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GEOLOCALISING ROAD RISK: HOW A LEADING EUROPEAN MOTOR INSURER STRENGTHENED RISK MODELS WITH GEOSPATIAL INTELLIGENCE

About me

Product & Project Manager at Earthpulse, focused on turning complex geospatial data into scalable, business-ready products.

I bridge the gap between Earth Observation technology and real-world impact—combining product strategy with execution to deliver functional, market-ready solutions.

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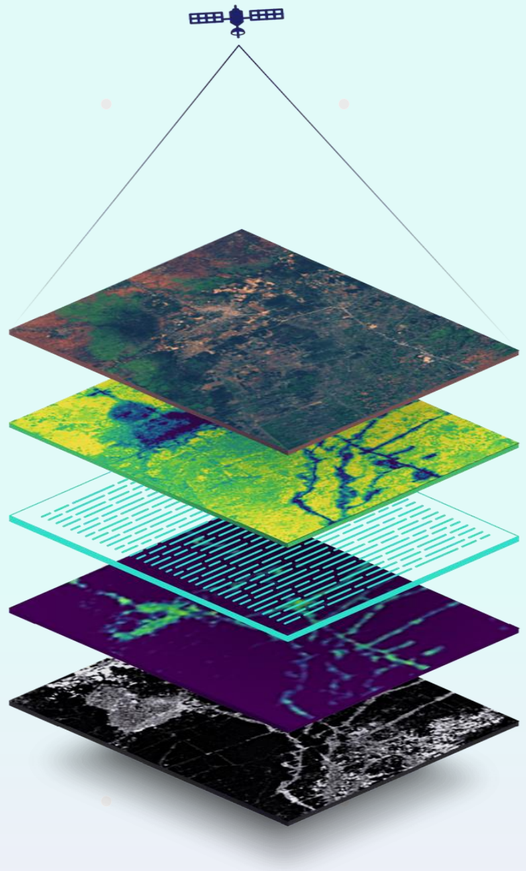
Who we are

OUR MISSION

Our mission is to help organisations understand risks, prepare for disruption, and build resilience.

We envision a world where geo-analytics is accessible to everyone through natural language interfaces.



OUR TECHNOLOGY

We combine satellite data with various data sources and leverage it with Artificial Intelligence to provide useful information that can find application in different sectors and industries. This approach is the foundation of our platform, **SPAI**, the geo-analytic engine.

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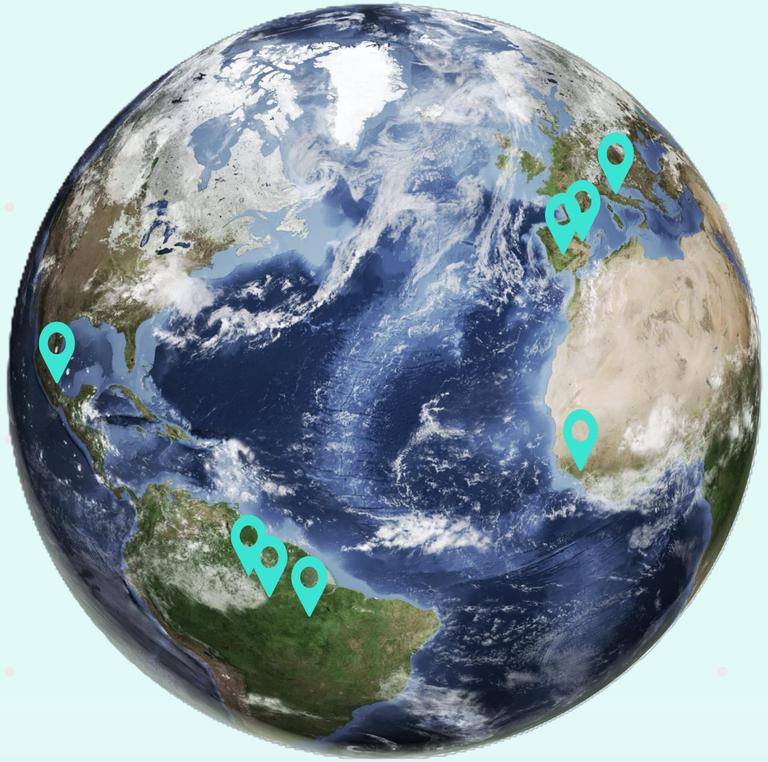
We operate at a global level

Earthpulse combines more than 20 years of experience in Earth Observation, AI and business & innovation to turn satellite data into useful, integration-ready and actionable intelligence.



