Industry Use Case — June 2026

KiiGen™: Edge AI that gives railways eyes in the dark

Logiicdev's low SWaP-C *KiiGen* fuses LiDAR and sensor intelligence to detect animals, debris, and obstacles on tracks—night, day, fog, or rain—before tragedy strikes.

1.The problem: An invisible crisis on the world's rail networks

Every year, tens of thousands of animals— from elephants and deer to grizzly bears and leopards— are killed by trains they never saw coming. A 24-year study across Banff and Yoho National Parks (646 mortalities, 11 species) shows that mortality risk rises sharply with train speed and track curvature. Conventional CCTV is blind in darkness, human lookouts fatigue, and acoustic deterrents can't trigger automated action. The **solution must see** in zero light, classify what it detects, and respond in milliseconds— small enough to mount on a locomotive.

2.Wildlife crisis statistics from verified sources

>2 km
Stopping distance for a freight train at speed

2,000
Moose killed annually on Swedish railways

220+
Elephants killed by trains in India over 30 years

32,000+ Animals killed on Indian rail tracks (2016–18)

3.KiiGen by Logiicdev — situational awareness that never sleeps

KiiGen by Logiicdev is an Edge AI platform for rolling stock, trackside infrastructure, remote rail corridors, and industrial/mining safety, combining on-device LiDAR perception to detect people, animals, stones, and other hazards in low-visibility conditions.

LiDAR scan— the dense 3D representation that allows *KiiGen* to resolve object shape, size, and distance regardless of ambient light.

From detection to action in under a second

KiiGen's AI chip processes fused LiDAR point clouds directly in silicon, with no server, no software stack, and no latency overhead. Where speed and curvature rob both animal and driver of reaction time, *KiiGen* extends the effective detection range to 350 m, giving the driver up to 25-55 seconds of advance warning at 50 -120 km/h — enough to sound the horn, flash high-power lights, and, if needed, trigger emergency braking, all automatically.

KiiGen detection performance — key KPIs

>100m
Small animal detection range (incl. cat, no ambient light)

350 m
Large object / person detection range

235 m
Trackside barrier detection

0.5°
Angular resolution resolves shape, not just presence

<150 ms
Detection-to-alert latency (on-device edge inference)

360°
Field of view from single fused point-cloud output

All weather, total darkness
no degradation.

Low SWaP-C
Mounts on existing locomotive; no vehicle redesign required

KiiGen for Railway Safety Automated Response Pipeline

Sense	Decide	Alert(horn)	Alert (Lights)	Emergency Stop	Log & Report
LiDAR fused on-device. Classifies obstacle type, size, and velocity in real time.	Edge AI scores the threat level and selects a response — warning, deterrent, or emergency stop.	Automated acoustic signal to deter an animal before it enters the danger zone.	High-power forward lighting flashes to disorient and move animals off the track.	If deterrence fails, automatic emergency braking is engaged at the earliest actionable moment.	Every event is time-stamped, geo-tagged, and transmitted to operations for fleet-wide learning.

4.KiiGen Technical Specification

Sensor Processing	LiDAR + Sensor Fusion + Edge AI Processor = No cloud dependency
Radar Angular Resolution	0.5° (AI-enhanced virtual aperture)
Max Detection Range	350 m (person); >100 m (cat-sized object)
Operating Conditions	0 lux to full daylight; fog, rain, snow
Elevation (Z-axis) Data	Yes— separates overhead structures from ground-level obstacles
Response outputs	Horn, high-power lights, emergency braking, ops alert, custom action
Integration	Retrofit-compatible; no locomotive redesign

