Seyond. See smarter™

Bringing light to life

Seyond™ is defined by devotion to its mission — to design, build, and mass produce the world's highest-performing state-of-the-art LiDAR systems. Headquartered in Silicon Valley, with additional facilities in Suzhou and Shanghai, Seyond represents the vanguard in long-range image-grade LiDAR and autonomous driving. Our technologies are enthusiastically embraced across automotive, smart transportation, rail transit, and industrial automation by industry leaders across the world. We attribute our success to a simple formula that unifies clarity of vision, tireless dedication to quality engineering & manufacturing and unwavering commitment to our customers.

So how can we help you today?

Seyond Europe GmbH

Founded in 2016, Seyond is headquartered in Silicon Valley, USA, and has more than 800 employees with core R&D teams worldwide. These include our European team who is nestled in Eschborn, near the bustling city of Frankfurt am Main, Germany. Headed by Conrad-Christian Kimmle, Seyond Europe GmbH, with its strategic location, serves as our gateway to service the extensive and diverse needs of the European market–connecting us with clientele ranging from automotive manufacturers to pioneering intelligent transportation system makers.

Rigorously Tested & Ready for Delivery

ISO26262-2-9:2018 | ISO9001 | IATF 16949:2016

Smart Highway Solution

Based on High-performance Image-grade LiDAR

With the rapid development of socio-economy and the continuous increase in highway mileage, the issues of frequent accidents and traffic congestion have become increasingly prominent. Traditional sensors on highways are no longer able to meet the growing transportation demands.

Seyond's smart highway solution is based on high-performance image-grade LiDAR technology, providing comprehensive and high-precision vehicle perception and event detection capabilities to customers. Its intelligent road analysis ensures the safe operation and traffic efficiency on the highway.

Functions

Vehicle Perception

Output 3D vehicle shapes with high-precision length, width, and height information, accuracy up to 10cm
Support long-distance tracking and positioning of target vehicles

Traffic Flow Analysis

Identify 4 vehicle types, including small, medium, large vehicles, and extra-large vehicles
Monitor traffic flow and vehicle speed, providing 3D vision for traffic management

Traffic Event Detection

Support 6 types of traffic event detection, including debris detection, pedestrian detection, abnormal parking, weaving driving, occupying multiple lanes, and driving against traffic
Event detection accuracy ≥99%

Signal Trigger

Work with camera and weighing systems
Unaffected by light conditions, providing triggering signals 7x24H, reducing light pollution

Deployment

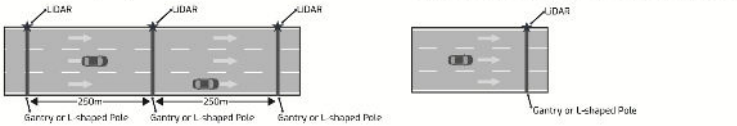
Highway Tunnel

Tunnel Deployment

Highway Mainroad

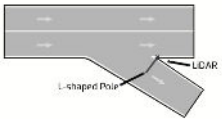
Mainraod Deployment

Traffic Volume Survey Station Deployment



Highway Ramp

Ramp Deployment



Use Case

Advantages

- Full Stack Solution with Software and Hardware
- 3D Road Condition Perception
- Wide Coverage and Easy Deployment
- Centimeter-level Detection Accuracy
- 7x24H Real-time Detection

Vehicle Overlimit Management Solution

Based on High-performance Image-grade LiDAR

Based on Seyond's high-performance LiDAR and algorithm, OmniVidi for VOM provides 360° 3D perception with high-precision of vehicle 3D size information for traffic management.

This is a revolution on redefining the solution of monitoring oversized vehicles. It can be applied to various scenarios like state highway, bridge, and tunnel etc. to prevent accidents or impacts on traffic flow caused by height, length, and width violations.

