

**Texas Commission on Environmental Quality
New Technology Research & Development (NTRD) Program
Monthly Project Status Report**

Contract Number:	582-11-13469-2019		
Grantee:	QuantLogic Corporation (Quantlogic)		
Report for the Monthly period:	November 1, 2012 to December 10, 2012	Date Submitted:	December 10, 2012

Section I. Accomplishments

Provide a bulleted list of project accomplishments as well as a description of their importance to the project.

Task 4: Transient Control Strategy Development and Testing.

- Task 4 is 85% completed
- Continued the integration of engine control models into open engine control unit (ECU) hardware and carried out the hardware level control function verification.
- Designed and tested a prototype injection driving command circuitry (DCC) to generate two solenoid command signals based on one fuel mass command pulse signal. The hardware-in-the-loop (HIL) test was completed. Figure 1 shows the HIL setup and Figure 2 shows the configuration screen of the injector driver

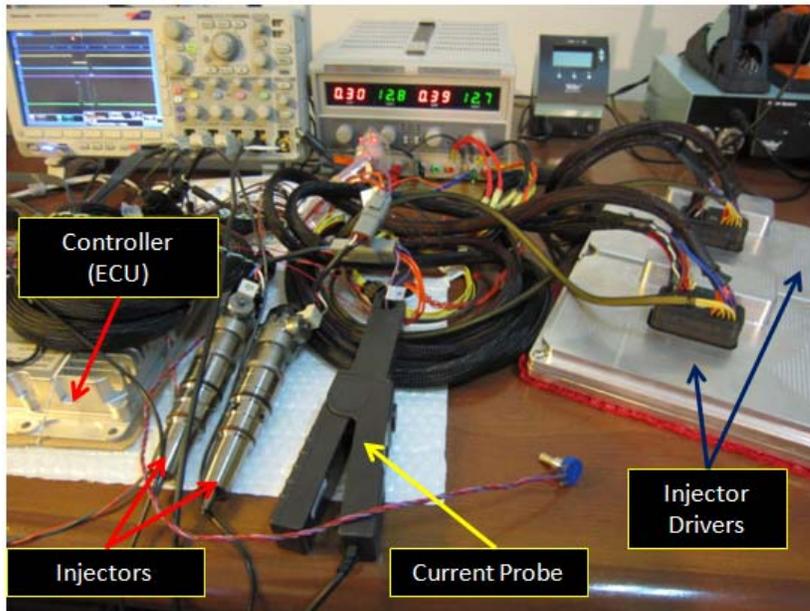


Figure 1 Fuel injector driving test setup with Open ECU and injector driver

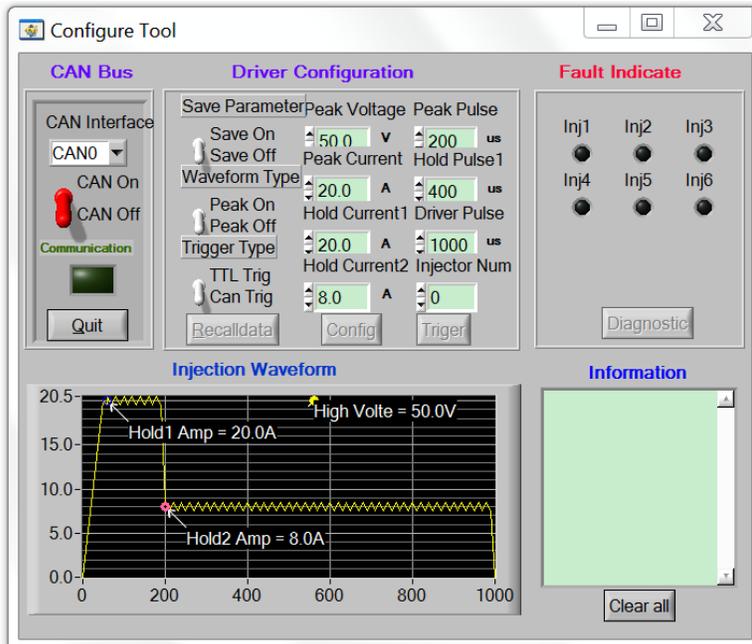


Figure 2 Configuration screen of the injector driver

- Figure 3 shows results of the real injector control with the OpenECU, DCC, and injector drivers. The injection command pulse was output from the OpenECU who was synchronized with the engine crank signals. Because the each of the project engine's fuel injector is controlled by two solenoids per injector, two solenoid driving signals were generated to open and close the injector. The resulting injector driver current trace can be found in Figure 3.

