Fiji Geospatial Information Management Strategy

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FOREWORD

We live in a digital world dusted with electronic parcels of information which is growing rapidly and in an increasingly dis-intermediated form. Software and technology are used to help streamline efficiency and customer satisfaction in a world where information is one click away, and everything has become a digital representation of its former self. Accessing digital information is a far cry from thumbing through catalogued mapping and trying to remember every detail.

The widespread use of geospatial technologies such as GIS, Remote Sensing, Photogrammetry and GPS brought such developments and significantly impacted societies throughout the world. Inevitably, the spatial nature of many of today's challenges warrant new ways of thinking and applying geospatial and non-geospatial technologies to solve global problems. We are in a digital phase focused on the abilities of nations and institutions to use geospatial information as a revolutionary tool to make decisions and embracing areas that are data driven.

The proposed National Geospatial Information Strategy 2017 is aimed at providing the foundation for a national geospatial platform which integrates different datasets and further boosts accuracy and accessibility of geospatial information which in turn empowers not only policymakers in decision making but also ordinary Fijians in their everyday lives. Nonetheless, we have to bear in mind these applications are only tools and the onus is ultimately on us to apply them to solve our local and international issues. In order to effectively do that, we require accurate geospatial information as a crucial component of the process. It is the incorporation of accurate records into powerful GIS operations that empower innovative geospatial solutions.

Geospatial information impacts every aspect of human life, underpinning a multitude of systems, software and applications intended to make modern living more productive, comfortable and connected.

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Mr. Malakai Finau
Chairman
Fiji Geospatial Information Management Council

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- The National Geospatial Information Management Strategy was developed by the Fiji Geospatial Information Technical
- Advisory Committee (FGITAC) with the endorsement of the Fiji Geospatial Information Management Council members.

1. INTRODUCTION

1.1. THE GEOSPATIAL INFORMATION CHALLENGE

Geospatial information is any information that has a geographic, or location component, which allows it to be placed on, above, or below the Earth's surface. This kind of information is vital for informed decision making, and is a key part of national development.

With the increasingly complex challenges facing the country, geospatial information can play a critical role in addressing these challenges, by providing an integrated information framework. Development planning, emergency response and public engagement are three examples where geospatial information can play a vital role.

Over the years, various levels of government, statutory organisations and the private sector have all invested in the development of geospatial information. By far the largest investment has been by national government where, since the early 1990s, a wide range of government departments have created large datasets of geospatial information. These datasets have enabled various sections of government to improve their efficiency, and develop new processes and outputs.

While the initial drive to create geospatial datasets was to improve operational efficiency at the department and sector level, it has become increasingly apparent that the best value from geospatial information comes when there is integration between ranges of different datasets. By creating geospatial information from a combination of different, yet interrelated datasets, a more comprehensive understanding of a problem can be created, and better responses and solutions to the problem generated.

The problem facing the geospatial industry in Fiji at present is that it is very difficult to combine and integrate different geospatial datasets. There is no national coordination of geospatial information, with the result that the large investment in geospatial information is not returning the kind of value it could potentially offer to the country. If organisations across the country actively collaborate to coordinate the collection, management and use of geospatial information, this would provide a much greater range of national benefits.

1.2. THE IMPORTANCE OF GEOSPATIAL INFORMATION

Geospatial information is critically important for national development for a variety of reasons.

First, geospatial information provides a spatial dimension to many different and diverse forms of information, and allows these other types of information to exist in a common, spatial framework. For example health statistics can be better understood when placed in a spatial context allowing these statistics to be related to factors such as socio-economic status (from the census), climate (from meteorology records), topography (from topographic mapping), accessibility (from infrastructure) and pollution (from environmental and industrial data).

