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Invited papers on recent developments in geospatial information management in addressing national, regional and global issues

Collaboration, Automation & Foundation Data: three steps towards spatially enabled government **

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ABSTRACT

This paper is not to define the reasons behind spatially enabling our government at all levels; the reasons for doing so have been well established. This paper will discuss some of the practical steps the Australian Government, in particular Geoscience Australia (GA), have taken towards achieving better decision making and policy through the use of spatial information. Here I have identified three practical steps that the Australian Government and in particular Geoscience Australia, have taken to facilitate change towards spatially enabled government;

1. Identifying and deriving a managed National Foundation Datasets.
2. Collaboration with government agencies to demonstrated benefits of spatial information.
3. Automation of how we derive spatial data, how it is applied to produce traditional series mapping, and how automation is significant to spatial information.

Fundamentally to move towards spatial enabled government we have stopped trying to answer everyone's questions or needs with one product (series mapping). Now we tailor products to answer individual questions, targeting specific information to derive an informed answer.

Change will not be achieved through one program or one policy. It will be achieved with a number of shifts, small and large, towards focusing efforts across an organisation and government. Spatially enabling government will require these steps and any number of other small shifts.

KEYWORDS: spatial policy, FSDF, Automation, Collaboration, Foundation data.

1. INTRODUCTION

Geoscience Australia is the peak geospatial and geological agency for Australia, concentrating on the collection, improvement and delivery of data and information across many areas ranging from petroleum exploration, minerals and geological pre-competitive information to community safety, remote sensing and spatial information. The National Geographic Information Group within GA was the peak mapping area of Australian Commonwealth Government and is now the leader in commonwealth government spatial information.

The Australian Government as a whole has yet to fully embrace the application and value of spatial information, to underpin better policy making, efficient service delivery, innovative research and better targeted investment. In 2010 a number of initiatives and studies occurred within Australia to identify and quantify the benefits and strategic direction of integrating the Australian Governments spatial needs within government information (Scott *et al.* 2011; Lawrence 2011). The need to spatially enabling our government is part of Geoscience Australia's strategic vision and direction for the future.

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2. FOUNDATION SPATIAL DATA

Each year Australian Government agencies use significant resources to collect and maintain large amounts of information to carry out their core functions. While they have strong incentives to efficiently meet their own information needs, there is little incentive to pool resources to more effectively meet the needs of the broader community, or for broader government with economy-wide objectives. There is a lack of mandate and motivation to manage and share data. This results in similar or duplicate information being collected, maintained and stored by multiple agencies.

On the 21st of November 2012, the Australia New Zealand Land Information Council (ANZLIC) released the "One Australian and New Zealand Foundation Spatial Data Framework (FSDF)" report which provides a national approach to managing government spatial information. The FSDF, when implemented, will be accessible to all users of spatial information including government, industry, research and academic sectors as well as the general public.

ANZLIC's vision for the FSDF is that foundation spatial data will become ubiquitous in all sectors of the Australian and New Zealand economies. When realised, the use of a common framework, which is embedded into the everyday business of government and private sector entities alike, will allow for seamless exchange of information and knowledge across organisational, sectoral and jurisdictional boundaries.

For each of the Foundation Spatial Data Themes this project will create:

- detailed theme specifications
- data product specifications
- supporting policy documentation
- implementation work packages; and
- Proposed future business processes.

