

dSPACE

COLLEGE OF ENGINEERING

Rapid Prototyping Environment for Climate Control Development

Team 4

Sponsor: General Motors



Abstract

General Motor’s (GM) Climate Control System is moving from analog interface actuators and sensors to devices that use Local Interconnect Network (LIN), which is a single wire serial communication. GM has provided team 4 with actuators and sensors that have been designed to use this protocol. Team 4 must assist GM to develop a dSPACE LIN driver library that will be used for prototyping climate control environments that will enable the integration of these devices.

Objectives

- Demonstrate dSPACE setup to read ILSS sensor and drive charging and theft deterrent indication light on ILSS.
- Demonstrate dSPACE setup to read Rain Light and Humidity (RLHS) sensor.
- Demonstrate dSPACE setup to drive multiple 2 LIN actuators with ability to expand to 6 for integration of the blower motor, heater core, evaporator, and temperature blend flaps.

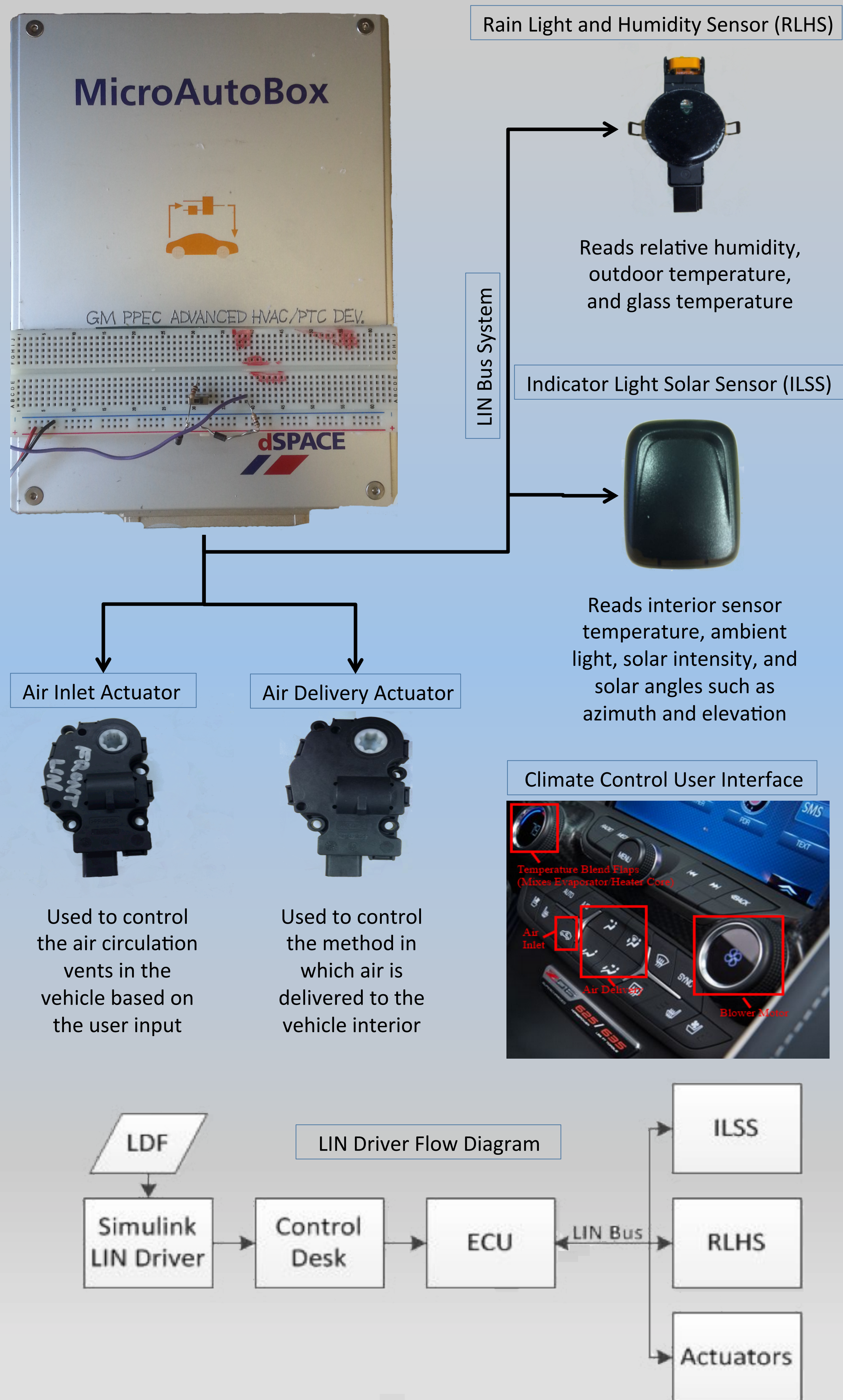
Acknowledgements

On behalf of team 4, we would like to say thank you to:

- Lixin Dong
- GM CWT Staff
- dSPACE Staff

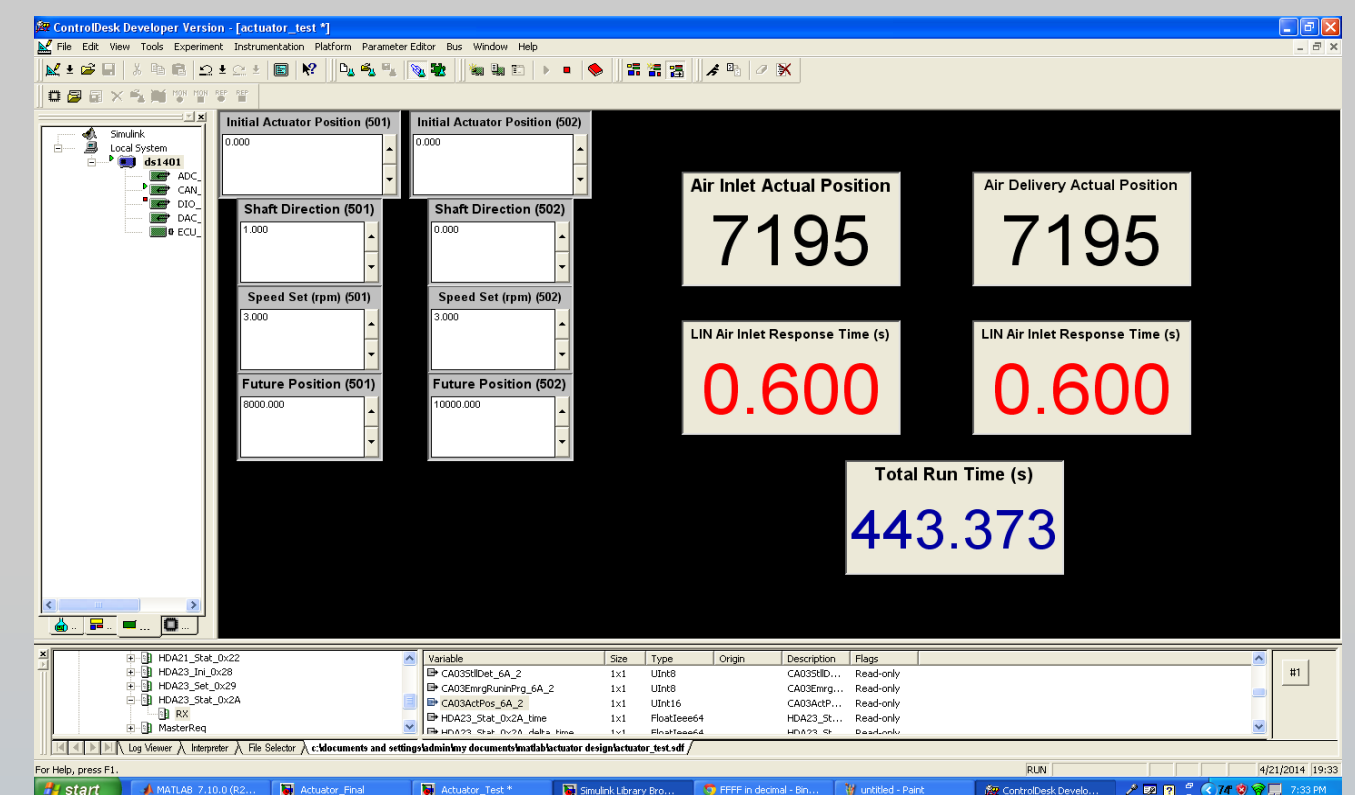
Final Design

The team was able to develop individual LIN Drivers and dSPACE simulation libraries. The sensor libraries have the capabilities of reading the surrounding environmental conditions. The actuator library has the capability of being adjusted to various speeds and directions.