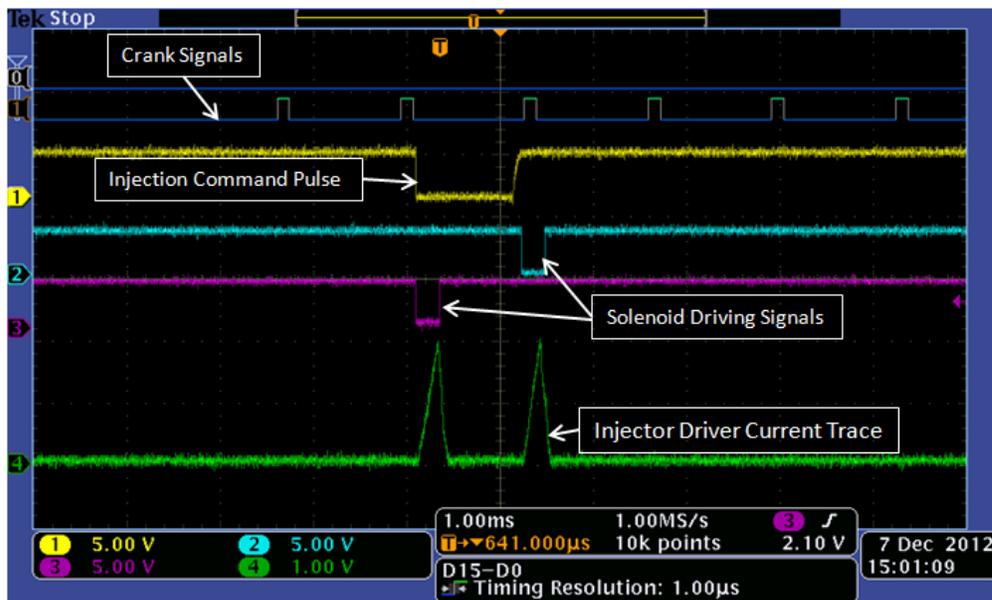


Figure 3 Injector driving command formation and drive current traces of both solenoids (measured by one current probe)

- Currently, the focus is on demonstration of the complete hardware and software on the test engine.

Indicate which part of the Grant Activities as defined in the grant agreement, the above accomplishments are related to:

- The authorized tasks are related to:

Task 4: Transient Control Strategy Development and Testing

2.4. Task Statement: The PERFORMING PARTY will develop and test an engine control strategy which can smoothly adjust the EGR to the target NO_x emission reduction levels during transient engine operation without noticeable impact to the engine operation.

2.4.1. Control strategy development.

2.4.1.1. The PERFORMING PARTY will develop an engine control strategy which can smoothly adjust the high and low pressure loop EGR or a combination of both EGRs to the target NO_x emission reduction levels during transient engine operation without noticeable impact to the engine operation. The control strategy will include functions to address the coupling of EGR with boost, as well as coupling of high and low pressure loop EGR. The PERFORMING PARTY will also improve the control model.

Section II: Problems/Solutions

Problem(s) Identified: Report anticipated or unanticipated problem(s) encountered and its effect on the progress of the project

- a) Task 4 starting date was set at May 4, 2012, due to waiting for the Notice to Proceed.
- b) Currently the project team is allocating more resources to speed up the progress in Task 4 and also looking into condensing the schedule of Task 5 due to test lab schedule and maintenance at University of Houston (UH) test center currently on-going.

Proposed Solution(s): Report any possible solution(s) to the problem(s) that were considered/encountered

- a) An amendment request for Task 4 was submitted to TCEQ for approval.
- b) Currently the project team is allocating more resources to speed up the progress in Task 4 also look into condensing the schedule of Task 5 which will start in January 2013 and finish by the end of March 2013 as scheduled.

Action(s) Conducted and Results: Describe the action(s) taken to resolve the problem(s) and its effect

- a) An amendment request for Task 4 was approved by TCEQ.

Section III. Goals and Issues for Succeeding Period:

Provide a brief description of the goal(s) you hope to realize in the coming period and identify any notable challenges that can be foreseen.

- Move on to the engine verification of control model developed and tuning and move on to Task 5.

Date: 12/10/2012

Authorized Project Representative's Signature

NOTE: *Please attach any additional information that you feel should be a part of your report or that may be required to meet the deliverable requirements for tasks completed during this reporting period.*