

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

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

Prepared for: *DOT, PHMSA*

Project Title: *Advanced Leak Detection Lidar*

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For quarterly period ending: *August 31, 2014*

1.0 Funds and Work Completed During this Quarterly Period

This report covers the fourth 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.

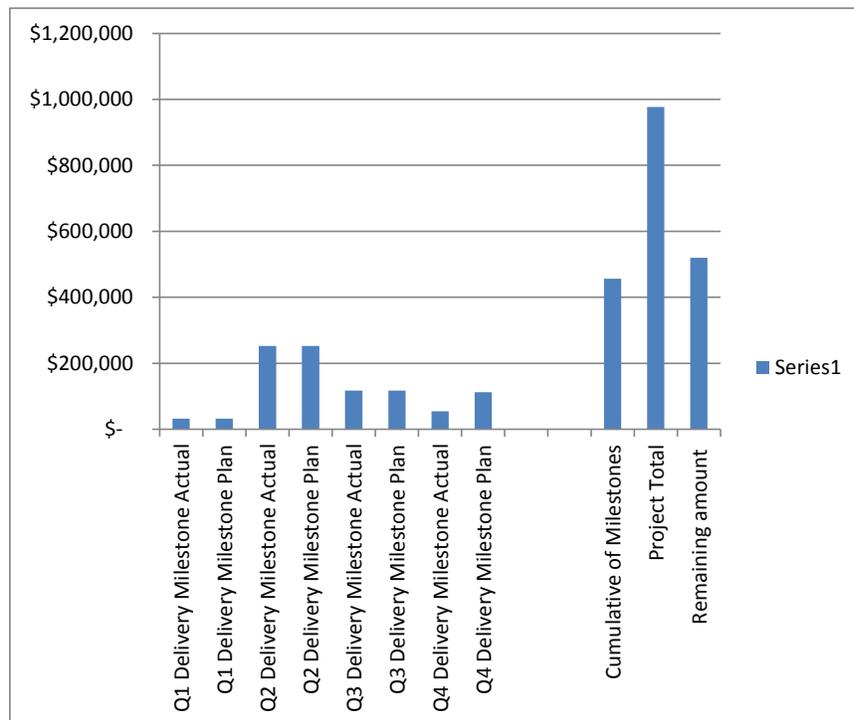


Figure 1, Achievement of payment milestones through the 4th quarter.

2.0 Progress Against 4th Quarter Delivery Milestones

Delivery Milestone 13. 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:

- An internal Project Peer Review was conducted in June to support the transition from the detailed design phase into the fabrication, assembly & test phase of the project. Several subject matter experts attended the review and a list of suggestions and areas of concern was produced as an output of the review. A total of 30 technical comments and suggestions have been documented in the project files and are being addressed as the project continues.
- Monthly and Quarterly Reports prepared and submitted.
- Schedule/technical issues arose with both the laser subassembly and the receive telescope assembly. These issues are described in conjunction with subsequent delivery milestones and have been substantially resolved.

Substantial commercialization activity was also completed in the 4th Quarter (not financed by PHMSA R&D funding).

Delivery Milestone D14. Task T10, Validate Electrical Interfaces (Accomplished): Key electrical interfaces with the National Instruments electronics were validated in this quarter as follows:

- Simulated detector signals were introduced to the analog interfaces and processed. This included using function generators to simulate the modulated detection signal.
- Several of the spare analog inputs were tested for use as temperature sensor interfaces. A recommendation of the design review in June was that several temperature sensors be added at key locations to improve our ability to resolve any performance anomalies that might arise with the 1st prototype of the ALDL instrument.
- The analog interfaces to the Laser Control Module which monitor detectors indicating laser transmit power and wavelength center-line were set-up and verified.

Delivery Milestone D15. Task T11, Procure Receiver and Detector Components (Not Accomplished): The detector, and other key receive-path elements have been received and are available for integration. However, the reflective optics have not yet been received. We attempted to order a fully-integrated, customized telescope assembly in June. The cost of this telescope assembly was sufficiently higher than our budgeted cost that we undertook a redesign. The individual piece-parts for the new design have been ordered and the detailed design of the full telescope assembly has been finished. The mechanical piece-parts are being fabricated now. Milestone D15 is re-planned to be completed next quarter (5th quarter of the project).

Delivery Milestone D16. Task T20, Industry Conference Paper and Presentation (Not Accomplished): This milestone was placed in the 4th quarter of the project as a placeholder. We believe that test results from the initial lab demonstration are needed before an abstract and paper for an industry conference should be put forward.

