

SUBSYSTEM 03 · PASSENGER COUNTING

Adaptive Passenger Gate

Every occupant counted, without stopping the lane.

IR-based occupancy counting for ferry terminals and Ro-Ro ports. It reads through tinted glass, links each headcount to the number plate, and writes one auditable record per vehicle.

WHAT THE DRIVER SEES. WHAT THE GATE SEES.



SCAN TO SEE
IT ONLINE



COLOUR SENSOR Plate, make, model and colour.



760 NM NEAR-INFRARED The same vehicle, occupants visible through the windscreen.

UP TO 3 ROWS

Front, second and third row counted per vehicle

THROUGH TINT

Factory and aftermarket window films

UNDER 4 S

From trigger to a complete record in GDS

SOLAS READY

Supports the operator's headcount obligation

01 · OVERVIEW

One headcount per vehicle, linked to the plate.

Before a passenger ship departs, the operator must count and record everyone on board. Passengers who stay in their cars are the hardest part of that count. The Adaptive Passenger Gate counts them automatically as the vehicle rolls through the lane.

The problem at the lane

- **Manual counts slow boarding.** Staff lean into windows or ask drivers to roll down. Every check adds seconds per car at peak departures.
- **Tinted glass hides the back seats.** Visual checks miss children and rear passengers.
- **The booking is not the car.** The manifest reflects what was booked, not who actually drove aboard.

What the gate does

- **Counts heads, row by row.** Driver, front passenger, second and third row, through the windscreen and side glass.
- **Identifies the vehicle in the same pass.** Front and rear plate, country, make, model and colour.
- **Writes one record.** Count, plate, images and timestamp land together in the Globessey Data Server (GDS), ready for your check-in, booking or manifest system.

99.5%

VEHICLE COUNTING

99.7%PLATE READ AND
NATIONALITY**93–95%**

FRONT-ROW OCCUPANCY

Under 4 sPER VEHICLE. TRIGGER TO
RECORD

Figures are the delivery KPIs our deployments are contracted to meet, measured across real traffic. Rear-row occupancy is contracted at 80–85%. Actual performance depends on port layout, traffic mix, lane design and the integration on the port's side.

WHO IT IS FOR

01

Ferry terminals

Count the occupants of every car before boarding, so the manifest and the headcount stay in sync at peak departures.

02

Ro-Ro boarding

Give your check-in system the counted occupants per car before the ramp. No manual headcount, no roll-down.

03

Peak holiday sailings

Count across mixed traffic, cars, SUVs, vans and campers, so manifest, safety counts and onboard planning match.

Who uses the data

- **Operations and check-in:** a count per car without stopping the lane.
- **Safety and compliance:** a time-stamped, image-backed headcount for the manifest.
- **Commercial:** counted versus booked occupants, compared by your booking system.

Built on 35+ years of ANPR

Adaptive Recognition has built number plate and vehicle recognition since 1991. The Adaptive Passenger Gate is one of six Adaptive Port Systems subsystems that share one data layer, the Globessey Data Server.

02 · HOW IT WORKS

Four moments, under four seconds per vehicle.

Vehicles roll through at lane speed. Vidar PAX cameras pulse near-infrared light into the cabin, capture the reflection and post an occupancy count to GDS.

01**Trigger**

An IR barrier across the lane fires the capture when a vehicle breaks the beam. No inductive loop is cut into the road.

02**Illuminate**

IR illuminators beside each camera light the cabin at 760 nm. Eye-safe, no flicker, barely visible to the driver.

03**Detect**

The Carmen ANPR and PAX engines read the plate and identify heads and seat occupancy per row, discarding bags, headrests and reflections.

04**Report**

Counts, confidence, plate and images are posted to GDS as one event, ready for your booking or check-in system.

