

AI-supported pedestrian detection for warehouse trucks



Be visible

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Visibility in mixed traffic

Pedestrian traffic, frequent obstacles and narrow pathways create blind spots around forklifts. Cameras and in-cab displays help operators monitor the vehicle surroundings and reduce collision risks.

HD cameras and displays

- HD imaging makes areas outside the driver's direct view visible on the monitor.
- Low-light night vision supports operation in dark working areas.
- Laser-positioned fork cameras help operators handle loads when visibility is obstructed.



Risks in daily operations

Mixed traffic, limited visibility, driver fatigue, reversing and turning manoeuvres increase the risk of collisions, scrapes and run-over incidents.

The consequences can include production downtime, compensation claims and management accountability.

Collision prevention priorities

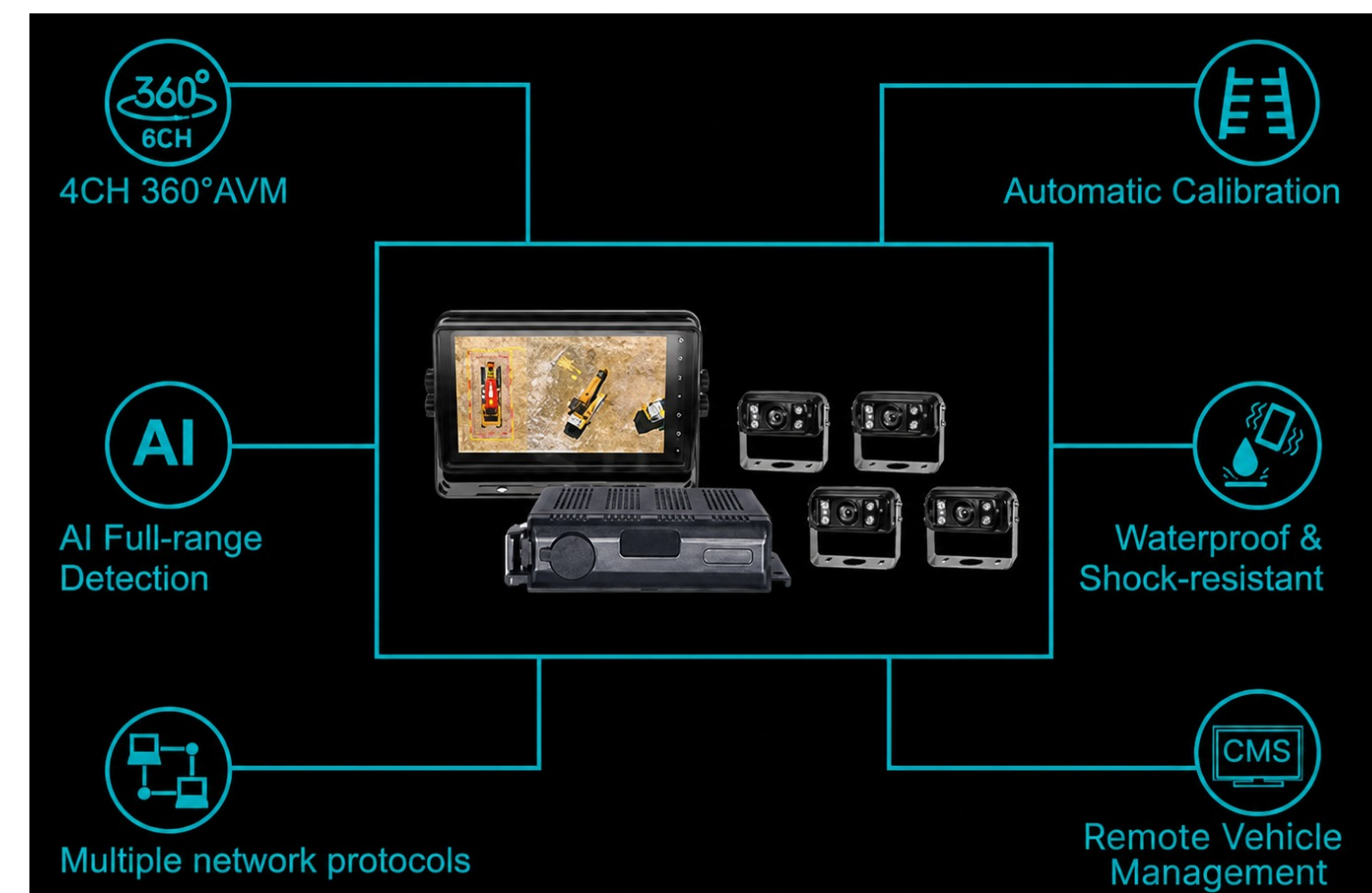
- Detect pedestrians around the forklift.
- Warn operators about hazards in blind spots.
- Reduce potential damage through timely intervention.



Rising labour costs and lean management priorities make workforce efficiency and equipment utilization essential for manufacturing and logistics operations.

Operational questions

- Are forklift assets still managed through manual records?
- Do newly purchased forklifts meet utilization targets?
- Can data improve scheduling across workshops with uneven workloads?
- Does time-clock-based evaluation reflect driver performance?
- How can operations reduce risks and prevent accidents?



