

CAT RESPONSE SERVICE: MID-WEST USA FLOODS

March 2019

Executive Summary...

Geospatial Insight's Post CAT response service provides insurance and re-insurance clients with a comprehensive visual risk assessment of their exposure, following a catastrophic event, through the provision of visual intelligence, event impact mapping and damage analytics.

Following the destruction brought by the recent extensive flooding in Nebraska and Iowa in the Mid-West of the USA during March 2019, this case study illustrates the typical data, imagery and analytics products that Geospatial Insight offer as part of the CAT Response Service. The CAT Platform includes access to pre- and post-event geospatial data to help assess the scope and impact of the flooding across the affected urban areas. In summary the CAT Platform provides subscribed clients with;

- **DIRECT ACTIVATION** of extensive satellite, drone and aerial data capture assets 24/7/365 because CAT events can happen anytime. Products delivered within 72 hours or better, so clients can focus on core business of settling claims.
- **PRODUCT DEFINITION** to ensure clients receive the analytics they want. GSI will find and use the best available sources, including social media and NGO photos and field reports when available.
- **EVIDENCE BASED** damage assessment of your exposures so clients can triage claims, settle quickly, enhance your customer satisfaction and ultimately retain and strengthen policyholder business.
- **INDEPENDENTLY VALIDATED** damage analytics that can be fed into CAT models to improve accuracy of future risk assessments. Products are licenced in perpetuity to support future model validation.
- **DEDICATED ACCESS** to the Visual Intelligence Portal (VIP) to display all forms of geospatial and location based data layers in a fused environment. A secure web-based platform, clients can upload exposure data and custom brand it as necessary.

Mid-West USA Flood Overview

The first signs of flooding were detected on 14th March after a combination of rain, melting snow and ice jams pummelled the Mid-West. As rivers started to overflow, evacuation orders were issued across Nebraska, Iowa, South Dakota, Wisconsin and Minnesota, with many rivers reaching record levels. About 200 miles of levees along the Missouri River have been breached, according to the U.S. Army Corps of Engineers.

In Nebraska more than 300 people have been rescued by Nebraska State Patrol, National Guard troops and urban search and rescue teams. The total number of evacuees is not yet known but is estimated to be in the thousands. The floods have left a trail of destruction in their wake, from livestock to the state highway system, where the Nebraskan Department of Transportation said more than 200 miles of roadways needed repair or replacement.

Data & Analytics Deliverables:

Geospatial Insight have conducted a range of analysis following widespread flooding across the US Mid-West; with a summary of key deliverables outlined below. All outputs will be delivered as both physical data files (ESRI shapefiles, Geojson, Tiff etc.) and via Geospatial Insight's secure and easy to use browser-based Visual Intelligence Portal.

Flood Extent Footprint

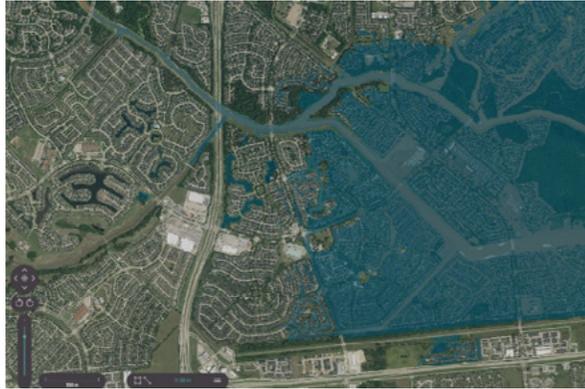


Figure 1: Example of a Flood Footprint

A flood footprint has been generated through a combination of automated and manual techniques, derived from multiple imagery sources where available including: optical satellite imagery, radar satellite imagery, aerial imagery, drone imagery and intelligence derived from social media analysis and aggregation; delivered as an ESRI shapefile and via the VIP platform.

Flood Depth Data...

Flood depth estimates have been derived from the results of the flood extent footprint mapping, differenced across a high-resolution Digital Elevation Model (DEM) of the impacted area; delivered as a geotif raster. Due to the large coverage of the flooding in the various states our flood depth extraction has been limited to the following locations; Omaha, NE, Freemont, NE, Plattsmouth, NE, Blair, NE and Sioux City, IA.

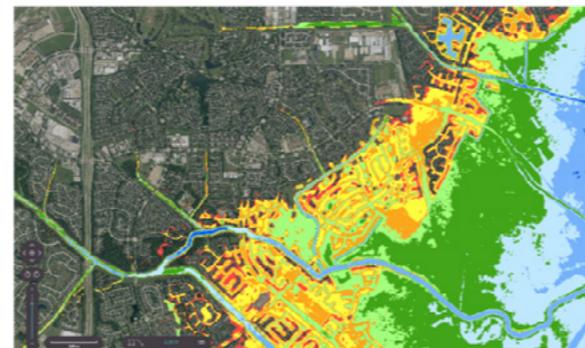


Figure 2: Example of a Flood Depth Estimates

Social Media Analysis:

Images scraped from social media and news sites often provide an invaluable source of visual intelligence that can build a better picture of the ground situation during and after the event. Whilst this data can be spatially patchy, it often provides granular levels of detail that can reveal insights not available from traditional image sources such as satellite, aerial and drone imagery. This data has been anonymised to allow unfettered use.