3.0 Schedule

The ALDL project remains on schedule. **Figure 3**, 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 D13 and D14 will be submitted for the fourth Quarter as summarized in Section 2.

Milestones D15 and D16 are delayed and will not be submitted for payment. The delay of these milestones is not expected to affect the overall project plan. Milestone D15 had sufficient schedule slack to the start of the next task (instrument integration) that no substantive impact is expected. Milestone D16 is tied to an industry conference presentation and is not in series with project work flow.

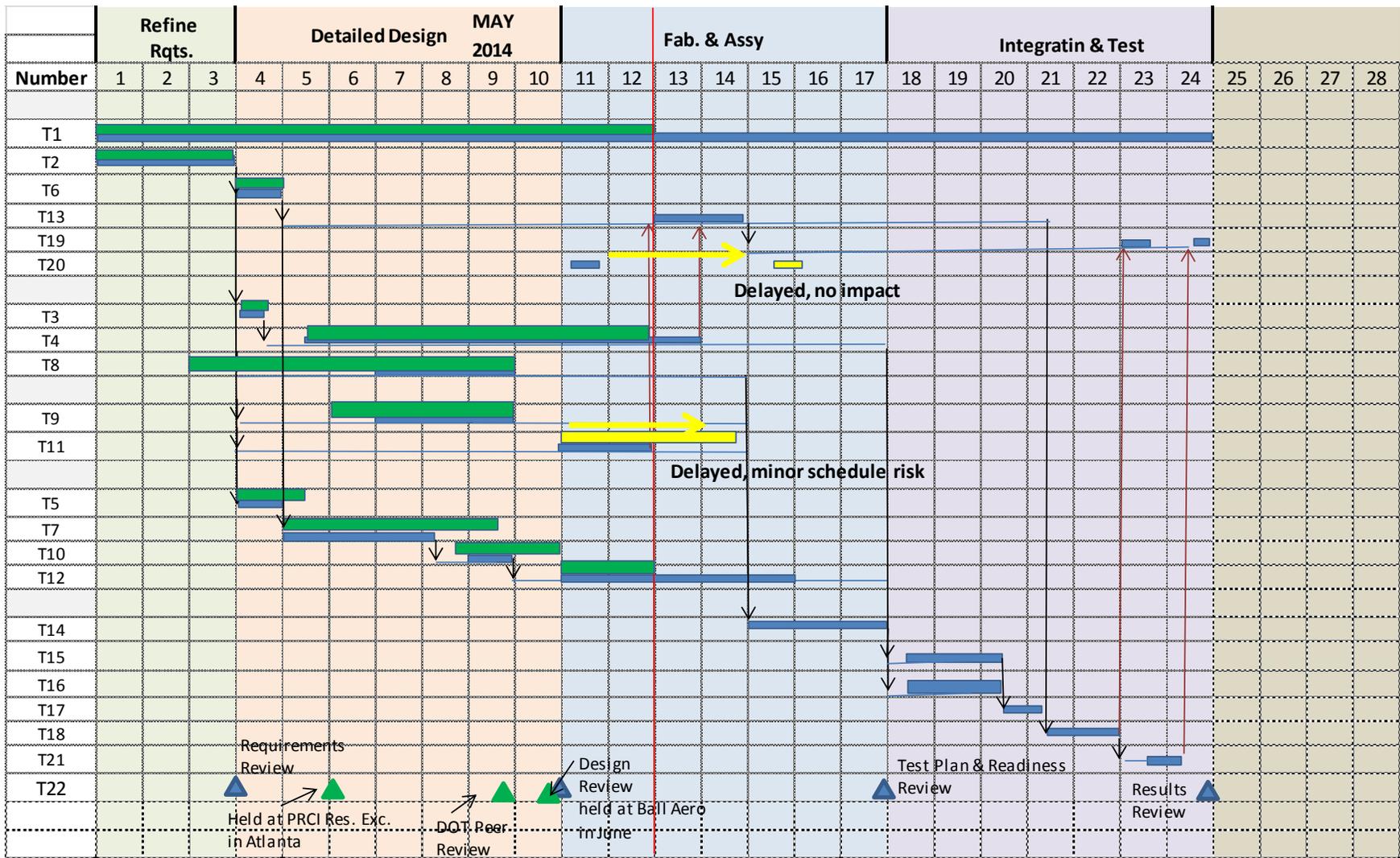


Figure 3, Advanced Leak Detection Lidar (ALDL) schedule progress against plan. Green bars indicate work accomplished and yellow and yellow arrows indicate tasks that are delayed. The vertical red line marks the end of the fourth quarter of the project (i.e. August 31, 2014)

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