

# Optimising emergency responses in cities using data-driven intelligence

STFC Hartree® Centre worked with IBM and Riskaware through the Hartree National Centre for Digital Innovation (HNCDI) to enhance responses to emergency situations in cities.

## Challenge

Cities present challenges for emergency response deployment due to obstacles and high population densities. Initial responses often rely on flawed or biased data, hindering effective aid delivery. Riskaware, specialising in incident modelling, developed UrbanAware to improve emergency responses to hazardous material incidents in urban areas. UrbanAware aims to provide actionable intelligence to help crisis management teams identify exclusion zones and set up safe operations bases. Due to the 70+ possible input parameters such as wind direction and urban topography, it was difficult to understand intuitively which input combinations correlated with deviations in UrbanAware's behaviour.

## Approach

Riskaware collaborated with us to enhance their platform by leveraging the Geospatial Discovery Network (GeoDN), a cloud-based modelling framework. This network allowed thousands of simulations of different input parameters to be run in parallel instead of one by one. To monitor the model's performance the team developed the Variational Exploration Module (VEM), which automatically analyses simulation data to identify the input parameters with the greatest impact on computational performance. The UrbanAware code was also streamlined and containerised, packaging all UrbanAware's code with the files and libraries it needs to run across different systems.

**"It was a pleasure to work with the HNCDI team. They discussed and explained their work thoroughly and integrated our suggestions"**

**Peter Melling**  
Riskaware

Credit: Unsplash

## Benefits

This collaboration expedited significant improvements to the UrbanAware platform, bringing actionable intelligence to our cities sooner. Access to the GeoDN and VEM sped up the process of identifying the most efficient input parameters to optimise computational performance. Streamlining and containerising the code meant that the platform's testing, deployment, scaling, and maintenance was improved. Organising the code this way also allows UrbanAware to run seamlessly across different infrastructures. Accessing support through HNCDI was crucial, positioning Riskaware to better support rapid urban emergency responses with improved reliability and effectiveness.

## At a glance

- Improved emergency response capabilities in urban environments.
- Expedited analysis of UrbanAware's performance with different parameters.
- UrbanAware running reliably and securely across different infrastructures.
- Improved testing, deployment, scaling and maintenance of platform.

## Who we are

The Hartree Centre was created by UK Government to help businesses and public sector organisations accelerate the adoption of high performance computing (HPC), big data analytics, artificial intelligence (AI) and quantum technologies. We play a key role in realising UK Government's Industrial Strategy by stimulating applied digital research and innovation, creating value for the organisations we work with and generating economic and societal impact for the UK. We are proud to be part of UK Research and Innovation.

## What we do

- Boost productivity and innovation for industry
- Offer training and skills development
- Provide insights into future technologies
- Give tailored business development support
- Build bespoke small teams around your project

