Resilience AI

Advanced Disaster Recovery & Resilience through AI Integration

LLM • Cartography • Satellite Imagery • AI Agents • Digital Twins

Case Study: Hurricane IRMA (Saint-Martin) | 2025

4 Billion People at Risk: The Escalating Threat of Natural Disasters

3.9–4.2 billion people live in high-risk disaster zones

Severe climate-linked events have **tripled** since the 1980s

350–450 million people affected annually

$300+ billion USD in direct annual disaster losses

Infrastructure downtime causes **$200–300 billion** in indirect losses

The EU Resilience Framework

> The emphasis of the proposals should be on the human dependant abilities of critical infrastructure to cope with an adverse event, including their capacity to prepare for the crisis, absorb the impact, reduce the recovery time, and adapt by reducing future exposure and vulnerabilities.

— European Union Commission

AI-Powered Disaster Intelligence for Faster Recovery

Priority-ranked reconstruction project portfolios

Automated analysis for project prioritization based on impact.

Geospatially accurate restoration paths

Mapping critical infrastructure: roads, bridges, power, water, hospitals.

Automated cost estimates and resource allocation plans

Real-time budgeting and resource distribution forecasting.

Optimized logistics and routing for humanitarian operations

Efficient supply chain and aid delivery route planning.

1–15 year resilience roadmaps tailored to local terrain and risks

Long-term climate adaptation and disaster mitigation strategies.

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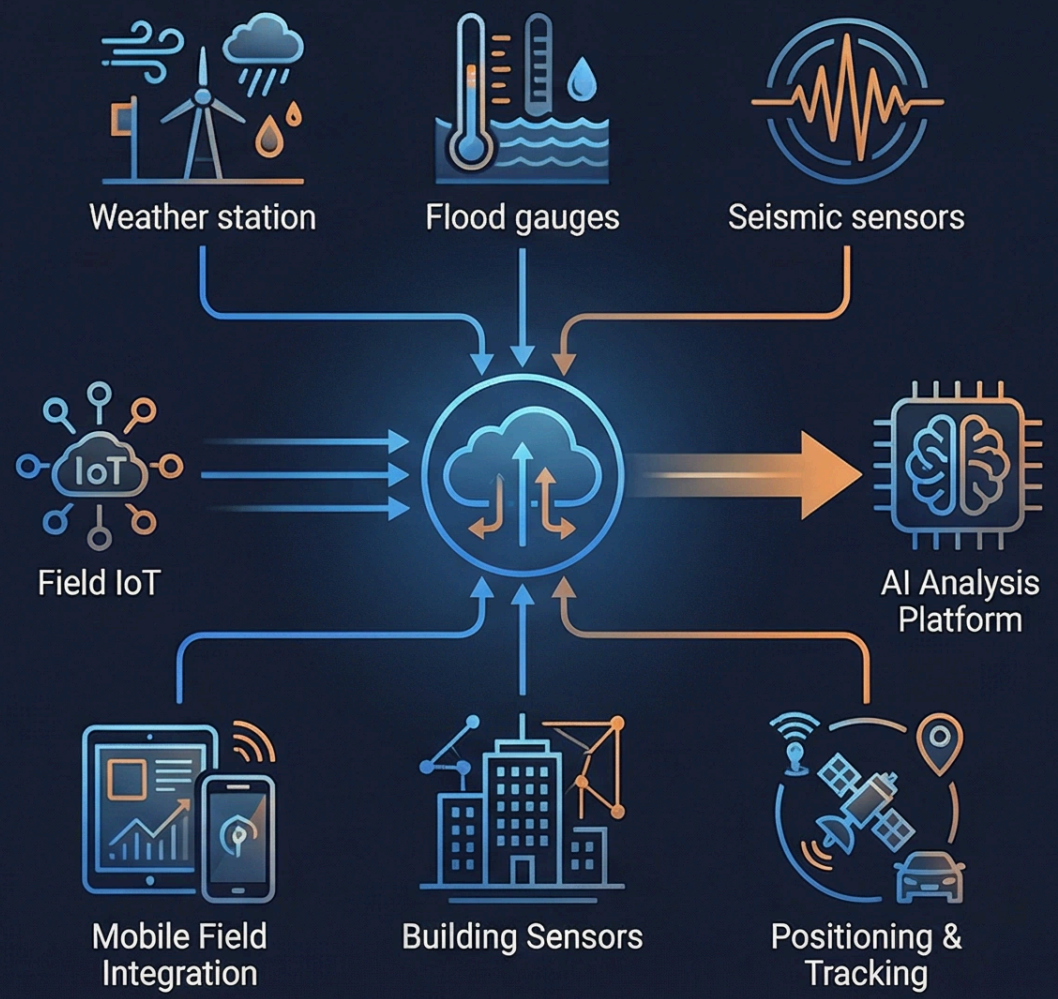
Digital Twins: Simulating Disaster Scenarios Before They Happen