Second, geospatial information provides a framework for information coordination. Since so much information has a spatial component, a geospatial information framework provides a natural framework for linking information

together. In many countries, the street address system provides a structured framework for linking individual households with a wide range of social, infrastructure and business services, and allows these various services to interact with their customers more directly. In Fiji, street addressing is one of the many sub-standard geospatial datasets, and would be of limited use in rural areas. However, street addressing is only one of a number of location standardising systems, many of which would enhance the ability for institutions to provide more efficient services to customers, and coordinate amongst themselves more efficiently.

Third, geospatial information has the potential to provide a foundation for a commercial geospatial industry. In many countries geospatial information is treated as a component of national infrastructure, much like the road network. The aim of the road network is to provide a framework for increasing economic participation and efficiency. By building roads, people can have better access to services, and can participate in economic activities more efficiently, which leads to a more active and diverse economy and thereby to improved national development. Similarly, an accurate and accessible geospatial information environment allows people to connect to services more efficiently, and allows for the development of information technology and communications (ICT) applications that utilise the core geospatial information framework. Fiji has an increasingly digitally literate population and digitally capable workforce, but one area that has not developed is geospatial ICT applications.

1.3. AN OVERVIEW OF THE NATIONAL GEOSPATIAL INFORMATION MANAGEMENT STRATEGY

This National Geospatial Information Management Strategy (NGIMS) is designed to be the highest level document outlining the vision, purpose, principles and strategic goals for geospatial development in Fiji for the period up to 2020. The strategy presents the current state of the geospatial industry in Fiji, and identifies the key challenges facing the industry. It is these key challenges that this strategy aims to address. The strategy then proceeds to outline five key strategic goals which are targeted at addressing the key challenges and present a way forward for the industry.

Since this strategy is the highest level national document for the industry, it seeks to be general enough to cover a wide range of challenges, and to present goals that the industry as a whole can contribute to.

The strategy outlines a number of important challenges and opportunities facing the industry, and presents five strategic goals with which to address the situation. The five strategic goals are:

1. *Governance* – this goal seeks to build on the existing institutional arrangements to build a robust and effective governance structure for the industry.
2. *Data* – this goal seeks to put in place a structure for the identification and definition of key geospatial datasets that would support a wide range of national development, industry coordination, emergency management/disaster risk management and commercial enterprise development.
3. *Access* – this goal seeks to create the necessary structures and processes so that geospatial information can be readily discovered, accessed and evaluated by the industry and the general public.

4. *Interoperability* – this goal seeks to ensure that geospatial data can be combined and reused for multiple purposes.
5. *Development* – this goal seeks to establish a set of priorities for developing the capacity of the geospatial industry to meet its own needs and the needs of wider national and economic development.

1.4. WHO THIS STRATEGY IS FOR?

This National Geospatial Information Management Strategy is for any organisation or individual with an interest in the geospatial industry. This will naturally cover a diverse range of interests, and therefore it concentrates on the largest section of the industry which is the national government. While the national government is the key audience and implementing agent of the strategy, the strategy is deliberately open enough so that other interested entities can take value from it and contribute to it. It is important for the success of this strategy that the industry as a whole takes ownership of it, while acknowledging that national government will take the lead in implementing it.

This strategy also aims to serve as a beacon for different sections of the geospatial industry to reference their own strategic development. The geospatial industry in Fiji is fragmented and diverse, with no single unifying instrument providing top-level direction. If this strategy is adopted by a significant proportion of the industry, it can be used by members of the industry to support and justify actions and proposals. This would allow individual actions and proposals to be tied to a national level strategy which is often a difficult challenge for the different sections of the industry.

2. THE GEOSPATIAL INDUSTRY IN FIJI

The geospatial industry in Fiji is a relatively new sector of the economy. Its main focus is the creation of geospatial information, initially through the digitisation of paper records, and now through automated digital processes. The national government remains the largest entity in the industry, primarily through the development of various activities in the Department of Lands. These have focused on the key business processes of the Department, primarily surveying (terrestrial and aerial), cadastral mapping and topographic mapping. In other sections of government, geospatial information is widely used in the natural resources sector (agriculture, forestry, minerals) and to a lesser degree in some of the administrative sectors (town planning, census and statistics). The utilities and infrastructure sector is also a significant part of the industry, with all the national infrastructure organisations (telecommunications, water supply and sewerage, electricity and roads) managing independent geospatial information processes.

