

PACIFIC ISLANDS GIS&RS NEWSLETTER

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Dear readers,

Finally, a new issue of the Pacific Islands GIS and Remote Sensing Newsletter is out! Currently, we have a very small team to make a new publication possible. However, we see the need for the newsletter to remain active within the network of the Pacific Islands GIS and Remote Sensing Council (PGRSC). There are important reasons for such a newsletter to be available alongside all social media:

(i) It serves as a place for a concise overview of new developments in terms of data, software, and methods for Pacific applications.

(ii) With its own ISSN number, the newsletter provides a platform for Pacific GIS & RS users to publish, where other publications may be difficult to access.

(iii) Perhaps the most important function is the documentation of ideas and developments for Pacific applications. It has already, and could continue in the future, to prevent the need to "reinvent the wheel."

This newsletter has been published for more than 30 years and is downloadable from the PGRSC website. This issue is hopefully a new start of publishing Pacific GIS and RS applications at regular intervals. There is a team again; however, every support is welcome.

CONTENT

1.)	Future-Proofing Oceania: Using Dynamic Space-Based Intelligence for Security and Disaster Response	2-4
2.)	GIS expertise and tools for intelligence gathering and decision support for Pacific maritime incident preparedness, planning, response and recovery.	5-6
3.)	Breaking Barriers: Making Satellite Data Accessible	7-9
4.)	2023 Pacific Islands CIS & Pomoto Sensing Conference	10-11

Future-Proofing Oceania: Using Dynamic Space-Based Intelligence for Security and Disaster Response

by Maurice Borer | BlackSky

Why Pacific Island Nations Benefit from Space-Based Geospatial Data

The world is moving away from static maps to real-time dynamic monitoring. Governments seek timely data and insights to understand what's happening inside and outside their national borders and to plan for and respond to disasters.

Commercial organizations like BlackSky support Pacific Island nations with timey, relevant data from space-based intelligence.

Unlike legacy imaging satellites, BlackSky's on-demand constellation is deployed in mid-inclined orbits that can image a single location multiple times in a day from dawn to dusk, ensuring high temporal diversity in collection and showing events as they are happening.



Get Accurate Information for Emergency Response and Recovery Monitoring /ildfires fueled by a dry summer and hurri



Mid-event capture of the fast-moving wildfire that devastated the town of Lahaina in Maui, Hawaii, United States. Smoke and damage are visible. © BlackSky 2023. All Rights Reserved.

On 8 Aug. 2023, a deadly wildfire broke out in the town of Lahaina in the U.S. state of Hawaii. Thousands of Lahaina residents had no official notice of the danger, leaving little time for evacuation. First responders struggled to help everyone get to safety from the fast-moving fire, which ultimately killed at least 115 people and destroyed more than 2,200 homes and other buildings.

The image above was taken during the wildfires, offering public safety officials and investigators insight into what happened.

Timely information is crucial for responding to and recovering from incidents like wildfires, hurricanes, and earthquakes.

When disasters unfold, the picture on the ground can change rapidly, making it hard for responders to quickly organize teams and send help. Unexpected events like fires can also make it difficult to quickly capture other kinds of data, such as drone or aerial imagery. Government and humanitarian organizations use BlackSky imagery to inform rescue operations, identify ingress/egress points, as well as aid site selection for staging areas, temporary medical facilities, housing for displaced people, and more.

In another example of disaster recovery monitoring, a massive flood destroyed the Fitzroy River Bridge at Fitzroy Crossing in a remote part of Western Australia. The collapse severed the only paved connection between northwestern Australia and other parts of the country.

Consequently, communities lost access to emergency services and necessary supplies that typically came from northwestern ports. Vehicles detoured hundreds of kilometers until a temporary



Left: Fitzroy Crossing Bridge, Western Australia, in January 2023 after the original, two-lane bridge was destroyed by flood. Right: Same bridge seen on 11 Sept. 2023, showing extensive construction activity and the first section of the larger, replacement bridge in place. © BlackSky 2023. All Rights Reserved.

bridge could be fully installed and construction begun on a new permanent bridge, which is expected in 2024.