Figure 3: Use of imagery from Social Media

Enriched Building and Parcel Information

Where feasible, building footprint polygons will be delivered in ESRI shapefile format. This data will be attributed with event-specific information such as whether the structure was flooded, an estimation of flood depth and, where available, information relating to the property parcel such as building value and total parcel value.

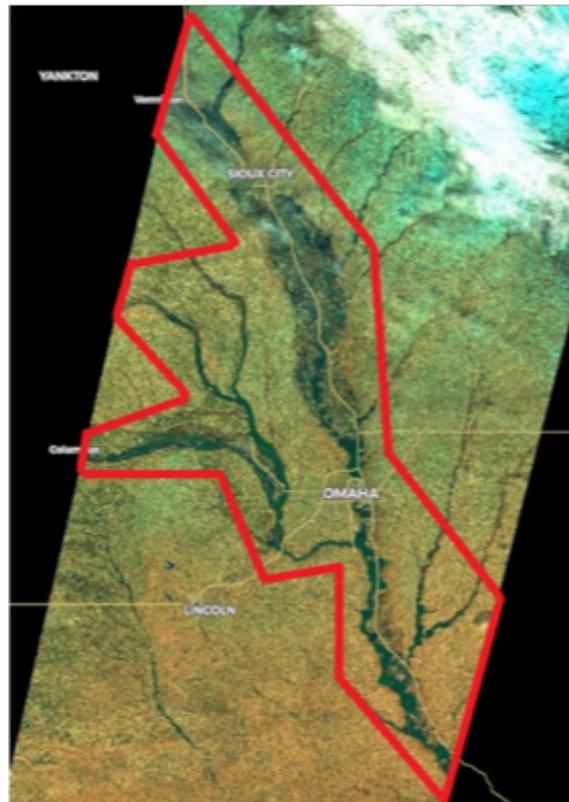


Figure 4: Enriched Building Information

Bespoke Collection Options:

Geospatial Insight have developed strong relationships with the world's leading satellite data providers including DigitalGlobe, Airbus, Planet, SuperView, and Urthecast. As Geospatial Insight is not tied to any exclusivity agreements with satellite data providers, recommendations for data acquisition are always based on objectivity and flexibility; with the client receiving the

most appropriate data for the task in hand. Geospatial Insight also have access to highly qualified commercial drone operators and aerial acquisition pilots across the United States' Mid-West. Accordingly, Geospatial Insight can provide a price for tasked aerial and drone imagery, as well as tasked satellite acquisition on request.



The Area Covered

The below map shows the initial area of interest identified by Geospatial Insight's CAT response team. Through satellite imagery and social media analysis, coupled with river gauge measurements Geospatial Insight's experts have been able to identify the key locations impacted by the floods.

Figure 5: Image showing the Area Coverage for Geospatial Insight's Data & Analysis

Geospatial Insight's Delivery...

The imagery and derived analytics are aggregated and delivered to clients through Geospatial Insight's proprietary visual inspection and analytics platforms Visual Intelligence Portal (VIP). VIP is a secure, browser-based data visualisation and analytics platform optimised for sharing imagery, footage and mapped spatial analysis across large institutions. Users are provided with a bespoke login with which they can access the system, view imagery and map information or conduct their own analytics, whether that be querying databases or making on-screen measurements and annotations for exporting into a report. The system is designed to allow clients to add their own datasets to map layers; enhancing the depth of analytics that can be performed.

Through VIP the following layers are available for the USA Mid-West Floods:

- FLOOD BOUNDARY VECTOR
- FLOOD DEPTH RASTER LAYER
- PLANETSCOPE IMAGE MOSAIC OVER AFFECTED AREAS
- LANDSAT-8 MOSAIC
- SENTINEL-2 MOSAIC
- SOCIAL MEDIA/NEWS MEDIA SOURCE IMAGES

The Pricing...

Geospatial Insight's price for the provision of flood extent mapping for the AOI over Iowa and Nebraska is as follows:

OPTION ONE:

Whole Area of Interest flood extent vector file, delivered via VIP (including view-only access to source imagery) and offline as a .shp file:

\$1,000

OPTION TWO:

Detailed flood extent and flood depth, delivered via VIP (including view-only access to source imagery) and offline as GIS file in the format of client's choice:

\$2,000 per urban area

The prices quoted are exclusive of VAT or local taxes.

Geospatial Insight's Summary of the Mid-West USA Floods

Geospatial Insight are leveraging innovations in drone, satellite, aerial, open and street-view imagery with proprietary software platforms and expert data analysis to deliver rapid visual assessment of CAT events. By combining state of the art readiness tools and leveraging extensive global provision networks GSI provide unparalleled CAT response capabilities in a cost-effective manner.



CAT Response for Insurance

At Geospatial Insight we're leveraging innovations in drone, satellite, aerial, and street-view imagery with proprietary software platforms to deliver rapid visual assessment of CAT events.

Read More of our Case Studies:

Find more CAT Response case studies here:
[geospatial-insight.com/resources/case-studies](https://www.geospatial-insight.com/resources/case-studies)

About Geospatial Insight...

Geospatial Insight is Europe's leading provider of independent research and alternative data derived from the analysis of satellite imagery and other aerial sources, combining this intelligence with a range of other data sources to provide in-depth market insight and business analytics to clients in the corporate, financial and insurance sectors.

Established in 2012 and head quartered in the UK, Geospatial Insight provides these unique intelligence services to clients around the world. Geospatial Insight is also a member of the European Association of Independent Research Providers (EuroIRP).