At present, there is no significant private sector commercial entity in the industry. Similarly, the use of geospatial information across large sections of government is largely absent or at a very low level.

2.1. THE ROLE OF THE DEPARTMENT OF LANDS

The Department of Lands has been the key organisation driving the development of the geospatial industry in Fiji. This has been largely as a result of the investment in the early 1990s to digitise the main datasets and business processes of the department. A review of the Department at that time recommended the establishment of a number of internal structures of which the Fiji Land Information System (FLIS) was a central component. The FLIS was intended to be a central hub of the Department's geospatial information. Related to the core dataset development was the establishment of two organisations to guide and implement the development of the FLIS, namely the FLIS Support Centre (FLISSC) and the Fiji Land Information Council (FLIC).

The FLISSC is intended to be the institutional hub of the FLIS, coordinating the development and integration of the Department's geospatial information. The FLISSC works under the direction of the FLIC. The role of the FLIC is to set policies and priorities for the development and improvement of the FLIS. The FLIC was initially made up of a number of heads of government departments, but as the scope of geospatial information widened, heads of other organisations (such as utilities and TLTB) were invited to join.

The FLIC and FLISSC all played a vital role in the development of Fiji geospatial information capacity over the last two decades, and will continue to do so in the foreseeable future. However, with the changing geospatial information landscape, there is an opportunity to re-define some of the roles of these entities to better support the changing needs of the national geospatial industry especially the formation of an advisory committee to provide technical advice to the FLIC.

3. THE NEED FOR A NATIONAL GEOSPATIAL STRATEGY

Fiji needs a national geospatial strategy for a variety of reasons.

First and foremost, the industry is fragmented across a range of different sectors and interests, and the historical investment by the different sectors of the industry is not delivering the national value that it could. This is largely a result of the fact that aggregated geospatial information is much more valuable than the sum of its individual parts. With no national strategy to guide the integration of different sources of geospatial information, the sectors continue to work in isolation and not achieving the value from their own information that they would, if it was combined with other geospatial information sources.

Second, a range of social, institutional and technical opportunities now provide the industry with a range of options and directions that could significantly enhance the value of its current activities, as well as provide new opportunities for value creation and efficiency.

3.1 KEY CHALLENGES

The key challenges facing the geospatial industry in Fiji are as follows.

1. *Lack of a national geospatial strategy* – the geospatial industry has developed on the basis of a variety of different organisations independently developing geospatial information to support their own

information needs and business processes. With the realisation that the value of geospatial information is significantly increased when it is combined with other geospatial information, the industry has been faced with the challenge of how to implement better coordination, communication and information sharing

2. *Lack of knowledge about geospatial resources* – there is no single directory of geospatial information that allows potential users of such information to learn about where the information is, and what characteristics it has. This is particularly frustrating and unproductive for new players in the industry who want to implement projects and programmes using spatial information. Valuable time and resources are wasted investigating the various sources of geospatial information, often with contradictory or unsuccessful results.
3. *Inaccessible information* – many organisations that create geospatial information take a proprietorial view of their information and are extremely reluctant to make the information available to other people or organisations.
4. *Duplication of effort* – since discovering geospatial information is difficult, and accessing such information once it is discovered often costly, there is the inevitable duplication of effort. Organisations that need information that is not forthcoming will often expend resources to re-create this information for their own needs. This is not only a waste of resources, but also leads to duplication of information and problems of accuracy and authority.
5. *Inability to combine geospatial information* – when geospatial information is available, a variety of technical formats and data standards often prevents the full utilisation of available geospatial information. Historical formats and standards mean that information is sometimes not transferable and therefore of little use.
6. *Out dated Geodetic Reference Frame* – the modernisation of the current Fiji Geodetic Datum 1986 (FGD86) which was based on an out dated World Geodetic Reference Frame 1972 (WGS1972) to a recognised international standard will well position Fiji's contribution and commitment to the work of the United Nations effort in implementing the:
    a. 2030 Agenda for Sustainable Development
    b. The Sendai Framework for Disaster Risk Reduction
    c. Paris Agreement on Climate Change
    d. SIDS Accelerated Modalities of Actions (SAMOA) Pathway

