However, due to travel restrictions created by the pandemic, the team is currently working with industry partners to locate alternative test sites in and around the Austin, TX, area to be in proximity to SeekOps. The schedule for the large-scale controlled test is still on track to be in Q2 2021.

ACTIVITY: DRONE SYSTEM INTEGRATION

Item Title: Readiness of Drone System

Item Number: 11

Task Number: 3

During this quarter, the pairing of the SeekIR methane detection system and camera with the DJI M300 RTK has been completed. The Internal Report includes a detailed presentation provided by Seekops, Inc. on the progress.

ACTIVITY: COMPLETION OF PAYABLE MILESTONE: SUBMIT 4TH QUARTERLY STATUS REPORT

Item Title: Submit 4th Quarterly Status Report

Item Number: 7

Task Number: 9

