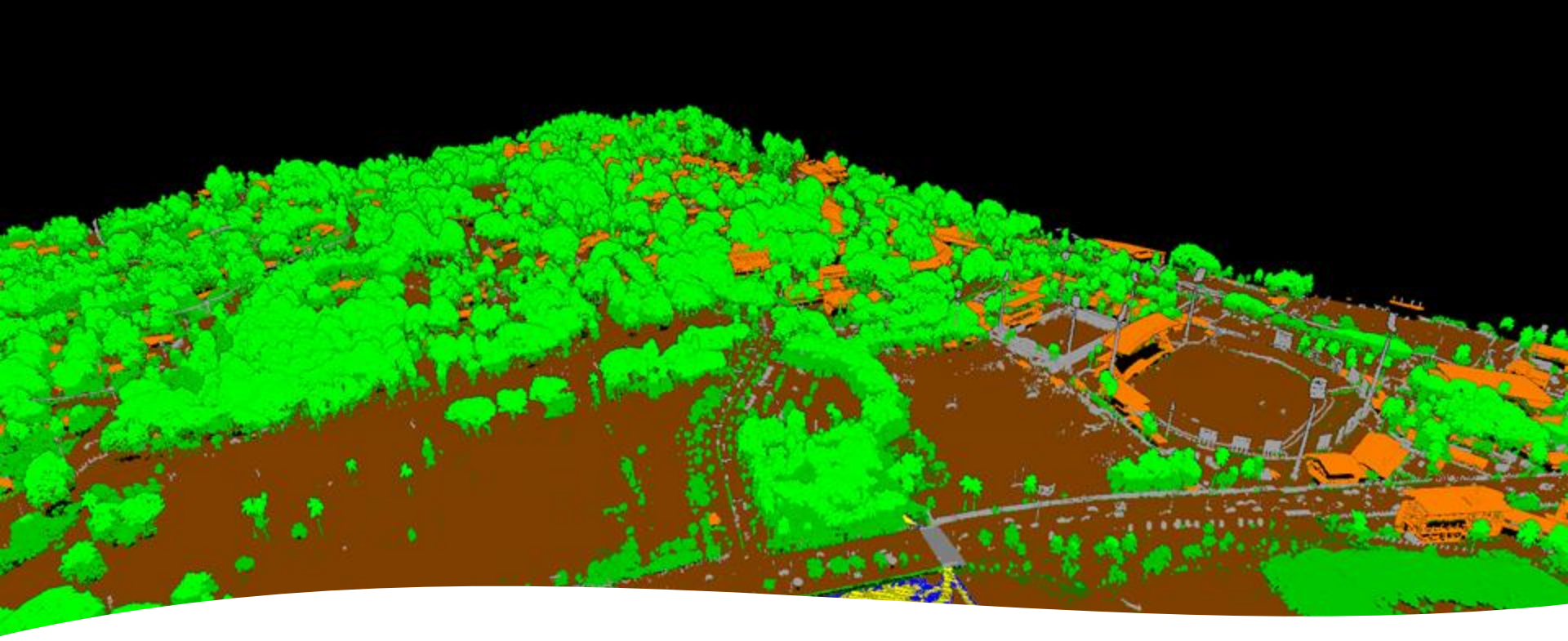
MOANA
Data Services

Advancing the Moana Data Service

Strengthening Pacific Geospatial Networks

PGRSC Conference Presentation



Executive Summary

- Pacific Island states lack consistent, high-quality geospatial baselines for land and sea.
- The Moana Data Service (MDS) is a Pacific-led, national platform built around authoritative GNSS, LiDAR, imagery, and bathymetry.
- Phase 2 in Fiji is acquiring 1,000 km² of high-resolution data over Suva, Nadi, Namosi, and Bua.
- Strategic partnerships with Landpro, Ministries, and SPC ensure datum integrity, QA/QC, and long-term sustainability.
- Outcome: trusted ridge-to-reef datasets that directly support resilient, climate-smart development.

The Challenge

- Pacific Island countries face major barriers to modern mapping:
- **Fragmented datasets and outdated datums** undermine hazard modelling and infrastructure design.
- **Limited local capacity** to procure, acquire, or manage national mapping programs.
- **No national standards** for data acquisition, processing, or long-term data management.
- **Very high acquisition costs** due to reliance on overseas suppliers and remote logistics.
- These challenges ultimately **impact vulnerable communities most**, especially in coastal and low-lying areas.

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Data Services

A national high-resolution land–sea geospatial platform

- Tailored to Pacific operational realities and governance structures.
- Integrates GNSS control, LiDAR, imagery, and bathymetry into a single environment.
- Provides authoritative, interoperable baselines for planning and risk modelling.
- Designed as a sustainable, Pacific-led data service rather than a one-off project.