Functions

- Car Dimension Detection
- Signal Trigger
- Weaving Driving Detection Precision
- Traffic Flow Analysis

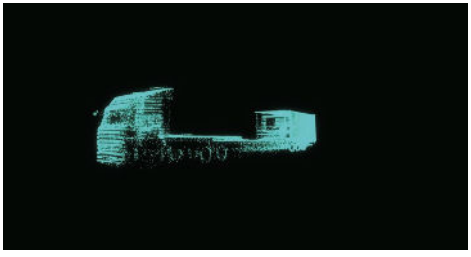
Length Measurement	≤ 20CM
Width Measurement	≤ 10CM
Height Measurement	≤ 10CM

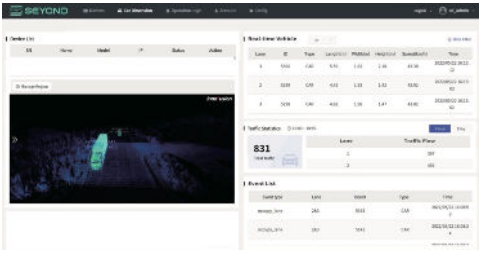
≥98%	≥99%	≥98%
Trigger Rate Accuracy	Occupy Multiple Lanes Detection Accuracy	Traffic Flow Analysis Accuracy

≤ 8%	≤ 10%	≥ 98%	<0.01%	<0.01%	10Hz(Configurable)
Yaw Angle Error	Speed Error Rate	Tracking Rate	Undetected Rate	Wrong Detection Rate	Frame Frequency

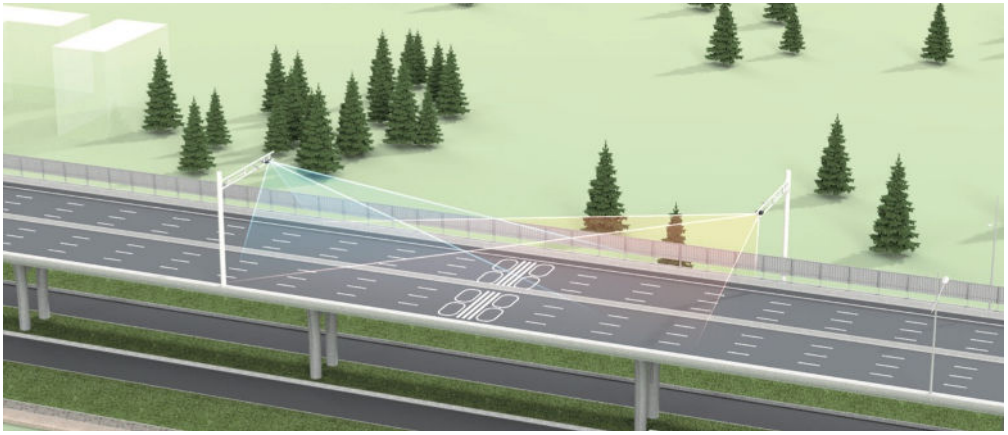
*Data of merging area of two LiDARs

Display





Deployment



System Configuration

LiDAR×2	MEC	Switch	OmniVidi for VOM

Customer Benefits

Alternative solution of current single-line LiDAR, with high detection and trigger precision, traffic flow and vehicle speed monitoring, and illegal driving behavior detection.
Save additional costs on new infrastructure such as poles, easy deployment and maintenance with no impact on traffic flow.
Applicable to diversified scenarios like state highway, bridge, and tunnel etc. to prevent oversizing violation by weaving driving, occupying multiple lanes, and driving against traffic.

Advantages

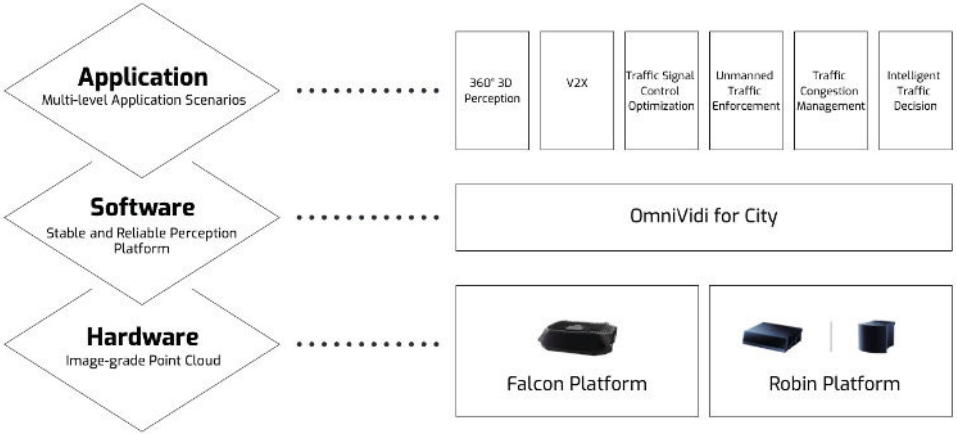
Centimeter-level Car Dimension Detection	Millisecond-level Position and Trajectory Tracking	Diversified Application Scenarios	7×24H Reliability
360° 3D Perception	High Detection and Trigger Precision	Easy Deployment and Maintenance	Driving Violation Detection