Our work with ESA and leading European projects delivers reliable insights trusted by public authorities, infrastructure operators and companies worldwide.

We are trusted by 20+ partners and clients

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FRAMING RISK IN THE REAL WORLD

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Good models, incomplete picture

Modern motor insurers already leverage:

- Detailed customer and vehicle data.
- Historical claims and behavioural patterns.
- Advanced ML models.

And yet, risk is still mispriced.

Two drivers can look identical on paper:

- Same profile.
- Same vehicle.
- Similar history.

But completely different real-world risk exposure.

Driver A

- Same profile. Same vehicle. Same driving story.
- Different driving context:
  - Dense urban environment.
  - Hilly terrain.
  - Heavy traffic.
  - Higher accident probability.

Driver B

- Same profile. Same vehicle. Same driving story.
- Different driving context:
  - Low-density road framework.
  - Fewer intersections.
  - Predictable traffic.
  - Lower accident probability.

Same driver profile, completely different risk

Why geography matters

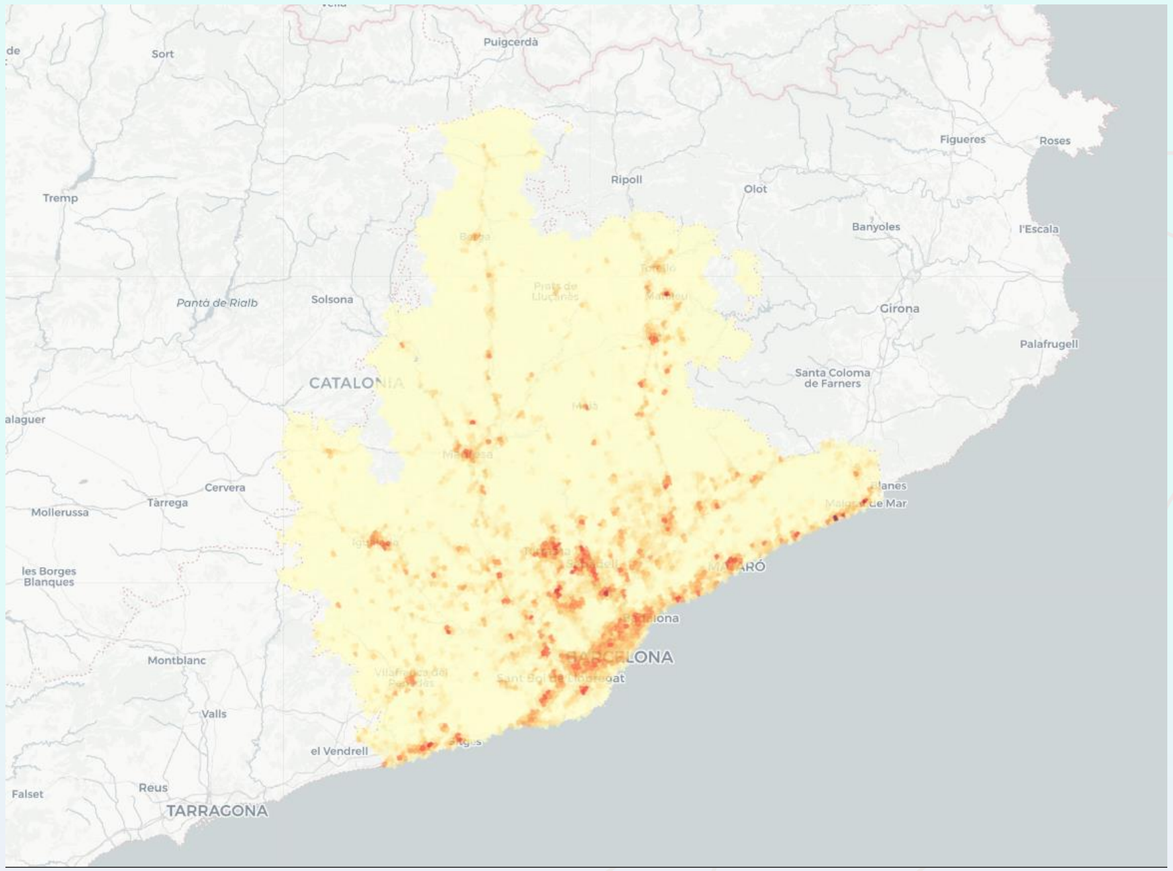
Everything is related to everything else,
but near things are more related than distant things.

