CUSTOMIZED AUTOMATED MONITORING SOLUTION SET UP PROM AFAR

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SMART INTEGRATED WASTEWATER AND FAECAL SUUDGE MANAGEMENT GIS NATURAL COASTAL LAND-EXPANSION OFFERS HOPE TO LOW

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CONTENTS



05 EDITOR'S NOTE

INDUSTRY

06

CUSTOMIZED AUTOMATED MONITORING SOLUTION SET UP FROM AFAR

09

SMART INTEGRATED WASTEWATER AND FAECAL SLUDGE MANAGEMENT GIS

12 THE CALM AFTER THE STORM

RESEARCH

16

NATURAL COASTAL LAND EXPANSION OFFERS HOPE TO LOW-LYING BANGLADESH

INTERVIEW

19

TECHNOLOGY CONNECTING FARMERS TO A FRIEND AT HIGH HEAVENS - A TALK WITH ANKUR OMAR, FOUNDER OF FARMONAUT

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editor's note

eospatial technologies are designed to provide support systems and decision-making scenarios for most civic issues. 'What is available where' is an inbuilt characteristic of the gamut of Geospatial technologies.

One of the most critical civic issues during these pandemic times is the provision of Medical & Health Services for all citizens. An information system detailing 'Which hospital has what infrastructure' could have helped the administrator to better respond to the huge surge in the demand for health services. With the help of the information system, the administrator can plug the gaps that can constrain the health services from responding immediately and adequately to the seekers of these services.

We came to realize that timely and efficient health services can only be provided if there is a robust health infrastructure in place to support the huge demand for health services. Geospatial technologies, using comprehensive databases, can provide critical information regarding the availability of various health services, such as hospital beds, ICUs, ventilators, oxygen, medicines, ambulances, etc. for timely support to desperate seekers of these health services.

The above is an example of an extremely rare and emergent civic issue where Geospatial technologies could have played a vital role to provide succour to the citizen.

India has undergone a rapid change in the past decade with a strong emphasis on sectors like smart city development, urbanization, and implementing the e-governance system and digitization of workflows. All this will require solutions to various urban civic issues, such as the provision of utility services like electricity, water, and sewerage, public transport services, traffic management, sanitation optimization and waste collection, tax collection for revenue generation, storage & transportation of agriculture produce, etc. In all this, spatial knowledge has gained importance in India due to the large-scale implementation of projects and urban planning.

Geospatial technologies provide robust capabilities for spatial analytics and utility management that support solutions for various civic issues. Technologies like databases, machine learning, artificial intelligence, and virtual reality help citizens in data analysis and visualization that empower them to access various services in realtime, accurately. Extending these possibilities to the rural areas will integrate the population in accessing services of and for their needs.

> Ashok Prim Editor

INDUSTRY

CUSTOMIZED AUTOMATED MONITORING SOLUTION SET UP FROM AFAR

A new level of automation provided via remote set-up to address safety concerns.

by Mark Anderson



hile development of the Newcastle city center continues as scheduled, there are many construction projects underway or already completed within the vicinity of underground sections of the English city's rapid transit system. These projects often require careful monitoring of sections of the rail network.

Unique Challenges to Overcome

When one of the construction projects was ready to begin in Newcastle's city center, Gatesheadbased Academy Geomatics Ltd. was recommended to design and install an automated monitoring system for the metro tunnel that could be affected by the work overhead. A tailor-made solution was created to protect the in-service metro tunnel by addressing a unique set of challenges that included:

- Lack of access the site was within a live metro tunnel, so could only be accessed for a short period of time during the night.
- Limited space in previous locations within the metro tunnel, there had been insufficient room to install a total station so a laser scanning method was used on a weekly or bi-weekly basis.

About Author



Mark Anderson

Director Academy Geomatics United Kingdom However Academy Geomatics advised the client that during critical phases of the job, such as piling, more frequent measurement would be required.

- Requirement for client assistance

 the construction company undertaking the work would need guidance in both the system set up and understanding the automated results and long-term logistics for the site.
- Communications if data was to be transmitted from the tunnel, robust transmission of this data would be imperative with a possible requirement for 280m of fiber optic cable run through a vent shaft.
- Need for additional sensors the tunnel was a cast iron ring section, which means heat could trigger movement through expansion that would need to be recorded.
- COVID-19, cost and time restricting the number of site visits to an absolute minimum would be beneficial to all involved especially with these visits restricted to nighttime.

Tailor-Made Solution

Responsible for finding a solution to the site's complex demands was Academy Geomatics Ltd. director, Mark Anderson. Having previously managed metro monitoring jobs, Mr. Anderson included a 3D laser scan of the affected tunnel in his initial investigation of the site. The scan revealed that through careful positioning, there would be enough room within the tunnel to place a total station and consequently, Mr. Anderson was able to suggest two potential solutions to the client: one involving the total station and an alternative method using tilt sensors. The client elected to use the total station method favoring the ability to generate absolute displacement values over the extra cost of using a total station.

As a long-term user of Trimble



Figure 1: Information from a 3D laser scan was used for the best positioning of the 100 prisms.

equipment supplied by KOREC, a Trimble supplier, Mr. Anderson used both his own knowledge and that of the KOREC monitoring team to create a tailor-made system that would suit all of the client's requirements and the dictates of the site. His final solution comprised a Trimble S7 1" Total Station, chosen for its reliability, a KOREC supplied Trimble Settop M1 total station controller, back up battery and charger, and Trimble 4D Control real-time monitoring software (T4D). T4D controls the measurement rounds, manages and analyzes the data and alerts, and additionally allows for extra sensors to be supported. In this case, a temperature probe was attached to the M1 box because temperature would be an important variable to monitor due to the possibility of expansion of the tunnel's cast iron ring sections.

