



# GEOSPATIAL AI-DRIVEN INSURANCE CLAIMS AUTOMATION: NEAR REAL-TIME DAMAGE ASSESSMENT FOR CAT AND NON-CAT EVENTS

## Abstract

The insurance industry is undergoing rapid change as carriers respond to rising claim volumes, climate-driven catastrophic events, increasing fraud exposure, and heightened customer expectations for faster and more transparent settlements. Traditional claims management models—largely dependent on manual inspections, physical site visits, and fragmented data systems—are increasingly unable to scale or deliver consistent outcomes, particularly during large-scale events. This white paper presents a geospatial artificial intelligence (Geo AI)-driven insurance claims automation platform that integrates geographic information systems (GIS), artificial intelligence and machine learning (AI/ML), satellite and drone imagery, and catastrophe risk intelligence into a single operational framework. The platform enables near real-time damage assessment, automated claim validation, and accelerated claim settlement across both catastrophic (CAT) and non-catastrophic (Non-CAT) insurance scenarios. By embedding location intelligence at the core of claims workflows, insurers can significantly improve operational efficiency, decision accuracy, and customer experience.



## Business context and industry challenges

Insurance providers today operate in an increasingly complex risk environment shaped by climate variability, rapid urbanization, and evolving fraud patterns. Large-scale events such as floods, cyclones, earthquakes, and wildfires often result in sudden surges in claim volumes that overwhelm traditional claims infrastructures. At the same time, insurers continue to process a steady flow of non-CAT claims, including fire incidents, accidental damage, and localized

agricultural losses.

A fundamental challenge is the lack of timely and validated damage intelligence. Claims assessment continues to rely heavily on manual inspections and document-based reviews, which introduce delays, inconsistencies, and subjectivity. Data fragmentation across claims systems, geospatial platforms, and risk models further limit insurers' ability to make informed, real-time decisions. In addition,

the growing dependence on unstructured data—such as photographs, drone imagery, satellite data, and field reports—adds complexity to claim evaluation processes.

These factors result in higher operational costs, slower response during peak events, and diminished customer satisfaction, highlighting the need for a more integrated and intelligent approach to claims management.

## The need for an integrated, location-centric claims platform

Many insurers have attempted to modernize claims operations through point solutions—digitizing claim intake, introducing AI for document processing, or integrating external risk data. While these initiatives provide incremental value, they often fail to address a deeper structural issue: Claim-related decision making is still made across disconnected systems that lack a unified, location-aware view of damage and risk.

Claims systems, imagery platforms, GIS

tools, risk models, and financial systems typically operate in silos. As a result, claims teams must manually correlate information across multiple sources to validate claims, assess damage, and determine payouts. This fragmentation is especially evident during CAT events, where claim volumes spike and decisions must be made consistently and at scale. Even in Non-CAT scenarios, high-frequency claims create sustained operational overhead when verification and assessment cannot be

automated.

These challenges underscore the need for a single, integrated claims platform that unifies geospatial intelligence, AI-driven analytics, real-time imagery, and workflow orchestration. Such a platform enables insurers to assess claims in full context, automate the decision making process, and maintain governance and transparency across the entire claims lifecycle.

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## Current market landscape and the need for an integrated future ecosystem

Over the past decade, insurers have adopted a range of point solutions to improve claims efficiency and decision-making. AI-based damage assessment tools, fraud detection models, catastrophe risk platforms, and claims workflow systems are widely available in the market today. While these tools deliver value within their respective domains, they typically operate as stand-alone capabilities rather than as part of a cohesive, integrated ecosystem.

In many cases, AI-driven claim decision

tools are not natively integrated with geospatial intelligence, real-time imagery, or external peril data. Damage assessment models may operate independently of catastrophe exposure analysis, while dashboards often present operational metrics without embedded location intelligence, limiting the ability to correlate claims performance with geographic risk patterns.

As insurers move toward more automated and AI-enabled operations, this fragmented landscape presents an

increasingly significant challenge. The future insurance ecosystem requires platforms that go beyond task-level automation and enable continuous intelligence across claims operations. Geospatial intelligence, embedded as a foundational layer, becomes the unifying element that connects event detection, damage assessment, and claims decision-making—enabling faster, more consistent, and scalable claims outcomes.

## Building an integrated geo AI-driven claims platform

The Geo AI-driven insurance claims platform was architected to operationalize location intelligence across the claims lifecycle. Rather than layering AI or geospatial capabilities onto existing systems, the platform was designed as an integrated framework in which GIS, AI/ML models, imagery, and workflow orchestration operate as a unified decision layer.