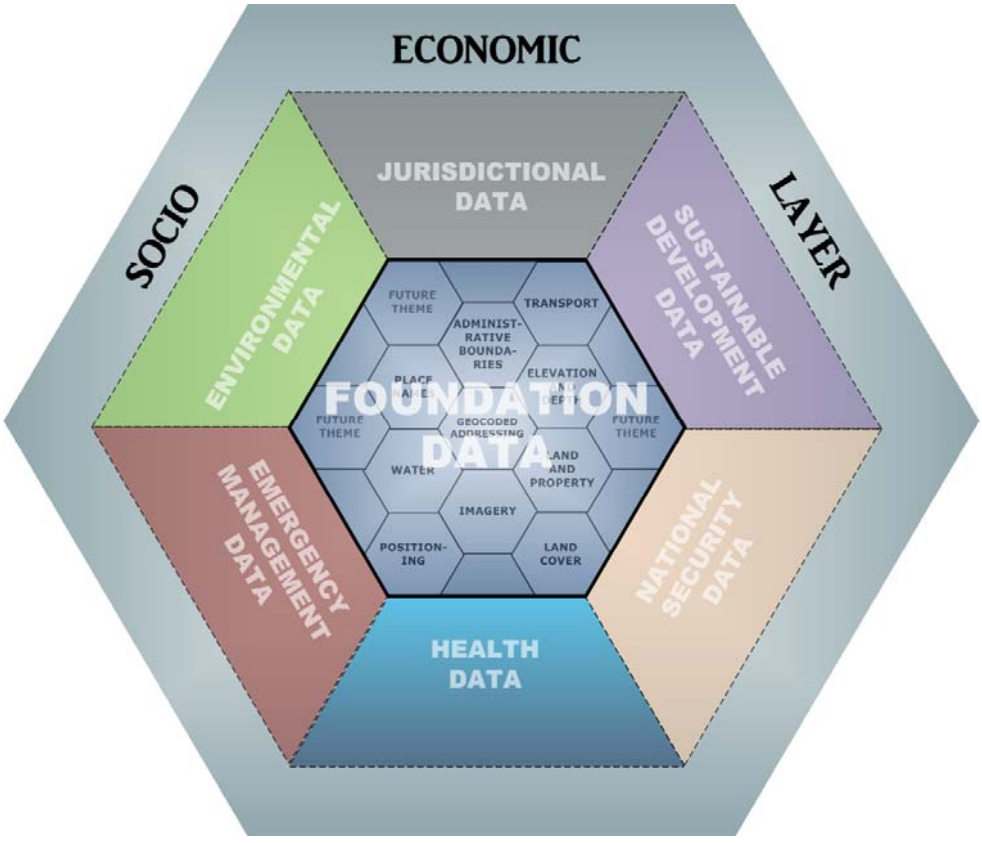

Figure 1: Foundation Spatial Data Framework

Following consultation and analysis of user requirements, ANZLIC identified the first ten spatial data themes which will form the foundation of the framework (Fig 1). It is recognised that this initial list may expand over time with increased demand from the user community and as data suppliers improve capacity to deliver products and services.

1. Geocoded Addressing
2. Administration Boundaries
3. Positioning
4. Place Names
5. Land Parcel and Property
6. Imagery
7. Transport
8. Water
9. Elevation and Depth
10. Land Cover

The development work behind the FSDF themes started in 2013. Current concentration is on the implementation of the framework with developing policy, standards and guidelines. The FSDF is across multiple layers of government. National datasets will be an amalgamation of state and commonwealth spatial information. There is work to formalise agreements, relationships and the business process between a number of data suppliers across government for the collection, maintenance and use of the themes and their data products. The Office of Spatial Policy, the policy home of spatial data, is the driver of the FSDF initiative with Geoscience Australia is a key player across all themes. Having nationally consistent base data is a building block towards to spatially enable government and the wider community.

3. COLLABORATION

Geoscience Australia spatial history consists of making national scale topographic maps at a variety of scales. Our last big series mapping exercise covered the country with 518 1:250,000 scale maps in 2006. After completion we shifted in our strategic direction, a new focus on working with government was created, to enable better policy decisions, based on spatial information. We moved from maps that attempted to be all things to everyone to providing answers for individual questions posed by policy focused agencies.

Over the last few years Geoscience Australia has actively undergone a program of collaboration with other government agencies. We have a history of working collaboratively with organisations such as AirServices Australia in the production of Aeronautical Charts, but this is still locked in chart/map production. Until recently we had not proactively sort collaboration to promote and demonstrated the power of spatial information in all its forms. Recent collaboration has primarily been through word of mouth, and has grown significantly. We now undertake major collaborations with other government agencies to develop spatial information and data and create produces for visualisations (Maps and/or Web Services).

Below are three case studies of our recent collaborations. These demonstrate some of the work we perform, and the ongoing relationships we still maintain.

