

Safeguarding Australia

Exposure information aids disaster mitigation

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As Geoscience Australia continues its grand survey of the Australian continent down to the Moho, it is also undertaking a series of national risk assessments for several natural hazards in the urban landscape. Information defining the buildings, people, businesses, employment and infrastructure that would be affected by natural disasters underpins the project.

A COAG research priority

The National Exposure Information System (NEXIS) project was an initiative of Geoscience Australia in response to the Australian Government's research priority of safeguarding Australian communities from natural hazards, terrorism, invasive diseases and infrastructure failures. It follows a recommendation in the Council of Australian Governments Natural disasters in Australia report for a 'nationally consistent system of data collection, research and analysis to ensure a sound knowledge base on natural disasters and disaster mitigation'.

NEXIS aims to collect, collate and maintain nationally consistent and best available exposure information at the level of individual buildings. It requires detailed spatial analysis and the integration of available demographic, structural and statistical data.

The system integrates data from several national spatial databases, such as the Geocoded National Address File, the Property Cadastre, Australian Bureau of Statistics (ABS) census data, the ABS Business

Registry, Reed–Cordell building cost factors, and Cityscope (commercial properties within CBDs). It also takes in post-disaster surveys and data from state agencies and local government bodies.

All building types covered

The generic version of residential exposure information is complete and provides information about location, building type, construction type, population and asset replacement cost (figure 1).

Business exposure information, which is harder to collect and maintain, covers CBDs, non-CBD commercial areas and industrial areas. The business information fields of this developing NEXIS capability include the business type (using Australian and New Zealand Land Information Council categories), business turnover and employee details, as well as the spatial and building information. Figure 2 shows a section of the residential, commercial and industrial buildings on the Gold Coast.

The exposure of ancillary buildings, including those of schools, essential services,



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Figure 1. Residential exposure information of the type contained in the NEXIS database.

government agencies, museums, stadiums and ports, will also be included.

Eventually, NEXIS will commence the integration of critical infrastructure information, which includes the attributes required to predict the consequences of infrastructure failures. This information has been collated by the Engineering Vulnerability Project, which is leading the development of vulnerability models to assess the damage from various natural hazards and critical infrastructure failures. The exposure information and vulnerability models will underpin the development of critical infrastructure protection modelling and analysis (CIPMA) and natural hazard impacts capability at Geoscience Australia. The data integration process being developed will observe confidentiality agreements made during collection of the data.

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NEXIS is undergoing quality assessment to identify and solve problems and fill gaps affecting the development of a more meaningful and realistic exposure definition. One example is the identification of the age and construction type of residential buildings. Geoscience Australia is sourcing several additional datasets, such as ABS historical databases and home approval information, to get



Figure 2. Spatial locations of residential, commercial and industrial buildings on a section of the Gold Coast.

a clearer picture of age and construction type.

NEXIS is currently using a generic approach, but the information will become more specific over time. The development of strategic alliances with external stakeholders is enabling the capture of the more specific reference databases they hold.

Geoscience Australia will incorporate this specific exposure information on location, building and demographic profiles, business activity and associated infrastructure as the new datasets and other sources of information become available.

Benefits for disaster recovery

This system is intended to provide a relative assessment of exposure to several hazards and map the distribution of exposure. This will help local, state and national government agencies identify communities at risk and prepare with impact mitigation strategies. The information will also help emergency managers. By integrating the information with the decision-support tools of early warning and alert systems, they will be able to forecast the impacts of various hazards and assess damage quickly. This will help them prioritise and manage response operations.

For more information

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