Location intelligence is applied early in the claims lifecycle to validate reported incidents against peril event data, historical claim patterns, and insured asset locations. AI-driven models augment this capability by classifying damage severity, identifying anomalies, and estimating losses at scale.

This

approach enables insurers to transition

from reactive, adjuster-driven processes to data-driven, automated claims decisioning with greater consistency and speed.

The platform eliminates operational fragmentation by delivering end-to-end integration rather than isolated automation. Geospatial intelligence is embedded as a core capability, ensuring that location context is consistently applied across all stages of the claims lifecycle.

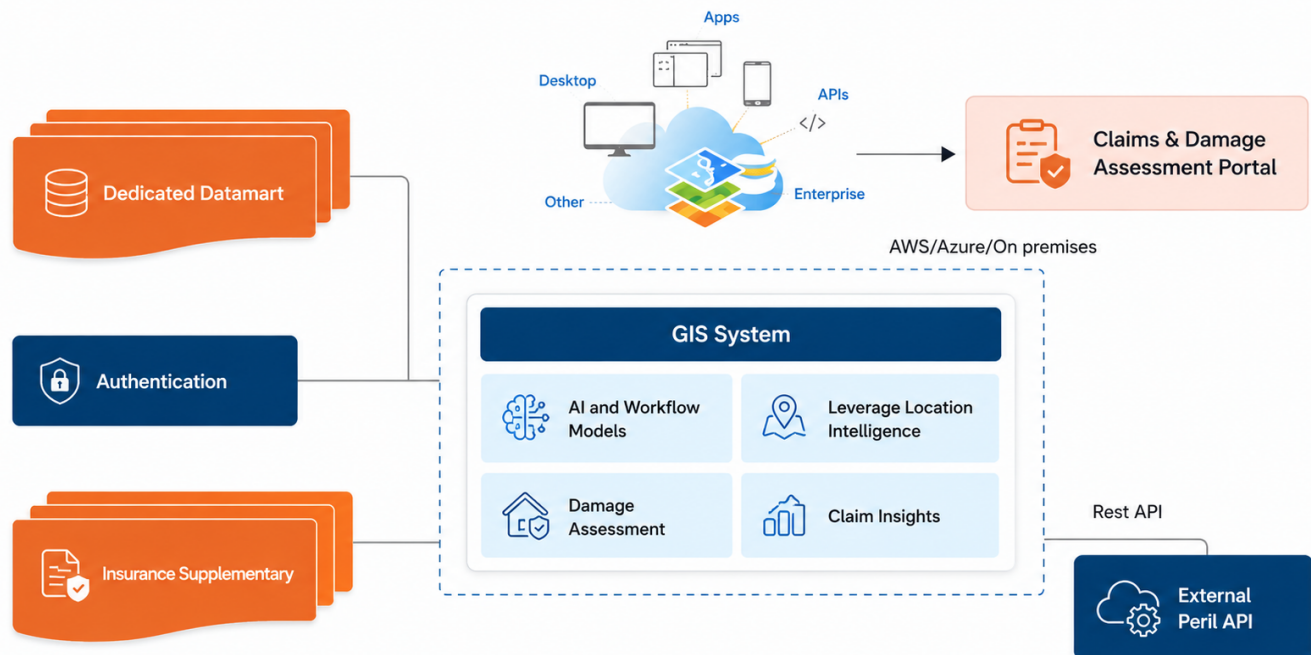
At the foundation, geospatial data is tightly integrated with claims workflows, AI models, and external peril intelligence. Satellite, aerial, and drone imagery are directly coupled with AI-based damage classification models, enabling automated interpretation of physical damage without mandatory site visits. Open APIs support seamless integration with

existing claims platforms, catastrophe risk models, weather data services, and partner ecosystems, enabling incremental adoption without large-scale system replacement.

The architecture is modular and cloud-agnostic, supporting deployment across cloud, on-premises, or hybrid environments. AI-driven workflow orchestration enables straight-through processing for eligible claims while routing complex or high-risk cases for human review with full contextual intelligence. A centralized data layer underpins analytics, dashboards, and reporting, ensuring consistent insights across operational and leadership teams.



## Solution → Enterprise Solution for Insurance Claims



### Platform architecture and workflow

The integrated platform brings together multiple functional capabilities into a single operational environment, spanning claims intake, damage assessment, workflow automation, geospatial validation, and analytics. These capabilities are delivered through a combination of

user-facing portals, AI-driven services, geospatial systems, and open integration layers.

