PACIFIC ISLANDS GIS&RS NEWSLETTER

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PACIFIC ISLANDS GIS&RS NEWSLETTER

Dear Reader,

This issue of the GIS&RS Newsletter is long overdue, attributed to a period of transition. Notwithstanding we are pleased to bring you these highlights in the hope that we continually celebrate and recognise these important contributions to Pacific GIS & RS applications. The editorial team has changed Iara Forstreuter is now performing with the editing in InDesign. Leba Gaunavinaka keeps in contact with the contributors while Wolf Forstreuter remains from the former newsletter crew

It was the decision of the PGRSC Board to keep the newsletter alive alongside other modern platforms of information distribution. The reasons are: (i) the newsletter still documents developments in the area of Pacific GIS and remote sensing (RS) also in cases where no other publication reflects on this, (ii) the newsletter expresses the history of Pacific GIS and RS developments since 1993 and (iii) Pacific GIS and RS users have a platform where it is easy to publish an article. This newsletter has its own ISSN number.

This issue also shows all three companies providing very high resolution (optical image data below 1 metre spatial resolution) image data for Pacific Island Countries. Mapping scale has to be 1:10,000 or larger for the atoll countries, while volcanic islands can utilise free optical image data like Sentinel or Landsat for 1:50,000 scale mapping. Sentinel is also explained through their contributing editorial. Other articles are shown in the table of contents. We certainly wish you an enjoyable read through these exclusive stories and invite you to send in an article articulating such notable contributions to GIS and Remote Sensing in the Pacific.

Thank you.

Your newsletter team.

Content

Front page satellite image: GeoEye-1 image acquired the 2020-10-07 Over Port-Moresby. SecureWatch © MAXAR 2020 - Courtesy of MAXAR Int.

1. The Pacific Islands GIS & Remote Sensing User Conference 2019 - Summary

The Conference was a success and with good reflection in the media and good results. The details are not analysed completely yet and will be further edited.

1.1 Opening and Closing

The Conference was opened by Permanent Secretary Dr. Raijeli Taga for the Hon. Minister Lands and Mineral Resources Ashneel Sudhakar. The welcome address of the University of the South Pacific was presented by Dr Nick Rollings for Jito Vanualailai. Dr Andrew Jones gave a welcome address for the Pacific Community followed by former PS Lands and Mineral Resources and Trustee of PGRSC Malakai Finau. Finally Dr Wolf Forstreuter Chair of PGRSC gave a Conference overview.

The Hon. Minister Lands and Mineral Resources Ashneel Sudhakar closed the Conference (see fig. 01) and officially handed over the Conference to the next host country Vanuatu (see fig.02). Important was the statement to have a Pacific Ministerial Meeting with the Conference in Vanuatu.

Dr Russell Howorth from the Board of PGRSC Trustees delivered a good bye address (fig. 02 second right) and Vanuatu Focal Point John Tarry Nimau (fig. 02 far right) delivered a speech for the Vanuatu delegation and announced the Conference 2020 in Port Vila, Vanuatu.

1.2 Participants

The Conference Participants were (i) GIS and RS users from Pacific Island Countries, which is the focus of the Conference, (ii) scientists and (iii) companies. The scientists came from universities based in Fiji and overseas such New Zealand, USA and Australia and also from institutions such as NASA, CSIRO, regional organisations such as FFA, SPC, SPREP, etc. The companies were image data selling companies, hardware and software selling companies and service providing companies.

1.3 Presentations

A number of 60 presentations were delivered not included the opening speeches. Most of the power point presentations will be downloadable from the PGRSC website, soon, www.picgisrs.org Most presentations showed interesting applications of GIS and RS, the number of reports of general activities of institutions were further reduced compared with the years before.

1.4 Donors

The biggest donor was the US Embassy with FJD 15,052 without their contribution the Conference would not have taken place. Other contributors were MAXAR with FJD 2,117 and SPREP with FJD 1,985

A detailed list of contributors and amount per donor shows the chapter finances.

1.5 Discussion Session

The discussion session concentrated on four topics this year: (i) “Satellite Images or Drone” (ii) “Mangrove and Seagrass Mapping, Cloud Based Automatic or Local Visual Interpretation”, (iii) “Data Storage, Access and Utilisation, Central or Close to Producer?” and (iv) “Open Source vs. Proprietary Software”.
The four thematics created an interesting discussion between the views of companies, scientists and the users with active participation.

Handing over the Conference to the next host country Vanuatu at the closing ceremony. Left Hon. Minister of Lands and Mineral Resources, Fiji Hon. Ashneel Sudhakar, far right PGRSC Focal Point for Vanuatu Johnie Tarry Nimau and secod on the right Trustee of PGRSC Dr. Russell Howorth

1.6 Women Session

It was the first time that the Conference had a women session by its own. It was successful and will be repeated next year in Vanuatu. The women session was sponsored by the US Embassy.

1.7 Social Functions

There was an opening cocktail sponsored by MAXAR with good participation. On Tuesday the traditional Kava Night allowed especially participants from outside Fiji to test Fiji's traditional drink. On Wednesday the participants were guided through the typical Fiji bar scene, which has an own character. Thursday the closing cocktail was hosted at USP and not at SPC with advantage that the participants did not have to move away from the location and the award giving could be integrated (see fig. 03).

On Saturday after the Conference, a picnic was hosted at the sandbank in the Suva reef. Three boats carried 30 persons to the location and the mostly overseas participants experienced Fiji ocean and sun. The memory will stay as only very few Conferences provide a picnic in the ocean.

1.8 Workshops

This year four workshops were conducted:

(i) MAXAR Technologies Workshop, conducted by Andrew Steele (Maxar);

(ii) SAR Applications for Pacific Island Nations, conducted by Amy Parker (CSIRO) and Ake Rosenqvist (JAXA);

(iii) Geospatial Processing – HEXAGON, conducted by Angela Manchester (HEXAGON) and

(iv) Exploring Spatial Data with Pacific Maps, conducted by Siolei Tonga (SPC).

