



case study

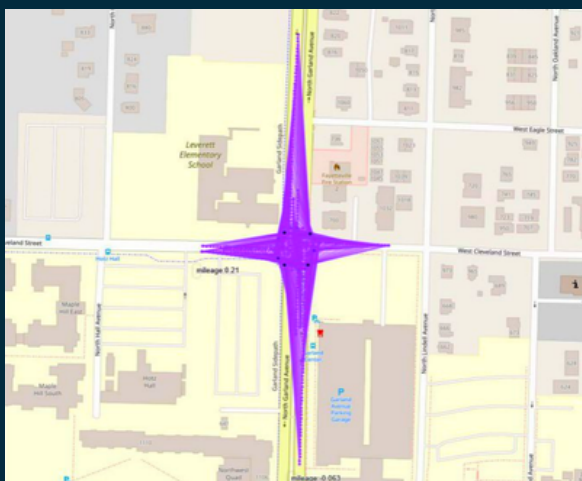
A Comprehensive Approach to Intersection Sight Distance & Vulnerable Road User Safety

Overview

The intersection of Garland Avenue and Cleveland Street, located on the University of Arkansas campus, experiences high volumes of vehicle and pedestrian traffic, creating safety concerns for pedestrians navigating the intersection.

Following recent pedestrian incidents, the University initiated a safety study with Olsson to better understand intersection conditions and determine whether pedestrians and motorists have adequate sight distance to safely identify and react to potential conflicts.

In partnership with Olsson, RDV Systems used its **RSA 3D platform** to conduct an **Intersection Sight Distance (ISD) analysis**. Using a LiDAR-based 3D model, RSA 3D evaluated visibility across real-world scenarios involving stopped and moving vehicles, buses, and pedestrians.



Garland Avenue & Cleveland Street

By analyzing multiple vehicle movements, pedestrian paths, and potential conflicts within the same 3D digital environment, RSA 3D provided an objective, data-driven assessment of sight distance throughout the intersection. The analysis identified locations where adequate visibility was available while also pinpointing areas where roadway geometry, vehicles, or surrounding features created potential sight-line constraints.

Why This Approach Matters

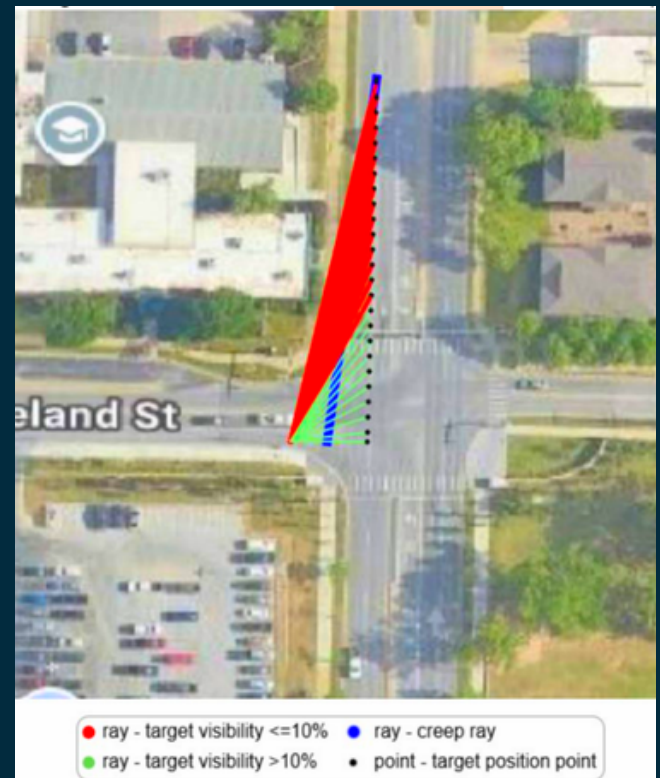
RSA 3D enables engineers to consistently evaluate vehicle and pedestrian movements, speeds, and sight conditions within a single 3D environment. Its repeatable, data-driven sight-line analysis helps identify visibility constraints and focus field reviews and design efforts on specific approaches, turning movements, and crosswalk interactions where safety concerns may exist.

Testing Multiple Speeds & Turning Movements

The analysis evaluated multiple conflict scenarios, including stopped and moving vehicles, vehicles and pedestrians in crosswalks, and other vehicle-pedestrian interactions. Garland Avenue was analyzed at speeds of 25 mph and 35 mph, while Cleveland Street was evaluated at 20 mph. The analysis generated an ISDQuality data item representing the percentage of the line-of-sight triangle that is visible, ranging from 0 to 1.0, with 1.0 indicating 100% visibility.

Representative Maneuver	Speed	ISDQuality	Observation
Garland NB → Garland SB, left-turn view	25	1.00	Strong modeled visibility
Garland SB → Cleveland WB, right turn	20	0.65	Reduced visibility; creep case
Cleveland WB → Garland NB, right turn	25	0.58	Reduced visibility
Cleveland EB → Garland SB, right turn	25	0.38	Lowest 25-mph vehicle result
Cleveland EB → Garland SB, right turn	35	0.31	Lowest 35-mph vehicle result

Key Finding: Several right-turn sight lines produced lower ISDQuality values than cross-over and left-turn views. RDV introduced the “creep factor” to measure how far a driver must move beyond the stop bar—often into the crosswalk—to achieve adequate visibility. For one maneuver, even the maximum allowable creep did not achieve the target visibility.



Speed Matters

Increasing Garland Avenue speed from 25 mph to 35 mph further reduced visibility for constrained movements. The Cleveland WB-to-Garland NB right turn decreased from 0.58 to 0.42, while the EB-to-Garland SB right turn decreased from 0.38 to 0.31. These results demonstrate how changing operating conditions can affect sight distance and identify areas requiring further review.

One Digital Environment. Multiple Road Users.

RSA 3D extended the analysis beyond vehicle-to-vehicle sight distance to evaluate pedestrian visibility across multiple scenarios, including moving vehicles viewing pedestrians, stopped vehicles viewing pedestrians in crosswalks, and turning vehicles approaching crosswalks. This provides engineers with a consistent way to evaluate both vehicle and vulnerable road-user visibility within the same digital environment.

Pedestrian Scenario	ISDQuality Range	What the Results Show
Static Pedestrians vs. Moving Vehicle	0.50 - 1.00	Some approaches had reduced visibility
Stopped Vehicle vs. Pedestrian in Crosswalk	0.66 - 1.00	Most modeled movements were 1.00
Turning Vehicle vs. Pedestrian on Crosswalk	0.57 - 1.00	Lowest value occurred at 35 mph

From Complex Data to Actionable Safety Insight

- **Pinpoint constrained sight lines** using repeatable 3D visibility rays.
- **Compare operating conditions** including speed, turning movement and driver eye position.
- **Focus engineering review** on geometry, vegetation, roadside objects, crosswalk placement, and other visibility influences.
- **Create visual, shareable evidence** for designers, safety teams, and decision-makers.



Why RSA 3D

RSA 3D transforms complex roadway data into actionable safety insights by enabling engineers to evaluate multiple movements, speeds, road users, and visibility conditions within a repeatable 3D environment. Using LiDAR, CADD, GIS, and other roadway data, RSA 3D automates safety and geometric analyses to help agencies identify potential deficiencies, focus engineering review, prioritize improvements, and make more informed, data-driven roadway safety decisions.

Find Out How RSA 3D Can Support Your Roadway Safety Program



CONTACT RDV SYSTEMS