Claims processing begins with digital submission and location validation. Pre- and post-event imagery analysis provides objective damage assessment,

while AI models estimate financial loss at the property or field level. Open integration ensures scalability and adaptability to evolving business and regulatory requirements, enabling insurers to modernize claims operations while preserving flexibility and governance.

### AI-enabled CAT claims management

For catastrophic events, the platform enables insurers to move from reactive responses to proactive, intelligence-driven claims handling. Once a CAT event is detected, impacted regions are identified and overlaid with insured assets to assess

exposure. Satellite imagery and geospatial analytics quantify damage extent and severity across affected geographies. AI-based damage classification models estimate losses at scale, enabling prioritization, efficient resource allocation,

and automated settlement for eligible claims. Scientific pre- and post-event analysis improves transparency, consistency, and speed during disaster response scenarios.

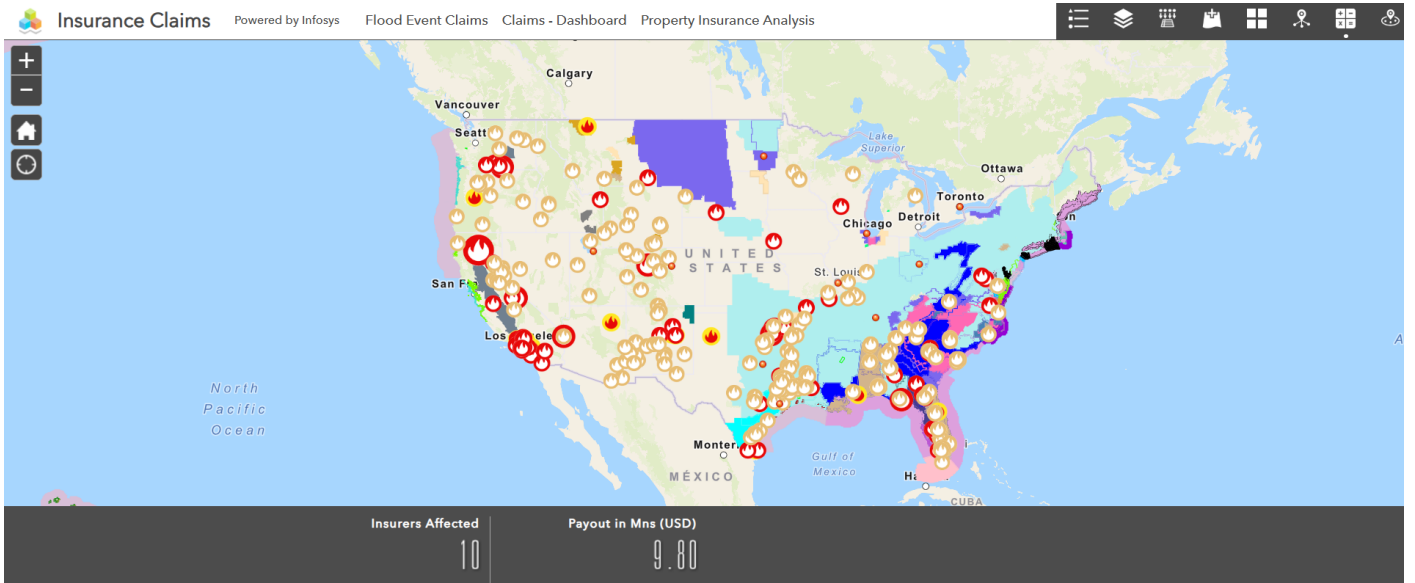
### Automation of non-CAT claims

The platform is equally optimized for high-frequency, localized Non-CAT claims. Property insurance use cases include fire incidents, vandalism, accidental damage, and structural issues. Agricultural scenarios include localized crop losses caused by

pests, disease outbreaks, wildlife intrusion, and weather variability.

Geospatial validation confirms event authenticity, while AI-based image analysis assesses damage severity. Low-risk claims can be approved and settled within

hours, reducing turnaround time and investigation costs while maintaining accuracy and control.