Laura Lorenzoni presenting for NASA, it was the first time that NASA was represented at the Conference

Former PS Lands and Mineral Resources and Trustee of PGRSC Malakai Finau open the Conference

1.9 Side Meetings

(A) The first side meeting happened already on Saturday before the Conference in the Suva Yacht club were the part of the Vanuatu delegation met with part of the PGRSC board. The results were:

Style of Conference stays as it is, (i) PGRSC runs officially the Conference with Logo, etc. (ii) it stays as USER Conference, (iii) Discussion session stays, (iv) short presentations 15 + 5 minutes;

· no fee for participants;

· PGRSC has keeps its own account in Fiji and the Vanuatu Conference Committee creates an account within Government structure with same or similar name;

· PGRSC website stays and will be mirrored in Vanuatu;

· Workshops will be facilitated in different locations in Port Vila;

· STAR as back to back meeting is welcome;

· Conference theme will be finalised at the closing session of the 2019 Conference.

(B) The second side meeting was performed on the first day of the Conference during the afternoon tea. The Focal Points and other GIS&RS users from the countries met with the PGRSC Board. The discussion was: (i) do the clarify the situation if local GIS&RS user groups need an official Government recognised status? This was not necessary in Fiji when the idea of these groups came up; (ii) assessment of the Focal Points: PGRSC needs an official Government recognition?

The predominant response was that a) without official status of GIS&RS user groups it is difficult to participate

during working time and b) with an official Government recognition of PGRSC it is easier to get travel funds to come to the Conference and to spend working time with PGRSC.

(C) The third side meeting was repeating the first meeting but with full PGRSC Board and full Vanuatu delegation. The results of the first meeting were repeated but there was an edition that Vanuatu will finance the PGRSC Chair and other members from the Board to come the Conference in Vanuatu to help the Vanuatu Conference Committee.

(D) The meeting number four was a meeting of the PGRSC members where mainly personal members were present and only very few student members. Like the focal points also the members stated that a Government recognition of the Council is a positive move. Furthermore, the members would appreciate more direct information from the PGRSC. In general, there were not many clear ideas from the members to be addressed. The members mentioned that ideas will come up during a communication between members and the Council. It was ensured from the PGRSC that there will a member of the Board who will take care of the members regarding membership certification and communication with the members.

(E) Side meeting between Vanuatu delegation Suva Conference Committee. The idea was to identify, which tasks of the Conference preparation (not the PGRSC related tasks) will be further handled in Suva and which ones fully in Vanuatu. From Suva PGRSC will address the international organisations, universities, companies and users in other countries. The management of presentations will be handled from PGRSC in Suva, which easily can be performed over e-mail. This also overlaps with the PR activities. It was agreed that Vanuatu concentrates the PR work on organisations in Vanuatu while the Suva PR work concentrates on more international and regional work. A similar approach will address sponsors, where the Suva Conference Committee addresses regional and international sponsors and the Vanuatu team the Vanuatu based ones. Related to this, the need of two separate accounts were explained again. The Vanuatu delegation also asked to produce the shirts in Suva. All other functions such as student helpers, workshop preparation, social functions, discussion and women session and all infrastructural issues will be fully handled by the Vanuatu team.

(F) A further meeting but not a side meeting was conducted as first part of the closing session. The Conference participants were asked to state possible improvements. An old point came up to shorten the running time of the Conference and the response from PGRSC was that this requires parallel sessions and was tried with negative outcome as people move within the sessions. The thematics of this Conference are simply to much overlapping.

The Conference theme “Building a Resilient Pacific Community through Geospatial Technologies” was agreed without any critics.

1.10 Outcome of the Conference

During this year’s Conference there was no disturbance by the Surveyor’s Council and the verbal response from the Participants was positive. The PGRSC as regional organisation was many times mentioned and not questioned. The reflection in the media was very good. The optimal outcome will be if the Pacific Ministerial meeting can be implemented with the Conference.

Minister of Lands Fiji hands out PGRSC Institution Membership Certificate to SPREP representative Julie Callebaut

2. MAXAR

Maxar is a space and intelligence company – a trusted partner and innovator in Earth Intelligence and Space Infrastructure that delivers disruptive value to government and commercial customers to help them monitor, understand and navigate our changing planet; deliver global broadband communications; and explore and advance the use of space. DigitalGlobe, SSL, and Radiant Solutions were unified under the Maxar brand in February 2019, creating a leaner and more focused organization that's better able to respond to the rapid changes occurring across the space and intelligence industry. MDA continues to operate as an independent business unit within the Maxar organization given its unique history with the Canadian government.

Maxar simplifies access to critical information about our planet, empowering customers to answer complex questions that impact environments, economies and lives. These capabilities include:

Earth Intelligence: Geospatial insights serving a spectrum of industries across government, commercial and nonprofit sectors which are sourced through:

·Electro-optical and radar satellite imagery

·Information layers derived from the world's largest library of commercial satellite imagery

·Change and object detection

·Predictive analytics and pattern identification

·Cloud-based platforms

Space Infrastructure: Design, manufacturing, and operations of communication and Earth observation satellites and persistent, resilient, affordable spacecraft with advanced capabilities including:

· Next-generation propulsion

· Industry leading composi·tes for structures and reflectors

· Best-in-class manufacturing and operations

· Space robotics

· On-orbit servicing

· Space asset protection

MDA: An independent business unit within Maxar, leading innovation in space and defence and providing mission-critical solutions to Canadians and the world for more than 50 years:

·Space sensors

·Satellite payloads

·Satellite ground systems

·Antennas and subsystems

·Surveillance and intelligence systems

·Defense and maritime systems

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The next MAXAR satellite generation Legion. The fleet of Legion satellite will triple MAXAR's capacity to collect 30 cm images

3. Planet

Planet provides geospatial insights at the speed of change, equipping users with the data necessary to make informed, timely decisions. We offer diverse offerings of imagery and analytic solutions, all made available online through our platform and web-based tools.

From agriculture and emergency response to natural resource protection and security, we believe that timely, global imagery and foundational analytics will empower informed, deliberate and meaningful stewardship of our planet.

In 2010, NASA scientists founded Planet with the goal of creating a company that could use information from space to help life on Earth. The aim was to disrupt the aerospace industry with a high performance, mass-manufacturable and autonomously-operated fleet of remote sensing satellites that could make knowledge available to more people who might seek it.

A decade later, that dream is a reality. With 150+ satellites in orbit, Planet images the entirety of Earth's landmass every day, offering always-on broad-area 3-5 m monitoring (PlanetScope) and targeted 0.72 m monitoring (SkySat) for timely coverage over any location with an option of sub-daily revisit. We are a leading provider of geospatial data and currently serve more than 30,000 users, 500 customers, in over 40 countries.

