

Advanced Leak Detection Lidar (ALDL), 3rd Quarterly Report (Public Version)

Date of Report: *May 27, 2014*

Contract Number: *DTPH56-13-T-000004*

Prepared for: *DOT, PHMSA*

Project Title: *Advanced Leak Detection Lidar*

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For quarterly period ending: *May 31, 2014*

1.0 Funds and Work Completed During this Quarterly Period

This report covers the third 3 month period of the research effort. A summary of the project-to-date cost history, which ties to the Delivery Milestones is provided in **Figure 1**, below.

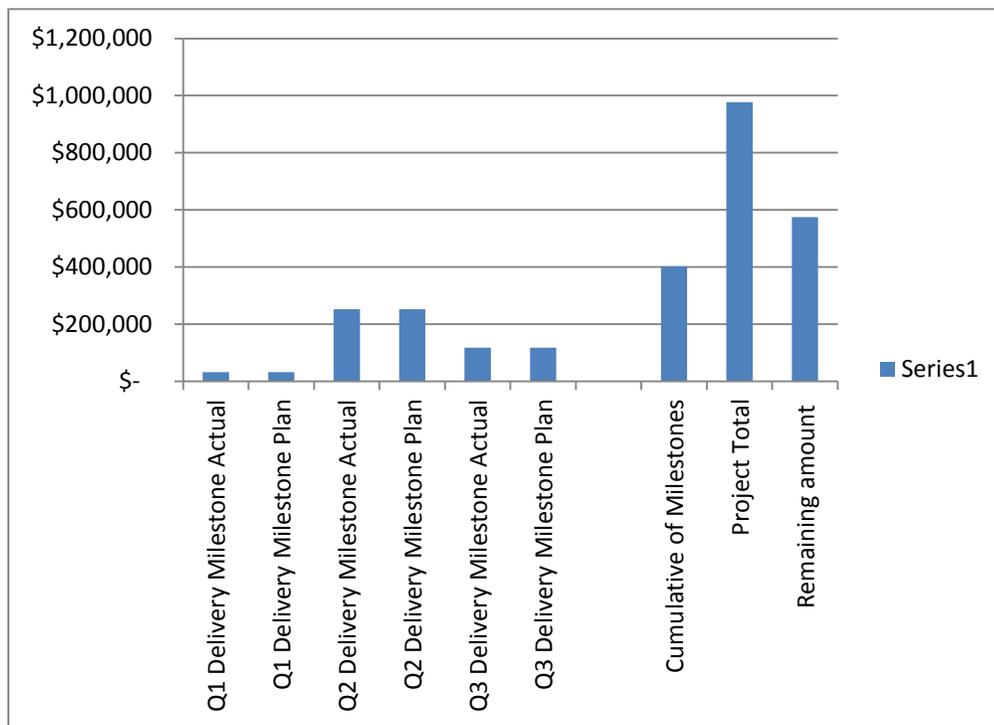


Figure 1, Achievement of payment milestones is on track through the 3rd quarter

2.0 Progress Against 2nd Quarter Delivery Milestones

Delivery Milestone D8. Task T1 Technical Management (Accomplished): Task T1 is an ongoing, level-of effort to organize and manage the project with associated contractual delivery milestones each quarter. Key items for this, the second, quarter have been:

- The detailed design phase of the project was pushed into high gear and nearly all engineering documentation needed to build and test the ALDL instrument is now complete.
- Monthly and Quarterly Reports prepared and submitted.
- The Project Peer Review with DOT was supported on May 20th.
 - Note that although we reported during the Peer Review that Task T10, Validate Electrical Interfaces was being delayed until the 4th quarter, the contract already lists this as a 4th quarter task.
- Laser bench testing has demonstrated 120 pm line-width on one of the laser diode chip assemblies with VBG. This had been the greatest technical risk. Now the full laser assembly can progress unimpeded.

Related commercialization activities for the third quarter (not funded from the contract) included:

- Face to face meetings were held with Chevron, Exxon and Enterprise products to describe our research, solicit support and lobby for acceptance of a PRCI white paper for related research.
- White papers were submitted to PRCI and were sponsored for consideration by the PRCI Operations and Integrity Technical Committee. Committee meetings are occurring in May and we have not yet hear results (i.e. if our research ideas have made it onto the PRCI research ballot).
- Face to face contacts were made with the Colorado Department of Public Health and the Environment as well as with members of the Environment, Health and Safety division of Anadarko Petroleum.
- We also visited Rocky Mountain Aerial Surveys to gather information about fixed-wing Patrol services for pipeline operators. This meeting also factors into plans for expanding flight testing beyond the Twin Otter and at lesser cost.

Delivery Milestone D9. Task T7, Coding and Timing Analysis (Accomplished): Two software engineers are supporting the project: Stephan Karcher and Steve Soga. Together, they have set-up the software development environment and software configuration control tools for the ALDL project. Software, including numerous pre-existing modules, is co-located and integration and testing on the target electronics from National Instruments is ongoing. Timing analysis has been completed and documented. This analysis indicates a wide margin between the capability of the electronics procured and the demands of the software running in real time. Exhibit 1(which is not included in the public version) to this report summarizes the engineering documentation and release status (this is paper documentation supporting the code design and maintenance). Exhibit 1 also includes a listing from the software configuration control tools of all the modules and their sizes that are now captured within the ALDL software development environment.

Delivery Milestone D10. Task T8, Optics Design and Mechanical Layout of Transmitter Components (Accomplished): The detailed design of the transmitter optics has been completed. The public version of the report omits the technical description and design details.

Omitted.

Figure 2, Mechanical layout of the transmit and receive optical elements for the Advanced Leak Detection Lidar (ALDL)

Delivery Milestone D11. Task T9, Mechanical Layout of the Receiver Components: The detailed design of the receiver optics has been completed. The public version of the report omits the technical description and design details.

Delivery Milestone D12. Task T22, Annual Peer Reviews with DOT (accomplished): The first annual peer review for the project was conducted on May 20th, 2014. Peer review presentation materials were uploaded to the DOT PHMSA web site and the review was conducted from roughly 2PM to 2:30PM Eastern.

3.0 Schedule

The ALDL project remains on schedule. **Figure 2**, on the next page, presents the project schedule. The plan is shown by the blue bars. Completed tasks are shown in green and tasks that are in-work are shown in yellow. The vertical red line on the schedule shows the current date.

Note that Task T10, Validation of electrical interfaces, has not been completed because we need to receive some of the key electronics (e.g. the lasers and detectors) before it would make sense to validate the signals and data at those interfaces. However, the associated Delivery Milestone (payment milestone) is in the 4th quarter, per the contract. There should be no impact to the overall development schedule from Task 10.

4.0 Payment Milestones

Payment milestones D8, D9, D10, D11 and D12 will be submitted for the second Quarter as summarized in Section 1.0. The project is on-plan: neither ahead of or behind plan. No effect is anticipated on funding.

