



CALTRANS DIVISION OF RESEARCH,  
INNOVATION AND SYSTEM INFORMATION

# Research Results

Rural

NOVEMBER 2023

**Project Title:**

Communication Technologies for Rural Intelligent Transportation Systems (ITS) Professionals

**Task Number:** 1749

**Start Date:** April 1, 2020

**Completion Date:** November 11, 2023

**Task Manager:**

Sean Campbell  
Senior Transportation Engineer,  
Electrical (Specialist)  
sean.campbell@dot.ca.gov

## Professional Capacity Building for Communication Systems Phase V: Intelligent Transportation Systems (ITS)

Develop appropriate courses to be taught by subject matter experts that update the students' skills for new and constantly evolving technologies in ITS.

### WHAT WAS THE NEED?

Rural communication engineering remains a mission-critical skill that most engineers in the state have limited experience with. Lacking these skills, engineers and technicians have a difficult time designing and maintaining reliable and robust communication networks for rural Intelligent Transportation Systems (ITS) field equipment. As new technologies emerge, engineers and technicians will be required to understand the reality of what is possible to achieve from these technologies versus the unrealistic claims from a vendor. This is phase V of this project and is a continuation of phases I, II, III, and IV to provide specific expert training to rural engineers and technicians to enable them to gain the skills necessary to design and maintain robust communication networks for rural ITS field equipment.

### WHAT WAS OUR GOAL?

The outcome and end-product of this research was the delivery of courses to Caltrans rural engineers and technicians to train them in the skills they lack, which are necessary for them to design and maintain robust communication networks for rural ITS field equipment. This project helped to build the professional capacity of rural ITS engineers and technicians through an applied, hands-on educational experience that brought together the latest/most recent information into a comprehensive, one-stop shop for rural ITS communications.



DRISI provides solutions and knowledge that improves California's transportation system

## WHAT DID WE DO?

- The research team contracted with the Western Transportation Institute (WTI) at Montana State University to update the PCB gap analysis, develop/deliver/evaluate new training content, and facilitate Caltrans meetings concerning PCB training.
- The research team contracted with Pearson Technologies, Inc., to provide two five-day training sessions on the design of fiber optic networks and installing, maintaining, and testing installed networks. These courses were held in October/November 2021. 24 District staff members participated in the training in Rancho Cordova and Fontana.
- DRISI partnered with D12 Maintenance and provided two five-day training sessions from Pearson Technologies, Inc. on designing fiber optic networks and installing, maintaining, and testing installed networks. One session was held on May 6-10, 2022, in D12, and the other was held on October 17-21, 2022, in D3. A total of 24 students attended.
- New training content developed by WTI and Caltrans - RF/Microwave Fundamentals training from Aviat Networks. This was a five-day, hands-on experience on October 24, 2022, at the District 3 TMC. 12 students attended.
- The research team contracted with CellStream to provide three five-day training sessions on hands-on TCP/IP and Ethernet fundamentals. The three training dates were scheduled throughout 2023, and 48 students attended this training.
- The research team contracted with CellStream to provide three two-day training sessions on hands-on advanced IP networks and protocols. The three training dates were scheduled throughout 2023, and 48 students attended this training.

- The research team once again contracted with Pearson Technologies, Inc. to provide two five-day training sessions on the maintenance and troubleshooting of fiber optic networks, designed specifically for Caltrans maintenance electricians. Sessions were held in June 2023, and 24 maintenance electricians attended this training.

## WHAT WAS THE OUTCOME?

- Overall, 180 Caltrans professionals were provided in-depth, hands-on training over 13 classes. The overall assessment of the training was very positive, as verified by surveys obtained at the end of each class.
- There are discussions underway with Traffic Operations and Maintenance to continue this effort under Task 1763.

## WHAT IS THE BENEFIT?

This effort benefited Caltrans engineers and technicians who gained the capacity in ITS technologies to successfully design, implement, and maintain reliable and robust communication systems for rural ITS field equipment in rural and remote areas.

## LEARN MORE

There is a Professional Capacity Building (PCB) project page on the Western States Rural Transportation Consortium website (<http://westernstates.org/Projects/PCB/Default.html>)

**IMAGES**



Image 1: Hands-On Fiber Optic Training – Fusion Splicing

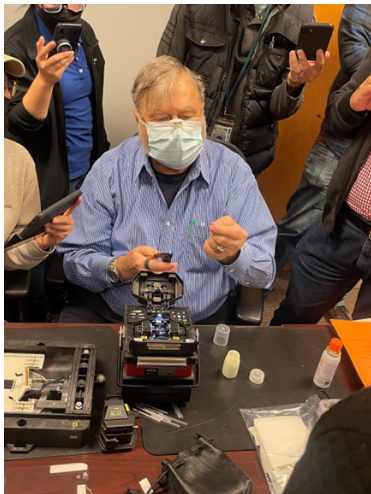


Image 2: Hands-On Fiber Optic Training – Fusion Splicing



Image 3: Hands-On Fiber Optic Training – Cable Preparation

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