- **Create virtual replicas** of cities, infrastructure networks, and critical assets
- **Simulate flood, earthquake, and hurricane** impact scenarios with real-world physics
- **Model infrastructure resilience** and identify vulnerabilities before disasters strike
- **Visualize recovery timelines** and resource allocation in real-time
- **Synchronize with live IoT sensor data** for continuous model updates

Custom Data Infrastructure: IoT, Positioning & Field Integration

Key Services:

- Design and deploy IoT sensor networks for environmental monitoring (flood gauges, seismic sensors, weather stations)
- High-precision positioning systems for asset tracking and damage assessment
- Building-level data collection for structural integrity monitoring
- Mobile field data integration for real-time situational awareness
- Custom data pipelines connecting field sensors to AI analysis platform



Leveraging World-Class Data Sources for Accurate Analysis

Copernicus Emergency Management Service
European crisis management data

NASA & NOAA Hazard Layers
Global atmospheric and geological data

OpenStreetMap + Humanitarian OSM
Ground-level infrastructure mapping

UN OCHA HDX Disaster Datasets
Humanitarian coordination data

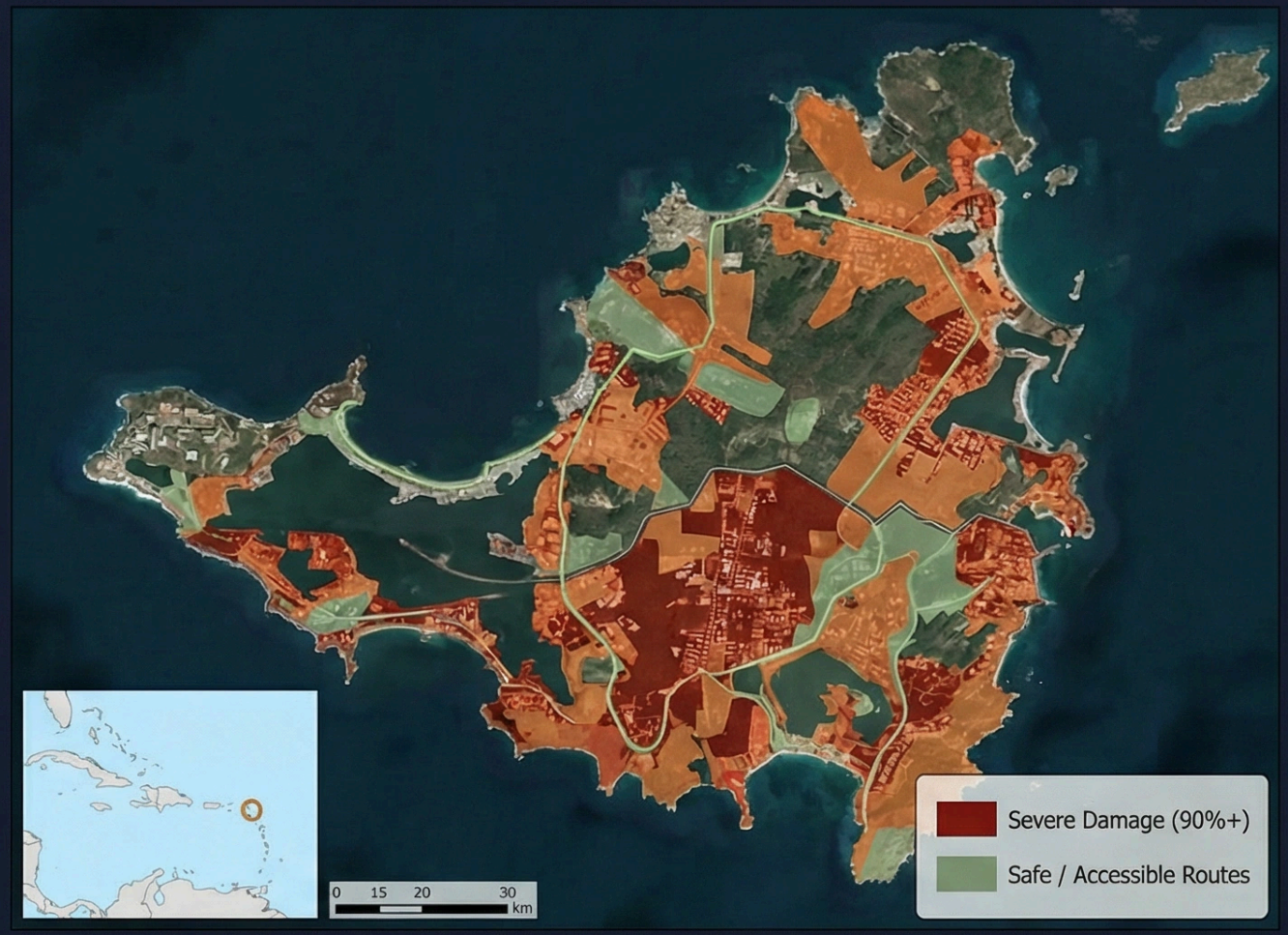
World Bank Climate & Resilience Data
Economic and risk modeling

Sentinel Satellite Imagery
High-resolution Earth observation

Hurricane Irma: 95% Infrastructure Destruction in Saint-Martin

Approximately 95% of infrastructure destroyed by Category 5 hurricane

- Satellite observations revealed catastrophic damage across the island
- Time-series NDVI analysis enabled vegetation and recovery monitoring
- AI-powered classification of damage severity levels
- Identification of accessible routes for emergency response teams



Why AI for Disaster Response?