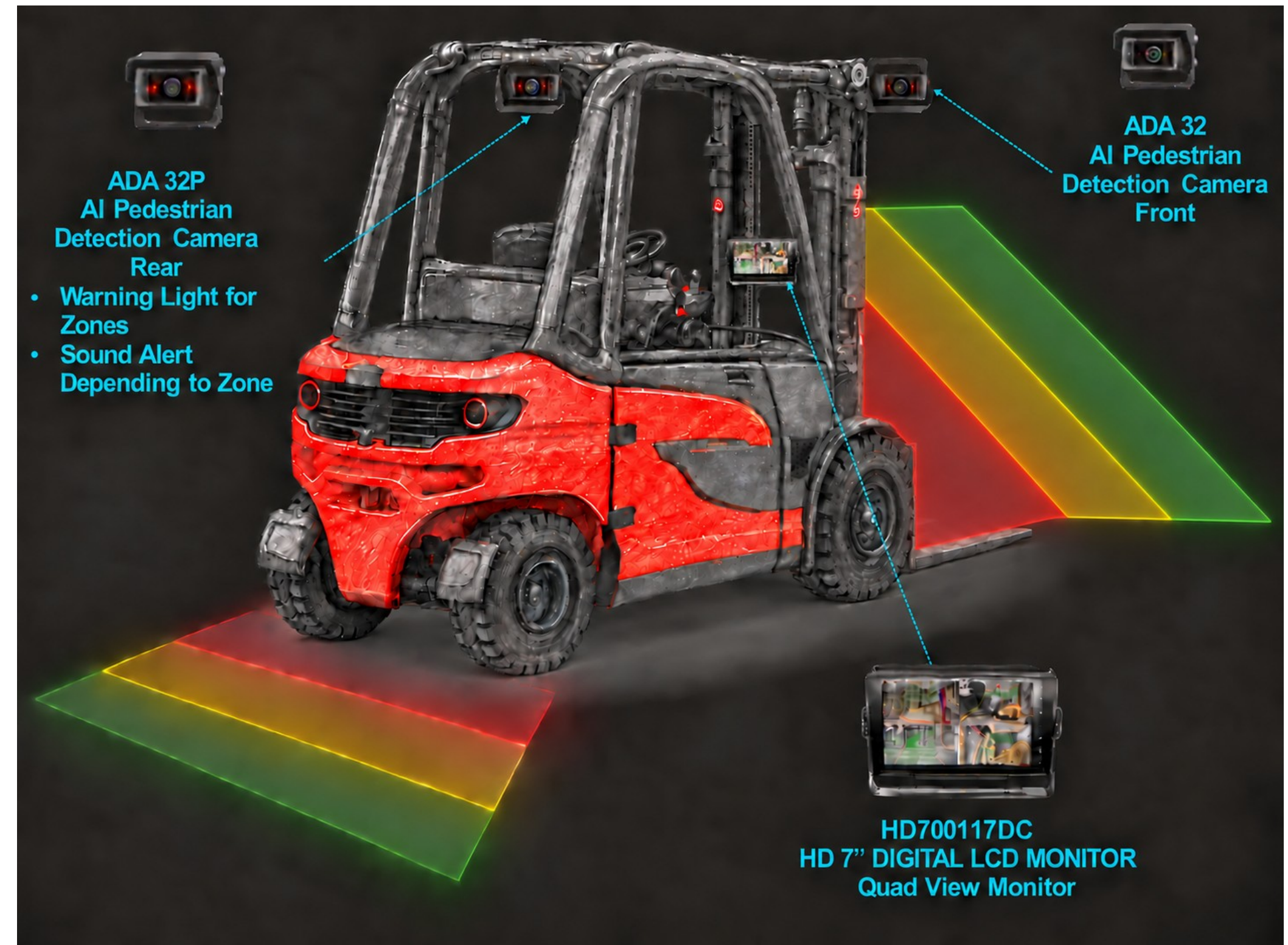
Detection and alerts

- AI BSD monitors the surroundings in three selectable detection zones.
- The monitor provides configurable audible and visual alerts when a pedestrian enters a selected zone.
- TC A systems also provide configurable audible and visual camera alerts for pedestrians.
- Vehicle detection is available in the three selectable zones.
- Three output cables support three speed-reduction levels, where the truck permits integration.