3.1 Case Study One – Department of Resources, Energy and Tourism (RET)

The tourism areas of RET have an ongoing relationship with Geoscience Australia, every year we assist them to map the distribution of the tourism grant program. The primary aim is to spatial display successful grant applicants; this shows the varied distribution around Australia and is an indicator of a fair and equitable grants program. This map is primarily used for program audit purposes (Fig 2). This is an example of a very simple collaboration. We do not seek to cover costs for the work, due to its size and part of our parent department. This work however has allowed us to raise our profile within the department, which has developed into number of large projects.

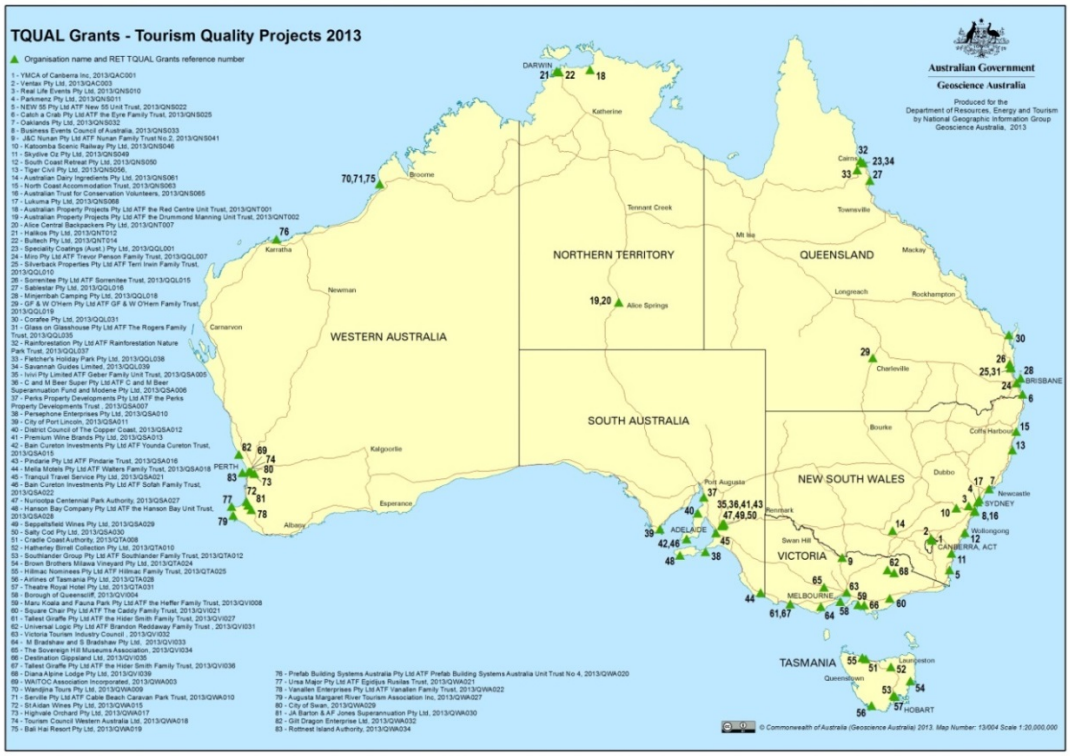

Figure 2 – Tourism Grants Program Map

3.2 Case Study 2 - Disaster Recovery and Administration

We have forged close working relationship with the emergency management area within the Australian Government. We provide mapping support for disasters and crisis as they occur, and also provide support for the administrative challenges following a disaster. Figure 3 demonstrates the path of Tropical Cyclone Yasi in North Queensland in February 2011. GA modelled the wind strengths as the cyclone crossed the coast and its path over time. We also depict critical infrastructure such as electricity infrastructure that may be affected in the area. The grey areas highlight local government areas, affected by TC Yasi, that were eligible for commonwealth government financial assistance. This work had an interesting impact, for the first time disaster assistance agencies had a true picture of where their services where needed and could plan and allocate to provide those services in a more targeted response.