Speed, Accuracy, and Expert-Level Analysis

Post-Crisis Emergency

Rapid damage assessment when every hour counts.

Cognitive Support

AI relieves operators with automated fact-checking and synthesis.

Cost Optimization

RAG and LLM technologies drastically reduce analysis time.

Expert Decision Support

Data-driven recommendations for critical resource allocation.

Serving Global Humanitarian and Emergency Response Leaders

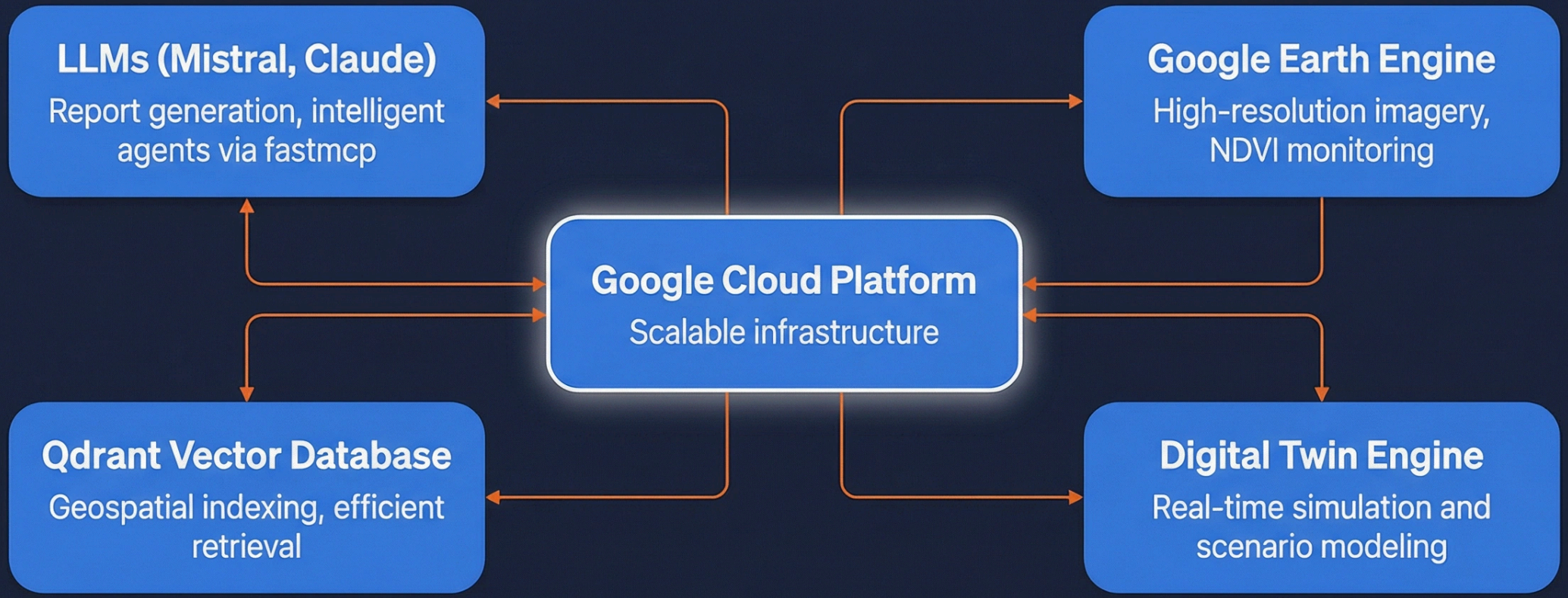
Key Clients

- **UN OCHA**
  Global relief coordination requiring rapid validation capabilities
- **IFRC / Red Cross Climate Centre**
  Flood response planning and reconstruction
- **Médecins Sans Frontières (MSF)**
  Field deployment logistics optimization
- **International Rescue Committee (IRC)**
  Crisis response prioritization
- **National Emergency Agencies**
  FEMA (US), AFAD (Turkey), NEMA (Nigeria), BNPB (Indonesia)

Expanding Impact Across Insurance, Infrastructure, and Government

- Key Sectors:
  - **Insurance & Reinsurance:** Resilience impact modeling (Swiss Re, Munich Re)
  - **Local Municipalities:** Disaster-prone urban planning (Manila, Jakarta, Lagos)
  - **Infrastructure Managers:** Power grids, water utilities, railways
  - **NGOs & Investors:** Climate adaptation funding (World Bank, BEI)

Integrated AI Architecture for Comprehensive Analysis



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Resilience AI: Empowering Communities to Recover Faster

Combining satellite imagery, digital twins, advanced AI, and custom data infrastructure to build resilient communities worldwide.

Partner with us to transform disaster response.