In the above comparison, BlackSky images show the flood's destruction and present-day construction activity. In places like Fitzroy Crossing where disaster damage is confined to a single structure, temporary solutions can be found in weeks and permanent repairs can be completed within months.

However, in others, such as Lahaina, full recovery and repair may be confirmed only years later. Satellite imagery captures new imagery of affected places, providing disaster recovery teams an updated picture of progress.



I Gusti Ngurah Rai International Airport, Bali, Indonesia. © BlackSky 2023. All Rights Reserved.

Monitor Important Locations and Create a Common Operational Picture for Greater Security

An up-to-date common operational picture is critical for leaders who need to maintain situational awareness and support decision-making. Geospatial data provides current, actionable information for important locations such as ports and airports. Regularly reported data can help leaders understand the level of activity and pattern of life at important sites. This BlackSky image of an international airport in Bali, Indonesia features automated aircraft detection (yellow outlines).

Analysts used aircraft-transmitted signals called Automatic Dependent Surveillance–Broadcast (ADS-B) to further identify individual aircraft and their flight numbers (dotted line circles and callouts). The analysts identified flights operated by Lion Air, AirAsia, and VietJet Air that were waiting to take off as well as a Virgin Australia flight that had just landed. This example demonstrates how independent data streams can be joined to space-based intelligence to make sense of key locations and create a complete picture of activity at places like airports.

Learn More about BlackSky

BlackSky is a leading provider of real-time geospatial intelligence. BlackSky delivers on-demand, high frequency imagery, monitoring and lite constellations, optimized to capture imagery cost-efficiently where and when customers need it. BlackSky's solution is underpinned by Black-Sky's Spectra[™] AI platform, which will allow users to directly task BlackSky's satellites without any human or manual handling. This capability is offered as an affordable annual subscription service. BlackSky is relied upon by U.S. and international government agencies, commercial businesses, and organizations around the world. BlackSky is headquartered in Herndon, Virginia, and is publicly traded on the New York Stock Exchange under the ticker symbol BKSY.

BlackSky was honoured to attend and present in the 2023 Pacific Island GIS and Remote Sensing User Conference on 27 November in Suva, Fiji. To learn more about BlackSky, join the presentation "BlackSky: Disrupting new space with real-time dynamic monitoring: Emergency Response Imaging" presented by Maurice Borer of BlackSky.

Interested parties can also contact BlackSky any time at sales@blacksky.com.

GIS expertise and tools for intelligence gathering and decision support for Pacific maritime incident preparedness,planning, response and recovery.

by Paul Irving | SPREP

Every country and territory in the Pacific has an obligation to protect its coastal, marine and maritime resources and values from maritime wrecks and spills.

The PacPlan (the Pacific Islands Regional Marine Spill Contingency Plan 2019) provides regional support to countries, each of which, through their maritime agencies, should have an operational National Marine Oil Spill ContingencyPlan(NatPlan). The coverage and quality isunderstandably variable. Addressing the risk, threat and response to maritime incidents groundings; wrecks; sinkings; oil, fuel, chemical

and cargo spills; salvage; clean-up; etc. - requires a multitude of technical capabilities and

expertise.

To structure all this, we use the same emergency preparedness model use din other forms of emergency response, known as PPRR, or Prevention, Preparedness, Response and Recovery.

All of these elements are equally important. All incidents are spatial, with initial location of the spill being but one component. GIS and spatial technologies and expertise are invaluable in all phases. Prevention may address risk and routes, allocating shipping to areas where bathymetry is best for their movement and manoeuvring. Preparedness would address threat areas, where the resources are vulnerable to incidents, spills and their impacts, and these are not limited to the high profile ecological or wildlife areas. Response requires priorities to be set, and de-

1000

cisions to be made, as the incident is always a surprise, always in a difficult place, and always has constraints on actions.