The resolutions of the following international organisations to use international standards for its activities:

a. United Nations Global Geospatial Information Management (UN-GGIM)
b. International Federation of Surveyors (FIG)
c. International Hydrographic Organisation (IHO)
d. International Civil Aviation Organisation (ICAO)

7. *Quality and authority* – existing geospatial information often does not include any measure of the information's quality or authority, and so presents difficulties when being used as part of information processes that require particular levels of accuracy and authority.
8. *Lack of capacity* – large sections of government and the wider economy would benefit from using geospatial information but do not have the capacity to do so. This lack of capacity includes the skills to use geospatial information, as well as the technical and institutional capacity to do so.
9. *No framework for collaboration* – in areas such as the acquisition of aerial imagery or large scale field inventories, individual organisations would benefit from collaborating with other organisations to pool their resources and thereby increase their collective capacity. No such framework for collaboration exists, and so development continues to be fragmented and shallow.
10. *Limited digital connectivity* – there is limited connectivity between key geospatial information producers and current and potential end users of that information. The result is that geospatial information has to be reproduced and copied for each end user, rather than accessed live and directly from the provider's authoritative source. This leads to information becoming unsynchronised with an associated loss of accuracy and authority.

3.2 OPPORTUNITIES

A variety of opportunities now exist that could potentially enhance the effectiveness of geospatial information, and present areas for developing new applications.

1. *Increased ICT capacity* – connectivity is improving and ICT systems are becoming more interconnected. This presents an opportunity for geospatial information producers to make their data available more dynamically and accurately.
2. *More awareness and demand from the public and external stakeholders* – the general public and a variety of professional areas are becoming increasingly aware of the value of geospatial information and are starting to expect more from the industry. This presents an opportunity to expand the scope of the geospatial industry by opening up new application areas and adding value to geospatial data.
3. *Improvements in data acquisition* – a new generation of sensors and data acquisition technologies now allow for data capture at increasingly higher accuracies and with greater efficiency. This presents an opportunity to renew existing geospatial information with improved accuracy, and to develop new data acquisition processes that are more efficient and robust.

3.3 ALIGNMENT WITH NATIONAL POLICIES

A number of national polices are relevant and related to the National Geospatial Strategy. These include:

1. *The 2013 Constitution* – the Constitution contains provisions for the right to access government information.
2. *The People's Charter, Pillar Four* – this section of the Charter highlights the need for improved public sector performance, efficiency and service delivery.

3. *The People's Charter, Pillar Five* – this section of the Charter highlights the need for achieving higher economic growth while ensuring sustainability.
4. *The People's Charter, Pillar Six* – this section of the Charter highlights the need to make more land available for productive and social purposes.
5. *E-Government initiative* – the national government has implemented a range of activities designed to improve services through the establishment of various e-government processes.
6. *The 1990 Land Information Strategy* – a strategy that put forward an appropriate organisational structure to ensure the successful corporate approach to the computerisation of Fiji's land records in order to gain the maximum benefit of land administration activities and to provide better information for the planning and utilization of its limited land resources.

4. AIM OF THE STRATEGY

4.1 VISION

The vision of the Strategy is to make reliable geospatial information available and accessible to support the safety, security and development of the country.

To achieve this vision, the national government needs to adopt a series of strategic goals to support the creation, exchange and use of geospatial information.