LANE ANATOMY · TOP VIEW

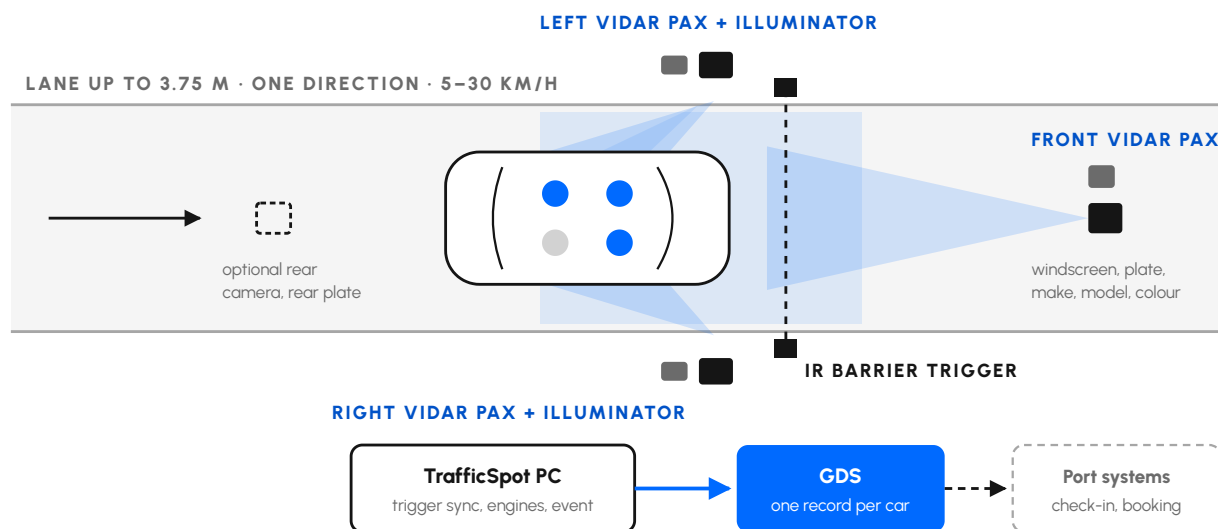


FIGURE 1 Standard lane: three Vidar PAX cameras, an IR illuminator beside each, an IR barrier trigger and one TrafficSpot PC. A fourth camera at the rear is optional.

Two sensors in one camera

- **Colour sensor:** number plate, vehicle overview, make, model and colour.
- **Infrared-sensitive sensor:** passenger counting. Occupants appear lit in the IR image, while the driver barely notices the light.

Why 760 nm near-infrared

It defeats the three things that break cabin imaging: windscreen reflection, window tint and shadow. The illuminators run continuously, so the camera takes several cabin frames milliseconds apart and keeps the clearest one. The car industry uses the same sensing family for in-cabin driver monitoring.

03 · WHAT THE CAMERAS SEE

One vehicle, six views, captured in a single pass.

These frames come from our own test lane at Adaptive Recognition HQ in Budapest. The front camera reads through the windscreen. The side cameras look into each row through the side glass.



FIGURE 2 Front, colour sensor. Plate, make, model and colour.



FIGURE 3 Front, IR sensor. Driver and front passenger through the windscreen.



FIGURE 4 Left side, front row. Counted through the side glass.



FIGURE 5 Left side, second row. Empty seats confirmed, not assumed.

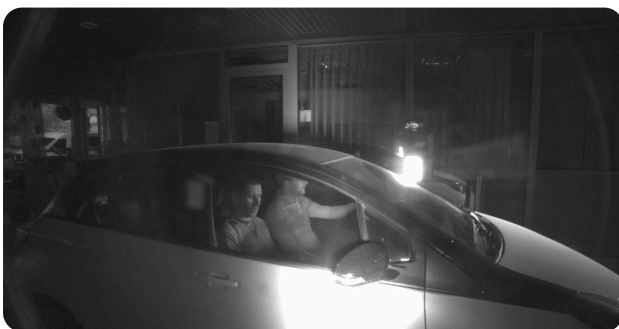


FIGURE 6 Right side, front row. A second angle on the same occupants.