Recovery has meaning meanings, but one is 'healing', and in the Pacific this can be anything from financial (recovering response or impact costs) to ecological (rehabilitating a damaged environment or ecosystem) to social or cultural (restoring important things to how they once were). Incidents are almost always criminal activities - spilling things in the sea is a national and international crime, even when there are mitigating circumstances. Damaging areas used for food, religion, culture, species protection, community amenities, commercial and industrial businesses, has impacts and costs, and ship owners, charters, and spillers, and their insurance companies need to be able to identify where the impacts occurred, what the costs are and how much to pay or contribute to their restoration.

Often these numbers become eyewateringly large - the 2011 MV Rena incident and response in NZ in ran to costs in excess of NZ\$550mil, and the 2019 MV Solomon Trader spill in the Solomon Islands will likely top USD\$50mil.



Some spills are a mystery, with oil secretly dumped, often at night and often in places where engineers thinks they wont be noticed. Maritime detectives use remote sensing, satellite and aerial observation, spill behaviour and fate modelling, chemical fingerprinting, and good spatial analysis, to find these miscreants, prosecute and get compensation. Are you part of your National Plan? Would you know what to do if asked? Do you have data, analysis or expertise to assist your country or agency (national or international, government, non-government, resource management or compliance or academic) protect he Blue Pacific from such damage. Could you be part of the healing process? Come find out.



Breaking Barriers. Making Satellite Data Accessible

by Planet

As we seek innovative ways to monitor and protect our environment, companies like Planet are at the forefront of technological advancements in Earth Observation.

In this interview, Kevin Weil, President of Product & Business at Planet, shares insights into the mission and the profound impact of integrating satellite imagery with cutting-edge AI.

Sustainability has been a major talking point for about a decade now, and Planet, as a strong advocate of sustainable practices, has been involved in numerous projects to further this cause. *Note:This interview originally appeared on Geospatial World. Minor edits have been made by the Planet team.*

What are the current sustainability missions that Planet is focusing on?

Kevin Weil: We have more than 900 customers and partners, and a substantial portion are actively engaged in various sustainability initiatives.

One noteworthy program we have undertaken and frequently discussed is the NICFI program. Through this initiative, we collaborated with the government of Norway to create a comprehensive dataset encompassing the world's tropical forests. Our daily global satellite imaging capability enables us to generate this dataset, which covers the area between specified latitudes that define the world's tropical forests.

Providing this data as a public good has enabled researchers to study and comprehend deforestation and various climate-related changes, ultimately contributing to their understanding of the sustainable economics of forest communities.

We now observe, from NICFI and other sources, the publication of peer-reviewed scientific papers every day that cite Planet data. This amounts to thousands of papers over the course of our business history, primarily because we have worked diligently to make our data accessible to researchers.

We believe that good things happen when we do so, as we witness new use cases and innovative solutions emerge.

We also have an ongoing mapping initiative to create a living atlas of the world's renewable energy sources. This project is a collaborative effort with Microsoft and the Nature Conservancy. We are generating a living map encompassing all sustainable, large-scale wind or solar developments

worldwide.

This initiative aims to make such data accessible and provide a ground truth for the locations of sustainable energy production. It enables users to delve into comparisons, such as how countries are progressing relative to one another or the growth of individual states or provinces within countries. This initiative also allows for an analysis of wind versus solar development.

Recently, Planet's satellite imagery was combined with Microsoft's AI to assess damages in the Maui wildfires. Tell us more about the project.

Kevin Weil: This work initially began as a collaboration centered on Ukraine. Our joint objective was to conduct automated building damage assessments in the conflict zone.

Specifically, we focused on cities that had experienced occupation and, upon liberation, required substantial rebuilding efforts. We aimed to evaluate how effectively we could utilize our data and Microsoft's AI to swiftly determine the extent of damage to buildings, road conditions, and access paths within specific areas.

By providing such information in an accessible format, we could gain insight into the resources needed for reconstruction and identify priority areas. This initial project spanned approximately oneto two months.

As we neared completion of this work, an earthquake occurred in Turkey (Turkiye), prompting us to adapt our techniques swiftly. Within days, we managed to provide automated damage assessments

for buildings across the earthquake-affected zone. This rapid response was crucial for assisting first responders in understanding the extent of damage, identifying navigable roads, and planning their actions effectively.