Fiji Phase – Areas of Interest

- 1,000 km² of LiDAR and imagery in four focus areas:
  - Suva – national capital, flood alleviation and critical coastal infrastructure.
  - Nadi – tourism, aviation, flood alleviation and rapidly growing urban areas.
  - Namosi – Community Carbon Project
  - Bua – Community Carbon Project

GNSS Control – Building the Foundation

Objectives

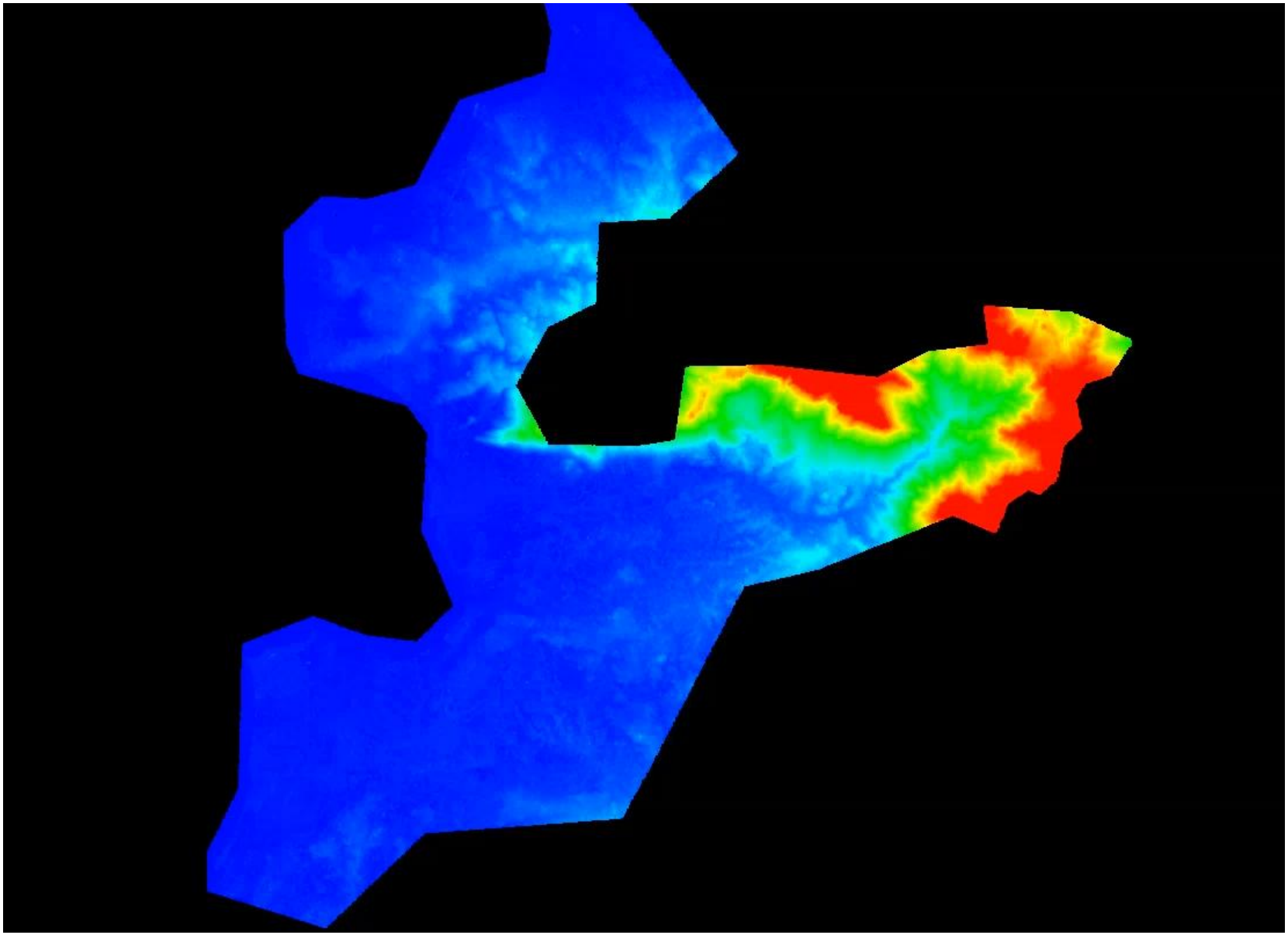
- Data fit & accuracy – tie LiDAR and imagery to Fiji's highest-order control.
- Datum compliance – confirm current horizontal and vertical datums and transformations.
- Vertical reference clarity – link elevations to MSL using tide gauges and/or geoid models.

Why Datum & Control Matter

- Without a strong geodetic framework:
  - Different datasets do not line up – causing 'steps' between old and new surveys.
  - Vertical datums and MSL references are unclear, so elevations are not comparable.
  - It is hard to upgrade to future datums or geoid models without a clear transformation path.
  - National agencies struggle to trust and reuse data collected by external partners.