Detection and alerts

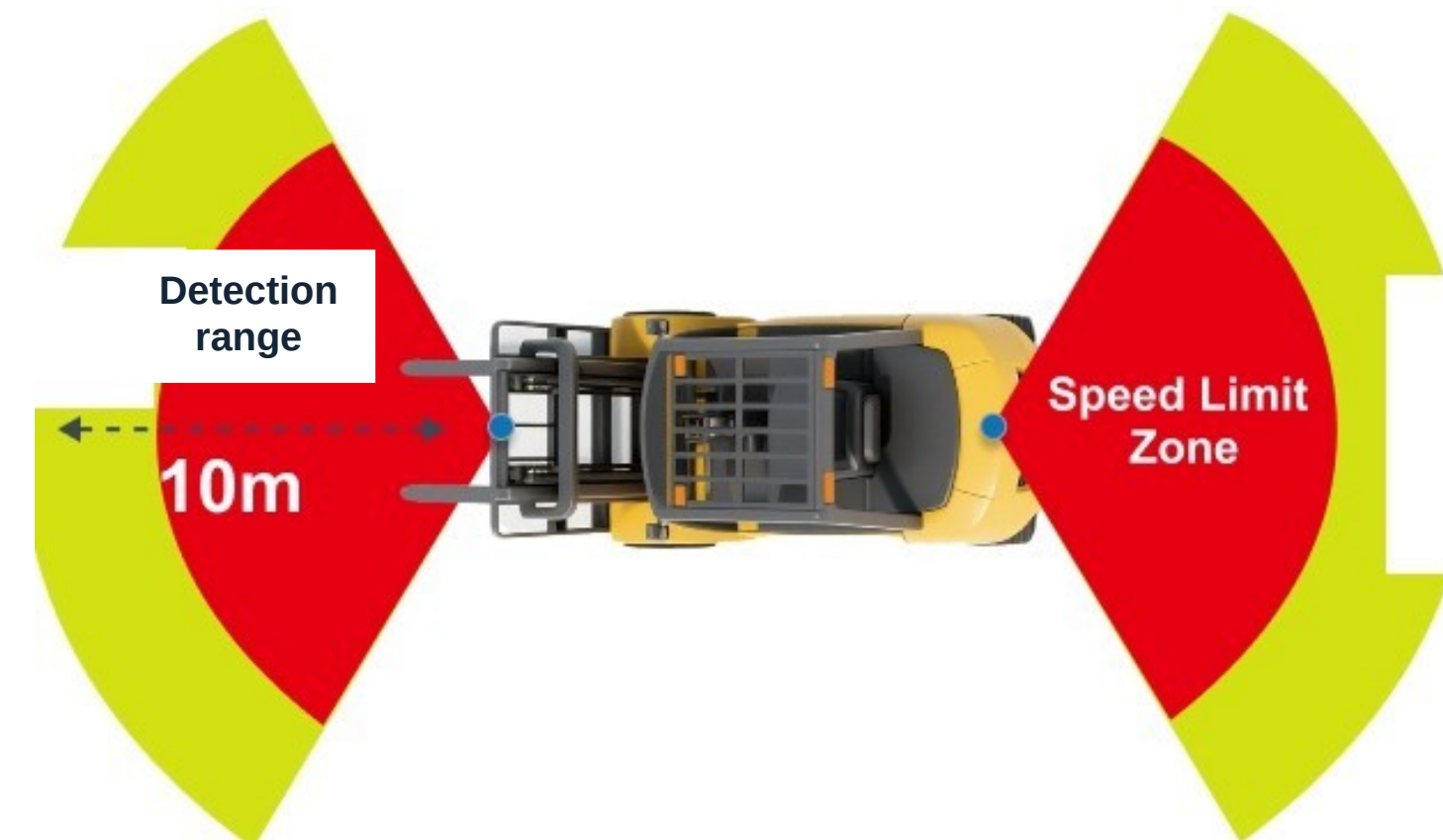
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- QR detection supports zoning and warns operators near doorways and pedestrian walkways.
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2 AHD cameras

- One front-view camera (130°) and one rear-view camera (130°).
- Real-time pedestrian detection, proximity audio alerts and switch signal outputs. No personnel ID badges required.



