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The Role of National Geospatial Authorities in Disaster Management – Australian Perspectives 2010-2013*

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THE ROLE OF NATIONAL GEOSPATIAL AUTHORITIES IN DISASTER MANAGEMENT – AUSTRALIAN PERSPECTIVES 2010-2013

Introduction

National emergency service organisations and government response agencies are dependent on access to, and expertise in the use of, authoritative and reliable location information, and Australia is no exception. Poor quality information in planning stages can destroy the effectiveness of response, relief and recovery efforts.

Much effort in Australia has been put into developing a whole-of-government disaster management policy, of which location information is a key platform. On 13 February 2011 the Council of Australian Governments adopted a National Disaster Resilience Strategy (COAG, 2011). The strategy highlights priority outcomes to reduce the impact, and improve our understanding of, the medium- to long-term risks of natural disasters. Key to these outcomes is the need for frameworks that enable the sharing of information to underpin disaster prevention measures, including information on location of people, buildings and infrastructure potentially exposed to a hazard (Middelmann, 2007). However whilst much strategic work has been done in developing a cross-government resilience strategy, it could be said that the underpinning spatial information platform still requires significant development.

Challenges in Australia's spatial framework for disaster management

Emergency management has been seen to be 10 percent telecommunications, 20 percent operations and 70 percent information (Everson, 1986). However, in the Australian context in the mid-1990s, the proportion of resources in emergency management devoted to information was thought to be only 10 percent (Granger & Johnson, 1994). At that time there was recognition of a gap in understanding between what users in the emergency management community required, and what the government and private-sector providers of spatial information thought was needed. Whilst that 10 percent figure is likely to have grown, recent disaster events showed that there was still lingering fundamental issues around resourcing and effective use of spatial information for disaster management.

Concurrent to the development of the resilience strategy, a string of major flood events in eastern Australia in the summer of 2010-11 highlighted inadequacies in Australia's spatial data framework for effective disaster response (from Scott, 2011):

- Sharing of information and knowledge of what other agencies were doing could have been improved; there was a reliance on informal networks rather than structured governance.
- There was not sufficient take-up or use of authoritative fundamental or dynamic high value geographic information but a reliance on what could be found quickly and easily.
- Geographic information did not appear to be used effectively in policy and decision making in response to the disaster, nor did there appear to be much understanding of the value that geographic information could offer. There appeared to be a disconnect between policy/decision making and geographic-based evidence.

Overall, expectations of accurate, real-time, high resolution imagery and mapping being accessed when and where it was needed were not met despite being key components of what a disaster management framework must be. That 'disaster season' highlighted the need for improvements to governance and institutional arrangements to make best use of geographic information for disaster management. Fortunately some parallel activities were underway to help address this need.

Addressing the issues

The perceived gap between disaster management requirements and the provision of location information has somewhat been bridged by the establishment of the Emergency Management Spatial Information Network of Australia (EMSINA) in 2002 (EMSINA, 2012). EMSINA is a network of emergency management practitioners from the geospatial teams of front-line emergency services organisations in each state and territory, as well as similar representation from federal disaster management agencies. EMSINA's strategy is to maximise the benefits of geospatial technology, establish common operating procedures and standards, and improve spatial expertise in the emergency services sector. EMSINA representatives have closely worked with GA and state mapping agencies in setting the work program for the collaborative capture of topographic information through the National Topographic Information Coordination Initiative (NTICI) (ICSM, 2012).

At the federal level, over 2010-12 two initiatives were undertaken to assess Australian Government practices in the creation, management, sharing and use of location information across Government departments and agencies. The APS200 Location Project recommended that a whole-of-government approach and framework linking information to location is needed not just for emergency management but for government to carry out its key business (APS200, 2011). Dr Vanessa Lawrence CB, Director-General and Chief Executive of the UK's Ordnance Survey, completed a broader review of state, territory and national spatial capabilities and how that cross-government capability can be improved for broader community benefit (Lawrence, 2012).

Both bodies of work recommended the need to strengthen and enhance existing governance and policy arrangements, and deliver authoritative and consistent national coverages of framework data themes at the lowest possible cost for the governments of Australia.

