



**ENABLING PACIFIC ISLAND
GEOSPATIAL DATA TO AID
CAPACITY, ECONOMY AND
RESILIENCE:**

**NIUE Environmental
Information Managements
System (EIMS)**

**2ND United Nations World Geospatial
Information Congress**

David Crossman & Ed Kuwalek

11 October 2022

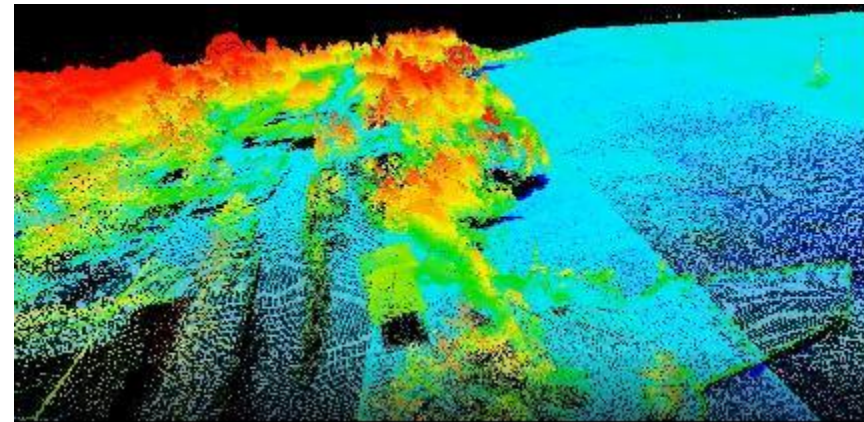


CONTENTS

- ❖ **Niue Situation**
- ❖ **Initial Scope/Purpose**
- ❖ **Requirement Capture**
- ❖ **Technical Resolve**
- ❖ **Outcome**
- ❖ **Questions**

Niue Situation

- No national data store
- Disparate data holdings
- No national infrastructure
 - Hardware, software, training
- Minimal data held on Niue
- Extent of data holdings unknown
- Inability to access or manage data
- Minimal data sharing
- Large amounts of data in hard copy format
- Limited ability to derive benefit from data holdings



Niue Government Statement:

The Niue Database and Geoportal solution (Environmental Information Management System (EIMS)) will provide the necessary functionality to load, manage and visualize a portfolio of geospatial data along with a set of features to make an effective use of such data resources in practice.

The solution will be enhanced by a mobile application that will provide direct access to the Geoportal and will also support the ability to use QR codes to easily connect end users with individual resources.



Requirement Capture

- Contracted Requirements
- Stakeholder engagement (24 meetings)
 - All Government departments
 - Health
 - Tourism
 - Environment
 - Education
 - Meteorological
 - Lands & Survey
 - Telecommunications
 - Social Services
 - Infrastructure
 - Etc
 - Niue Community
 - Environmental entities
 - Commercial entities
 - NGO's

S No	Epic	User story
1	Geoportal	As <u>an</u> user I want to see the available datasets category wise on the web application.
2	Geoportal	As <u>an</u> user I want to search / discover the required dataset by <u>name</u> of location.
3	Geoportal	As <u>an</u> user I want to see the preview of the required dataset.
4	Geoportal	As <u>an</u> user I want to see the metadata of the clicked dataset.
5	Geoportal	As <u>an</u> user I want to navigate through the map using tools like zoom and pan.
6	Geoportal	As <u>an</u> user I want to download the required datasets.
7	Geoportal	As <u>an</u> user I want to see the coverage of the data on the index map.
8	Mobile	As <u>an</u> user I want scan the QR code of the dataset from posters, advertisements, web application.
9	Mobile	As <u>an</u> user I want to get the download link of the dataset that scanned.
10	Mobile	As <u>an</u> user I want to see the preview of the download dataset.
11	Mobile	As <u>an</u> user I want to see the metadata of the downloaded dataset.
12	Mobile	As <u>an</u> user I want to navigate through the map using tools like zoom and pan.