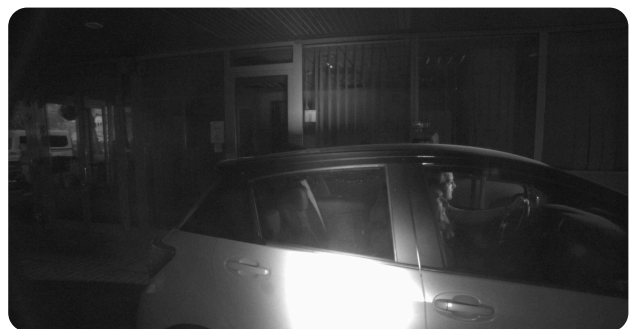


FIGURE 7 Right side, second row. Coverage of every seat from at least one angle.

Why three cameras. Counting through glass depends on viewing angle, reflections, cabin layout and seat visibility. Front and both side views together cover every seat from at least one angle. If one view is blocked, for example by a heated metal-coated windscreen on some newer electric cars, the side views keep counting.

04 · THE RECORD

What one vehicle writes to the Globessey Data Server.

The headcount and the vehicle identity land in the same record. Your team can reconcile the manifest against who was actually in the car, not against what was booked.

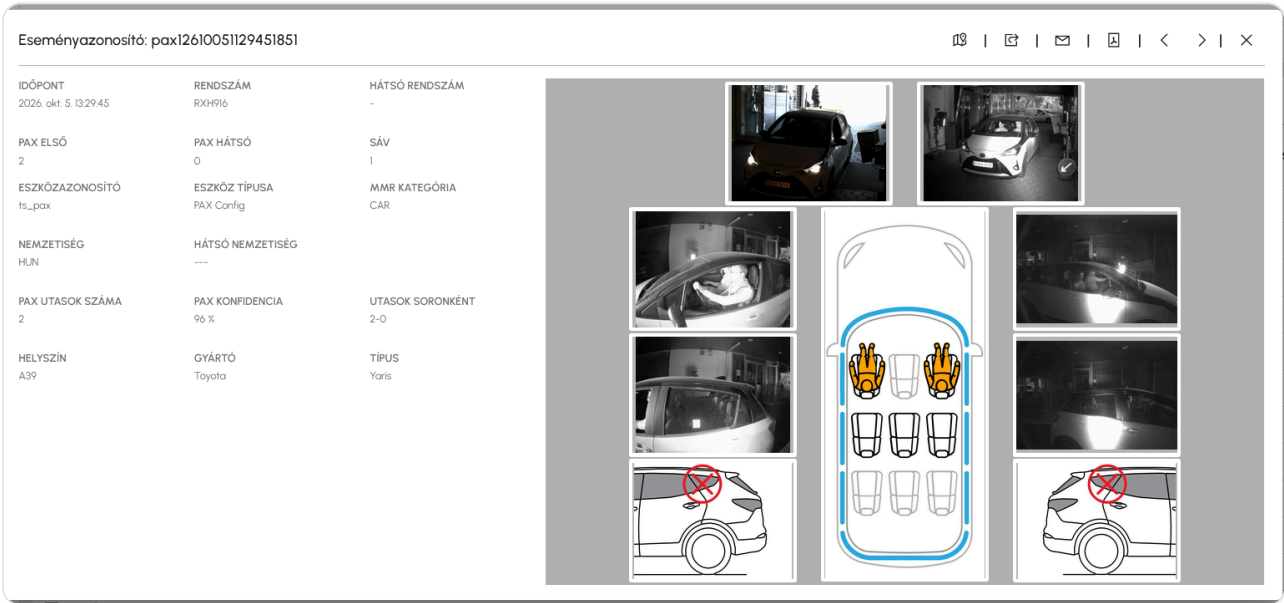


FIGURE 8 The event for the HQ test vehicle in the GDS event viewer: front colour and IR views, four side views and the seat map. Interface language shown: Hungarian.