Smart Traffic Management

Based on High-performance Image-grade LiDAR

In the modern cities, there are serious traffic congestion and frequent traffic accidents. Relying solely on traditional traffic sensors is insufficient to provide precise, stable, and reliable traffic flow perception data to realize the "perception-control-decision-optimization" in traffic management. Seyond's smart traffic management solution, based on high-performance image-grade LiDAR and the OmniVidi perception platform, offers lane-level traffic flow perception data. While recognizing road users, it provides full-time, comprehensive information about traffic participants, generating multi-dimensional structured data and accurate traffic event information. The LiDARs help to get 3D perception of the traffic, meeting the needs of traffic management departments for dynamic analysis and intelligent scheduling of urban traffic

Architecture



Display

Application Scenarios

Vehicle-to-everything

- Sensing all road users to get 360° 3D perception of intersections, event warning and traffic data statistics.

1 Object Detection

- Car(Light/Heavy Vehicle)
- Bicycle
- Pedestrian
- Small Object
- Road Debris
- Lane Line

2 Object Recognition

- Class/ID/Dimension
- Distance/Speed/Acceleration /Angle/Lane Number
- Longitude & Latitude

3 Object Tracking

- Multi-object
- From Frame to Frame
- Unique-ID

Traffic Management

- Real-time monitoring of lane-level traffic flow and all types of traffic violations, supporting the high precision of intelligent traffic signal control and unmanned enforcement, supporting the digital upgrade of traditional traffic management.

1 Congestion Identification

- Lane-level Traffic Flow
- Lane-level Average Speed
- Lane-level Time Headway
- Lane-level Queuing Length

2 Event Detection

- Overspeed
- Driving against Traffic
- Illegal Parking
- Oversize
- Abnormal Car
- Road Debris Detection

3 Traffic Situation Analysis

- Traffic Flow Analysis
- Traffic Incident Alert

Advantages

AI + Clustering Perception Algorithm

Comprehensive Recognition of All Road Users

Lane-level Traffic Flow Perception

Multi-scene Traffic Event Detection

Real-time Traffic Monitoring

Smart Railway Solution

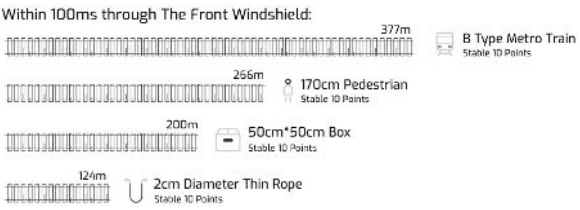
Based on High-performance Image-grade LiDAR

Traditional rail transit safety measures mainly rely on physical barriers and security personnel. In recent years, emerging monitoring methods such as electronic fences and intelligent video surveillance still have limitations such as short monitoring distance and high false alarm/missed detection rates.
In future, "automated driving" has become a new trend in rail transit, placing higher demands on train active detection systems.
Seyond's smart railway solution is based on high-performance image-grade LiDAR. It provides long-range, high-precision, all-weather, stable, and reliable monitoring. It supports deep learning algorithms for fast and accurate target perception, ensuring higher detection rates, lower false alarm rates, thus strengthening the lifeline of rail transit operations.