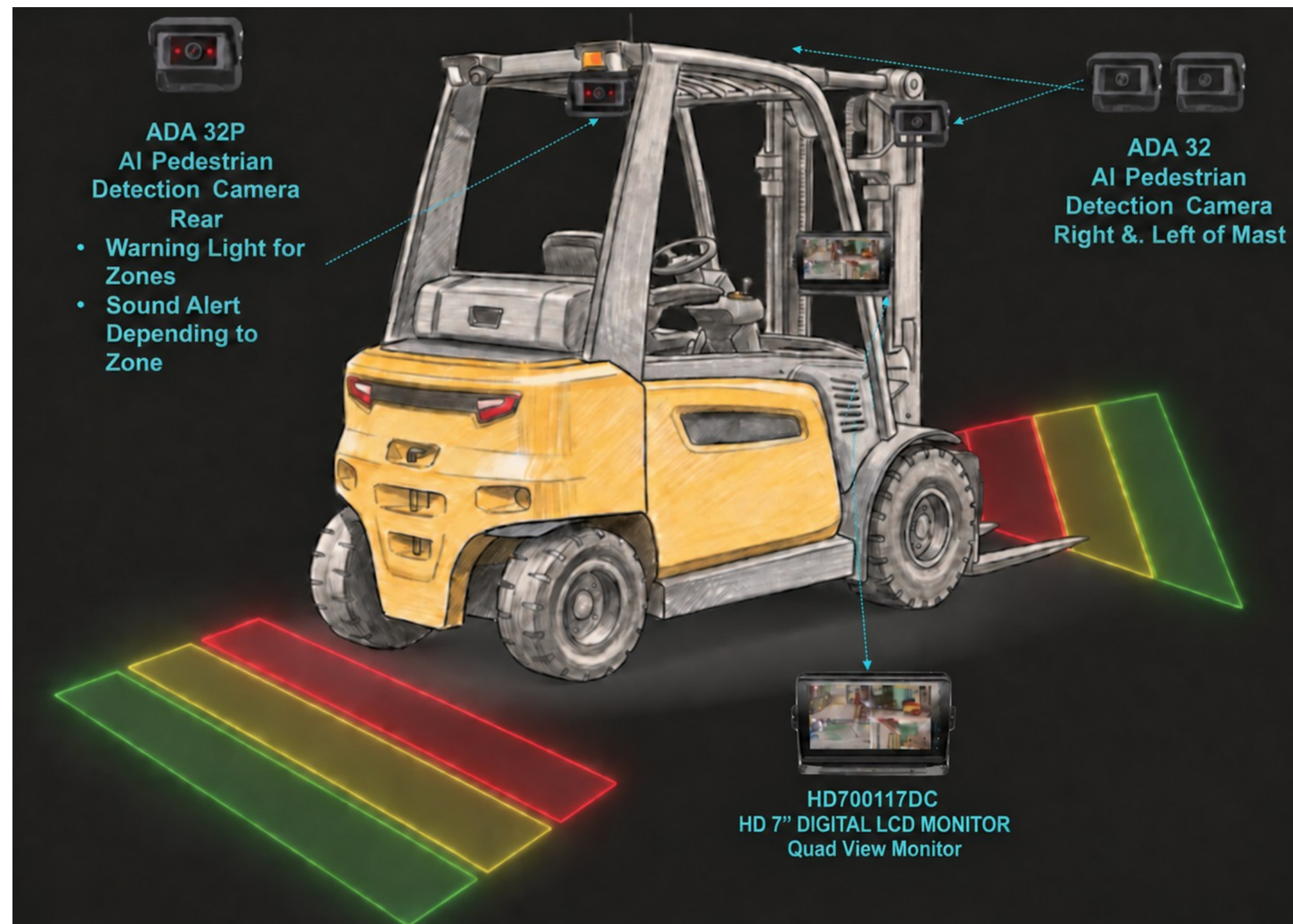
Camera coverage: 260° Maximum detection range: 10 m

Warning zone: detected

Speed limit zone: brake

Detection and alerts

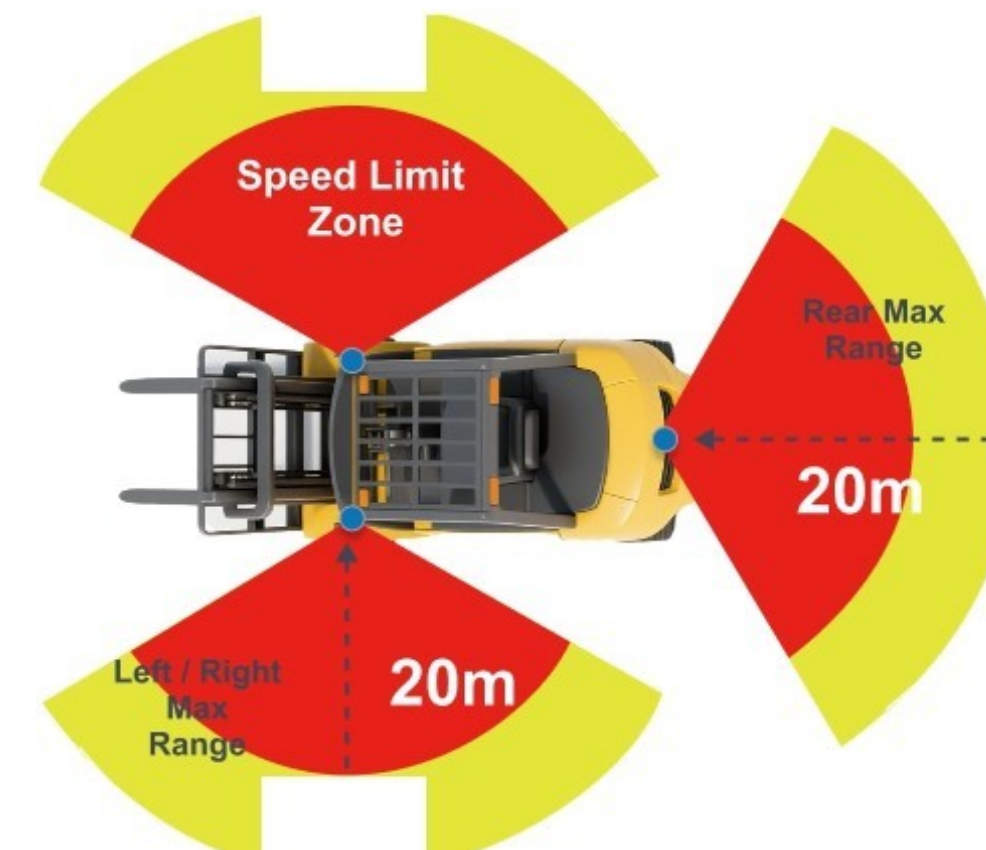
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3 pedestrian detection cameras

- Two side-view cameras (130°) and one rear-view camera (130°).
- Supports front-view visibility during cargo loading and unloading.