The same event, field by field

EVENT ID	pax12610051129451851
DATE AND TIME	2026-10-05 13:29:45
FRONT PLATE	RXH916 · HUN
MAKE AND MODEL	Toyota Yaris
VEHICLE CLASS	Car
LANE	1
OCCUPANTS, FRONT ROW	2
OCCUPANTS, REAR ROWS	0
PASSENGERS PER ROW	2-0
TOTAL OCCUPANTS	2 · confidence 96%

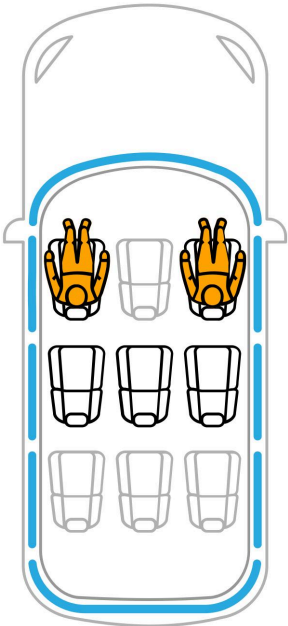


FIGURE 9 Seat map. Each counted occupant is placed per row.

05 · EVENT PACKAGE AND PERFORMANCE

What every vehicle delivers, and what we commit to.

One pass below 30 km/h produces one complete occupancy record, linked to the plate. These are the numbers a SOLAS headcount can stand on.

DATA	WHAT IS RECORDED	DELIVERY KPI
Event metadata	Site, lane, event ID, timestamp.	99.5% counting
Number plate	Front and rear plate with country of registration.	99.7% read · 99.7% nationality
Make and model	Manufacturer and model recognised per vehicle.	per event
Vehicle class	Vehicle category derived from make and model recognition.	95%
Occupancy, front	Driver and front passenger, counted through the windscreen.	93–95%
Occupancy, rear	Second and third rows, counted through the side glass. Total per vehicle.	80–85%
Flags	Timeout flag when a vehicle lingers. Optional height alert from the IR barrier.	per event
Image evidence	Front and rear overview plus IR cabin photos, attached to the event.	every event

KPIs are the acceptance thresholds our deployments are contracted to meet, measured across real traffic, not staged demos.

Operating envelope

LANE WIDTH	Up to 3.75 m, one direction per lane
DESIGN SPEED	5–30 km/h, steady flow
MAXIMUM SPEED	All rows up to 50 km/h. Front row only up to 90 km/h
ROWS COUNTED	Up to three. Third row where the lane is fitted for it
TRAFFIC	Mixed: cars, SUVs, vans, minibuses, campers
TIME PER CAR	Under 4 s, trigger to record
DATA SECURITY	Encrypted in the camera and on the wire. GDS on-premise by default

Keep the car moving

The system pairs front and side images into one clean event. Vehicles should pass slowly and steadily, not stop inside the detection zone. A stop raises the risk of:

- repeated or incomplete triggering, and fragmented events
- wrong image pairing
- changing reflections on the glass
- passenger movement and partial occlusion

Queues. Where traffic backs up, port-supplied barriers and displays can hold vehicles before the zone and release them one at a time. This protects both flow and accuracy.

Honest limits

Reflective tints. A few luxury models and illegal reflective films with IR-resistant coatings cannot be imaged through. Those vehicles are flagged, not guessed.

Heated windscreens. Some newer electric cars have metal-coated front glass. The side cameras still read the cabin, so counting continues.

Seatbelt and phone use. Not part of the lane count. Available as a project option on a gantry-mounted standalone PAX camera.

06 · HARDWARE

What is in the lane.

Three components, one subsystem.

Per lane: one Vidar PAX at the front, one on each side and an optional fourth at the rear. An IR illuminator sits beside each camera. One TrafficSpot PC pulls it together.



3-4 PER LANE

Vidar PAX camera

Dual global-shutter sensors, colour and IR, at up to 100 fps. Motorised 3.3x zoom that adjusts itself from gyroscope, accelerometer and laser telemetry. Side units angle slightly into oncoming traffic.

Coverage	Lanes up to 3.75 m
Protection	IP67 · IK10
Temperature	-45 to +70 °C
Origin	Made in EU · NDAA



1 BESIDE EACH CAMERA

IR illuminator

Eye-safe near-infrared array with 12 high-power LEDs, pulse-synced with its camera. Intensity adjustable in 100 steps, with parity flash: alternating intensity on odd and even frames.