Aerial Acquisition with Landpro

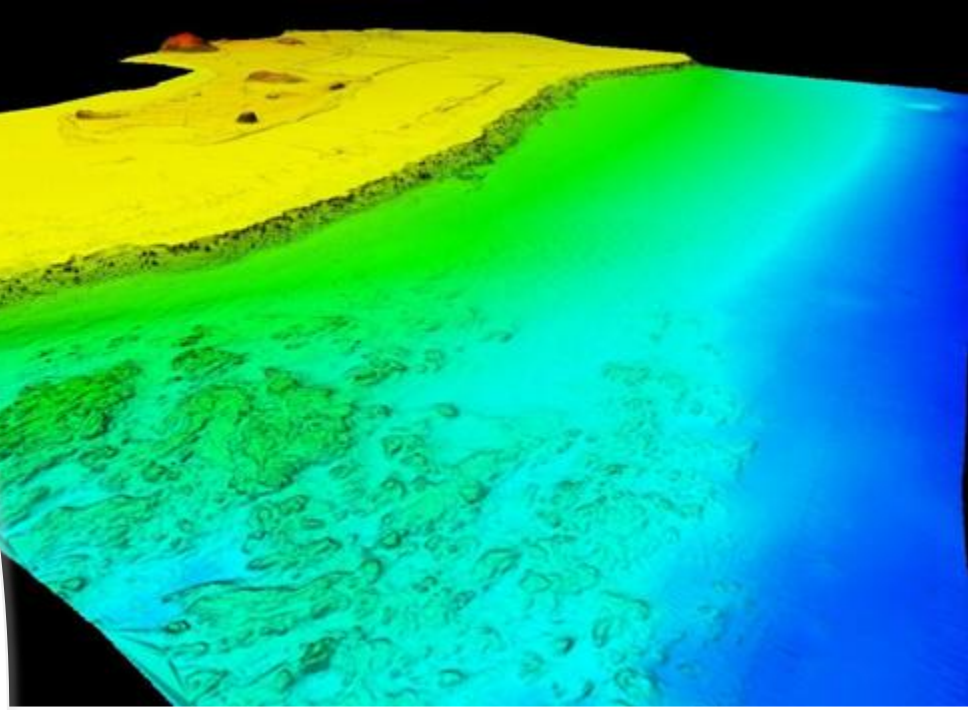
- Leica Terrain Mapper 2 + RCD30 80MP
- **≥ 8 ppm LiDAR**, **12.5 cm GSD** imagery
- Stereo coverage for 3D modelling
- **Processing & classification to LINZ specifications**
- Ensures data is **fit for purpose** for:
- Drainage & hydrology modelling
- Engineering & infrastructure design
- Structure & vegetation mapping
- Coastal hazard modelling



Unified Land–Sea Elevation Model

Integrating topography and bathymetry

- High-density LiDAR on land combined with multibeam bathymetry offshore.
- Continuous surface from ridge-to-reef for coastal inundation and hazard analysis.
- Supports tsunami, storm-surge, and wave-runup modelling.
- Enables marine spatial planning and nature-based coastal defences.



Strengthening National Geospatial Networks

- MDS datasets become the trusted baseline for:
  - Infrastructure design and asset management.
  - Flood, landslide, and coastal hazard modelling.
  - Climate-risk and relocation planning.
  - Integrated land and marine spatial planning.
  - Cross-agency data sharing and regional collaboration.

Partnerships & Capacity Building

- Pacific-led, partnership-driven approach
  - • Local agencies – setting priorities, standards, and governance.
  - • Kahuto Pacific – project leadership and coordination.
  - • Landpro – aerial acquisition, processing, and technical transfer.
  - • SPC and LINZ – guidance on best practice and regional interoperability.
  - • Embedded training and co-production to build enduring national capacity.

KAHUTO

ADB

MOANA Data Services

LAND PRO.

GWP consultants earth & water resources

BlueSpatial Australia

Next Steps – 2025 Timeline

- • Early June 2025 – GNSS ground control surveys (5–7 days per site).
  - Mid-July 2025 – Aerial LiDAR and imagery acquisition over the four AOIs.
  - September/October 2025 – Processing, QA/QC, and delivery of DEM/DTM and orthoimagery.
  - Late 2025 – Integration into the Moana Data Service platform and stakeholder onboarding.
  - Solomon Islands and Vanuatu

Technical Appendix – Geodesy

- Key geodetic considerations
  - Active horizontal datum (e.g., Fiji Map Grid / FMG2016) confirmed with Ministry of Lands.
  - Vertical datum tied to Mean Sea Level via tide gauges and/or geoid models.
  - Documentation of transformations between legacy datums (FMG1986, WGS84) and current systems.
  - Highest-order control points identified and reused for calibration and validation.

Technical Appendix – LiDAR & Imagery

- Planned acquisition specifications
  - • LiDAR density: ≥ 8 points per m^2, meeting or exceeding national standards.
  - • Orthoimagery: 12.5 cm GSD RGBN, suitable for detailed urban mapping.
  - • Stereo coverage: ~70% forward, 20% side overlap for 3D feature extraction.
  - • Deliverables: classified point clouds, DEM, DSM, CHM, ortho mosaics, and metadata.

Closing – A Pacific-Led Geospatial Future

- The Moana Data Service aims to:
  - • Provide trusted, integrated land–sea datasets for Pacific decision-makers.
  - • Reduce uncertainty in climate-risk planning and infrastructure investment.
  - • Build enduring national capacity in geospatial science and practice.
  - • Support collaboration between government, private sector and