4.2 PURPOSE

The purpose of this Strategy is to provide the principles and goals to achieve the vision. The strategy aims to:

1. Provide a framework for the governance of the development of the geospatial industry.
2. Define the approach to ensure that the country's geospatial information meets the current and future needs of government and the private sector.
3. Ensure that geospatial information is collected, managed and distributed in a way that maximises the return on investment and provides the greatest public benefit.
4. Ensure that key geospatial information is accessible to all.
5. Provide a framework for building the capacity of human and technical resources to meet the needs of the industry.

4.3 KEY PRINCIPLES

The key principles that guide this strategy are:

1. Geospatial information is collected once, to agreed standards, for use by many.
2. Geospatial information is easily discoverable and accessible.
3. Geospatial information is easy to understand, integrate, interpret and use.
4. Geospatial information of national importance is readily available and not unduly restricted.
5. Geospatial information is preserved and protected as an archive.

5. STRATEGIC GOALS

The following strategic goals define the work programme for the implementation of this Strategy.

5.1 GOVERNANCE

Fiji has made good progress in the governance of geospatial information development. The existing structures of the Fiji Geospatial Information Council (previously known as the Fiji Land Information Council) and its associated support structure within the Department of Lands have created a foundation for further development. The widening scope of the geospatial industry and the increasing diversity of geospatial information needs, present the existing governance structures within, an opportunity for review. The existing system tends to be more focused on the geospatial needs of government, rather than on the needs of the nation as a whole.

5.1.1 GOAL

To create an administrative structure to maximise the benefits of geospatial information.

5.1.2 ACTIONS

- To review the role and composition of the Fiji Geospatial Information Council to ensure that a full range of interests of the Fiji geospatial industry is represented.
- To review any existing laws and regulation relating to the geospatial industry and recommend changes where appropriate.
- Coordinate the implementation of the National Geospatial Strategy.
- Monitor the progress of each of the strategic goals of the Strategy.
- Carry out an educational and awareness programme to inform the geospatial industry and the wider public about the value and benefits of geospatial information.
- Provide a mechanism for coordinating resources between different sectors of the industry to facilitate joint data acquisition programmes.

5.2 DATA

Geospatial datasets are the heart of the geospatial industry. Without data, there would be no industry. The creation of reliable, accurate, temporal, authoritative geospatial data is the first and most important part of any geospatial development. When this data is created for national benefit, it needs to be done in a way that maximises the value of the investment in creating that data, and is done in a way that follows international best practice and standards.

5.2.1 GOAL

To ensure the capture and maintenance of fundamental datasets.

5.2.2 ACTIONS

- Determine a list and description of the fundamental datasets that are critical to the development of a robust and efficient geospatial industry.
- Identify the custodian of each of these fundamental datasets and put in place a data custodian system that ensures the integrity of the fundamental data.
- Evaluate the quality of each fundamental dataset and develop a process for improving the quality of fundamental data where necessary.
- Ensure that the fundamental datasets meet the needs of the nation.
- Ensure that the fundamental datasets accord with international standards and best practice by reference to guidelines and resolutions which are generally accepted internationally.

5.3 ACCESS

Having quality foundation and non-foundation data is of limited benefit if that data is not accessible to the industry and the wider community. Accessibility of data is critical if data is going to be combined to create richer, more informed spatial views of operational situations and strategic plans. Access includes the ability to discover, access, and evaluate geospatial data.

5.3.1 GOAL

To ensure that fundamental data sets can be readily discovered, accessed and evaluated by the industry and the general public.

5.3.2 ACTIONS

- Develop metadata, to an international standard, for all fundamental datasets.
- Publish metadata and processes for accessing the fundamental datasets in a manner that is open and accessible.
- Encourage public agencies and non-government organisations to make their non-fundamental datasets available following agreed practices and procedures.
- Develop and encourage access to the fundamental data and provide a framework for adding value to the fundamental data.

5.4 INTEROPERABILITY

Geospatial data is often dynamic and subject to frequent changes and update. If each user of a geospatial dataset is to maintain an authoritative copy of that data set, this will involve an intensive process of replication. Also, geospatial information technology utilises a wide variety of data formats, many of which are incompatible with each other. Interoperability is a concept where geospatial data is made available in a way that requires minimal replication and conversion.