First Law of Geography

Accident risk is influenced by multiple spatial indicators, such as:

- Road network structure and complexity.
- Traffic patterns.
- Weather and environmental conditions.
- Terrain and elevation.

Therefore, Road risk is a property of the environment.



Accidents are not random — they cluster. In this image of the province of Barcelona, Spain, we see how they cluster in specific areas.

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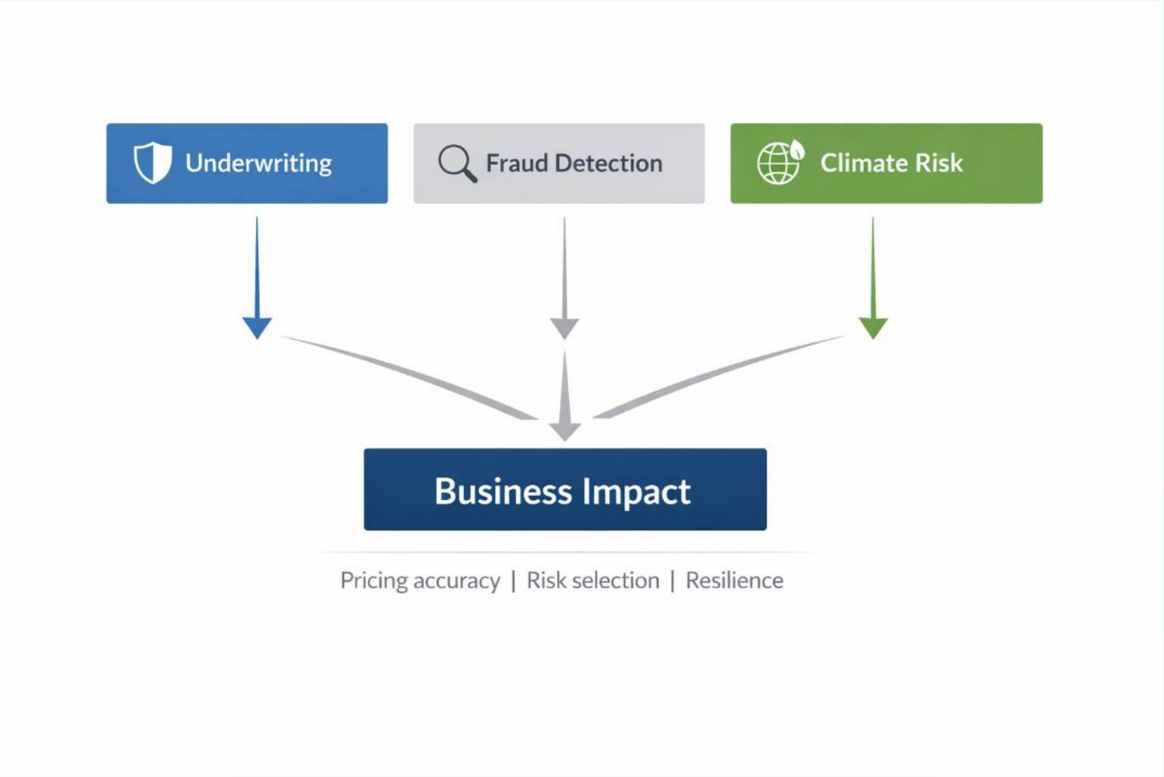
Location intelligence in insurance

Geospatial risk assessment and location-based analytics are transforming how insurers work.

- Improve underwriting accuracy → more precise, context-aware risk pricing
- Detect fraud more effectively → identifying anomalies in location and behaviour patterns
- Build climate-aware models → integrating environmental and disaster risk exposure

From data → to decision-making → to competitive advantage

In this talk: a real-world example from motor insurance



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A leading European motor insurer

Here we have a real-world example. A highly digitalised insurer, with strong data science capabilities, advanced pricing and underwriting models, and a clear focus on data-driven decision making.

They had already built sophisticated machine learning models and were outperforming competitors across several markets.

Yet, they were still missing a critical dimension: a structured understanding of geographic risk.

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The missing layer: geographical context

If risk can change within a single city, imagine modelling it consistently across Spain, the UK, and Italy, like the insurance company we're talking about.

Across geographies

Spain, UK, Italy. Different markets, regulations and driving patterns.

Across road conditions

Urban, rural, complex networks. Varying road density, speed regulations, complexity and infrastructure.