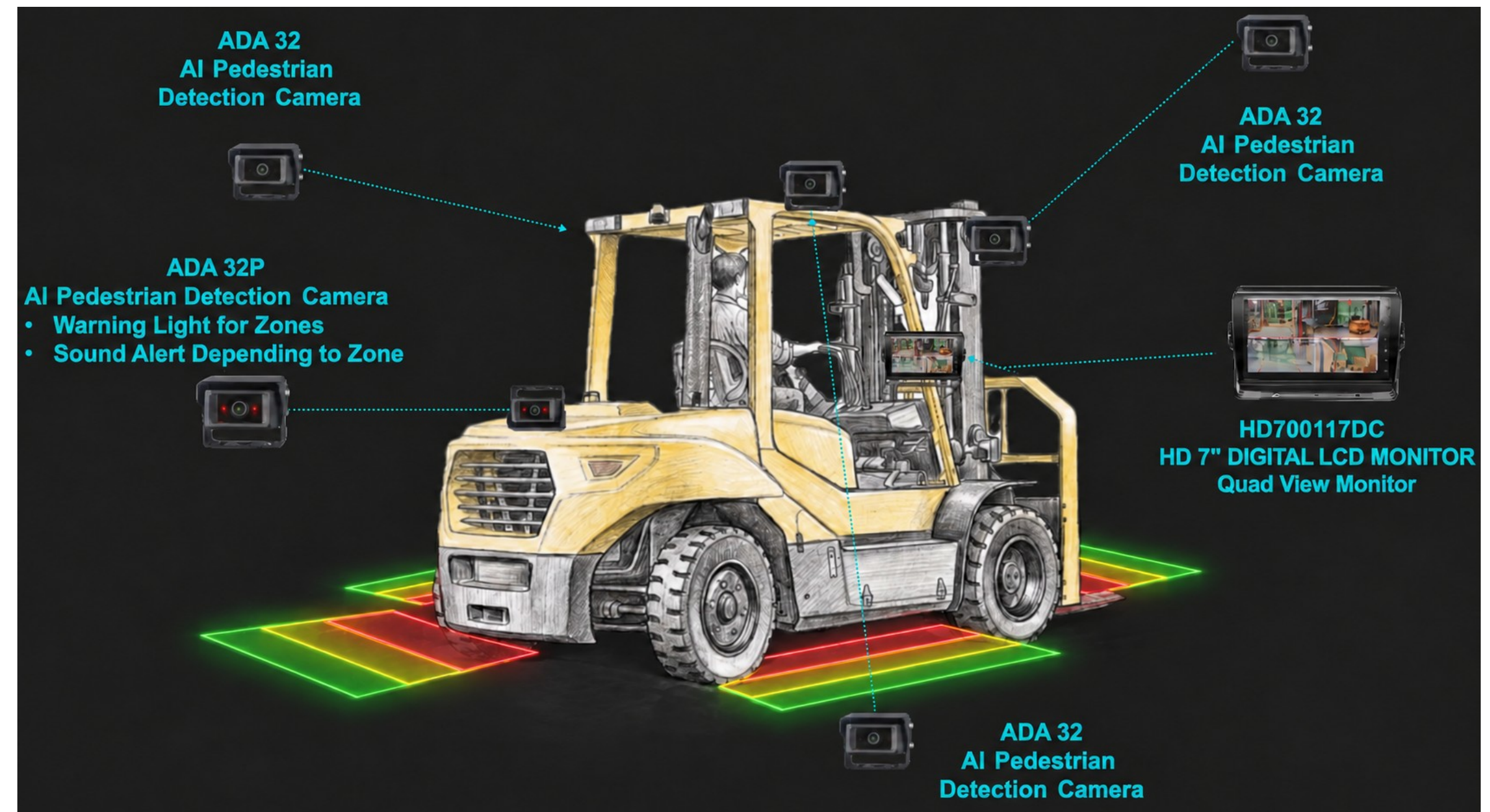
Camera coverage: 310° Maximum detection range: 20 m