Subsequently, when wildfires struck Maui, we applied the same approach once again. With each

iteration, we have improved our efficiency and response time. These experiences underscore the incredible potential of AI when combined with Planet's imagery for real-time assessments and disaster response.

What are some other use cases to which this kind of integration can contribute?

Kevin Weil: Our partner, LiveEO, integrates Planet data with AI in a really exciting work around disaster management. Specifically, they focus on inspecting linear features such as rail corridors and power lines to identify vegetative encroachment.

Often, some of the most significant wildfires are ignited when a tree falls onto a power line in the midst of a forest. Hence, it is crucial to automate the process of identifying trees that are tall enough and in close proximity to potentially hazardous positions along thousands of miles of power lines.

A similar need exists for rail lines; although it may not lead to forest fires, overgrown vegetation on rail lines can still result in significant delays.

Historically, this type of work has required periodic flights with airplanes or other costly and nonscalable methods. However, by utilizing daily satellite imagery in conjunction with AI, we can now efficiently pinpoint areas needing attention. This approach enhances safety, saves substantial government and taxpayer resources, and streamlines the overall process.

Planet has been preparing to launch the Tanager hyperspectral satellites. Tell us more about these satellites and the roles of Carbon Mapper and NASA in the mission.

Kevin Weil: This is a significant milestone for us because, historically, we have exclusively launched

optical satellites. However, with Tanager, we are launching hyperspectral satellites.

These satellites possess the capability to detect a wide range of substances that are imperceptible tothe human eye. Specifically, it can identify chemical fingerprints of diverse materials and compounds, which serves as the primary objective. The involvement of Carbon Mapper is pivotal because it enables the detection of carbon and methane emissions, both of which contribute to global warming and remain relatively unknown in terms of their precise sources.

These satellites will offer more than a broad assessment of carbon or methane emissions within a general area. They can pinpoint specific emissions sources, such as a leak in a particular pipe. This level of precision can enable us to identify and address emissions with great accuracy.

With governments increasingly making commitments to advance their sustainability efforts, this capability provides them with a means to acquire accurate and reliable information on their progress and areas where improvements are needed. It also serves as a tool for holding emitters accountable. We are fortunate to have forged a partnership with NASA JPL, where they are essentially conducting a technology transfer of the hyperspectral sensor itself. This sensor is the result of decades of dedicated work and is an exquisite piece of technology. They have honed and perfected it over many years, but on airplanes. Our collaboration will deploy this sensor in space.

What does the roadmap ahead look like for Planet?

Kevin Weil: I'd like to highlight three key points. Firstly, we are actively developing new datasets and are committed to pushing the boundaries by creating innovative datasets that the world has never encountered, akin to our achievements with PlanetScope and our Dove constellation.

We are in the process of upgrading our SkySat constellation, specifically the high-resolution tasking constellation, to Pelican. This upgrade will deliver substantial improvements across the board, offering higher resolution and reduced latency. We also introduced the hyperspectral constellation,Tanager. The first satellites for both these constellations are scheduled for launch in the very near future. Therefore, we remain dedicated to advancing the frontier by creating novel datasets. The second focus revolves around what we discussed—making our data more user-friendly. This entails the creation of Planetary Variables and other derivatives that serve as simplified

building blocks, facilitating ease of use.Our objective is to expand the range of applications and systems that leverage AI in conjunction with our imagery. This enables us to provide answers to users without requiring them to possess advanced geospatial expertise. Ultimately, we aim to showcase the extensive possibilities that can be unlocked by effectively utilizing satellite imagery.

Thirdly, a significant aspect pertains to the platform and workflows. We aim to seamlessly integrate our space capabilities into GIS platforms that users commonly employ. We want to eliminate the need for organizations to construct custom infrastructure pipelines, which can hinder obtaining the answers they seek.

Our vision is to empower users by providing them with advanced capabilities through what essentially constitutes a geospatial cloud platform. This vision stems from our acquisition of Sinergise and Sentinel Hub.The more capabilities we offer, the faster users can arrive at solutions and the more we contribute to the growth of this industry.