Planet's 10+ billion sq km archive contains proprietary datasets dating back to 2009 and public datasets dating back to 1972, having acquired BlackBridge's RapidEye constellation in 2015. New imagery is added to the collection every day, and today Planet has on average 12,800 images of everywhere on Earth. With Planet's Archive, customers get historical context across the globe as well as deep imagery stacks for app development and machine learning and computer vision-based analytics.

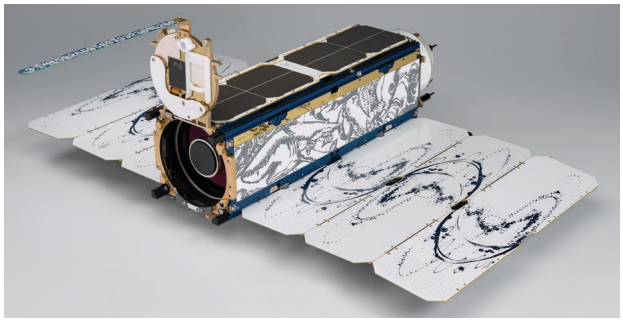
Image taken of Uluru, or Ayers Rock by Planet

This year, Planet will make available a series of product upgrades to enhance the customer experience, including Next-Generation Planetscope, our flagship monitoring solution powered by the latest iteration of our Dove satellite called SuperDove. Next-Generation PlanetScope is interoperable with publicly available imagery, like Copernicus Sentinel-2, empowering customers to utilize PlanetScope data with other sensors to enhance their analyses with higher spatial and temporal resolution.

Planet is also building a future capability to provide customers with Planet's highest resolution yet: 50cm. This new data will open up a wide array of applications in energy, mining, finance, and security, which require ultra-fine resolution to distinguish objects and features.

Over the course of 2020, Planet will continue to launch SuperDoves and will gradually transition Planet's 3 and 4-band Dove users and 5-band RapidEye users over to interoperable products created from SuperDove's 8-bands, as well as upgrading our global monitoring dataset to include all 8 of these spectral bands.

As Planet continues to pursue our mission of imaging the entire Earth every day, we look forward to creating more international partnerships to make global change visible, accessible and actionable.



dylan@planet.com

For press inquiries please contact:

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4. Airbus maritime solutions for the Pacific region

World trade and economics are heavily dependent on maritime activities: 90% of the goods transport is done by sea; almost half of the world's population depends directly on the sea for their livelihood and prosperity; over 2500 ships have been hijacked since 2009 and 25 billion USD average estimated annual loss from piracy worldwide between 2000 and 2010.

To face these manifold and growing challenges, Airbus Defence and Space provides maritime surveillance solutions and services predominantly for mainly institutional customers. These cutting-edge services address a wide range of requirements relating to including security, illegal fishing, pollution detection, as well as search and rescue at sea.

Airbus is present in many sectors that operate directly in maritime areas, such as oceanography, marine meteorology, ship positioning and telecommunications with satellites programs. Since For more than fifty 50 years, Airbus is has also been involved in maritime surveillance and sea rescue. The company strives to develop with special-mission aircraft such as the C295 maritime patrol aircraft, helicopters like the H160, NH90 and VSR700, and Aliaca, a UAV, designed for the complex maritime environment, with over three hours' flight endurance to meet the challenging requirements of the maritime sector.

Broadly speaking, we have a strong presence in maritime safety and security, in particular through our coastal surveillance systems, Vessel Traffic Services and protection of maritime critical infrastructuressolutions. We currently have almost 250 customers in 50 countries using our STYRIS maritime traffic management and coastal surveillance systems.

In particular, the Intelligence division of Airbus Defence and Space is responsible for operating the Earth observation satellites and for all the information they generate for applications related to security, environment and economy.

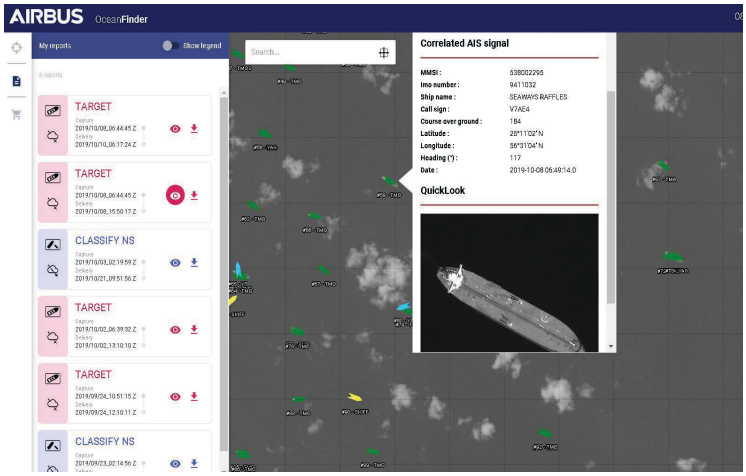
We receive images via our ground reception antenna before our expert analysts interpret them and feed information to the security and support departments of national agencies. One operational example is the Trimaran contract, which provides observation and surveillance service anywhere in the world. This multi-years contract provides support to the French Navy through a consortium between involving Airbus Defence and Space and Telespazio France. It Trimaran is designed to optimise French Navy operations in different domains: trafficking, clandestine immigration, search and rescue at sea, surveillance of marine protected areas, pollution detection, etc. French naval maritime control areas therefore have access to maritime surveillance services via satellite. Those services are currently used around New Caledonia and the French Polynesia.

As well asApart from security requests, we Airbus isare also involved in the detection of illegal fishing, which is a recurring problem. We can also be involved in environmental matters, to help locate ships responsible for oil dumping at sea or to monitor the proliferation of Sargassum seaweed on beaches.