5.4.1 GOAL

To ensure that fundamental data can be combined with other geospatial information and reused for multiple purposes.

5.4.2 ACTIONS

- Promote the concept of interoperability among the fundamental data custodians.
- Support the development of the necessary technical standards and procedures to implement interoperability of fundamental data sets.
- Encourage non-fundamental data custodians to implement interoperability.
- Support the development of a national geospatial network where all fundamental data is available, and on which non-fundamental data can be made available.

5.5 DEVELOPMENT

The geospatial industry in Fiji is currently fragmented, both in information and in capacity. There is a need for a more comprehensive picture of the state of the industry and the human and technical capacity of the industry. An inventory of the current capacity of the industry will allow for the identification of capacity gaps as well as form the basis for a collegial professional development in the industry.

5.5.1 GOAL

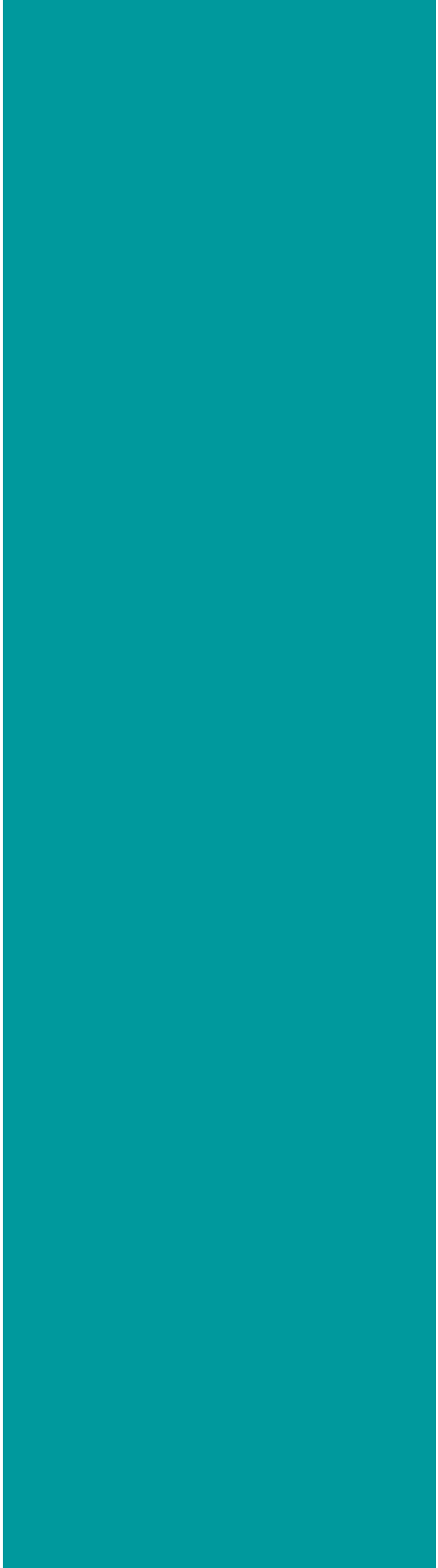
To establish a set of priorities for developing the capacity of the geospatial industry to meet its own needs and the needs of wider national economic development.

5.5.2 ACTIONS

- Undertake a human and technical capacity inventory to identify gaps and overlaps of capacity.
- Encourage the establishment and development of dedicated higher education training opportunities in geospatial science and technology in Fiji.
- Encourage and facilitate access to shared training and technical resources.
- Establish an annual national geospatial conference to promote information sharing and network at all levels of the industry.

6. MAKING IT HAPPEN

The Fiji Geospatial Information Council will be the coordinating organisation for the implementation of this strategy. The Council, through its Geospatial Information Technical Advisory Committee and the Geospatial Information Management Division of the Department of Lands, will execute the actions of the various strategic goals. The Council will determine the priority of the goals and actions, and the progress of implementation will be reported to the Council at its regular meetings.

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