Use Case	Original Story	Priority
Central Data Repository	✓	
Data Discovery	✓	
Data Visualization	✓	
Data Import (in various forms and formats)		
Data Access	✓	
Data Export	✓	
Data Management	✓	
Dashboards		
Access Controls	✓	
Data Capture (real-time, in field using pre-formatted templates etc)		
Access to Govt Application Forms		Medium
eLibrary		Medium
Metadata Management		Medium
Community Data Collection		Medium
Education Support		Medium
Community Engagement		Medium
Village Portal		Medium
Pre-formatted Tools for Analysis and Reporting		Low
Online Application for Gov Benefits		Low
Community Messaging		Low
Data Sharing with Other Systems		Low
QR Codes	✓	Low

Requirement Summary

All of government supporting Silver Bullet resolve for data and information management

- SDI+++: Have, hold, build, manage, serve, analyse, share, visualize and report spatial and non-spatially enabled data – images, video, sound, art, history, culture, medical information etc)
- Be the recognised Niue data repository
- Allow utilisation by Niue Government, community, NGO's, diaspora and general public
- Win community buy-in
 - Village specific sites
 - Community announcements
 - Links to other Govt services

Epics



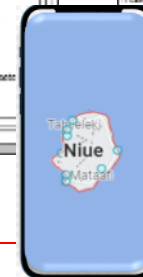
1. Central Data Repository – consolidate all data holdings in one place, including: geospatial, documents, and statistics
2. Data Access – enable data sharing
3. Data Discovery – enable metadata-driven geospatial data discovery
4. Data Visualization – provide best in class geospatial data
5. eLibrary – document management system
6. Data Export – export geospatial data
7. Data Management – provide data management capabilities
8. Metadata Management – enable 19115 data cataloguing
9. Dashboards – provide system vitals/stats etc. and to provide stats of choice: i.e. monthly rainfall, or immigration statistics etc.
10. Access Controls – public, gov-wide, department-wide, user-specific, confidential
11. Community Data Collection
12. Education Support
13. Community Engagement and Support
14. Village Portal
15. Community Messaging
16. Data Sharing with other systems including live data feeds
17. QR Codes generation and access
18. Access to Govt Application Forms
19. Online Application for Gov Benefits

Solution Outline

- Easy to use web application to load, manage and visualize geospatial data and other content
- Mobile application enhancing data access and field data collection
- OGC compliant services (WMS, WFS, WCS...) to share data externally
- Backed by enterprise-grade components from IIC's Nautilus Cloud
- Cloud based vs nationally-owned infrastructure
- Visualisation systems at key Niue facilities
- Training for users and to allow self-sufficient support




**POTAAGA FAKAILOAAGA
MA E LEVEKIAGA HE TAKATAKAIMOTU**
**ENVIRONMENT INFORMATION
MANAGEMENT SYSTEM (EIMS)**



Result: Niue EIMS












Potaaga Fakailoaga
Ma e Levekiaga he Takatakaimotu
Environment Information Management System

[Home](#) [Search](#) [Map](#) [About](#) [Login](#)


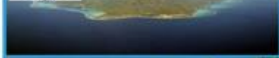





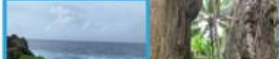





Departments

Our Services

 <p>EIMS</p>	 <p>Met Office</p>	 <p>Education</p>	 <p>Environment</p>
 <p>Government Projects</p>	 <p>Health</p>	 <p>Telecom</p>	 <p>Community Affairs</p>
			

About

About Niue

About Niue

Niue is an island nation in the South Pacific Ocean. Niue's land area is about 261 square kilometres (101 sq mi) with a resident population of approximately 1800 people.

Niue is a self-governing democratic state in free association with New Zealand. Niueans are citizens of New Zealand and between 90% and 95% of Niuean people live in New Zealand. Niue is a bilingual country, with 30% of the population speaking both Niuean and English.

Niue is not a member of the United Nations (UN), but UN organisations have accepted its status as a freely associated state as equivalent to independence for the purposes of international law.

Niue is sub-divided into 14 villages (municipalities), with each village having a council that elects its chairperson.

Geographical Information

Niue is one of the world's largest coral islands. Niue has two levels, with the higher level made up of a limestone cliff running along the coast, with a plateau in the centre of the island reaching approximately 60 metres (200 feet) above sea level. The lower level is a coastal terrace approximately 0.3 km (0.3 miles) wide and about 25-27 metres (80-90 feet) high, which slopes down and meets the sea in small coves. A coral reef surrounds the island, with the only major break in the reef being in the central-western coast, close to the capital, Alofi.

Environment

Niue is a leader in green growth, with a focus on solar power provision. The Niue Island Organic Farmers Association is committed to making Niue the world's first fully organic nation.


Niue is part of the Tongan tropical moist forest's terrestrial ecosystem. The island is home to approximately 60 native or pre-European plants, and approximately 100 naturalised flowering plant species.