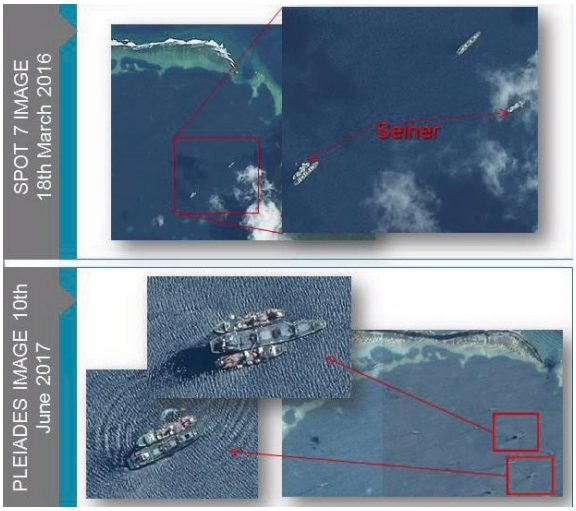
Our constellation of satellites gives access to a very broad range of imagery with different resolutions and coverage. We can detect ships within a wide area, with the ability to zoom in to focus on precise details. In this way, we can identify a ship and offer information in the event of illegal activity and, if required, justify intervention, action on the sea, in the event of an urgent situation.

Our core business is centred on satellite imagery, but our maritime applications combine different sources of data, including AIS (Automatic Identification System). Each ship is equipped with AIS, which means we can precisely track the ship by superposing its position on satellite images. The AIS can be switched off if a ship does not want to be tracked, but this would generally be considered suspicious behaviour. The ship could still be detected on satellite images, allowing it to be tracked and helping to determine the crew's motivations.

We are also increasingly focusing increasingly on analysis of open source data on social networks thanks to our solutions for monitoring, translating and automatically analysing online media, which provides us with additional information. We can analyse a discussion forum where a disturbing photo may have been posted along with comments threatening a port infrastructure, for instance. Based on this photo, we need to be able to react quickly



Ocean Finder interface: satellite tasking from your desk combined with machine learning and automatic ship detection. Vessel features are delivered together with the report.



Pléiades and SPOT7 images collected at the East of New Caledonia, South Pacific Ocean.

and obtain confirmation of what is happening. Our satellites contribute to this analysis by revisiting every point on the globe on a daily basis.

For example, to track, detect and identify ships that are only a few metres long from space, we use the combination of two types of sensor: high-resolution sensors capable of detecting boats measuring only a few metres, and radar sensors that can see ships through clouds. We also use a combination of human expertise and automation to detect ships. We use algorithms based on artificial intelligence to locate the ships, whatever their size, before verification by a human operator and an in-depth scenario analysis takes place in order to advise our customers on the decisions they need to take. This does not require a specific infrastructure on customer side, as this is available on a service mode, through our Ocean Finder solution. Thanks to this on-line portal, the customer can himself launch satellite tasking request, and automatic detection of ships. A report is then delivered to him, containing position, length, cap, stopped or en route, and correlation with AIS when possible.

In terms of future trends, we are constantly innovating to enable us to enhance our offering.

Firstly, we are investing in new sensors, such as the new Pléiades Neo satellites. Pléiades Neo, with its intraday revisit capacity and its 30-cm spatial resolution is perfectly suited to identify vessels. Indeed, thanks to their very high resolution instruments Pléiades Neo satellites are able to precisely recognize specific ships deck equipment.

We are also investing in high-altitude UAVs with the Zephyr programme, a high-altitude pseudo-satellite currently in the demonstration phase before being brought onto the market. Flying at an altitude of 20 km and capable of loitering over a specific area for several months, these UAVs will transmit images at intervals of a few minutes covering broad areas, along with videos. Zephyr is perfectly adapted to maritime surveillance and could help in anti-trafficking activities, as well as in alerting the emergency services when ships are in difficulty.

Our ambition is to remain at the cutting edge of innovation and to maintain our demanding standards and our level of excellence, in order to continue to offer our customers products and services that correspond precisely to their expectations and this wherever you are, in the Pacific or anywhere else around the world.

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5. Where's Peter Kinne... PK?

The 2019 Pacific Islands GIS and Remote Sensing User Conference was not the same without DigitalGlobe's Peter Kinne. His absence, after many years of continuous contributions, was felt by participants and professionals alike.

To appreciate his significant achievements in SOPAC, it is important to recap the development of spatial data collection and analysis in the Pacific over the past eight years.

Before 2011, SOPAC purchased 1:10,000 scale level image data for Pacific Island countries from a small Canadian-based company, due to the lack of support or direct access to the satellite companies which capture images in our region. In 2011 Peter Kinne joined DigitalGlobe as the Regional Sales Director and promptly make his way to the Pacific to understand our business needs and imagery issues. Soon after the SPC had a new program, unique to the Pacific, which offered direct access, volume pricing models and whole-of-government licensing.

With Peter's understanding and service-oriented business model for the Pacific, DigitalGlobe soon became the main supplier of next-generation quality data. When DigitalGlobe and GeoEye merged, Peter remained our Pacific representative and was able to offer increased libraries from the two very high-resolution optical image data suppliers.

Peter Kinne – Head of Sales Gilmour Space, Fellow SSSI, RDA Board, Qld Robotics Cluster Advisory Board

Peter Kinne was more than our DigitalGlobe Sales Director, as he came with an extensive background of application development in the spatial industry, an ability to link us to DigitalGlobe technical experts and a commitment to understand the unique issues in our region. His commitment to the Pacific included convincing the satellite data collection planning team to record images over the Pacific, sometimes for years without any orders, to take advantage of the available satellite capacity over the one of the cloudiest regions on earth. This resulted in improved imagery delivery and optimised wet season collections when our countries needed data.

Such access was vital during our emergency management responses to natural disasters. We received emergency imagery within two hours for TC Pam, TC Winston and many other events due to Peter's proactive work in the region. He collaborated with SPC and BlueCham to ensure the high risk areas of damage were on the collection deck at midnight for the morning collection. His efforts were often at night and over weekends as if he was one of the SPC team.

Over time SPC leveraged the multispectral data to develop atmospheric correction algorithms specific to the Pacific, while still delivering pan-sharpened image data. Peter Kinne provided real value for eight band bundled data (one panchromatic and eight multi-spectral channels) which allowed even greater innovation and replaced conventional methods, such as legally defining maritime boundaries. This alone enabled a mapping scale change from 1:50,000 to more detailed mapping at 1:10,000.

When satellites orbit over the Pacific's volcanic islands, data is often rejected due to high cloud content in an imagery strip. Peter's technical background enabled him to analyse the automatic procedure and convince the programming crew to instead extract the cloud-free coastal belts over mountainous strips. Suddenly the yield increased allowing many more images available and shorter project delivery.

Nearly one year ago, DigitalGlobe merged to form Maxar and Peter's Australian office was closed.