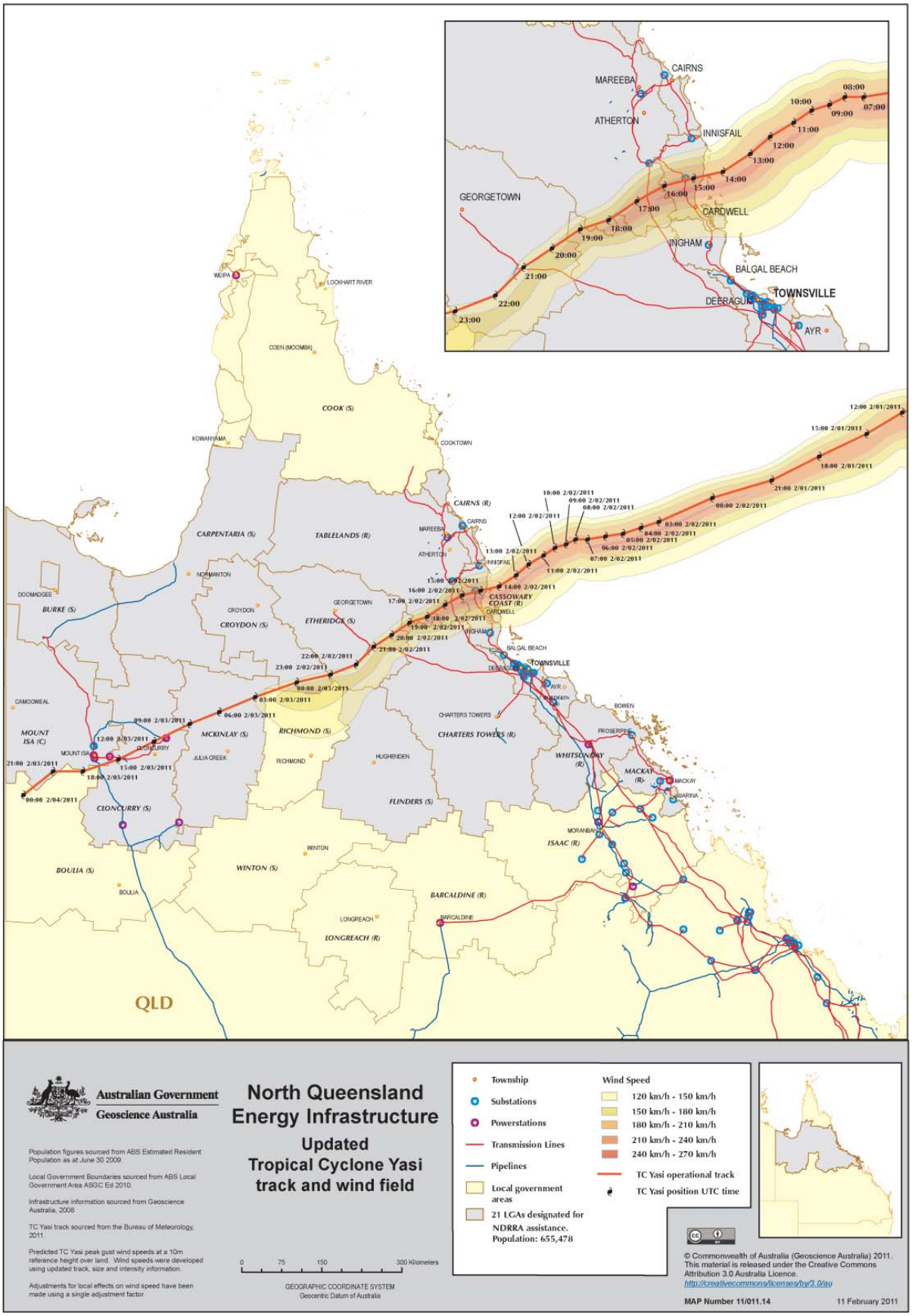

Figure 3 Tropical Cyclone Yasi Impact Support Map.

