Overview

- Introduction to SwRI
- SwRI’s Ranger Localization System
- Automated Truck Platooning
- Automated Trailer Docking (and other apps)
Benefiting government, industry and the public through innovative science and technology
Southwest Research Institute (SwRI)

- Founded in 1947 by Tom Slick
- Currently ~2700 Employees
- Revenue: ~$550M
- 10 Technical Divisions
SwRI: From Deep Sea to Deep Space

Alvin: New Deep Submergence Research Vehicle

New Horizons 2006 - Present
SwRI Automated Vehicle Technology
Since 2006
Ranger: Camera-based Localization System

[Diagram of a vehicle with a camera and illuminator labeled]

[Image of the Ranger system components]

[Image of a camera illuminator]
Ranger Matches Pavement “Fingerprints”
Ranger Works Like a Very High Precision GPS System

GPS Error = +/- 5 feet

Ranger Error = +/- 1 inch
Mapping the World
SwRI Vehicles (All Use Ranger)

Automated!

Automated!

Automated!

SwRI White Paper for "Automated Trailer Yard Operations"
September 16, 2016
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... and is available for use by our Unmanned Systems Section year round, around the clock. The track also has a loading dock.
Enabling Technology: Precision Automated Following / Platooning

Highway Automation for Fuel Savings
Platooning Can Greatly Improve Fuel Economy (in theory)


- Fuel Saved @16 feet:
  - Rear Truck: 23%
  - Front Truck: 9%
  - 12.5% at 80 feet

Graph shows the relationship between gap (feet) and fuel saved for both rear and front trucks.
Figure 18: Percentage Fuel Saved for NREL Tests, 65 mph, 65K lbs/Loaded Weight

-20%

2.8%

9.4%

Front Truck

Rear Truck

Why The Difference?

Significant Culprit: Lateral Offset

Luke Humpreys (Auburn)

Ranger $\rightarrow$ very precise lateral control
Low Speed Automation

- Yard Navigation
- Truck Backing
  - Trailer Docking
  - Trailer Parking
Trailer Angle Measurement

Laser Scanner
Automated Trailer Docking

Positioning for Docking Maneuver
Automated Trailer Spotting

- SwRI is actively developing enabling technologies relevant for automated trailer spotting
  - Precision automated docking
  - Complex path planning for vehicle with a trailer
  - Precise and Robust Localization
  - High-reliability object detection
Thank You!