Peter Kinne has now been appointed Head of Sales for the Queensland-based Gilmour Space Technologies and is now focussed on launching rockets to take satellites into space. We hope that Peter Kinne's new venture will enable him to continue his professional contributions to the PGRSC and send him to Vanuatu this year.

6. Digital Atlas of Micronesia

Danko Taboroši, Island Research & Education Initiative (iREi)

Maria Kottermair, Island Research & Education Initiative (iREi)

Snyther Biza, FSM Department of Environment, Climate Change and Emergency Management (DECEM)

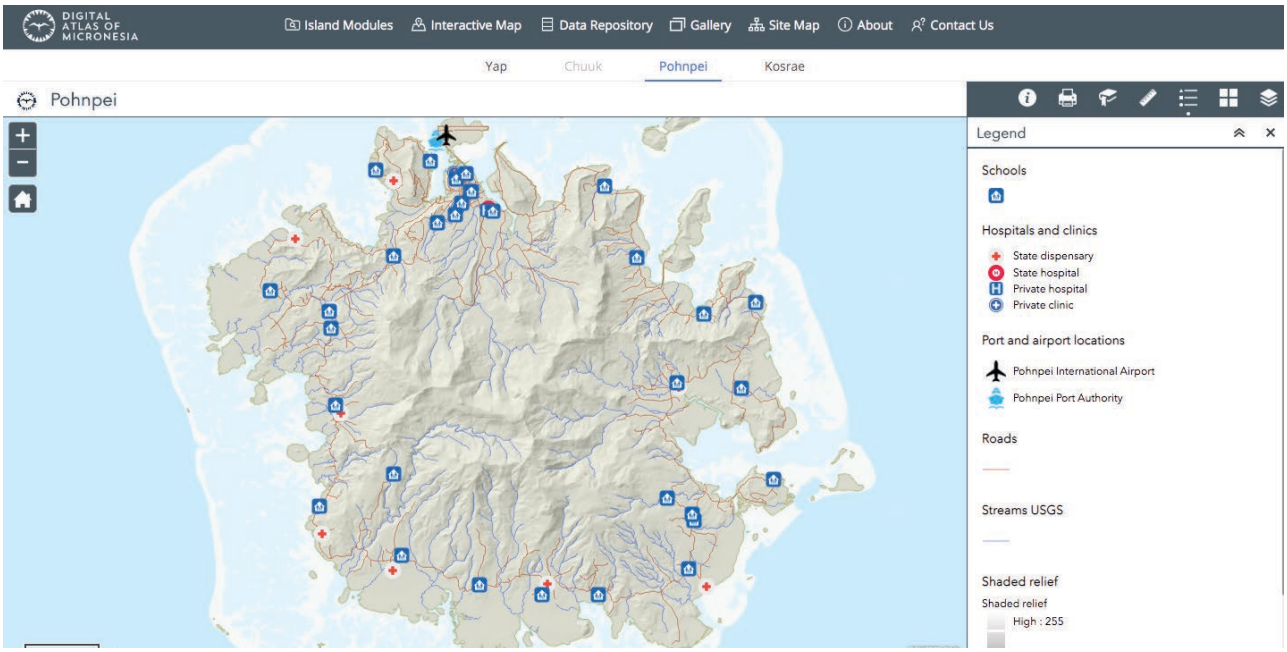
The Digital Atlas of Micronesia is the foremost source of geospatial information for the Federated States of Micronesia. Users can visit this web-based resources to identify, visualize, query, analyze, and download data relevant to their interests. The Atlas is accessed at islandatlas.org. At its core are web-enabled GIS and searchable database that allow users to view and manipulate hundreds of geospatial layers. In addition to serving as the data repository, the Atlas is also an informational tool and incorporates a huge range of pre-made maps, charts, and datasets related to the natural and human environment of Micronesian islands. This article outlines some of the key features of this Atlas and invites users to visit this geospatial gateway.

A network of partners and stakeholders

The project to create the Atlas started in 2015 and continues. The agencies leading its development and maintenance are Island Research & Education Initiative (iREi), Water and Environmental Research Institute of the Western Pacific (WERI), and the FSM Department of Environment, Climate Change and Emergency Management (DECEM). The key funding sources have been the US Geological Survey (USGS) and the FSM National Government. In addition, a wide range of enthusiastic partners -- NGOs, government departments, private entities, and other stakeholders -- have contributed data and advice and continue to be involved in the growth and broadening adoption of the Atlas by GIS users in the region and beyond.

Modular organisation

The Atlas is envisioned as a permanent work-in-progress that provides the full coverage of the FSM, including every bit of its territory and incorporating data on even the smallest and most remote atolls. Though continually worked on, the Atlas has a unique, modular nature that allows full access to the content already completed, without the need to wait for a hypothetical overall launch date. To make that possible, the Atlas is organized into 7 well-integrated yet functionally stand-alone modules. Each module covers one of the four main islands or three groupings of outlying atolls that comprise the Federated States of Micronesia. So far, all four main islands, specifically Yap, Chuuk, Pohnpei, and Kosrae, have been completed. We are currently working on the modules focused on the outlying atolls.



Easy navigation, thematic approach, and comprehensive search

The Atlas contains a huge amount of data but is well organized and no part of it is dificult to reach. The user-friendly interface is locally-inspired with attractive yet straightfoward design and intuitive navigation via several logical menus. The menus allow users to quickly switch from one screen to another, without time-consuming dialog boxes or pop-ups. Switching between different island modules and any other resources in the Atlas takes just one or two clicks. Enhancing the intuitive organization is a unique theme-based menu that presents information, maps, and data by eight general themes: land, reefs, water, vegetation, conservation, population, infrastructure, and culture. Interested in corals? Click the reefs section. Want to know about local plants? Open the vegetation section. The Atlas is also fully searchable and entering any text into its search box will instantly check the user's terms against all content of all Atlas pages as well as any data layers and associated metadata, so that a single querry leads to all the relevant information, maps, and geospatial data in all the available formats.