3.3 Case Study - Solar Resource Mapping Portal

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Over the last three years we have undertaken work to collaborate with the Australian Renewable Energy Agency (ARENA) to allow for improvements to be made in solar insolation data quality in Australia. GA has developed energy infrastructure datasets that are easily discoverable and are freely disseminated through a web portal. The Australian Solar Energy Information System (ASEISonline) is an example of supporting government and industry to provide pre-competitive energy resource data for regional analysis of for large scale solar power station development.

This portal (Fig 4) has limited focus on traditional mapping. The industry and government departments we provide this information are interested in answering questions, not necessarily a map. The Australian Solar Energy Information System Online (ASEISonline) site was targeted to three main levels of audience.

- Level 1 focuses on an audience interested in a general view of solar resources across Australia, using a traditional map to visualise resource and change over time suits all needs.
- Level 2 is the investigator who has little knowledge or concern with spatial information, they just want data at their location of interest. This level of user clicks on the map, and that is their spatial decision made. They will receive a CSV file of the 20 year solar insolation record, with additional information such as coordinates, and distance to electricity transmission infrastructure.
- Level 3 investigators know about spatial data and how to use it; they can download the data directly.

Here our collaboration is all online, targeted to different users to serve a specific goal.
http://www.ga.gov.au/energy/other-renewable-energy-resources/solar-energy/solar-mapping.html

