Problem
11.8% of crashes involve one large truck [1]
- 8 out of 10 people in these crashes killed
Average truck driver sleeps 4.78 hours before 10-13 hr shift [2]
- About half reported experiencing at least one 6-min drowsy period
Economic Impact:
$13,033,724 saved each year in U.S. with truck drivers:
Average truck driver sleeps 4.78 hours
11.8% of crashes involve one large truck [1]

Goal
1. Determine optimal camera location
   - Captures all 36 eye points
2. Minimize driver obstruction of view
3. Evaluate best feedback system
   - Intuitive not intrusive

Feedback System

Auditory Warnings:
- "Eyes on the road" → "Alert, Alert"

Visual Warnings:

Combination Warnings:

Participant Survey
Participants filled out surveys giving their opinions on the feedback systems, camera locations, and alertness monitoring system.

Simulation
A truck simulator was used to test the different camera placements and warning systems. While all four cameras recorded, drivers were asked to perform a series of tasks, such as:
- Looking at different areas of the cab
- Answering and dialing a number using a cellphone
- Wiping the steering wheel and dashboard
- Reading a piece of paper taken from their pocket
Drivers were then exposed to different warning systems and asked to evaluate them.

Results
14 participants with varying attributes including:
- Gender
- Truck Drivers
- Height

Category 1: one eye missing
- Best: Cameras 1 & 2
- Worst: Camera 4
due to angle of camera

Category 2: both eyes missing
- Best: Camera 4
due to nose blocking left eye

Category 3: eyes obstructed
- Best: Cameras 1 & 2
- Worst: Camera 3
due to brim of glasses or arms reaching above

Recommendations
- They capture the eyes the most & deliver better fields of view that constantly span the driver's eyes.
- Participants rated both locations as more obstructive but with marginal difference to the other two.

Camera locations: 1 and 2
- Auditory warnings → most intuitive
- Visual warnings → least annoying
- Truck drivers, however, found visual warnings highly annoying.

References:
[1] "Large Trucks and Buses by the Numbers", Federal Motor Carrier Safety Administration
[6] "Paccar represents Anuj Srinivasan, Buchanan, supervisor Raeef Barsoum, and Paccar representatives Anuj Srinivasan, Robert Peckham, and Josef Tarp
[8] "Category 3:的眼睛被遮挡。
- Best: Cameras 1 & 2
- Worst: Camera 3
due to movement from given tasks