Original cartography

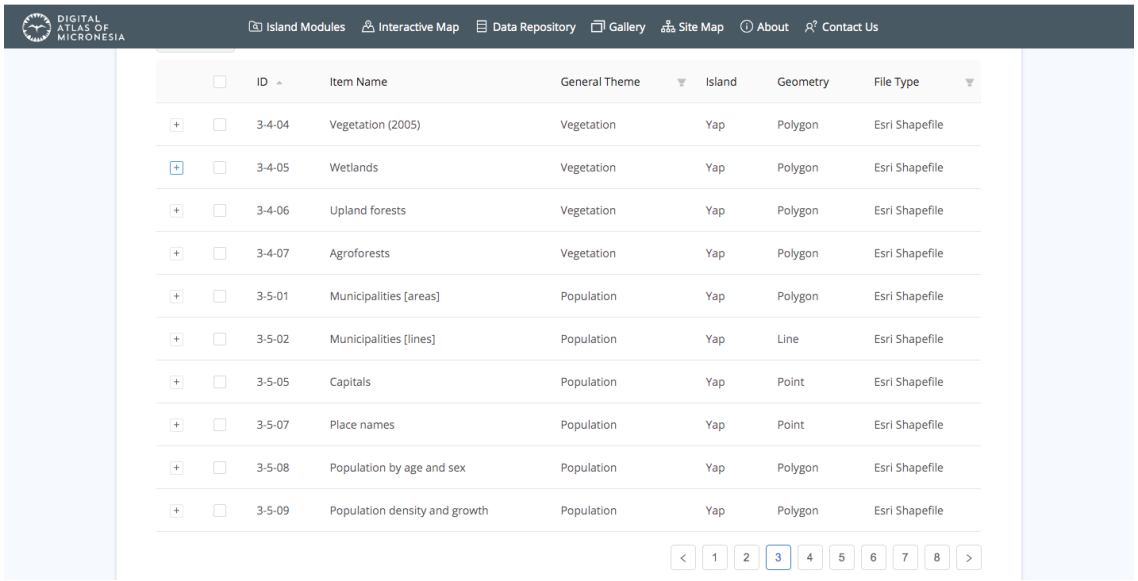
Since many people in Micronesia have personal or professional interests in island geography but do not use GIS software, we have made the Atlas interesting and useful to anyone, not only the specialists. Unlike many similar resources around the world, this Atlas contains pre-designed static maps in addition to geospatial data and metadata. The islands are represented through 500+ beautiful maps, each created exclusively as part of this project. The maps are attractive and informative and made with end-users in mind. Each map presents a single geospatial data layer in great detail, excludes other layers to increase clarity and versatility, and omits place names to reduce clutter. That allows people with different needs to skim through "galleries" of maps and easily select those most suitable for their needs and download them. For instance, a teacher looking for a map of rivers of a particular island can quickly find one that shows just that, download it, and use it in a lecture. In addition, each map is offered in different file formats and sizes to allow maximum accessibility at different internet speeds.

Interactive maps

There are also many non-GIS users who might need more complex, previously unavailable maps. They can create their own maps via the powerful interactive map tool integrated with the Atlas. This tool allows users to visit and explore different islands, customize maps as they wish, and manipulate data. For example, users can zoom in to particular areas, switch layers on and off, examine relationships between different feaures, peak into attribute tables, get additional information about features of interest, and even import outside data to combine it with data contained in the Atlas. They can then export their custom-made maps and download and save offline in multiple formats.

Data repository

Users with GIS experience will probably want to download raw data layers and use them in professional software. They can head directly to the data repository part of the Atlas. The data repository is essentially a "one-stop shop" that will quickly lead users to shape files, raster files, and imagery they need and allow them to download files and later use them to make own maps and analyses. We have not only collected and catalogued the data, but have checked each and enhanced each layer, improved or added attributes and/or metadata, and re-projected everything in common projection and corrected the typical offsets encountered when data from a variety of sources are put together. We have even created a range of previously unavailable data layers. For those reasons, the chances



ID	Item Name	General Theme	Island	Geometry	File Type
3-4-04	Vegetation (2005)	Vegetation	Yap	Polygon	Esri Shapefile
3-4-05	Wetlands	Vegetation	Yap	Polygon	Esri Shapefile
3-4-06	Upland forests	Vegetation	Yap	Polygon	Esri Shapefile
3-4-07	Agroforests	Vegetation	Yap	Polygon	Esri Shapefile
3-5-01	Municipalities [areas]	Population	Yap	Polygon	Esri Shapefile
3-5-02	Municipalities [lines]	Population	Yap	Line	Esri Shapefile
3-5-05	Capitals	Population	Yap	Point	Esri Shapefile
3-5-07	Place names	Population	Yap	Point	Esri Shapefile
3-5-08	Population by age and sex	Population	Yap	Polygon	Esri Shapefile
3-5-09	Population density and growth	Population	Yap	Polygon	Esri Shapefile

are that users of the Atlas will find what they need and acquire data in better and more complete versions than may be available anywhere else. We have also thought of people who have not learned to use GIS software but do enjoy Google Earth. For their benefit, nearly all GIS data have been manually converted and re-designed as KML files that can be also be downloaded through the same data repository.