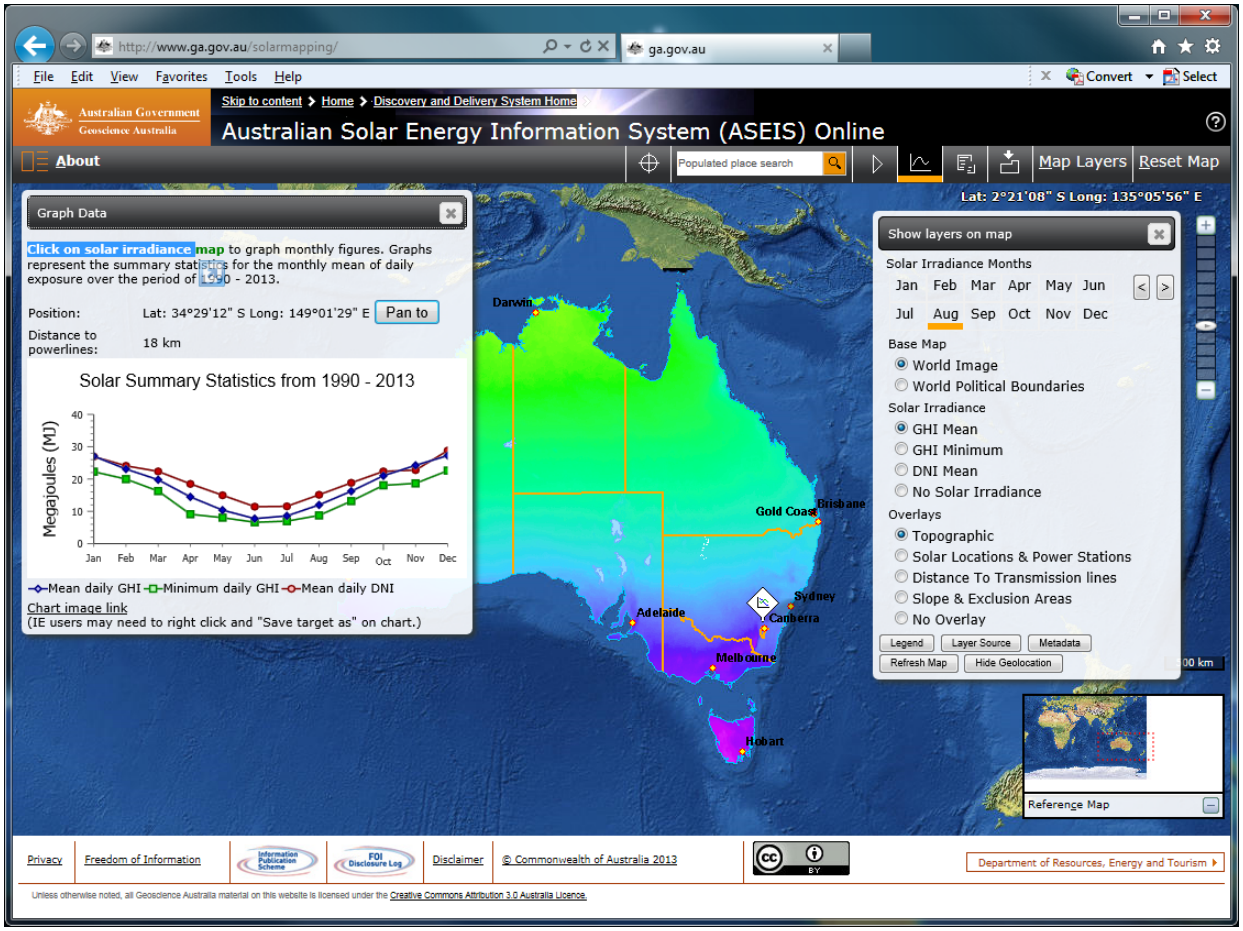

Figure 4 - Screen shot of Australian Solar Energy Information System Online.

3.4 Developing Collaboration work

Our current collaboration work is moving further into policy agency support work. Our past work has given us profile in other government agencies. Our current work program moves further into the areas of policy support and geo-regulation. Collaboration is something we have had to build from a small base, building on past success and demonstrations. We see that our business can grow to support other government agencies in this area, utilising the power of spatial information to better informed policy decisions.

4 AUTOMATION

Moving away from the series mapping programs of the past and into a future of targeted spatial information to answer questions for government policy, requires a fundamental change in how we manage data and produce maps. While we concentrate on the right answer, delivery in a timeframe that allows for its use and integration is just as important. No longer can we spend months delivering the beautiful map that attempts to answer all questions before they are asked. Now we need to deliver the good map, or the table, or the yes/no answer to actual targeted questions. To do this we have had to become automated as much as possible. Not only does automation give us a good product quickly, it also documents procedures and provides repeatability.