Application Scenarios

Proactive Detection

Installed on the train, the LiDAR can monitor of the track in front and surrounding area, ensuring the detection and recognition of objects and people infringing the safe braking range etc.
It differentiates the warning levels for sudden deceleration of the vehicle ahead and safe distance, assisting the driver or autonomous driving train to brake for safety.



Trackside Boundary Intrusion Monitoring

Boundary Intrusion Detection

Deployed on high-risk areas (mountain roads, public-rail overpasses, tunnel entrances, etc.), the LiDAR can identify obstacles threatening driving safety within the track limit, including geological disasters (landslides, falling rocks, landslides, etc.) or man-made reasons (throwing objects, abnormal human/animal stay on tracks, etc.) and natural causes (wind rolling large debris, etc.), assisting operation safety.

20cm x 20cm Box at 110m (100ms)

6 Points

20cm x 20cm Box at 110m (1s)

56 Points

Gap Detection between Metro Train and Platform Screen Door

Human Detection

Foreign Objects Detection

Deployed on high-risk areas (mountain roads, public-rail overpasses, tunnel entrances, etc.), the LiDAR can identify obstacles threatening driving safety within the track limit, including geological disasters (landslides, falling rocks, landslides, etc.) or man-made reasons (throwing objects, abnormal human/animal stay on tracks, etc.) and natural causes (wind rolling large debris, etc.), assisting operation safety.

Gap Detection between Metro Train and Platform Screen Door

Bag

Walking Stick

Thin Rope

Advantages

500m Ultra-long-range Detection	250m@10%(POD>90%) Continuous and Stable Detection	120°H×25°V Ultra-wide Field of View	0.09°H×0.08°V Ultra-high Resolution	1550nm Superb Anti-interference Capability
7×24H Accurate Monitoring	ASIL B Automotive Safety Levels	Automotive Grade High Stability and Reliability	Mass Production Fully Industrialized Production Line	

Smart Port Solution

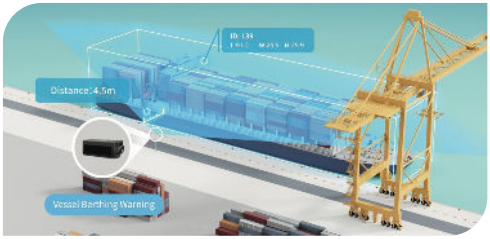
Based on High-performance Image-grade LiDAR

With the development of port industry, automation, digitization, and intelligence have become new drivers for smart port development. In recent years, the scale of terminal operations has been expanding constantly, presenting many challenges to production management at the terminal, such as increasing costs, continuous safety risks, insufficient staff capabilities, and lack of production efficiency. These are widely recognized industry problems that urgently need automated and intelligent means of production and management. Seyond's smart port solution is based on high-performance image-grade LiDAR, providing 24-hour, all-weather, high-precision cargo scanning and container positioning, helping increase operational efficiency at shore and yard. It assists autonomous trucks at the port area to better avoid obstacles in front and provides positioning guidance, ensuring safety and efficiency while reducing operating costs.

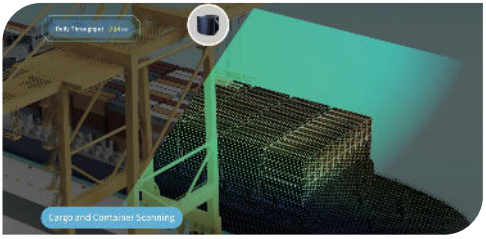
Products

 Falcon K	2m~500m(250m@10%) Detection Range	120°×25° FOV(H×V)	0.06°(0.09°×0.08° default) Resolution(H×V)
	150~200lines(150lines default) Scan Lines	5~30FPS(10 default) Frame Rate	30W Power Consumption
 Robin E	0.2m~250m(180m@10%) Detection Range	120°×24° FOV(H×V)	0.1°×0.1° Resolution(H×V)
	128 Lines Scan Lines	10~20FPS(10 default) Frame Rate	9W Power Consumption
 Robin W	0.1m~250m(70m@10%) Detection Range	120°×70° FOV(H×V)	0.1°×0.36° Resolution(H×V)
	192 Lines Scan Lines	10~20FPS(10 default) Frame Rate	9W Power Consumption