Responsive design and easily updatable content

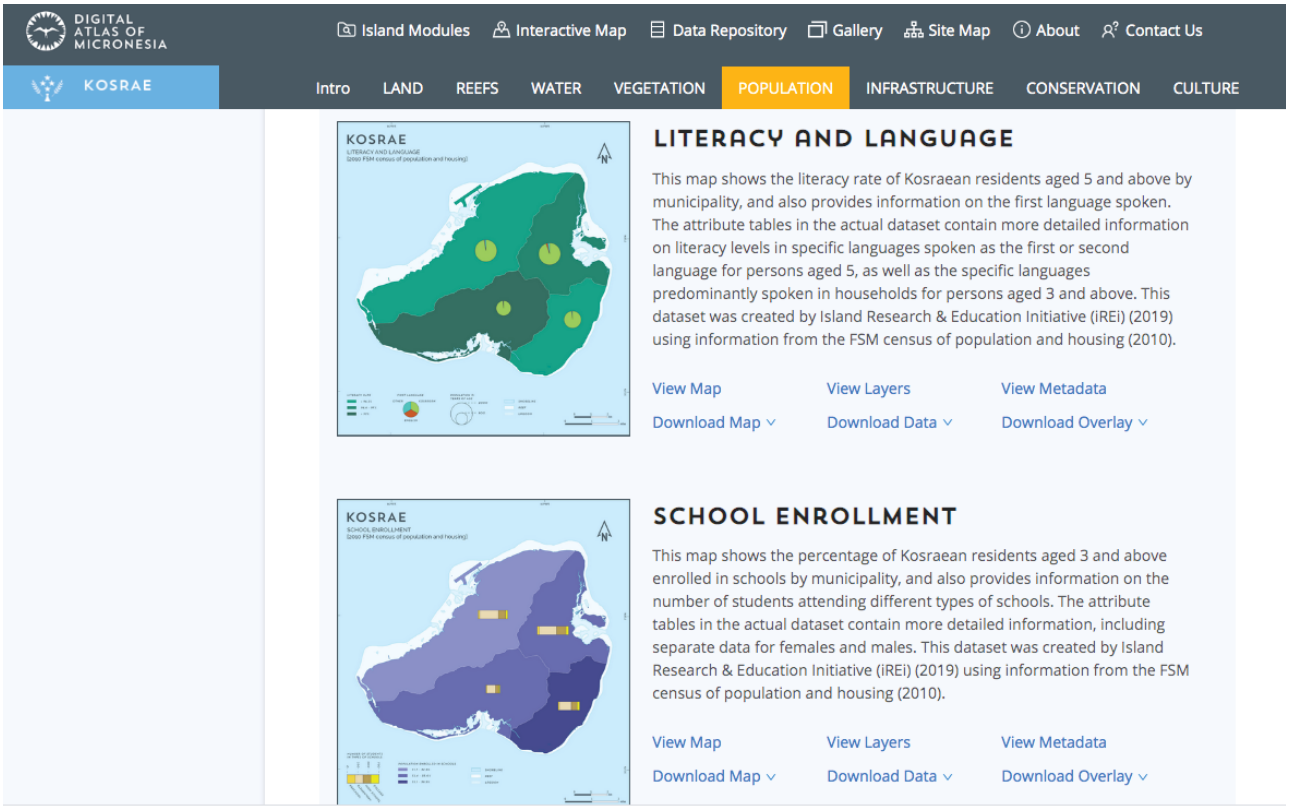
The user-interface of the Atlas employs responsive web design. That means that it is fully functional and useful on any device in any size, from desktop and laptop computers to tablets and mobile phones. It can be utilized equally well on many different platforms and its layout and functionality adjusts to the user's browser, operating system, and screen size and resolution. On the other hand, the user-interface does not change over time. We deliberatley keep it constant so that it remains familiar and easily accessible to users, no matter how often or how rarely they visit. The underlying content is, of course, regularly updated so that the users always get the latest versions of the data. Updating the Atlas is easy by design and often involves simply accessing the server and overwriting older GIS files with newer ones, without any need to modify programming code.

Data ownership and copyright considerations

Because this Atlas contains information sourced from many different places and owners, we have strived to document each data set's origin and rules of use. In general, anything that we created for the Atlas, including datalayers and all static maps are licensed under Creative Commons Attribution-Noncommercial 3.0 US License. That means that we allow users of this site to download, print, display, utilize, distribute, and modify any of our data layers and maps for non-commercial purposes. We do require that any use acknowledges the source, specifically as Digital Atlas of Micronesia by Island Research & Education Initiative (iREi), Water and Environmental Research Institute of the Western Pacific (WERI), and FSM Department of Environment, Climate Change and Emergency Management (DECEM). Of course, the Atlas also contains a wealth of data that belongs to other entities and which have entirely different terms and additional conditions for use. For that reason, users are requested to examine relevant metadata for any geospatial layer they wish to use and determine the copyright status and restrictions required by individual third-party owners, whose contact information is also included in metadata. In rare instances where data owners prohibit sharing of their data whatsoever, we have presented the information in static maps and catalogued it in the data repository, but disabled the download options. That way, users can learn that the data exist and get previews through static maps, but must contact owners directly if they wish to obtain such restricted layers.

Final note

The Atlas description presented here is not the best way to understand this resource. Instead, please visit the islandatlas.org and venture across our lands and waters, and through our traditions and culture.



7. Copernicus

The Copernicus-Programme is the European Union programme on Earth Observation coordinated and managed by the European Commission. It aims at achieving a global, continuous, autonomous, high quality, wide range Earth observation capacity. Providing accurate, timely and easily accessible information to, among other things, improve the management of the environment, understand and mitigate the effects of climate change, and ensure civil security.

It provides cost free Earth Observation data, information and services for the benefits of its users and the public and allow downstream services to be developed. Copernicus covers 3 components: i) space component (satellites and associated ground segment), ii) in-situ measurment network, iii) services. There are several satellites already in orbit and several others will be launched during the next years to cover six main interacting themes: atmopshere, marine, land, climate, emergency and security.

In the beginning the focus was more towards Europe, now the data is also available for Pacific Island Countries.

The Sentinel Satellites

Copernicus has launched and still complete the amount of satellites with additional ones to monitor the environment. For GIS and RS users in the Pacific Island Countries Sentinel 1, Sentinel 2 and Sentinel 3 satellites will be the most interesting ones.

Sentinel 1

Sentinel 1A was launched in April 2014 and provides all-weather, day and night observation. Sentinel 1B was launched on 25 April 2016. Each of the two satellites are carrying an imaging C-band SAR instrument (5.405 GHz) providing data continuity of ERS and Envisat SAR types of mission. Each Sentinel-1 satellite is designed for an operations lifetime of 7 years with consumables for 12 years. The S-1 satellites fly in a near polar, sun-synchronised in an orbit at 693 km altitude. A summary of applications are:

Monitoring sea ice zones and the Arctic environment, and

surveillance of marine environment.