The Hukuru Forest Conservation Area is a 5,400 ha site that protects the largest area of primary forest in Niue. It has been designated an Important Bird Area (IBA) by BirdLife International.

Niue and its communities proudly champion sustainability and good environmental practice, with many locally and internationally driven environmentally focused projects in place on the island and in its surrounding oceans.

Tourism

Tourism is already one of the major industries in Niue, however tourism has been defined as of the three priority economic sectors of Niue economic development, the other two being agriculture and fisheries. With its pristine oceans, inviting climate, stunning and unique flora and fauna, and friendly welcoming people Niue is an excellent and unique tourist destination. Supported by a single international airport with periodic flights to the island, and with a variety of accommodation options, Niue is well worth visiting.



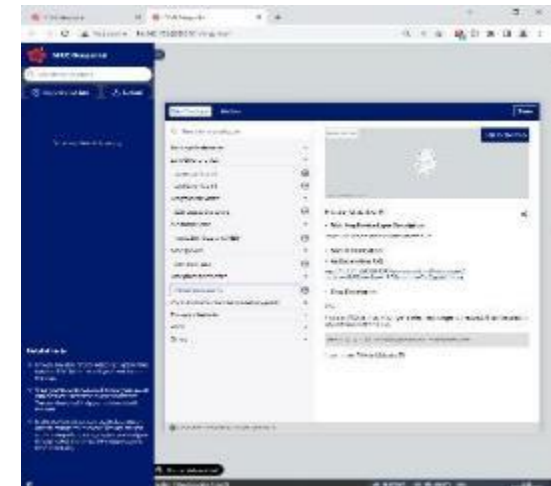
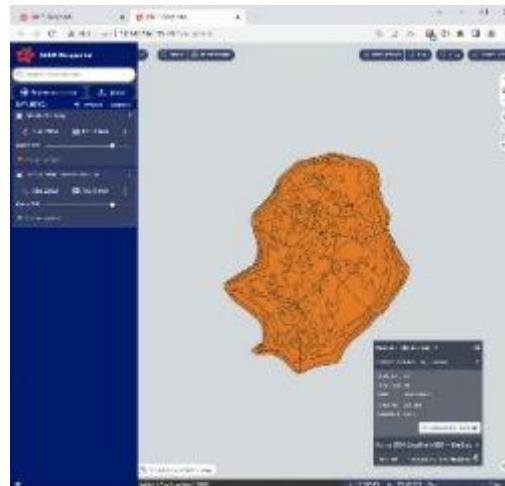
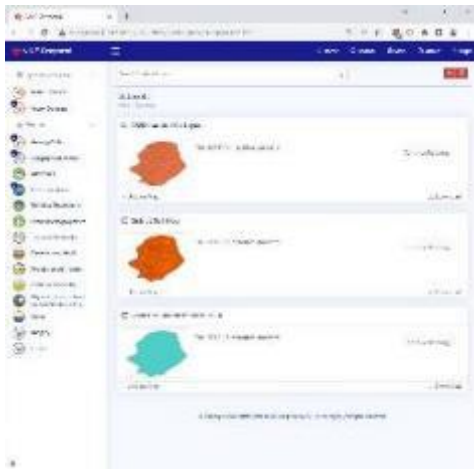
© Copyright NIUE Geospatial. All Rights Reserved.
Designed by IIC Technologies.