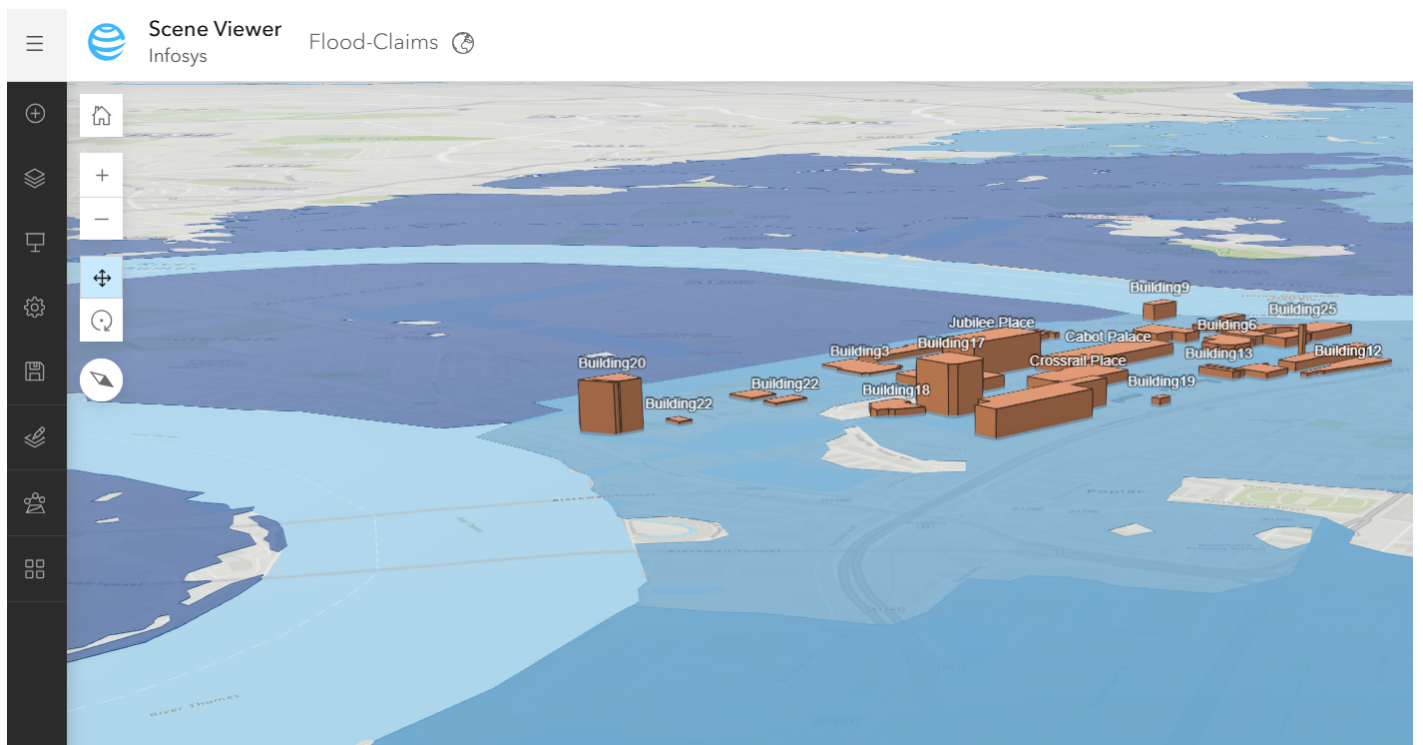


## Advanced visualization and decision support

Advanced visualization capabilities enhance assessment quality and decision-making. Three-dimensional

visualization of insured properties provides additional context for complex claims, while interactive maps enable dynamic

exploration of risk, exposure, and claim impact across regions and portfolios.



## Claims dashboard: Real-time visibility and control

A central component of the platform is an interactive claims dashboard, which provides real-time visibility into claims performance, risk exposure, and financial