2023 Pacific Islands GIS & Remote Sensing Conference

by Bradley Eichelberger

For more than 20 years, the Pacific Islands GIS and Remote Sensing User Conference has provided a platform for:

(i) GIS and Remote Sensing (RS) users from nearly all Pacific Island Countries,

(ii) satellite data, software, hardware and consulting enterprises and

(iii) scientists from universities and research institutions.

The 2023 Pacific Islands GIS and Remote Sensing User Conference was held in Suva, Fiji from November 27 to December 1, 2023 under the theme "Improving Resilience in the Pacific Islands Through GIS and Remote Sensing". The event hosted over 200 participants from 16 Pacific Island nations and six regional countries and consisted of 64 presentations, 7 workshops, a Women's Session Panel, and the most attended Kava Session in PGRSC history!



Minister of Lands and Mineral Resources Fiji, Filimoni Vosarogo.



Head of Schools Sageon at University of the South Pacific, Prof. Surendra Prasad.

The Opening Keynote Speakers and Chief Guests were Filimoni Vosarogo (Fiji Minister of Lands and Mineral Resources),Surendra Prasad (Head of Schools Sageon at University of the South Pacific), Salote Viti (Chair of the Pacific GIS and Remote Sensing Council (PGRSC)), and Simon Hill (Asia-Pacific Government and Public Safety Lead for ESRI).

Sponsors for the event included ESRI, Eagle Technology, University of South Pacific (USP), Pacific Community (SPC) – Digital Earth Pacific, BlackSky, Humanitarian OpenStreetMap Team (HOT-OSM), Open Source Geospatial (OSGeo) Oceania, Vodafone, Fijian Elections Office (FEO), and the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN- SPIDER). The 2023 conference was honoured to host a full-day series of ESRI special sessions an PGRSC National Focal Points also had the opportunity to highlight software (Kenna Kelly, Eagle Technologies and ESRI), exploring PostgreSQL (Elisa Puccioni, FOSS4G OSGeo Oceania), NASA ocean satellite data (Bridget Seegers and Kelly Luis, NASA), the Qëhnelö Digital Platform (Remi Andreolli, Bluecham SAS), protected area data using the Pacific Islands Protected Area Portal (PIPAP) (Kasaga Tora,SPREP), and a multi-day remote sensing for disaster emergency (Lorant Czaran, UN-SPIDER).



Deputy CEO for LGIS Division Tonga, PGSRC Focal Point Tonga, Halalika Etika.

Travel grants were provided by OSGeo Oceania for three participants (Halalilika Etika (Tonga),-Joshua Turia (Papua New Guinea), and Jewel Tuitama (Tokelau). Additionally, UN-SPIDER provided travel awards to 22 participants (Gandercillar Vosaki (Cook Islands), John Strickland (Cook Islands), Stephano Rampling-Tou (Cook Islands), Alexandre Amary (French Polynesia), Yoann Roncin (French Polynesia), Turia Bokai (Kiribati), Rodney Yoshida (Palau), Tingneyuc Sekac (Papua New Guinea), Samir Paniani (Samoa), Henry Letaulau Tuuau Letaulau (Samoa), Taialofa Daphne Lale leti-Letufuga (Samoa), Pasese Junior Pasese (Samoa), Frost Tuaau (Samoa), Reginald Kuts Reuben (Solomon Islands), Derrick Lauomea Lediomea (Solomon Islands), Branson Pitakia (Solomon Islands), Ana Ilaisaane Kaipa Patolo (Tonga), Kelepi Tupou Hufanga (Tonga), Nikolasi Fetaiaki Moeata Heni (Tonga), Jean Massenet (New Caledonia), ophie Julie Lartigue (New Caledonia), and Titie Afuhia I Vaha JR Kaufusi (Tonga).



Chair of the Pacific GIS and Remote Sensing Council,

Salote Viti.

The Pacific Islads GIS and Remote Sensing Council also held their Annual General Meeting during the event and officially accepted their 5-Year Strategic Plan. Overall, the 2023 conference was a huge success and was well-represented by the Pacific GIS and remote sensing user community!



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