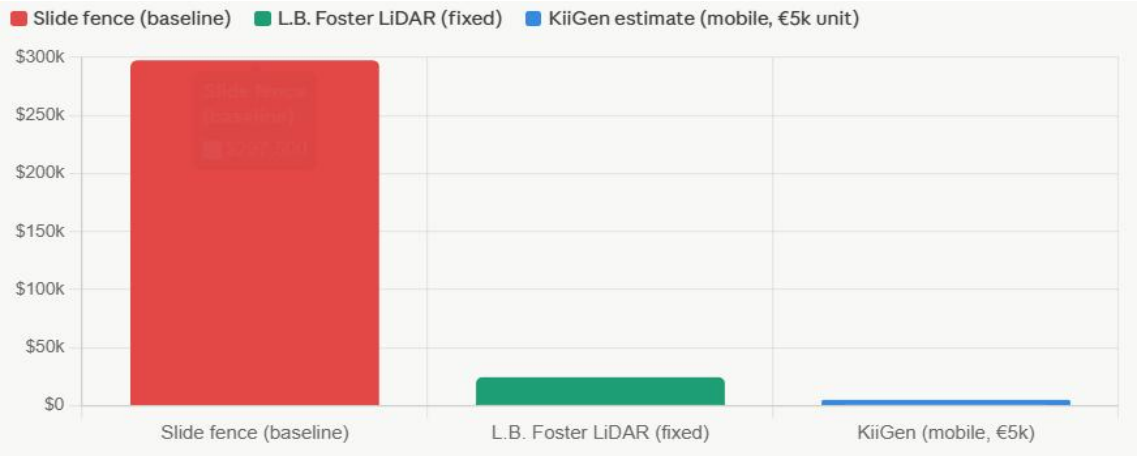
5.KiiGen Value & Impact

KPI	Target benefit
Detection lead time	Earlier warning before track hazard encounter
Obstacle detection reliability	Higher confidence in night and adverse weather operation
False alarm reduction	Fewer unnecessary stops and operational interruptions
Edge latency	Near real-time response at the vehicle or trackside unit
Power efficiency	Lower operational cost and easier deployment
Connectivity resilience	Works even when cloud links are unavailable
Ruggedness	Industrial-grade operation in harsh environments

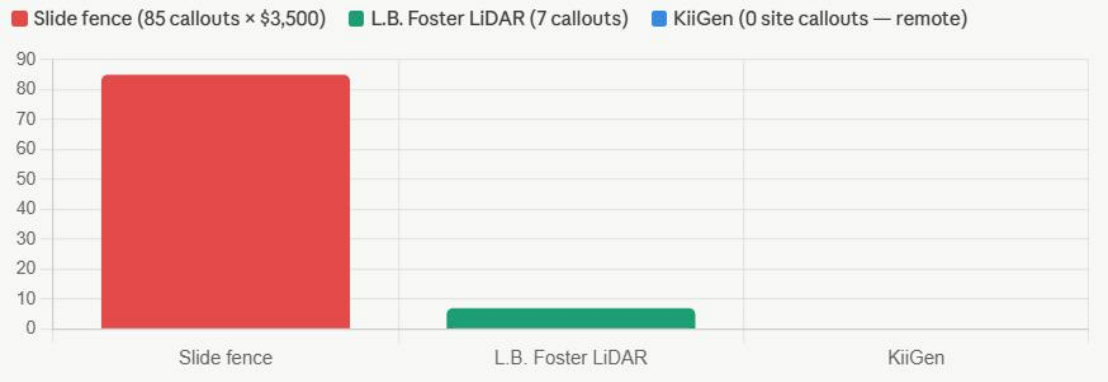
6.Head-to-head feature matrix

	***KiiGen* (Logiicdev)**	L.B. Foster Rockfall*
Deployment model	Train-mounted — monitors 100% of track on every journey; no blind spots	Fixed trackside — sensors every 87 ft at pre-defined hazard zones; unmapped risks undetected
Processing architecture	Dedicated AI SoC — deterministic latency	Software on centralized CPU — variable latency
Power & connectivity	10 W via single PoE cable — power + data on one wire; plug-and-play on locomotive	Per-site DC power + multi-sensor wiring harness; 1 junction box per 8 LiDAR
Alerting	Real-time to driver cab, station master, and control center simultaneously	Email alarm only — 45 s delay, no in-cab alert; relies on someone reading email
Total cost of ownership	~€5,000 per unit; remote diagnostics, swap-in-place — no field travel	High capex (per-site infra, wiring, HMI); plus 7 site callouts at ~$3,500 each in trial
False alarm rate	Near-zero — hardware inference filters environmental noise at source	Low for LiDAR (vs 96% for slide fence); fog/wildlife false events remain
Scalability	One unit per train; no per-km infrastructure	Scales linearly with track length — sensors, wiring, HMI per zone
Obstacle types detected	Animals, stones, debris, people — AI classification by type and size	Rocks and objects ≥16"×16"; wildlife triggers false alarms
Night / low visibility	Full capability at 0 lux; fog, rain, snow	LiDAR functional; needs camera validation system
*https://lbfoster.com/rail/total-track-monitoring/rockfall-monitoring		

Cost analysis — operational labor (trial data, L.B. Foster case study 2024)



Maintenance callouts — trial period



When L.B. Foster fits	When *KiiGen* wins
Fixed known rockfall zones with mature geology mapping. The operator already has site access, power infrastructure, and wiring crews. Detection of rocks ≥16" is the primary requirement, and no in-cab real-time alert is mandated. Long-term static deployment where the hazard location does not change.	The hazard location is unknown or changes (animals, fallen stones on curves, night crossings). Full-route coverage is needed. Budget is constrained (€5k vs. high-capex fixed network). Real-time cab alerts are critical for driver action. No on-site maintenance resource. Fleet-wide rapid rollout is required with minimal disruption.

7.Conclusion

A single PoE-powered hardware AI unit on the locomotive front deck delivers full-route awareness on every journey— detecting threats in total darkness at 350 m, classifying at the edge, and triggering alerts and emergency braking in milliseconds. At ~€5,500 per unit with near-zero maintenance, *KiiGen* pays for itself within a single avoided incident.

The track ahead is safer with KiiGen™.

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