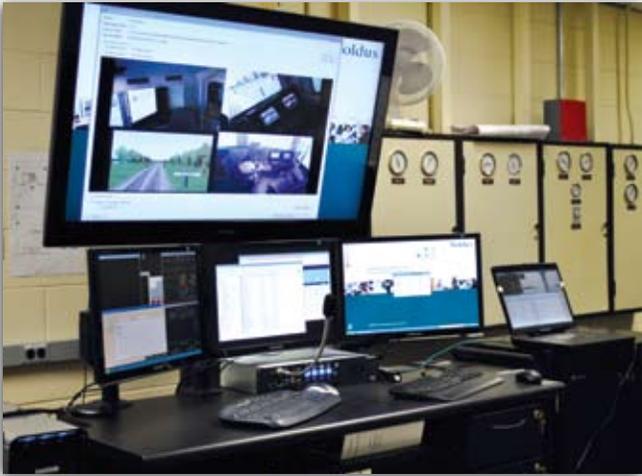*View of cab rear entrance at factory*
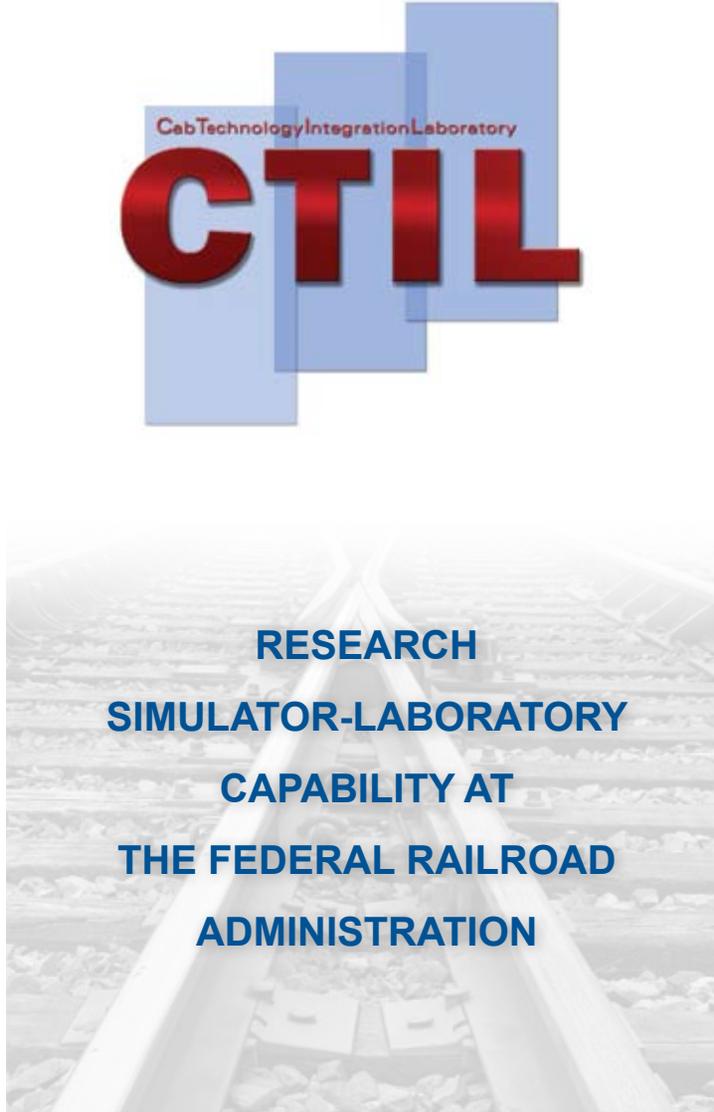

Researcher's workstation

Engineer's view

U.S. Department
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**RESEARCH
SIMULATOR-LABORATORY
CAPABILITY AT
THE FEDERAL RAILROAD
ADMINISTRATION**

RESEARCH MAKING RAIL SAFER

CTIL

The Cab Technology Integration Laboratory (CTIL) is a mobile, full-sized locomotive simulator configured with tools for the analysis of crew performance given new cab technologies and configurations.

Mission:

CTIL is to be the resource to provide a broad-based collaboration with the railroads, railroad industry, academic, and government scientific and technical resources on fundamental problems of human performance in integrating advanced cab technology in a way that assists people, improves crew reliability and enhances routine operations.

For more Information Contact:

Mike Jones

Program Manager Human Systems and Technology
Federal Railroad Administration
Office of Research & Development
1200 New Jersey Ave., S.E.
Washington, DC 20590
Tel: 202 493 6106
michael.e.jones@dot.gov

CTIL interior panoramic view showing conductor and engineer stations.

Research Agenda:

Across transportation domains, it is becoming increasingly important to address human factors in the design of the human interface. It is critical to design controls and displays that minimize risk of "design induced error" and that keep the operator informed of vehicle operating status, location and proximity to other traffic and obstacles. In short, situational awareness and the ability to interact with the vehicle as it transits is essential to safe, economical, and speedy transit. The CTIL capabilities will enable the FRA to assess the locomotive crew operating and display interface. The FRA's broad range of research areas of interest include:

- Emerging Positive Train Control (PTC) technologies effect on crew performance

- Locomotive crew display and control design for safety and efficiency

- Improved countermeasures for crew fatigue and enhanced vigilance

- Crew workstation ergonomic design

Key Capabilities:

- Ability to reconfigure cab crew workstations

- Anthropometric modeling

- Video and Audio data capture and analysis during research activity

- Head and Eye tracking

- Post-run engineer performance analysis

- Analysis and performance modeling for both physical and cognitive activities of the locomotive crew

- 3rd party control/display integration to assess and evaluate the human-machine interface on human performance

- Mobility

- Remote researcher dial-in

- Statistical analysis tool

- Locomotive performance data capture during simulator run

- Track builder and scenario authoring

- Accident reconstruction

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