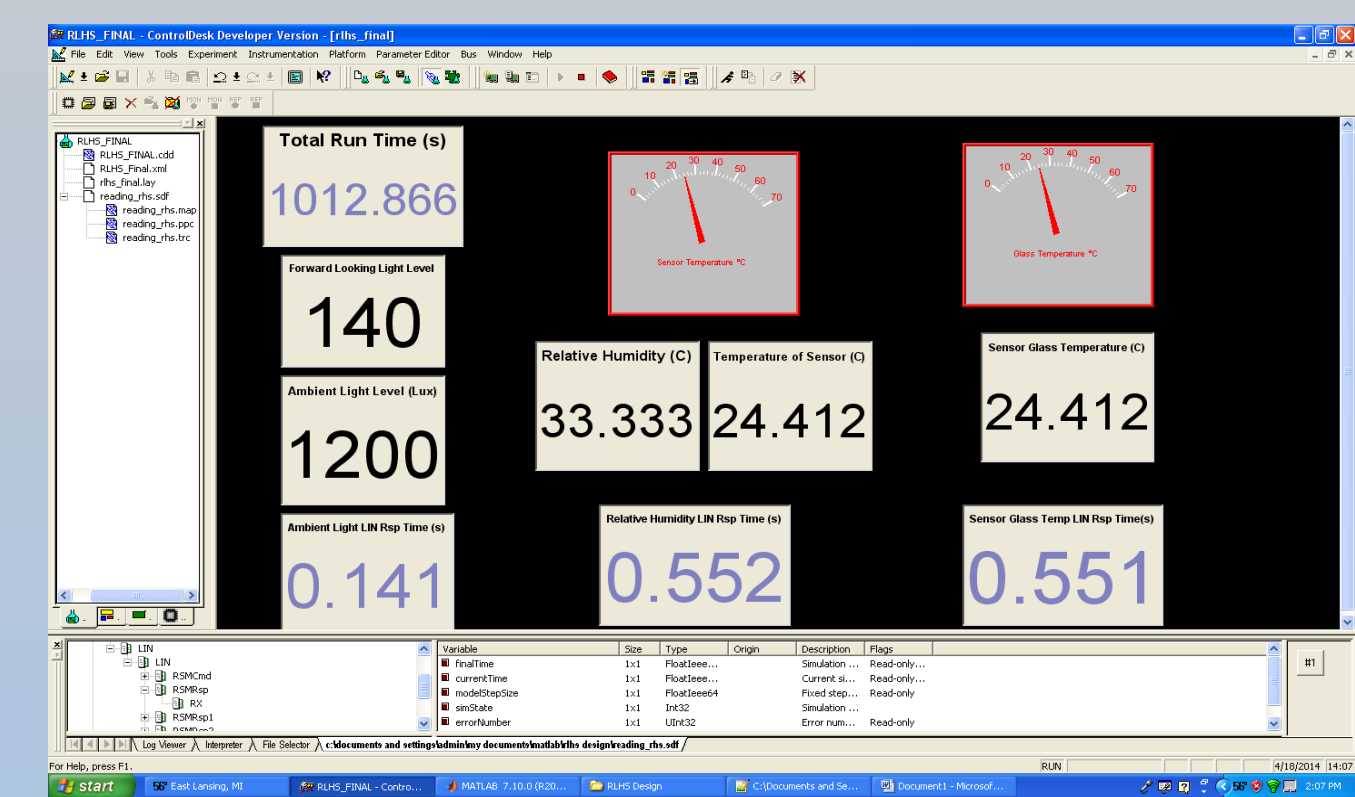


Testing and Results

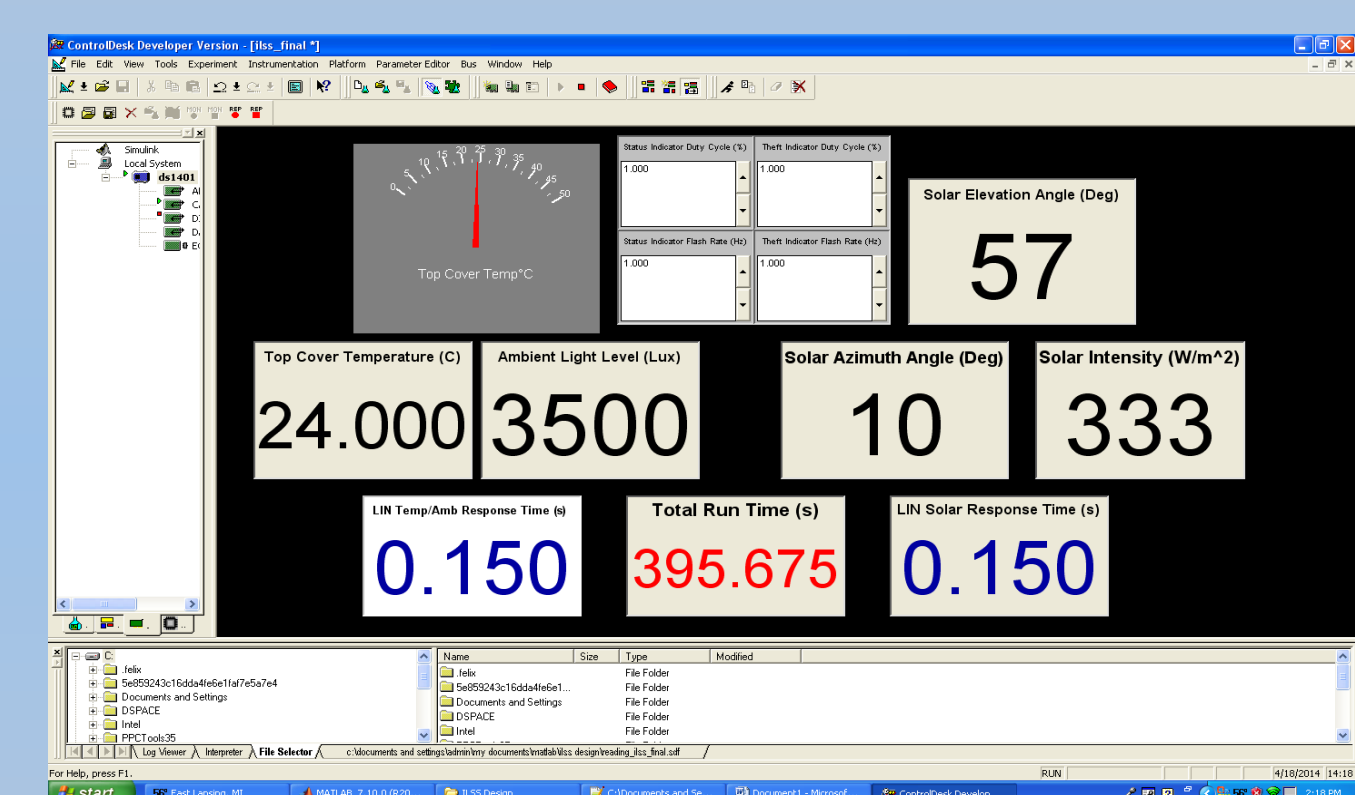
ILSS Results through Control Desk



RLHS Results through Control Desk



Actuator Results through Control Desk



Final Budget

The team was provided with a budget of \$500 to complete the design requirements set by GM. Thanks to GM, dSPACE and the Division of Engineering and Computing Services at MSU the team did not spend any of the budget. However, the table below shows the estimated cost of developing this rapid control prototyping environment.

Products	Cost
Hardware	\$111,26.98
Software	\$799.95
Total:	\$11,926.93

Team 4 Members



Dr. Lixin Dong
MSU Facilitator



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