The Office of Spatial Policy (OSP) was established in response to these reviews and has released an implementation plan to develop an Australian Government Location Information Strategic Framework (AGLISF). To maximise the spatial enablement of all Australian Government resources (including disaster management), the AGLISF will be based on the following principles (APS200, 2011):

- Implementation of national leadership and coordination to build and sustain the framework;
- Government information and national priorities linked to location through geocoding to fundamental datasets;
- Established and clear stewardship and custodial responsibilities to maximise data integrity and confidence;
- Clear and agreed access and sharing to make information transparent;

- An open data licencing culture to realise innovation, productivity and investment gains;
- Consistent standards and interoperability frameworks to optimise access, reduce costs, remove duplication and improve data quality;
- Improve and develop governments' capability to maximise the utility of location information.

OSP is working closely with Geoscience Australia and the Australia New Zealand Land Information Council to implement the AGLISF. The immediate focus of AGLISF is to address licencing and access issues, and assess user requirements for now and into the future. AGLISF may also provide some overarching Australian Government direction to existing collaborative acquisition programs managed by GA such as NTICI, the Australian Hydrological Geospatial Fabric (Geofabric) and the National Elevation Data Framework (NEDF).

Assessing the spatial information needs of users, including disaster management, is a key step in making sure that the location information framework is robust, useful and practical. Location information for disaster management still needs to be authoritative, reliable, current, and have appropriate resolution. The ongoing work of EMSINA shows that emergency management agencies are becoming more spatially enabled and are requiring the delivery of information in more sophisticated and timely ways; however fundamental information requirements still appear consistent with those identified in the 1990s (Granger & Johnson, 1994):

- Fundamental location information, including address, parcel/cadastre, gazetteers/place names, terrain, land use and tenure, administrative boundaries;
- Profiles for various hazards, including geographic extent, frequency and severity;
- Location and availability of emergency facilities such as fire stations, equipment and personnel;
- Location of other facilities such as health and welfare, schools, utilities and transport
- Earth observation information such as satellite imagery, photography, meteorological and astronomical observations, and value-adds such as "hotspot" or other models;
- Likely exposure of population and built assets to any particular hazards and post-disaster surveys.

Case studies from Geoscience Australia

As Australia's national geospatial agency, GA is heavily involved in providing location information and spatial support to disaster management of national and regional significance. GA undertakes this support in collaboration with other Australian Government agencies – AusAID and the Attorney-General's Department (AGD) in particular - who have responsibilities for other aspects of disaster management.

Three case studies are described below outlining GA's continuing involvement in the sharing of spatial expertise and information for disaster management within the Asia-Pacific region and in Australia. The examples highlight the progression away from just using topographic mapping to more sophisticated portals and expertise provision.

There is also an increasing trend towards enabling disaster management agencies to better use location information – which means making location information open, accessible, authoritative and relevant.

1. The National Flood Risk Information Portal (NFRIP)

On 14 November 2011, the Natural Disaster Insurance Review was released as a result of devastating floods in the heavily-populated areas of eastern Australia during 2010-11. In response to recommendations in the NDIR, the Australian Government launched the development of the National Flood Risk Information Portal (NFRIP) for which GA has technical lead and implementation (Geoscience Australia, 2012).

Location information forms one part of the NFRIP; however the broader principles behind the Portal are consistent with those of the Australian Government Location Information Strategic Framework, for example:

- flood information should be standardised and consistent, but not necessarily take a 'lowest common denominator' approach;
- effort, resources and information will be shared among jurisdictions;
- any available flood risk information will be openly available but be certified by custodians;
- information, products and services will be easy to access and use, and be relevant to user needs;

The Portal will also undertake continuous improvement of its services to ensure it keeps pace with user needs.

Over four years from July 2012, NFRIP will provide a centralised public access point to existing flood risk information and make historical flood events obtained from a 30 year record of Landsat satellite imagery publicly available. By providing access to information on flood risk NFRIP will assist insurers to offer appropriately priced flood insurance and government agencies can consume information to undertake risk assessments.

2. Situational Awareness Support to the Crisis Coordination Centre during disaster season

The Australian Government Crisis Coordination Centre (CCC) was officially launched on 17 October 2011 to integrate capabilities across government agencies to provide holistic and efficient whole of government situational awareness to support decision makers during a crisis.