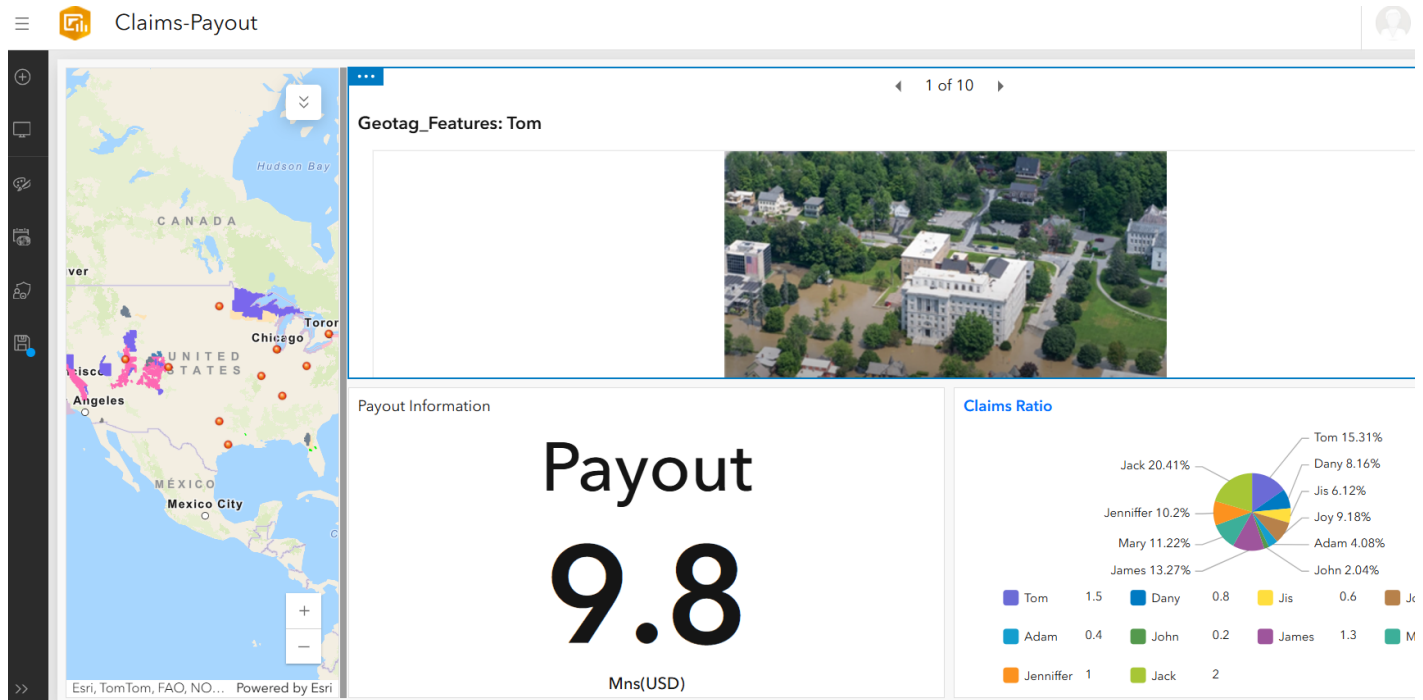
impact across geographies and lines of business. The dashboard consolidates data from claims systems, geospatial analytics, AI-driven damage assessment models, and

external peril intelligence into a single, unified view.

Claims leaders can monitor the entire claims lifecycle—from event detection and submission through assessment, approval, payout, and closure. By integrating spatial intelligence with operational and financial metrics, the dashboard delivers actionable insights that support faster prioritization,

improved resource allocation, and measurable reductions in turnaround time. Automated processing indicators highlight claims eligible for straight-through settlement, enabling resolution within hours rather than days. By embedding geospatial intelligence directly into

operational dashboards, insurers gain not only visibility into claims performance, but also the ability to correlate outcomes with location-specific risk drivers—enabling faster decision-making and continuous portfolio optimization.



## The integrated portal as a unified intelligence layer

A key differentiator of the Geo AI-driven insurance platform is its integrated portal, which serves as a unified entry point across claims and operational decision-making. Unlike traditional portals designed around isolated functions, this portal is built on a shared intelligence layer, ensuring that insights flow seamlessly across the claims lifecycle.

The portal follows a location-first design

philosophy, where geographic context forms the basis for claims evaluation and decision-making. Claims teams interact with a unified geospatial view of assets, hazards, historical losses, and real-time imagery, enabling consistent understanding and faster assessments. AI-driven analytics, damage assessment models, and peril intelligence are embedded directly into portal workflows,

eliminating the need for users to switch between multiple systems. By unifying claims automation, visualization, and analytics within a single operational interface, the integrated portal functions as an intelligence command layer, supporting faster decisions, improved coordination, and scalable claims operations.

## Business impact

Adoption of a Geo AI-driven claims automation platform delivers measurable operational and financial benefits. Settlement timelines are significantly

reduced, manual inspection costs are lowered, fraud detection is strengthened, and scalability is improved during CAT events. Most importantly, policyholders

experience faster, more transparent claim outcomes, strengthening trust during critical moments.



## Conclusion

As risk landscapes continue to evolve, claims operations must become more intelligent, scalable, and responsive. The convergence of geospatial intelligence,

AI, and workflow automation provides a strong foundation for transforming claims assessment and settlement. A Geo AI-driven claims platform enables

insurers to modernize operations, improve resilience, and deliver consistent, high-quality outcomes across both CAT and Non-CAT events.

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