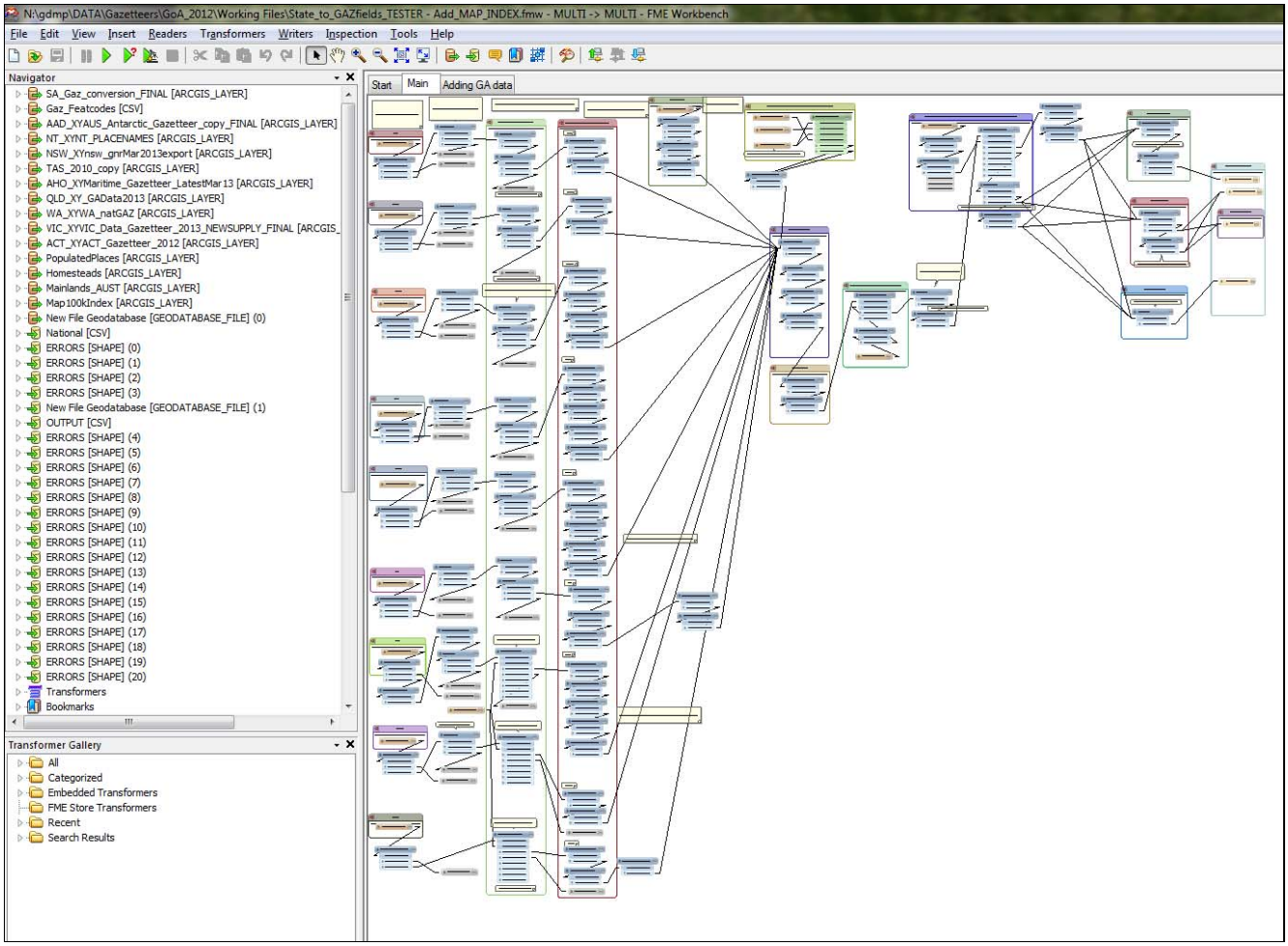

Figure 5 - Automation process for Gazetteer of Australia Amalgamation (FME Worksheet).

4.1 Gazetteer of Australia Automation

For many years we have constructed the Gazetteer of Australia by combining place name data from nine state and territory jurisdictional sources. This had, until recently, been a slow,

painful and manual process over a number of months, which suited in a bi-annual update cycle. Increasingly government and industry are using the freely available dataset to build business processes. Their requirements and demands on this dataset and its quality had meant we needed a repeatable and efficient process to produce the Gazetteer of Australia. The complex interactions depicted in Figure 5, map and depict the process developed to move a manual 3 months process into an automated 30 minute one. The data produced is high quality, has less chance of human error and documents a process previously held in individual minds. This now opens the door to more frequent updates, and quality support of business processes on better data. All of this through a simple automation process using already available technology within our organisation.

4.2 Series Mapping Automation and Changing Focus

Of course our new strategic direction does not forget or ignored our past. We still have a requirement to map the nation. Figure 6 is an image of one of the first six 1:250,000 scale maps that have been created using automated mapping techniques. This automation takes the map creation timeframes out from months and into days. The biggest shift is the concentration of effort. Previously the effort came at the end of the process in cartographic work to adjust and correct visual errors. Now the focus has been almost completely been placed on the quality of the data, and the quality control processes surrounding that data. We could produce a new map series covering the country (518 maps) in a few weeks if required, but only if the data is correct. We are still coping and dealing with a shift of focus from map to data. However, if we concentrate on the data we'll produce spatial information for any number of uses. A map is one product produced from spatial information; it is no longer the product.