Result: Niue EIMS



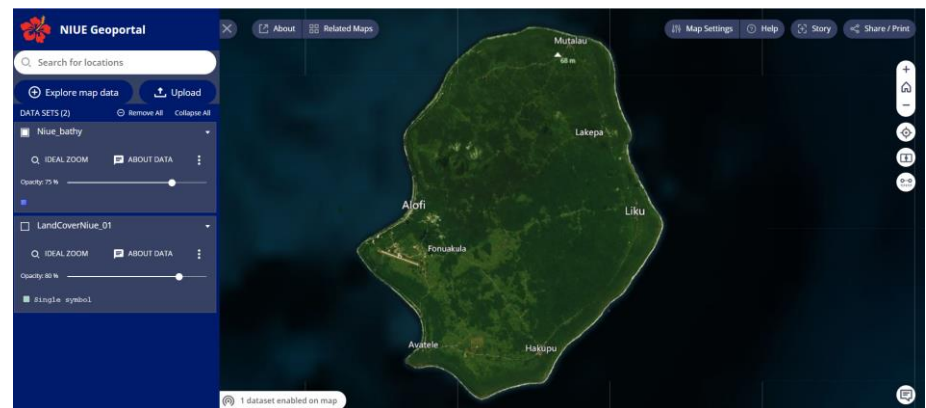
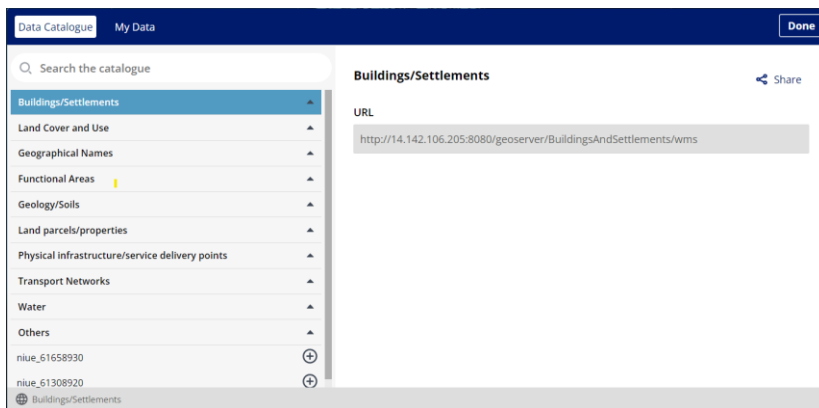
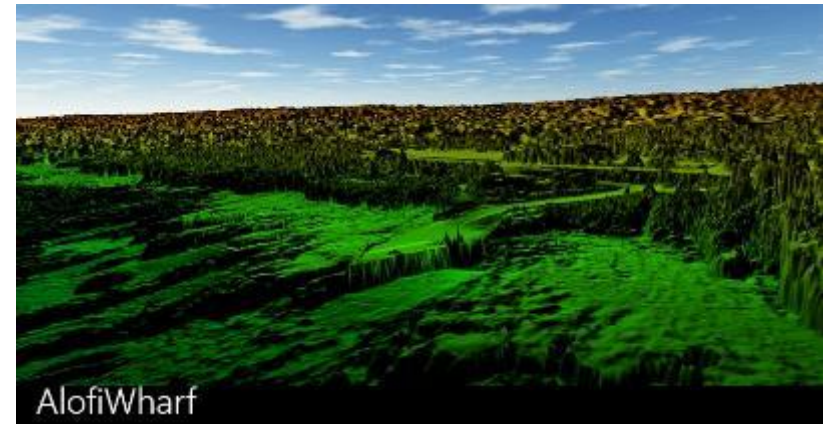
A screenshot of the NIUE Geoportal web application. The interface is dark-themed. On the left is a sidebar with the 'NIUE Geoportal' logo and a search bar. Below the search bar are buttons for 'Explore map data' and 'Upload'. A 'DATA SETS (3)' section contains two data layers: 'Shadows' and 'LandCoverNiue_01'. The 'Shadows' layer is currently set to 'None' and has an opacity of 80%. The 'LandCoverNiue_01' layer is also set to 80% opacity and has a 'Gray Polygon with Black Outline' style. The main map area shows a 3D aerial view of a residential area with a road and buildings. A vertical toolbar on the right side of the map contains various navigation and interaction icons. At the top of the map area, there are buttons for 'Home', 'Map Settings', 'Help', 'Story', and 'Share / Print'. At the bottom of the map, there is a status bar showing '1 dataset enabled on map' and coordinates: 'Lat 19.05954°S Lon 169.92205°W Elev 37m'. A scale bar indicates 10 meters.

- Effective data discovery and visualization tools for geospatial data (terrestrial and bathymetric), documents, multimedia
- Ability to upload/download datasets or access them via web services
- Ability to capture data
 - Organisations
 - Citizen science (met, bio, env, fishing, Hort, Ag, Infrastructure, academic etc)
 - Students



