HYPOINT

LIDAR-Based Vehicle Classification System

System Overview:

LIDAR-based vehicle classification system from HyPoint offers robust and real-time traffic analysis capabilities designed to meet the needs of modern transportation monitoring. The system will accurately classify vehicles into one of 15 categories, which include the 13 official Federal Highway Administration (FHWA) vehicle classes, as well as two additional categories designated as “Not Used” and “Unknown Vehicle Type” to be defined in coordination with Maine DOT. Using high-resolution LIDAR sensors, the system generates detailed point clouds that allow for real-time detection and classification of vehicles traveling at posted roadway speeds.

System Features:

- Real-time vehicle detection using 3D LiDAR point cloud data
- Accurate classification by FHWA vehicle class (1–13)
- Precise axle count for reliable identification of vehicle types
- Real-time speed measurement with an accuracy of ±5 miles per hour
- Speed and direction data synchronized with classification and timestamp
- All-weather, day/night operation for uninterrupted performance
- Onboard edge processing to minimize bandwidth and reduce latency
- Operating Temperature: -22°F to +120°F (-30°C to +50°C)
- Only metadata and classification results transmitted
- API support for integration with custom applications and roadside systems
- Communication Protocol: WiFi 6 dual-band 802.11 ax/ac/a/b/g/n

Vehicle Classification Categories:

Passenger Vehicles and Light Trucks
- Class 1 – Motorcycles
- Class 2 – Passenger Cars
- Class 3 – Other Two-Axle, Four-Tire Vehicles

Single Unit Trucks
- Class 4 – Buses
- Class 5 – Two-Axle, Six-Tire Trucks
- Class 6 – Three-Axle Trucks

Combination Trucks
- Class 7 – Four or More Axle Single Unit Trucks
- Class 8 – Four or Fewer Axle Single Trailer Trucks
- Class 9 – Five-Axle Single Trailer Trucks
- Class 10 – Six or More Axle Single Trailer Trucks

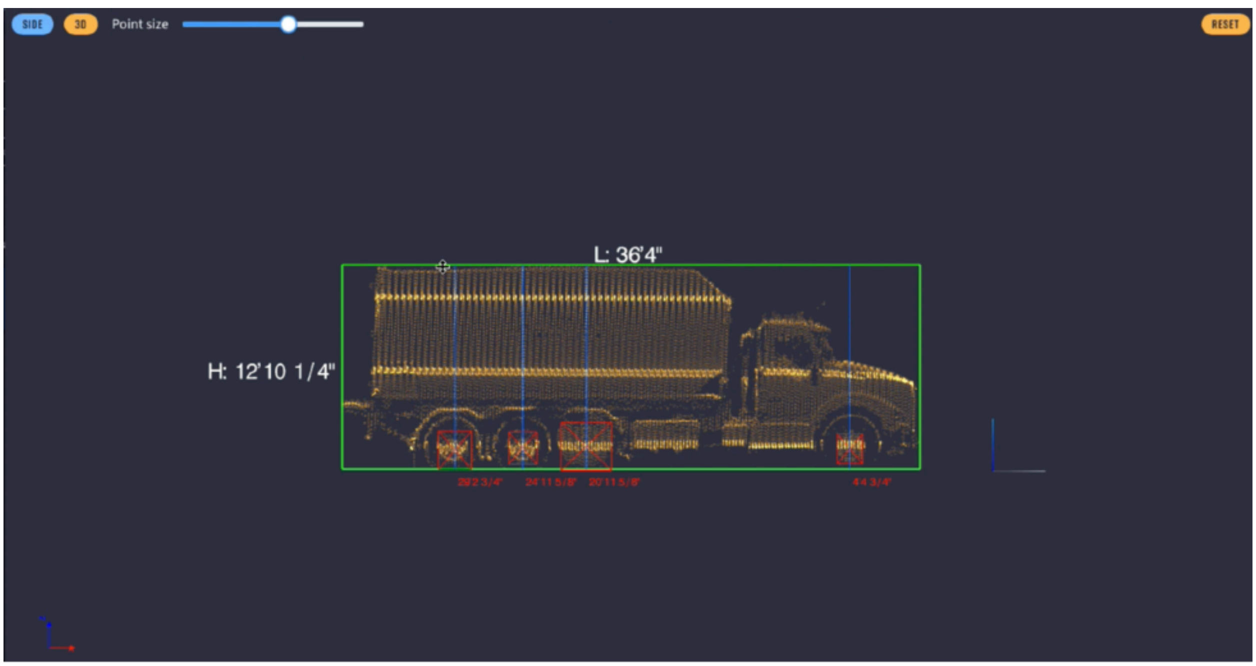
- Class 11 – Five or Fewer Axle Multi-Trailer Trucks
- Class 12 – Six-Axle Multi-Trailer Trucks
- Class 13 – Seven or More Axle Multi-Trailer Trucks

Additional Categories
- Class 14 – Not Used
- Class 15 – Unknown Vehicle Type

LIDAR Sensor Specifications:

- **Maximum Detection Range:** 200 meters at 30% reflectivity
- **Field of View (HxV):** 60° × 16° (3 scan lines: +8°, 0°, -8°)
- **Horizontal Angular Resolution:** 0.22°
- **Frame Rate:** 380 Hz; 1140 lines per second
- Range Accuracy: ±3 cm
- **Operating Voltage:** 10–15 V
- **Power Consumption:** 12 W
- **Laser Wavelength:** 905 nm
- **Laser Safety Classification:** Class 1 (eye-safe)
- **Environmental Protection:** IP67 rated
- **Points per Second:** Approximately 315,000 (single return)

LIDAR Generated Point Cloud



LIDAR-generated point cloud of a classified truck, displaying real-time height and length dimensions, axle positions, and axle spacing—captured at posted speed for FHWA-compliant vehicle classification.