DRISI
CALTRANS DIVISION OF RESEARCH, INNOVATION AND SYSTEM INFORMATION
TRANSFORMING IDEAS INTO SOLUTIONS

Research Results

Investigating Teleoperated Equipment for Use in Caltrans Operations

Investigating the operations of non-line-of-sight remote control technology for Caltrans operations.

Equipment

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Project Title: Investigating Teleoperated Equipment for Use in Caltrans Operations

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Task Manager:

Melissa L. Clark
Transportation Engineer (Electrical)
melissa.clark@dot.ca.gov

DRISI Division Chief:

Prakash Sah, PE
prakash.sah@dot.ca.gov

WHAT WAS THE NEED?

Advances in the field of teleoperated/autonomous vehicles have shown potential for new and innovative applications that could change how State Departments of Transportation (DOTs) maintain roadways and roadside vegetation, and roadway and roadside construction, among other operations. Mowing of medians and right-of-way is an important vegetation management practice for the California Department of Transportation (Caltrans) but is labor intensive and requires expensive and specialized equipment.

With the advent of teleoperated/autonomous vehicles, it may be possible to reduce worker exposure and risk by utilizing driverless tractors for mowing operations. In addition, cost savings are also possible by utilizing one operator to control more than one mower.

WHAT WAS OUR GOAL?

The goal of this study was to demonstrate in the field, a vehicle capable of meeting the requirements for teleoperated / autonomous vehicles as requested by the Caltrans Division of Equipment.

WHAT DID WE DO?

The researchers completed the assessment of industry capability and investigated non-line-of sight remote control. Discussions were completed with vendors interested/ available to participate in the demonstration. Demonstration occurred at the California Highway Patrol Academy in West Sacramento on June 20, 2024, to showcase an autonomous mower developed by Industry. The purpose of the demonstration was to educate and support the dissemination

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of information on the importance of the future use of such technologies.

The researchers produced a final report and completed a online presentation to Caltrans, academia, etc.

WHAT WAS THE OUTCOME?

Mowing medians and rights-of-way are a crucial vegetation management practice for Caltrans, but it is labor-intensive and requires costly, specialized equipment. This research evaluated the safety, ease of use, and effectiveness of remote-control mower technology to protect worker safety and reduce labor costs in vegetation management.

Important conclusions:

- Found industry is not pursuing teleoperated technology.
- Industry is pursuing autonomous systems.
- Autonomous mowers are currently not allowed within Caltrans Right of Way.

Caltrans could look into possible future research including:

- Pilot project to deploy "mowers" at more than one location (e.g., Northern California & Central Valley)
- Investigate development of an AV sweeper for construction / maintenance activities

WHAT IS THE BENEFIT?

The benefit of this research was for California to increase worker safety. Implementation of this technology would allow a maintenance worker to control the vehicle (i.e., mower in this instance) from a safer location while mowing "steep" grades along the state right of way. In addition, labor costs may be reduced by having one operator controlling multiple mowers.

LEARN MORE

https://www.youtube.com/watch?v=X9stc_5hAJs

IMAGES

Image 1: Autonomous Mower at Demonstration

Image 2: Example of Vulnerable Road User Obstacle at Demonstration