

VANTAGE 3D Obstacle Detection and Avoidance



Visual navigation with 3D laser overlay



FORECAST 3D laser sensor

The VANTAGE 3D Obstacle Detection and Avoidance system developed by Autonomous Solution Inc. (ASI) is a complete, laser-based obstacle detection and avoidance solution, not just a laser scanner. Its output is a full traversability map showing both positive and negative obstacles, suitable for input into any path planning algorithm. VANTAGE's range, field of view, resolution, and update rate make it a solution for large unmanned vehicles operating at speeds of 25-30 mph. VANTAGE has seen thousands of hours of use in outdoor operational environments and is a proven hardware/software solution.

Under the Hood:

VANTAGE algorithms minimize false positives while maximizing detection of small obstacles at speed. Separate algorithms single out and distinguish negative obstacles. By combining wide spatially referenced areas, variations in vehicle roll and pitch are accounted for without the need for high accuracy IMU data. The algorithms have been tuned to maximize detection of obstacles in outdoor inclement environments such as rain, snow, and dusty conditions.

Self-diagnostic algorithms detect sensor and processor faults in addition to detecting the sensor horizon and monitoring data quality in real time. VANTAGE's reactive planner processes sensor data to plot a safe course around obstacles or halt movement depending on your safety parameters.

With a useful look-ahead distance of up to 50 meters, and hardened, field-tested packaging, VANTAGE can allow for safe operation of autonomous vehicles in real-world environments.

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VANTAGE Features and Highlights

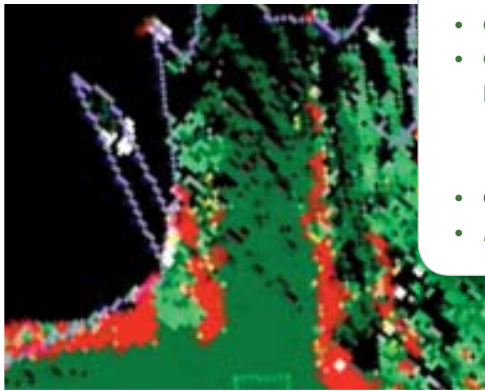
Performance

- Detects objects 1m in height out to 50m, and obstacles as small as 30cm out to 20m
- Consistently detects humans and vehicles at 40m or more
- Detects vertical drop-offs out to 20m
- Detects cliff faces and negative obstacles
- Detects holes deeper and greater than 30cm in diameter out to 10m
- Full scan rate of 2Hz
- Works well in moderate rain and dust
- Reactive planner plots safe course around obstacles or halts vehicle movement



Specifications

- Outputs row/column cost map as AS-4/JAUS message
 - Communicates by UDP over Ethernet
 - Other protocols and carriers available
 - Cost map size and resolution are configurable
- Nominal values:
- 0.25m resolution
 - 100 x 100m grid
- Configurable object marking criteria
 - Maximum range up to 50m



Tools

- Calibration tool allows for precise alignment of sensor data to vehicle using targets and real obstacles
- Visual status indicator for troubleshooting shows which components of the system are functioning correctly