GA was invited to play a greater role in providing support to the Australian Government during the 2011/2012 'disaster season' through providing a spatial support capability to the CCC. GA coordinated the delivery of over 350 customised situation awareness products and maps to the CCC which provided unprecedented exposure of GA's products and expertise to a large number of Australian Government stakeholders involved in the disaster response.

The support provided was significantly enhanced through the implementation of a liaision officer within the CCC to help guide and direct the mapping efforts being undertaken at GA. This role ensured the products developed were useful and relevant

to the specific needs of decision makers, and also provided a unique opportunity to explain and present the products to CCC staff and provide advice in how the products could support evidence based decision making.

The spatial products delivered were either driven by GA's liaison officer identifying how a spatial capability could be innovatively applied to help inform a question at hand, or a spatial product being developed to portray a specific information need. For example, GA identified innovative ways to visualise important excel data on government disaster expenditure to assist decision makers quickly identify which areas had been impacted by multiple disaster events and gain a quick national snapshot of which LGAs were eligible for government assistance. Examples include:

- collaborative identification of location information requirements and custodians across whole of government;
- developing CCC specific spatial training modules;
- developing standard operating procedures and templates for quick and consistent mapping products;
- identifying appropriate tools for decision support and common operating platform (including the consumption of on-line web services).

GA's support to the CCC provides a constant and ongoing opportunity for the exchange of data, information and knowledge between scientists, policy makers, and decision makers. This approach facilitates knowledge transfer between agencies and encourages the application of information and appropriate technologies to enhance emergency decision making. The CCC and GA are exploring how they can continue to work together, and with other agencies, to increase the application of spatial information to support situational awareness and analysis requirements.

3. Strengthening spatial data development and delivery in the Philippines

GA previously supported a program in the Philippines with the National Mapping and Resource Information Authority (NAMRIA) who is responsible for the development and delivery of topographic, bathymetric and land use data (Scott & Simpson, 2009). The work focused on three areas:

- Development of a plan for a NAMRIA spatial data information system
- A small pilot to test how a NAMRIA spatial data information system might work – using 1:50,000 tiles
- Guidance to make the validation of NAMRIA 1:50,000 tiles more efficient.

The current program of work focuses on post-disaster recovery and rehabilitation in Manila. GA with assistance from the Australian Agency for International Development (AusAID) is applying its expertise in the development and maintenance of exposure information to creating an exposure database to support impact analysis for severe wind, earthquake and flood hazards in the Greater Metro Manila Area with two agencies:

- GA is providing the Philippines Institute of Vulcanology and Seismology (PHIVOLCS) with support and expertise to integrate existing government data with exposure data captured in the field. GA's support is based on the use of existing methodologies developed through the QuiveR program with PHIVOLCS, and extended using techniques adapted from GA's National Exposure Information System;

- GA's work with NAMRIA in acquiring, managing and distributing lidar and stereoimagery, which will underpin the derivation of further exposure information for PHIVOLCS. This sharing of expertise has included extensive embedment of GA staff in NAMRIA and training of NAMRIA staff in Australia in the past two years, with further support being provided through 2013.

GA's role in building spatial capacity in the Philippines shows not only how location information underpins effective disaster management, but is an example of how the sharing of expertise across borders makes best use of resources. GA's engagement in this instance can be seen as strengthening the ties between the two countries. (GA, 2010).

Conclusions

Location information continues to be a key component of disaster management – but it needs to be authoritative and linked closely with the needs of decision makers in order to be effective. Emergency management agencies are becoming increasingly sophisticated in their needs and suppliers of location information need to evolve their offerings - no longer is geospatial information just about maps, but providers of location information now need to evolve their offerings in order to maintain relevance.

Australia is currently working through how best to maximise the use of location information by government users including those in the disaster management sector. The establishment of an Australian Government Location Information Strategic Framework will hopefully clarify custodianship, access and reliability issues surrounding the use of fundamental location information for disaster management. The sharing of GA's spatial knowledge with other disaster management agencies through training, embedment and on-line systems is a parallel approach designed to build operational expertise within disaster management agencies. It is envisaged that the combination of approaches will address recent issues with location information faced by disaster management agencies.

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