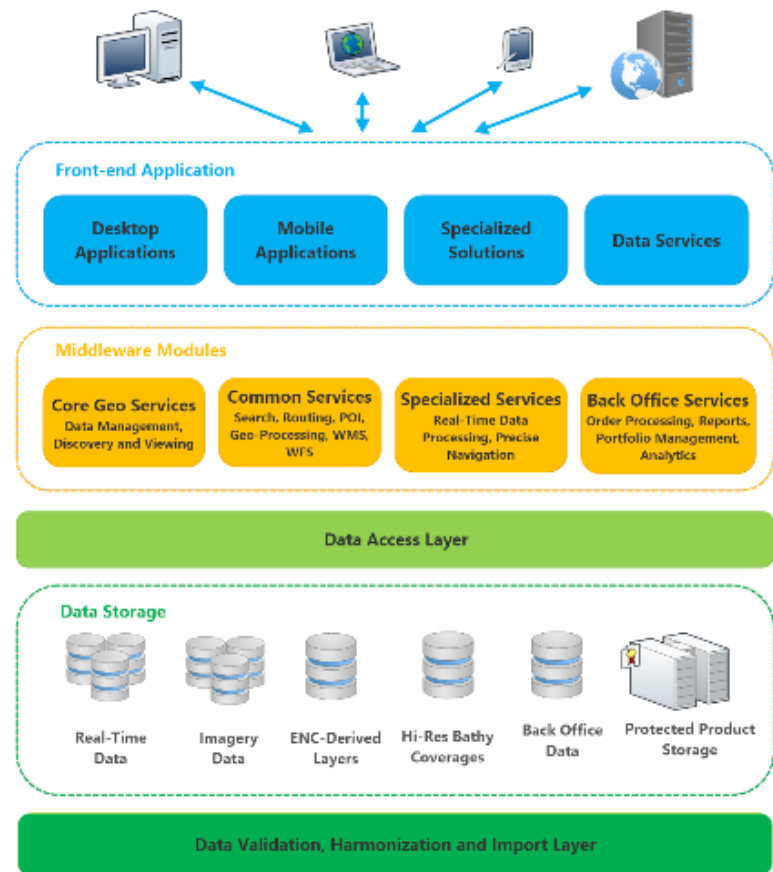
Result: Niue EIMS

- GIS functionality
- 2D and 3D visualisation
- Ability to select, view and overlay datasets
- Manipulate and interrogate data
- Tailored reporting
- Tailored analysis



Addressing Core Technical Challenges IIC TECHNOLOGIES

- Common SDI challenges:
 - Complexity: domain, infrastructure, and scalability
 - Data volumes, formats, location, and policy
 - Data discoverability and interoperability
 - Cost and human resources availability
- IIC's Nautilus Cloud Platform
 - Enterprise-grade components
 - Reusable and easy to customize
 - Robust and scalable
 - Build for cloud
 - Used for large projects, for example: Canada's Ocean Supercluster



Contracted/Intended Outcomes:

- Niue EIMS is a Spatial Data Infrastructure +++
- All of government supporting, as well as community, NGO's, environmental and public
- Default data hub for government and public
- Managed multi-level access (for data protection of sensitive data)
- Numerous data formats (including non-spatial)
- Full data capture, management, analysis, visualisation and reporting to support future planning, resilience and spatial management.
- Ability to derive benefit from existing and newly provided data
- Promotes Open data, and maximises use of Open Standards and freeware
- Visualisation systems in the Museum and Marine Center



Additional Outcomes:

- 400% increase in data holdings to date
 - Identification, retrieval and co-location of data
 - Full data sharing on island
- Full community buy-in:
 - Government, villages, off-island diaspora, NGOs' environmental and research groups.
 - Education will utilise for curriculum
 - Citizen science
 - Village specific information
 - Naming competition
- Strong desire for use within environmental management and awareness
- Captures and preserves Niue culture, history, language and traditional environmental practices (UNESCO list Niuean language as "Definitely Endangered")
- **Directly supports Niue's efforts toward UN Sustainability Development Goals**



For consideration:

- The issues raised by Niue are common for most Pacific & small island nations.
- This SDI is designed to be easily tailored for used for any nation.
 - Including: stylisation, analysis, reporting, data types, user groups.
- The ability to ingest, manage and visualise non-spatial data achieves significant, cost effective, utility for smaller Governments.
- Can be utilised by nations in achieving UN Sustainability Development Goals.
- IIC is passionate about enabling Pacific Island Nations to effectively utilise their data to achieve self-managed planning, resilience and national outcomes and believe this tool could easily assist in achieving that.




This Project is supported by the Niue Govt and Niue Ministry of Natural Resources, and is part of the Ridge to Reef program funded by GEF via UNDP



NEW PATHS. NEW APPROACHES


Questions

David Crossman 

david.crossman@iictechnologies.com 

Ed Kuwalek 

edward.kuwalek@iictechnologies.com 

www.iictechnologies.com 



NEW PATHS. NEW APPROACHES

Thank You

David Crossman 

david.crossman@iictechnologies.com 

Ed Kuwalek 

edward.kuwalek@iictechnologies.com 

www.iictechnologies.com 