PAISA

Vision for Safety

PRODUCTS

COLLISION AVOIDANCE SYSTEM (CAS)

Surface & Underground

CAMERA   DISPLAY UNIT   RADAR SENSOR   IN-VEHICLE PROCESSING UNIT

"Protect your team, equipment and infrastructure with the CAS device, a cutting edge and adaptable collision avoidance system developed specifically for the mining industry"

- ✔ Industry tested and proven reliable collision avoidance technology that sets the standard for workplace safety
- ✔ Improved operator spatial awareness and reduced incidence of injury and fatalities
- ✔ Fully configurable and adaptable to site-specific
- ✔ Provides real-time predictive proximity alerts and vehicle tracking via web-based reporting
- ✔ System is
  - ✓ configurable audible & visual alarms
  - ✓ OEM agnostic
  - ✓ Stand-alone system
  - ✓ Low "total cost of ownership"

SAFETY

Improve the safety of your mine, save time, avoid collisions, prevent fatalities and damage to vehicles & infrastructure.

4 %
of global **GDP** is lost annually due to Injuries.

7
Every **7** seconds, a worker is injured on the job.

60%
of workplace fatalities are vehicle related

3x
indirect costs of accidents are greater than >3x higher than direct costs

Collision Avoidance Systems (CAS) is an integrated risk management system for mines. A sophisticated operator's aid that allows for enhanced situational and proximity awareness, CAS improves safety on site by minimising risks. Proven in surface and underground environments, CAS performs detection and perceives depth and distance around corners, through strata and, importantly, between people, vehicles and infrastructure.

Specifically, CAS is effective in reducing the incidence of collisions between:
- Vehicles and people
- Vehicles and vehicles
- Vehicles and infrastructure

SENSOR SYSTEM

- ISO 21815 vehicle interface
- CANBUS integration
- Configurable warning distance and detection range mode
- Configurable brake distance
- Data logging
- Realtime data sharing with control room
- No tags, & no beams
- Sensor fusion

RADAR

- Operating frequencies 77-81 GHz (3 centre frequency)
- 4 dimensions: range, speed, azimuth & elevation angle
- User-preference multimode, multi-band operation
- Plug & Play 360° data fusion
- Interference suppression

Field of view
140° HORIZONTALLY

Coverage of
28° IN ELEVATION

Range interval of
0.1 to 300 METRES

DEPTH CAMERAS

- Machine vision algorithms
- Multiple cameras creating a single picture, wide field of view
- Artificial intelligence at the edge
- Self calibrating
- Lidar backed for increased perception
- Combined long-range depth perception with AI to perceive your environment in 3D with up to a 120° wide-angle field of view.
- Built-in IMU, Barometer, Magnetometer & Accelerometer
- Featuring 9-DoF sensors for spatial and positional awarenes

MONITOR & SPEAKERS

Displays detection data on a map and provides an intuitive description of relative distance and level severity. Audible audio to alert operators of imminent collision scenarios for intervention to be taken.

RADAR

PERFORMANCE	Perception 2		Perception 3		
	Long-Range Mode	Medium-Range Mode	Long-Range Mode	Medium-Range Mode	Short-Range Mode
Operating Frequency	76...77 GHz 4 center frequencies	76...77 GHz 2 center frequencies	76...77 GHz 4 center frequencies	76...77 GHz 2 center frequencies	76...77 GHz 1 center frequency
Detection Range Passenger Car	180 m / 590.6 ft	66 m / 216.5 ft	300 m / 787.4 ft	100 m / 328.1 ft	40 m / 131.2 ft
Detection Range Min...Max	0.9...180 m / 2.95...590.6 ft	0.33...66 m / 1.08...216.5 ft	1.2...300 m / 3.94...787.4 ft	0.5...100 m / 1.64...328.1 ft	0.2...40 m / 0.66...131.2 ft
Range Separation	≤ 1.8 m / ≤ 5.9 ft	≤ 0.66 m / ≤ 2.17 ft	≤ 2.4 m / ≤ 7.87 ft	≤ 1.0 m / ≤ 3.28 ft	≤ 0.4 m / ≤ 1.31 ft
Range Accuracy	≤ 0.45 m / ≤1.48 ft	≤ 0.16 m / ≤0.53 ft	≤ 0.6 m / ≤1.97 ft	≤ 0.25 m / ≤ 0.82 ft	≤ 0.1 m / 0.33 ft
Speed Min...Max	-400...+200 km/h / -249...+124 mph		-400...+200 km/h / -249...+124 mph		-250...+200 km/h / -155...+124 mph
Speed Separation	≤ 0.26 m/s	≤ 0.26 m/s	≤ 0.26 m/s		≤ 0.52 m/s
Speed Accuracy	≤ 0.07 m/s	≤ 0.07 m/s	≤ 0.07 m/s		≤ 0.14 m/s
Field of View Azimuth	-50...+50°		-50...+60°		
Field of View Elevation	-10...+10°		-10...+10°		
Angle Accuracy Azimuth	≤ 0.5°		≤ 0.5°		
Angle Accuracy Elevation	≤ 0.5°		≤ 0.5°		

MECHANICAL

Weight	< 200 g / ≤ 7.06 oz		< 300 g / < 10.58 oz		
Dimensions	97.5 x 143 x 19.5 mm / 3.84 x 5.63 x 0.77 in		97.5 x 143 x 26 mm / 3.84 x 5.63 x 1.02 in		

GENERAL

Update Cycle Time	≤ 50ms		≤ 50ms	≤ 50ms	≤ 32ms
Operating Voltage / Power Supply	7 ... 32 V / < 7 W		7 ... 32 V / < 7 W		
Operating Temperature	-40...+85°C / -40...+185°F		-40...+85°C / -40...+185°F		
Interfaces	100 or 1000BASE-T1 Ethernet 1GBit (2-wire); 2xCAN FD 5Mbit/s		100 or 1000BASE-T1 Ethernet 1GBit (2-wire); 2xCAN FD 5Mbit/s		
Connector	MX4 Moles Series		MX4 Moles Series		
IP	IP 67		IP 67		

CAMERA INFORMATION

Video Recording

- Native resolution video encoding in H.264, H.265 or lossless format (on host)

Video Streaming

- Stream in realtime to control room over IP

ISP

- New ISP tuned with machine learning for AI and vision tasks

Video Mode	Frames per Sec	Resolution (Side by Side)
2.2k	15	4416 x 1242
1080p	30 / 15	3840 x 1080
720p	60 / 30 /15	2560 x 720
WVGA	100 / 60 / 30 / 15	1344 x 376

IMAGE SENSORS

Sensor Resolution

Dual 4M pixels sensors with 2 micron pixels

Sensor Format

Native 16:9 format for a greater horizontal field of view

Sensor Size

1/3" backside illumination sensors with high low light sensitivity

Shutter Sync

Electronic Synchronised Rolling Shutter

Camera Controls

Adjust Resolution, Frame rate, Brightness, Contrast, Saturation, Gamma, Sharpness, Exposure and White Balance

PROCESSING UNIT

Power Input: 9-45V DC Power input

Protection class: IP69

Dimensions: w250 x h105 x d170mm

Weight: 3.7kg

Operating Temperature: -25℃ to +65℃

PAISA
Vision for Safety

+27 010 057 4007

info@paisatechnology.com

www.paisatechnology.com

41 Juta St, Braamfontein, Jhb