Wavelength	760 nm NIR
Beam, side	40° x 15°
Beam, front	22°
Light pollution	None visible



1 PER 2 LANES

TrafficSpot PC

Rugged, fanless gate computer. Takes the trigger, pulls frames from every camera for the exact time window, runs the Carmen ANPR and PAX engines and sends the event to GDS. Buffers locally if the link drops.

Role	Trigger sync, event assembly
Engines	Carmen ANPR, MMR, PAX
Output	GDS event package
Resilience	Local buffering

LANE CONFIGURATIONS

Single lane

One complete subsystem: three Vidar PAX cameras with illuminators, an IR barrier trigger and a TrafficSpot PC. Add the rear camera for rear plate reads.

Two adjacent lanes

Cameras double, but both lanes share one TrafficSpot PC and processing environment, provided the lanes are close enough for a common installation and cabling. Lower cost than two independent lanes.

GLOBESSEY DATA SERVER

GDS is the data layer under all six Adaptive Port Systems subsystems. It stores every Passenger Gate event with its images, and exposes it through documented APIs and SDKs to your check-in, booking or manifest system.

- On-premise by default, on your own hardware
- Security posture aligned with NIS2, GDPR and ISO
- One source of truth if you add more subsystems later

07 · COMPLIANCE AND SCOPE

Built for SOLAS passenger registration.

Clear about who supplies what.

SOLAS and Directive 98/41/EC

Supports the requirement, as amended by Directive 2017/2109, to count and record all persons on board before a passenger ship departs.

Accurate, even in-vehicle

Front, rear and third-row occupancy counted through tinted glass at lane speed. No manual headcount, no roll-down.

Auditable record

Every count is time-stamped in GDS, ready to reconcile against the manifest and to export for inspection.

The gate supports the operator's headcount obligation. Responsibility for the manifest stays with the operator.

Delivered by Adaptive Recognition

- Front and side Vidar PAX cameras with their IR illuminators
- Rear Vidar ANPR camera (optional)
- Triggering units
- TrafficSpot industrial gate control PC
- Globessey Data Server, on your own hardware (optional)
- Commissioning, fine-tuning and lifecycle support under one SLA through ARGS

Provided by the port or its integrator

- Electrical cabinet and power supply
- Infrastructure, poles, gantries and cabling
- Network
- Traffic-control display
- Kiosk, barrier and traffic lamp, where the lane needs them
- Integration into your check-in, booking or ticketing system

SITE VALIDATION

What we check with you before installation

Recognition performance depends on the real site. Our engineers validate these parameters with you before the final design:

- | | | |
|---------------------------------------|--------------------------------------|--|
| ■ Lane width | ■ Expected vehicle speed | ■ API data structure |
| ■ Distance between adjacent lanes | ■ Queue management concept | ■ Network availability |
| ■ Camera positions, height and angles | ■ Barrier and traffic light logic | ■ Data retention and event archiving |
| ■ Vehicle stopping points | ■ Lighting and reflection conditions | ■ Third-row requirement and height alert |
| ■ Vehicle flow direction | | |

Where the counting runs. The Vidar PAX cameras capture the cabin images. Counting runs on the lane's TrafficSpot PC, which pairs the result with the plate read. That keeps the cameras simple and the counting logic centrally upgradable.

GET IN TOUCH

See the Adaptive Passenger Gate running at your terminal.

Book a 30-minute consultation. We review your terminal layout, traffic mix and tinting profile, and show you what a deployment looks like.

WHAT TO HAVE READY

Traffic volumes

Peak and off-peak vehicle counts, freight and passenger mix, peak hours.

Site layout

Number of lanes, gate locations, distances between checkpoints, network access.

Existing systems

Booking, ticketing, customs and traffic-management platforms in use.

Your goals

Speed, accuracy, compliance, cost, or all of them.

WHO YOU WILL TALK TO



Péter Tomolák

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Your first point of contact. Péter works with ferry terminals, Ro-Ro ports and integrators across Europe to find where automation pays back fastest.

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This subsystem online

Capabilities, the 34-second demo and full specifications.

adaptiveportsystems.com/lanes/passenger



Book a consultation

We respond within one business day.

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