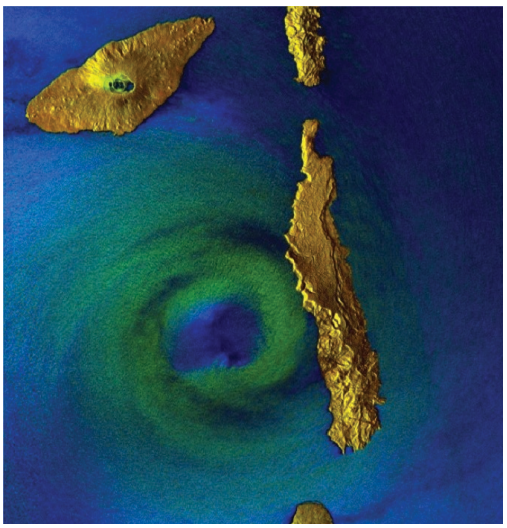
Monitoring land surface motion risks (volcanoes, earthquake, subsidence)

Mapping of land surfaces: forest, water and soil

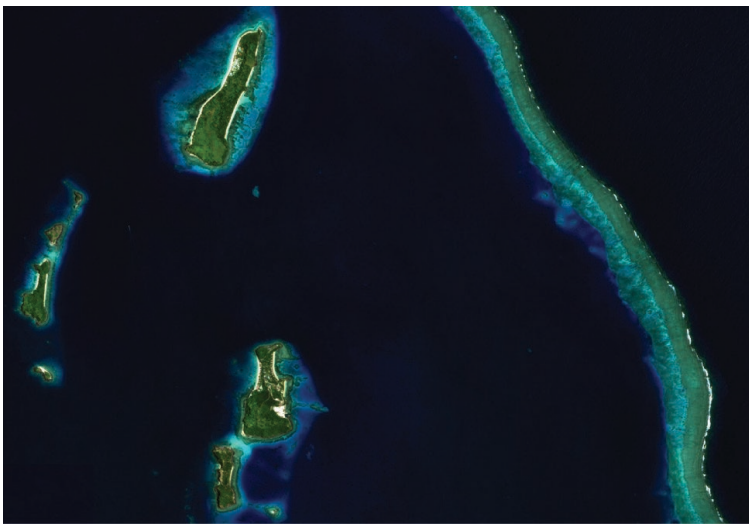
Mapping in support of humanitarian aid in crisis situations

Sentinel 2

The mission is again a constellation with two twin satellites, Sentinel-2A, launched in June 2015 and Sentinel-2B, launched in March 2017. Sentinel-2 features a 290 km-wide coverage, the channels blue, green, red and near infrared have 10 m spatial resolution, the red edge channels 20 m. Altogether 13 optical channels operating from visible-near infrared to shortwave infrared. The band coverage ensures enhanced-quality continuity with existing missions Spot and Landsat and complementarity at a larger scale with commercial imagery such as Worldview-3. It provides improved revisit time, swath width, coverage area, spectral bands, calibration and image quality.



TCH Harold as seen by Sentinel-1 the 6th of April 2020, Contains Copernicus data 2020. Courtesy of BLUECHAM SAS.



Sentinel-2 image of Yanuyanu-i-Sau Island, Contains Copernicus data 2020. Courtesy of BLUECHAM SAS.

Copernicus Session during the GEO Week 2019 in Canberra. The PGRSC Chair Wolf Forstreuter explains challenges of satellite image data applications in Pacific Islands.

Sentinel provides image data for the applications Landsat and SPOT data was used, such as vegetation monitoring, forest management maritime surveillance, etc.

Sentinel 3

Sentinel-3A was launched in February 2016 and Sentinel-3B in April 2018. The Sentinel-3 mission's main objective is to measure sea-surface topography, sea- and land-surface temperature and ocean- and land-surface colour with accuracy in support of ocean forecasting systems, and for environmental and climate monitoring. Near-real time data enable ocean forecasting, sea-ice charting, and maritime safety services on the state of the ocean surface, including surface temperature, marine ecosystems, water quality and pollution monitoring.

Sentinel 4

There will be a Sentinel 4A and a Sentinel 4B to monitor trace gases. The launch of Sentinel 4A is expected in 2023.

Sentinel 5P

The main objective of the Copernicus Sentinel-5P mission is to perform atmospheric measurements with high spatio-temporal resolution, to be used for air quality, ozone & UV radiation, and climate monitoring & forecasting. The satellite was launched in October 2017.

Sentinel 6

Sentinel 6 will monitor the sea level. The launch date is supposed November 2020

PGRSC as Copernicus Relay

PGRSC applied to become a Copernicus Relay on 02 June 2020 which was supported by the EU Delegation in Suva. PGRSC became the status of a Copernicus Relay on 18 June 2020 with a notice from the DG for Defence Industry and Space of the European Commission in Brussels.

This means that PGRSC will distribute information regarding Copernicus potential, data, assistance, etc. through the information vehicles. PGRSC will also act as the direct voice of GIS&RS Pacific users needs to the Copernicus Programme Office in terms of data acquisition, type of measurments and collection, revisit frequency, etc. There is another advantage that the EU has a support office to help GIS & RS users to utilise the Copernicus data. Here The PGRSC has access to resources assisting the user. PGRSC will update its website to focus on Pacific needs and buffer most frequently asked questions for Pacific applications.

The Copernicus Support Office

The Copernicus Support Office (CSO) is located in Brussels. The office started in 2016 when the European Commission launched two networks (i) the Copernicus Relays and (ii) the Copernicus Academy, consisting of champions in the Copernicus ecosystem who could act as promoters, trainers, and supporters of the Copernicus data and information services. Key to the running of the CSO was the dedication of SpaceTec's partners and consultants in getting to know the networks' members and influencers on social media. Three consulting companies working for the CSO.

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Sentinel-2 image of Lautoka, Contains Copernicus data 2020. Courtesy of BLUECHAM SAS.

8. University of the South Pacific becomes a Member of the Pacific GIS Remote Sensing Council

By Nick Rollings

The University of the South Pacific and the Pacific GIS RS Council (PGRSC) formalised a long term working relationship by signing a Memorandum of Understanding (MoU) on the 24th of July. As part of the MoU, the University of the South Pacific will now become an Institutional Member of PGRSC.

USP has been providing GIS and remote sensing education since 1994 and in 2015 instituted a full degree in Geospatial Science. Its graduates are now spread across the Pacific and are an integral part of the Pacific Geospatial community.

As part of its objectives, the PGRSC provides expert guidance in building effective national GIS & RS User Groups and an active Pacific-wide Geospatial community through their focal point network.

During the signing of the MoU, the Vice Chancellor and President of the University of the South Pacific, Professor Pal Ahluwalia said, “We are pleased to formalise this long standing partnership and look forward to working with PGRSC in advancing capacity building in the area of geospatial science across our member countries.

PGRSC Chairman, Dr Wolf Forstreuter said, “the Council’s Pacific focus matches perfectly with USP’s member countries, particularly as USP’s Geospatial Programme is spread across these Pacific Island Countries. Together we can build capacity in this important area and make a difference.”

Dr Nick Rollings
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The USP Vice Chancellor and President with part of the PGRSC Board after signing the MoU between USP and PGRSC

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