Warning zone: detected

Speed limit zone: brake

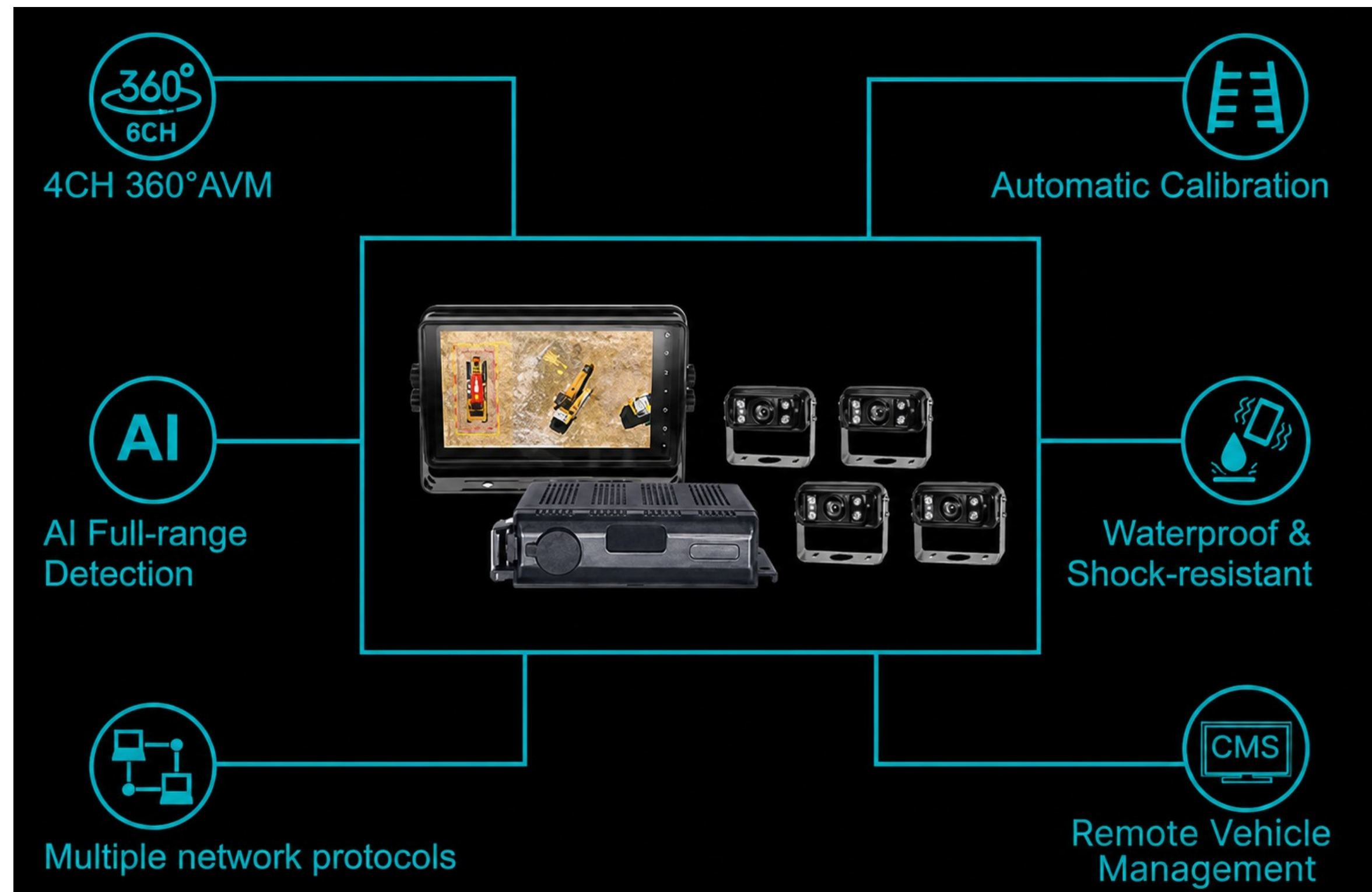
Detection and alerts

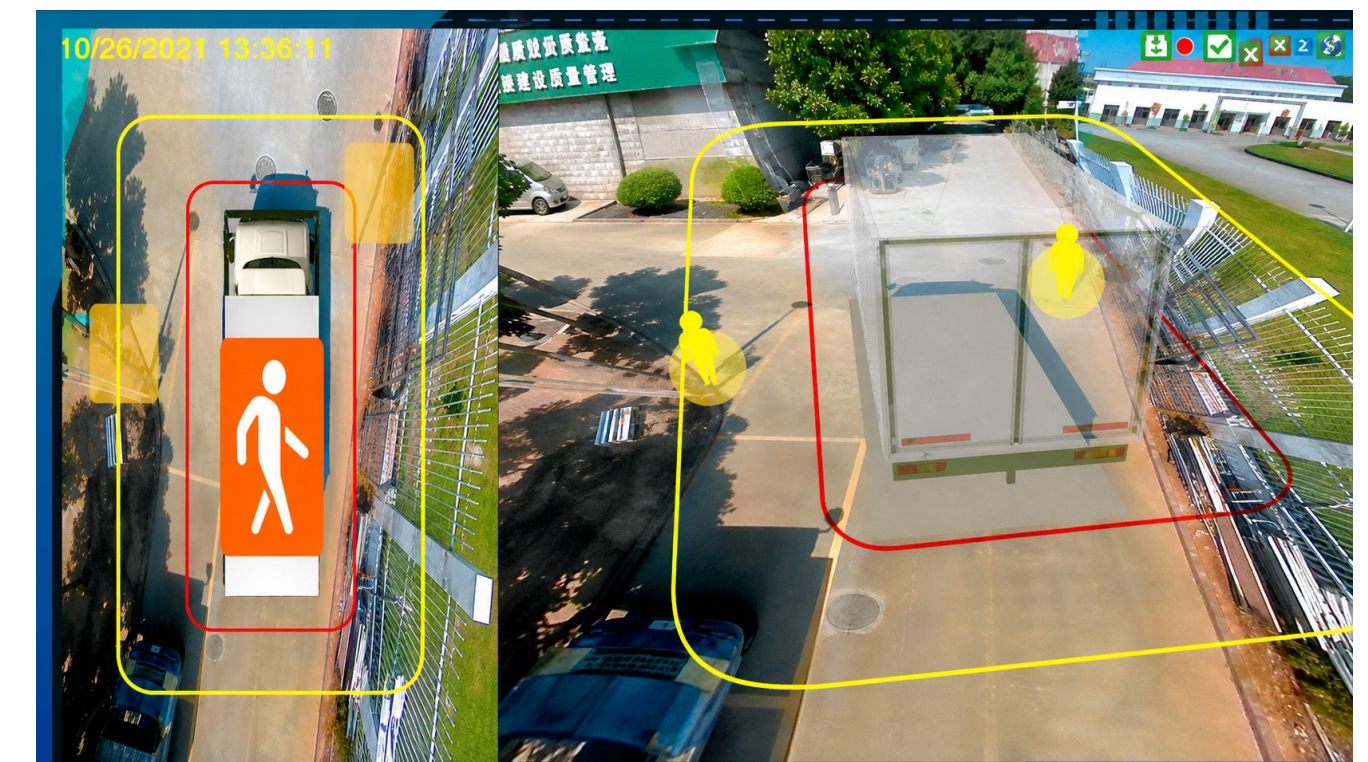
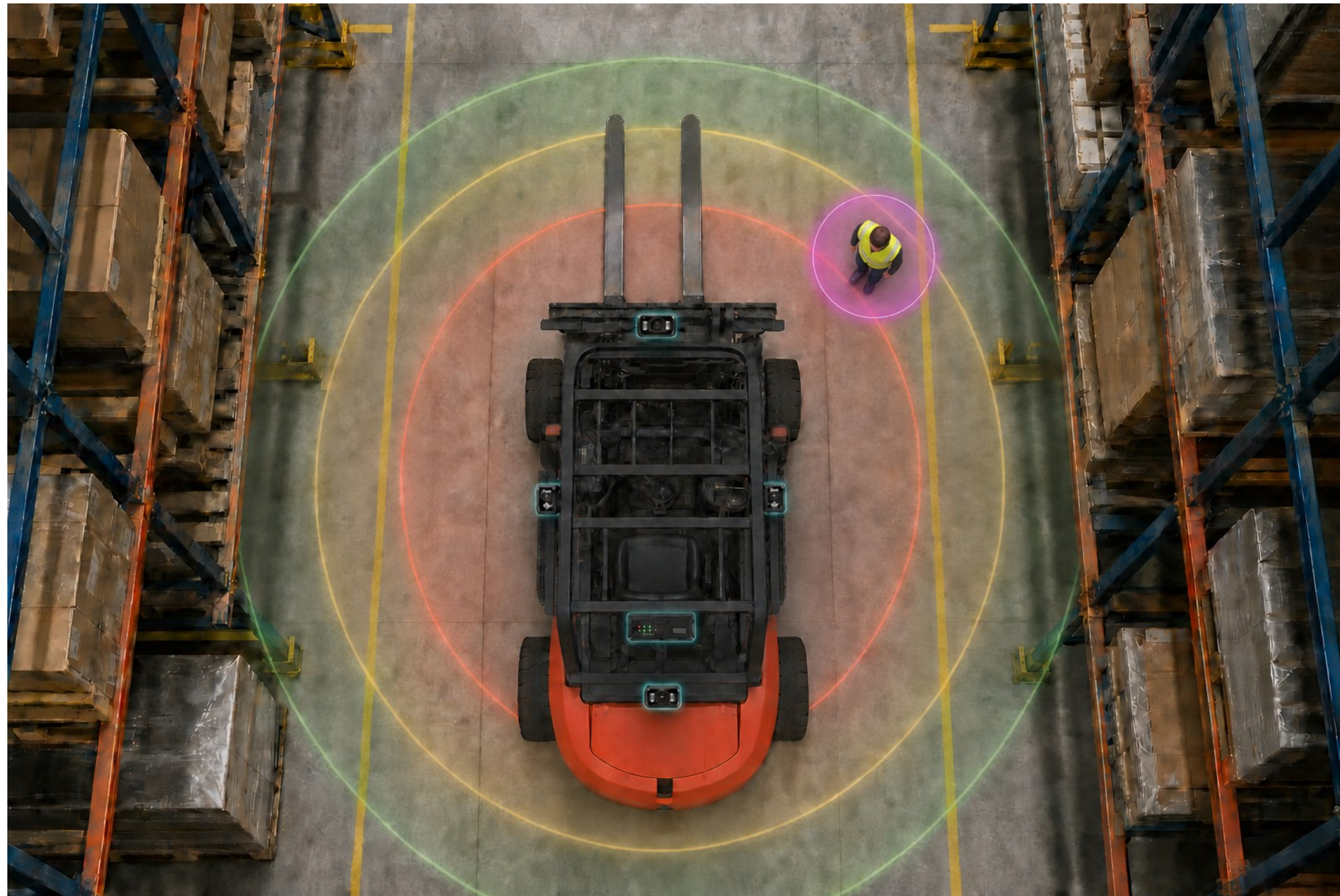
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Detection and alerts

- Four 90° cameras and a 360° AI control box warn the operator when a pedestrian is nearby.
- AI BSD monitors three configurable zones and supports vehicle detection.
- Configurable audible and visual monitor alerts notify the operator when pedestrians enter a zone.
- TC A cameras also provide configurable audible and visual alerts for pedestrians.
- An output cable supports speed reduction, where the truck permits integration.
- QR codes enable straightforward calibration.







