

## RESULTS SUMMARY

Researchers created a web portal where vendors can test spreader controllers and AVL equipment for compatibility with the Clear Roads Communications Protocol—ultimately allowing more types of equipment to work together.

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# WEB PORTAL LETS EQUIPMENT VENDORS TEST AND CERTIFY DATA COMPATIBILITY

The ability to seamlessly collect and transmit operational data has become an increasingly important feature for winter maintenance equipment. Data communications protocols are commonly incompatible between vendors, which can lock highway agencies into using a single equipment manufacturer to maintain compatibility. Lack of interoperability also limits equipment customization and interferes with an agency's ability to share data with other agencies.

For more than a decade, Clear Roads' Plug-and-Play Initiative has worked to develop a universal bi-directional communications protocol for in-cab electronics, including automatic vehicle location (AVL) devices and spreader controller systems. Standardizing how critical operational data are shared on modern winter maintenance equipment will benefit both Clear Roads members and vendors.

## Need for Research

Two previous Clear Roads projects investigated and began developing an open data plug-and-play protocol for winter maintenance equipment. [Phase 1](#) addressed the need to establish a common set of standards. Researchers established a protocol that allows AVL equipment to communicate with spreader controllers. In [Phase 2](#), investigators laid the groundwork for open protocols that would allow winter maintenance equipment to communicate with a central office or other location.

As the next step in the effort, research was needed to develop test bed software that would let equipment vendors test their products for compatibility with the protocol, officially called the Clear Roads Performance Specifications and Communications Protocol.

## Objectives and Methodology

This project's goal was to design, deploy and maintain a test application and website portal that would allow vendors of AVL equipment and spreader control-

## PROJECT DETAILS

**Project Title:** Developing Test Bed Software to Qualify Plug and Play Technology

**Project Number:** CR13-05

**Project Cost:** \$108,161

**Project Co-Champions:**

Scott Lucas

Ohio Department of Transportation  
scott.lucas@dot.ohio.gov

Craig Bargfrede

Iowa Department of Transportation  
craig.bargfrede@iowadot.us

**Investigators:**

Russ Brookshire, Daniel Collins

Parsons Transportation Group  
russ.brookshire@parsons.com  
daniel.collins@parsons.com



A typical snowplow cab features an array of controls and electronic instrumentation. The Clear Roads Plug-and-Play Initiative improves the interoperability of this equipment across manufacturers and agencies.

lers to test and certify their compliance with the new Clear Roads standards. Researchers created a software suite with three components:

- **Database.** The database stores test parameters and information about vendors and their equipment for the web portal.
- **Web portal.** Vendors can register through the [web portal](#) to begin the certification process and download the device test applications. The portal also includes an area where Clear Roads members can view compliant equipment and vendor test results. The portal employs password encryption and a robust authentication mechanism to protect user data throughout.
- **Device test applications.** These applications test vendor devices for compliance with the protocol, provide feedback to the user, and communicate the test results to the database. There are two test applications: one for testing a vendor's spreader controller against the Clear Roads Communications Protocol and one for testing AVL equipment against the standard. Vendors can download the device test applications once they have registered through the web portal.

## Results

The web portal launched in September 2018 with an invitation to more than 20 vendors to participate in a pilot portion of the project, which was intended to be a time of testing and fine-tuning of the web interface and test applica-

tions. Although the pilot ran for several months, there was minimal participation and feedback from vendors. Four manufacturers expressed interest, and one manufacturer engaged the development team with questions regarding the protocol, the test application and the portal. Through this process, two technical issues in the test application were identified and resolved.

The web portal is now available for vendors and Clear Roads members at <http://portal.clearroads.org>, and one manufacturer has already completed the certification process for one of its spreader controllers.

## Benefits and Further Research

The development of a plug-and-play protocol for equipment interoperability has been a multiyear, multiphase commitment by Clear Roads. The resulting open data protocol can help realize the goal of equipment compatibility, but only if road maintenance agencies require that vendors use it.

To increase vendor participation, the project development team suggested that agencies include certification of compliance with the Clear Roads Communications Protocol as part of purchase requisitions for winter maintenance equipment. Certification could be an up-front requirement or part of promised deliverables. The researchers recommend that Clear Roads create standard language that members can use to communicate the requirement, ultimately conveying that member states are dedicated to implementing the Clear Roads Communications Protocol and will hold their vendors accountable for compliance with it.

"The Clear Roads Plug-and-Play Initiative has created a standard communication language for spreader controller units. This will allow agencies to use any qualifying spreader with their AVL systems, ultimately cutting costs through increased competition."

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Project Co-Champion Scott Lucas  
Ohio DOT  
[scott.lucas@dot.ohio.gov](mailto:scott.lucas@dot.ohio.gov)