Across environments

Traffic, weather, terrain. From rush hour congestion to adverse weather and steep terrain.

How do we build a consistent view of geographic risk?

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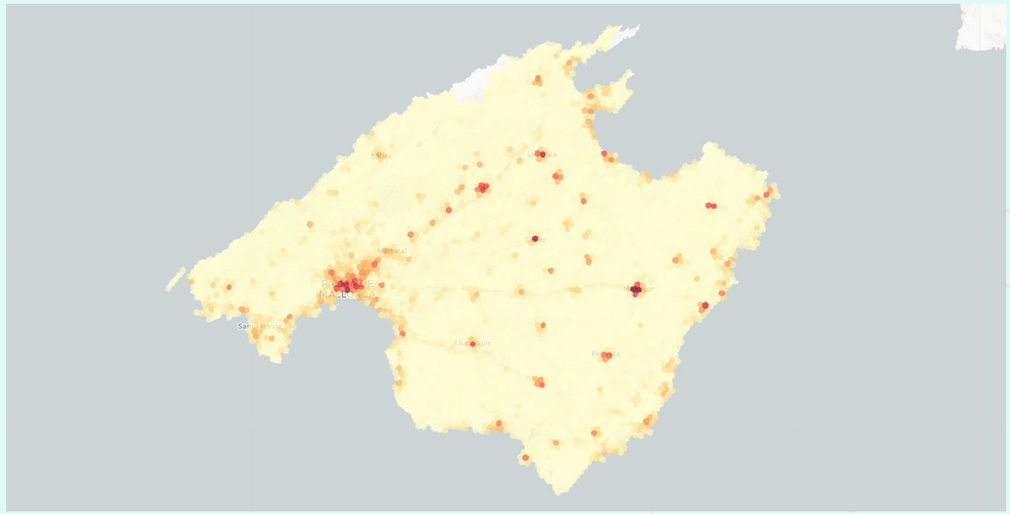
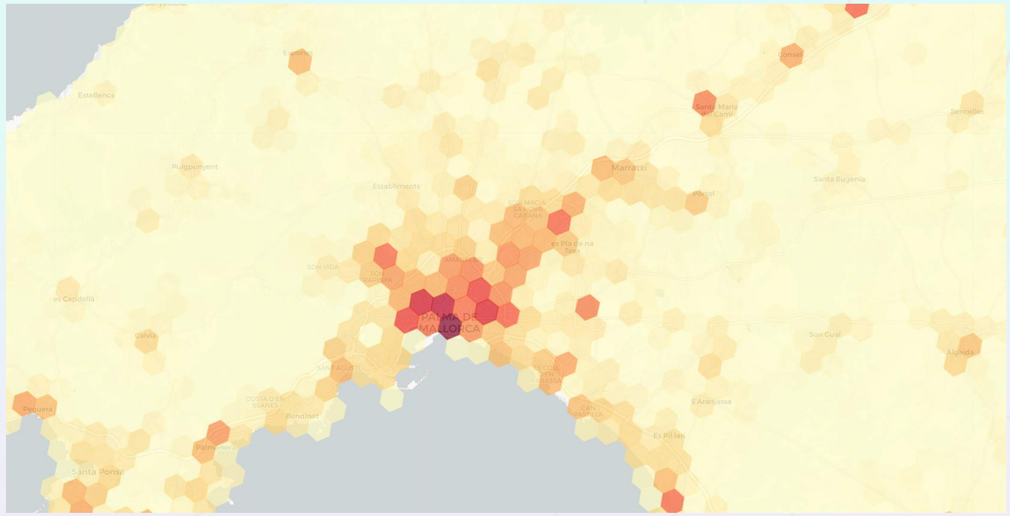
Geolocalising road risk

To address this challenge, we built a comprehensive geospatial characterisation of road networks across Spain, the UK, and Italy, covering more than 1 million km^2.

We transformed raw geospatial data into structured, model-ready features capturing key aspects of road risk.

A critical requirement was ensuring that this could scale consistently across countries. To achieve this, we used a global spatial grid system, H3, which allowed us to standardise the territory into uniform spatial units.





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From data to intelligence

We integrated geospatial features directly into their existing models, moving from driver-centric to context-aware risk modelling. This allowed them to better capture real-world risk patterns and improve how risk is represented across their portfolio.