System	Camera	Qty	Monitor	Qty	Trigger cable	Qty
TechmaC I	ADA32	1	HD700136DC	1	233-79#3M	1
TechmaC I A	ADA32 P	1	HD700136DC	1	233-79#3M	1
TechmaC II	ADA32	2	HD700136DC	1	233-79#3M	2
TechmaC II A	ADA32 P	2	HD700136DC	1	233-79#3M	2
TechmaC III	ADA32	3	HD700136DC	1	233-79#3M	3
TechmaC III A	ADA32 P	3	HD700136DC	1	233-79#3M	3
TechmaC IV	ADA32	4	HD700136DC	1	233-79#3M	4
TechmaC IV A	ADA32 P	4	HD700136DC	1	233-79#3M	4

HD700136DC: 7-inch HD digital LCD monitor with built-in quad view, without touch.
233-79#3M: 3 m multi-trigger cable for AI cameras.

TC Pano components

Qty	Part number	Description
4	FHD 685 CAI	1080P HD camera, 1/2.9-inch CMOS, 170°, IP69K
1	HD100263DC	10.1-inch HD colour monitor for HD DVR use
1	BVA 17 P	360° AI control box, waterproof IP66K
4	AC575(8pin)	4-pin, 15 m extension cable
4		Calibration mats, 1.2 m x 4



HD700117DC

7-inch HD digital LCD
quad-view monitor



ADA32

1080P AI pedestrian
detection camera, 150°



ADA32 P

1080P AI camera
Built-in alarm, zone light
and sound alerts



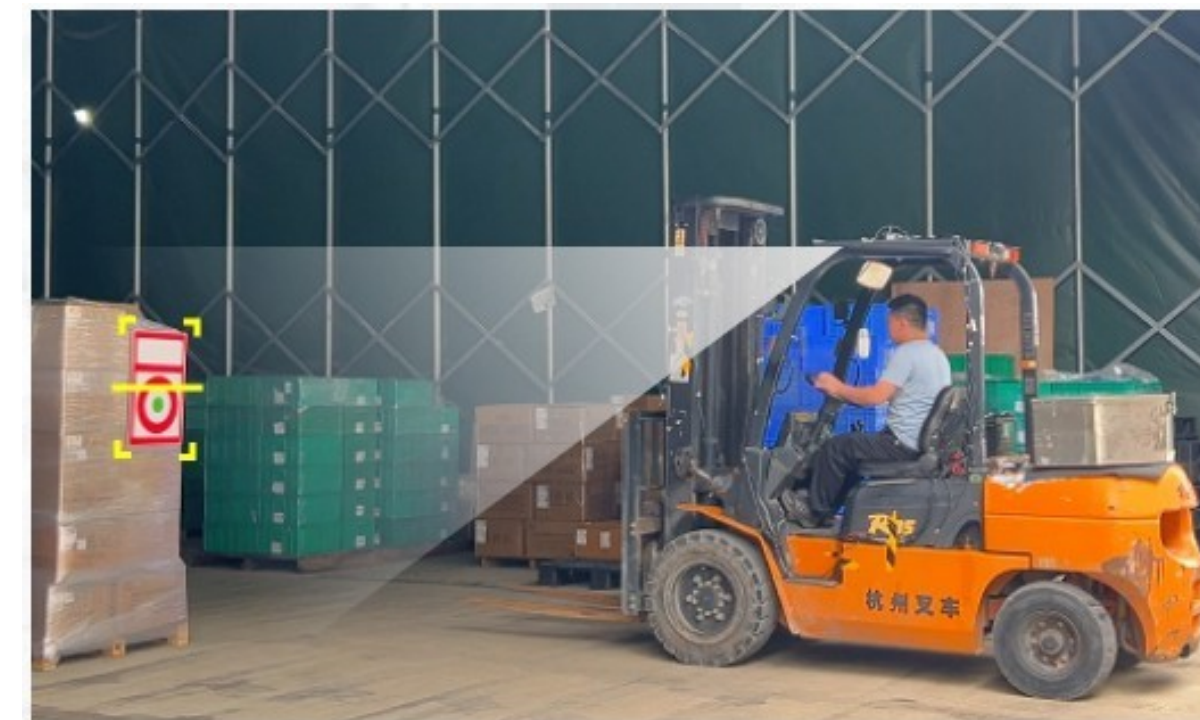
Light projection range recognition

The AI camera identifies the illumination range of three-side light strips to calibrate its detection area. This reduces manual calibration steps. Within the defined range, pedestrian detection triggers an alarm for the driver.



Motion state estimation

Pixel movement between consecutive frames indicates object direction and speed. The system estimates the forklift trajectory and changes around it. The rear-camera alarm turns off during forward travel, while the rear view adapts during reversing.



Sign recognition

In warehouse applications, camera recognition of Mindeo-designed signs can trigger forklift commands, including alarms, alarm cancellation, deceleration and cancellation of deceleration. The system warns drivers or supports automatic vehicle control.

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