Application Scenarios

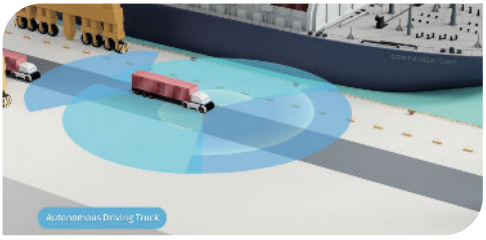


Vessel Berthing Warning



Cargo and Container Scanning

Automation for Grab Ship Unloaders



Autonomous Driving Trucks

Cargo Operation at Container Yard

Automated Container Handling

Advantages

7x24				
All-weather Accurate Detection	Image-grade Ultra-high Resolution	Automotive-grade Reliability	Fully Industrialized Production Line for Mass Production	Multi-scene Flexible Adaptation

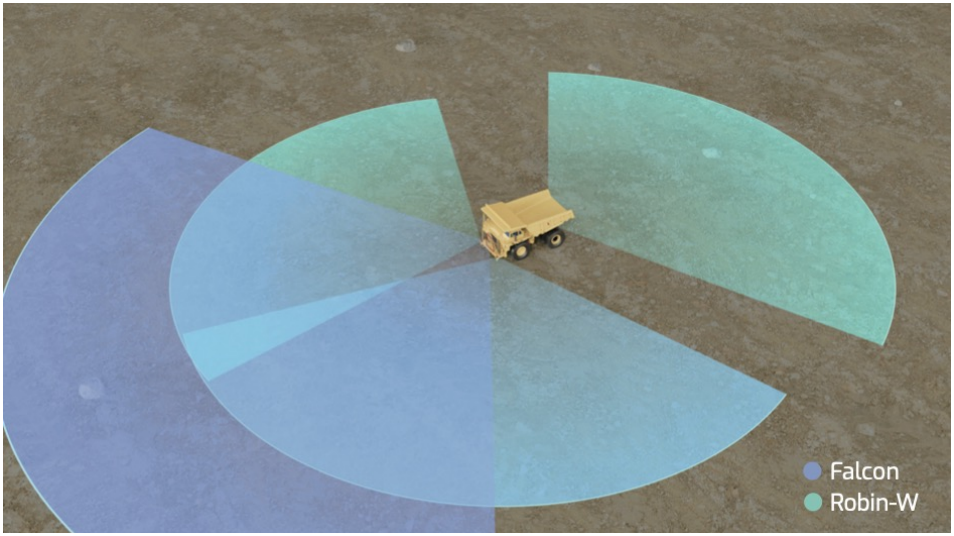
Smart Mining Solution

Based on High-performance Image-grade LiDAR

The mining operation environment is harsh, and it has long faced issues such as safety production and difficulties in recruitment. Driven by policies and the development of autonomous driving technology, the application of unmanned driving in mines has become an inevitable trend for intelligent mine operation.

Seyond's smart mining solution is based on high-performance image-grade LiDAR, providing high-precision long-distance detection capabilities and superior dust penetration abilities. It is not affected by the dust and direct sunlight in the mining area. The output of high-quality structured point cloud data facilitates algorithms, helping improve operational efficiency while identifying risks early to ensure operational safety. It empowers unmanned mining trucks to achieve scaled operation.

High-performance Front-view and Wide-FOV LiDAR Solution



Assisted Driving for Unmanned Mining Trucks

Ultra-high Resolution

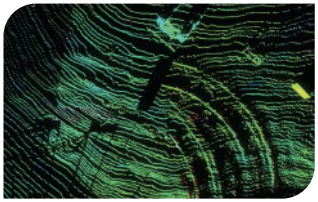
Coal mines are often located in environments filled with flying sand and rolling stones year-round. Seyond's high-performance image-grade LiDAR has extremely high resolution detection capabilities. It can accurately detect obstacles such as curbs, rut lines, and falling rocks, helping the fleet to discover potential dangers.

Ultra-long Detection Range

Mining trucks require the perception system to achieve longer-distance detection and discover obstacles such as rocks and falling rocks earlier. This provides timely and accurate decision-making support for planning safe routes for the trucks, avoiding larger economic losses.