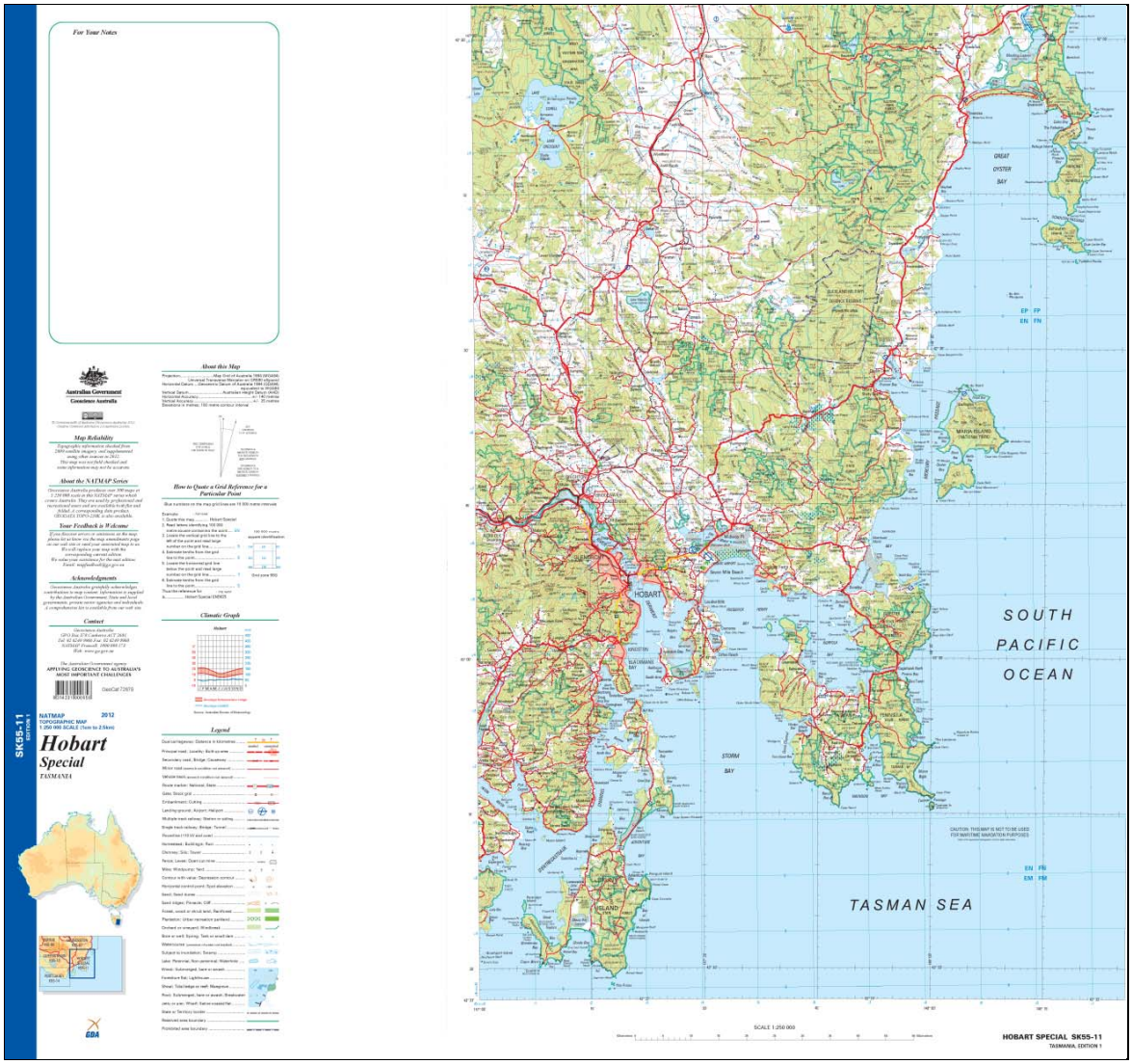

Figure 6 Hobart Special 1:250,000 Map (automated mapping)

Automation certainly shifts business concentration, but the value add and change to spatial information concentration allows us to react to government requests in a meaningful timeframe. We rarely say we cannot provide that support because of timeframes these days, we tend to over deliver. This brings its own issues and expectations, but being challenged to improve is a problem we can live with.

5. CONCLUSION

Spatially enabling government will not be achieved through one program or one policy. It will be achieved with a number of shifts, small and large, towards focusing efforts across an organisation and government. By building managed, standard and consistent national foundation datasets we will create our base for the future. Developing collaborations and profile across government will drive the use of those datasets. Automating will allow you to react to requests in a realistic and relevant timeframe, with up-to-date information. Spatially enabling government will take these and any number of other small steps. We have seen the change as it has been occurring, and look forward to the benefits that change will bring in our future.

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