Driver-centric model

- Who you are defines your risk
- Limited spatial awareness
- Simplified risk representation

From this …

Context-aware model

- Who + where defines your risk
- Spatially informed models
- Richer, more accurate risk representation

… to this

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Business impact

By integrating geographic context into their models, the insurer was able to improve how risk is understood, priced, and managed across their portfolio. This translated into more accurate pricing, a clearer segmentation of risk, and a significant reduction in exposure to underpriced policies, particularly in complex and high-risk environments.

Pricing accuracy

More precise alignment between risk and premium.

Risk segmentation

Clearer differentiation across environments.

Risk exposure

Reduced losses in complex and high-risk areas.

Estimated improvements of a few percentage points, which at scale can translate into hundreds of thousands — or even millions — of euros in margin.

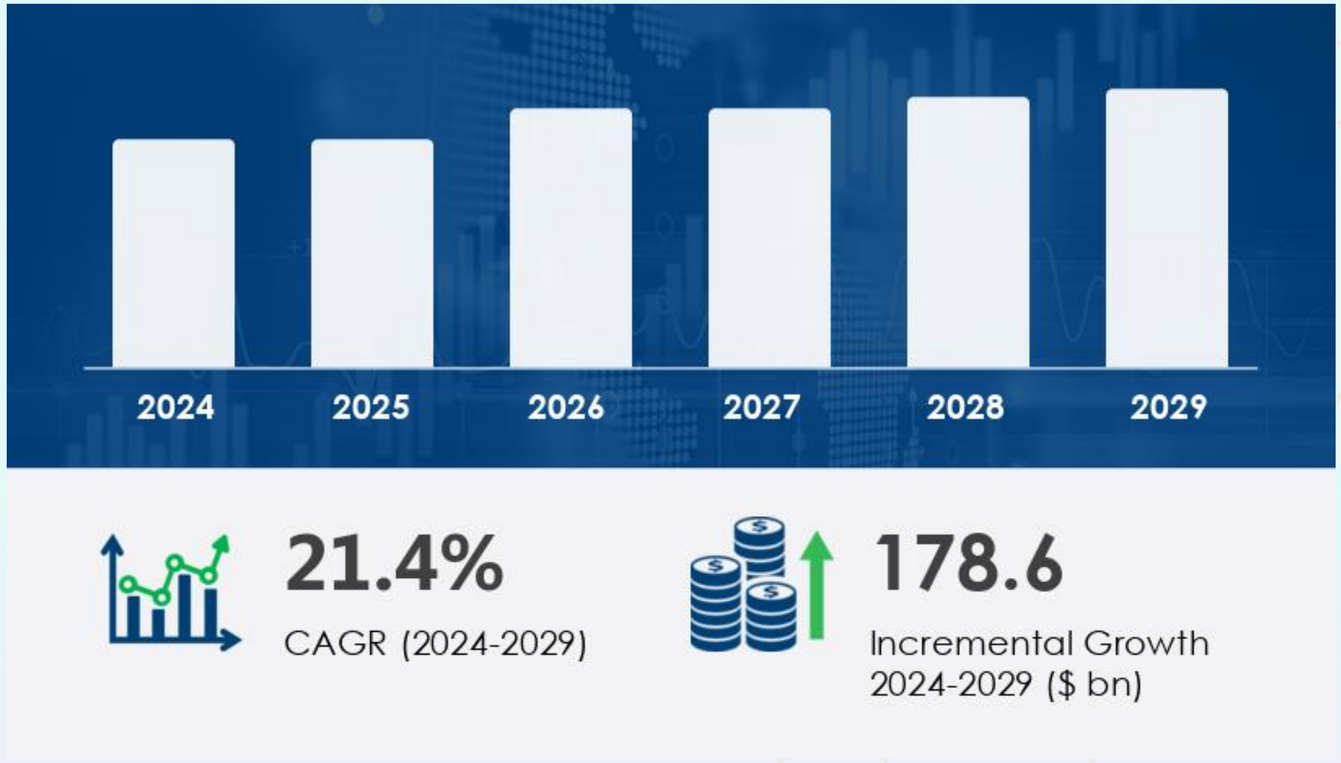
Key takeaways

What we've seen in this example is not an isolated case, but part of a broader shift across the industry.

Geospatial intelligence is no longer a niche capability — it is becoming a core component of how risk is understood and managed.

From underwriting to fraud detection and climate risk, location-based insights are increasingly driving better decisions and measurable business impact.

This is where the industry is going — and the data clearly supports it



Geospatial Analytics Market Size, Growth Forecast, and Industry Insights (2025–2029). Source: Technavio.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Complex data, made easy!
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