Strong Environmental Adaptability

The mining work takes place in all weather conditions. Seyond's high-performance image-grade LiDAR can withstand temperatures as low as -40 centigrade and can also withstand the long-term severe vibrations in the mining area. It reduces the manual requirements for key production links such as stripping, loading, unloading, and transportation in open-pit mines, achieving efficient collaboration between production links.



Advantages

- Unaffected by Light Interference
- Excellent Dust Penetration Ability
- 7x24 All-weather High-precision Detection
- Automotive-grade Reliability
- Fully Industrialized Production Line for Mass Production

Our Products
Ultra Long-Range

Falcon K
Long Range is Safety

Long range LiDAR detection is a key technology that ensures more safety. Falcon K provides ultra-long detection range up to 500 meters and can detect dark objects with 10% reflectivity up to 250 meters. It spots distant obstacles earlier and gives the vehicle time to respond in advance, improving the autonomous driving experience.

Precision with Dynamic Region of Interest (ROI)
Falcon K delivers image-grade point cloud and dynamic region of interest (ROI). Image-grade point cloud and dynamic-frame high-density region of interest ensure clarity of key detection and safe autonomy in any environment.

more Info

Key Features

Detection Range	2 m – 500 m (250m @10%)
Resolution in ROI* (H x V):	0.09° x 0.08°
Field of View* (HxV):	120°×25°
Interface:	1.000base - T1 Automotive Ethernet
Dimensions (H×W×D)	60.4 mm × 228 mm × 149.8 mm
Weight	1.7 kg

*Configurable. For more information, please contact Seyond

Falcon Prime

Long Range is Safety

Falcon Prime is an image-grade LiDAR developed by Seyond as a core sensor for Intelligent Transportation Solutions (ITS) like V2X, smart highway, etc. Wide application scenarios include Smart City, Security, Railway and industrial automation. Highly-integrated design, easy deployment and maintenance enable its long-term stable operation on the roadsides

- 500m ultra-long detection range, image-grade ultra-high resolution
- Configurable scan pattern
- 1550nm laser wavelength, Eye-safe
- Mass produced high quality sensor

more Info

Key Features

Detection Range:	1.5 – 500 m (250m @10%)
Resolution in ROI* (H x V):	0.09° x 0.08°
Field of View* (HxV):	120°×25°
Interface:	TCP and HTTP APIs
Dimensions (H×W×D)	83.8 mm × 267.6 mm × 171.3 mm
Weight	2.3 kg

*Configurable. For more information, please contact Seyond

Our Products
Long and Mid-to-Short-Range

Robin-E

Powerful performance for safer mobility

Robin E features 200-meter range at 10% reflectivity with ultra-high resolution of 0.1°×0.2°, which ensures the perception and safety requirements of assisted driving.

The Robin E scanning architecture borrows from Falcon's proven automotive grade design, ensuring stable and reliable performance. With advanced modular design, Robin E can be easily integrated into roof, lights, bumpers or even behind the windshield with compact size and ultra-low power consumption.

more Info

Key Features

Detection Range	0.2m~250m (180m@10%)
Resolution(H×V)	0.1°×0.2°
Field of View(HxV)	120°×24°
Interface:	1.000base-T1 Automotive Ethernet
Dimensions (H×W×D)	34 mm × 122 mm × 105 mm
Weight	0.6 kg

Robin-W

Ultra-wide FOV

Robin W features an ultra-wide field of view (FOV) of 120°×70°, with broader side-view detection and no blind zones.
Robin W detects up to 70 meters at 10% reflectivity which is twice the detection range of other side-view lidar, while maintaining a minimum range of down to 0.1 meters which keeps the blind zone at an absolute minimum.
Robin W can provide image-grade resolution 0.1°(H)×0.36°(V) and over 1.77 million points per second, which enables better perception planning control.

more Info

Key Features

Detection Range	0.1m~250m (70m@10%)
Resolution(H×V)	0.13°*0.36°
Field of View(HxV)	120°×70°
Interface:	1.000base-T1 Automotive Ethernet
Dimensions (H×W×D)	85 mm × 102 mm × 105 mm
Weight	0.8 kg

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