Maximizing Space and Time

A walk over of the site revealed there was sufficient mobile phone coverage to ensure seamless communication simply by placing the relevant SIM card in the Settop M1 box. Meanwhile, power was provided to the instrument via 150m of armoured cable that was pulled and then installed in cable trays - one of the most problematic parts of the project that involved the Academy team crawling under platforms. A walk over of the site revealed there was sufficient mobile phone coverage to ensure seamless communication simply by placing the relevant SIM card in the Settop M1 box. Meanwhile, power was provided to the instrument via 150m of armoured cable that was pulled and then installed in cable trays - one of the most problematic parts of the project that involved the Academy team crawling under platforms.

With communications and power in place, Mr. Anderson addressed the limited access times and limited instrument area by using the 3D laser scan he had carried out during an earlier visit. The scans enabled him to plan the exact position he required for the instrument's installation, to design and order a customised casing that would protect it for the duration of the project, that it would fit within the restricted area and additionally ensure full line of site to the prisms. The scan was also used to model Academy's set up of 100 prisms, a number dictated by the extents of the site and the piling plan. The scan confirmed the prisms would not be placed too close together, they were all visible by the Trimble S7 and were a safe distance away from the tracks. By carefully

planning their locations in advance, Mr. Anderson could make best use of his limited time in the tunnel.

Automated Set up – Safe, Efficient and Cost-Effective

Over the course of one night, KOREC monitoring expert Julian Gray remotely configured the Trimble M1 Settop box, without the support of on-site staff, to get the monitoring system fully operational - all from the safety of his home office. Not only did this ensure the system was up and running almost immediately and was operational by the next nightshift, it also removed the need for access to the tunnel, additional travel expenses and the cost of having KOREC personnel on-site during the five night shifts. This was also the safest method possible during the pandemic.

Maximizing All the Benefits of Automated Reporting

The T4D software program was set up by Mr. Anderson to include automated alarms for any movement outside the predetermined tolerances along with automated reports, analysis charts, and custom and composite views. All the information and visuals were designed for clear and easy interpretation of the tunnel's behaviors by the client via T4D running on Academy's server through the web portal.

For Mr. Anderson, it was important that the client understood both the long term logistics of the site and how best to interpret the data. A project-specific guide was therefore created, which outlined how to use T4D by highlighting the various functions and best practices when viewing the data and also pointing out some of the better analysis charts to look at and the rationale behind them. Daily and weekly reports would also be issued automatically to interested parties via email. The automated alarms, if triggered, would report via email and SMS (text) to all relevant parties so site movement could be investigated in a timely manner.

Figure 2: A project specific guide was created for the client to ensure best practices.

Mr. Anderson reported the system was up and running, and fully tested in preparation for before the beginning of the construction project. The system delivers unrelenting and constant monitoring (rounds every 30 minutes) with live data reassuring the client that their building activity is not unduly affecting the tunnel and therefore the safety of passengers. The system will deliver exactly what the client and Nexus (who provides, plans and promotes public transport in north east England) specified for this complex project.

Side Bar: Settop M1 – Communicating New Levels of Automation

The M1 total station controller has recently been relaunched with new software and is an extremely robust communication hub. When combined with Trimble 4D Control (T4D) software, the Settop M1 enhances the operation of a Trimble total station, combining the functionality of a field computer, device server, router and remote switch all into one device. This streamlines the number of components needed in the field and provides a level of remote installation unrivalled by any other system.

Remote installation greatly improves site safety and also significantly reduces set up costs that can be factored into tenders in order to be



Figure 3: Key components - (Top) Trimble S7 Total Station and (Bottom) the Trimble Settop M1 controller.

strongly competitive on price with no compromise to service. Additionally, KOREC's Julian Gray has developed software to feed total station raw data directly into 3rd party monitoring software as well as T4D making it a viable solution for all.

SMART INTEGRATED WASTEWATER AND FAECAL SLUDGE MANAGEMENT GIS

GIS provides an opportunity to increase the sustainability of the planning and decision-making process of smart wastewater and faecal sludge management.

by Ashwanii Rawat



or a majority of the populace in low and middle-income countries, on-site sanitation is a way of life. When talking about equitable access to sanitation, including emptying, collection as well as transportation for accumulated faecal sludge, major challenges arise. One can surmise that there is a lack of comprehensive information regarding service coverage by mechanical faecal sludge emptying service providers.

Sludge collection systems for faecal matter are different from traditional vehicle routing and even solid waste collection systems in terms of the various dynamic collection points, the urgency of service as well as the diversity of demand. Owing to the varied conditions, authorities continue to face proper networking and management problems.

While on-site sanitation provides a more affordable and sustainable option to sewer-based sanitation when you look at it as a standalone solution or in combination, however, there continues to be a lack of sustainable management of faecal sludge. If not emptied, collected and delivered to appropriate treatment centres, there are serious repercussions for public and environmental health as well.

About Author



Ashwanii Rawat Co-Founder & Director Transerve Technologies Pvt Ltd Panaji, Goa India

Hence, emptying, collection, as well as transport services, are critical to citywide faecal sludge management, ranging from household-level users to treatment for resource recovery and safe end use or even disposal.

While providing good sanitation is the responsibility of public authorities, yet private service providers also play a key role in faecal sludge management, thus to this end cooperative publicprivate partnerships are essential. The use of logistical tools and IT for the analysis of emptying services in low and middle-income countries is limited, hence utilising spatial data that is embedded in GIS for evaluation, visualisation and optimisation of the logistics of waste collection systems, can help in better management of many aspects of faecal sludge management.

Using innovative methodologies and tools for analysing faecal sludge management, can help in optimising faecal sludge logistics at a citywide scale and increase access to equitable sanitation services. Analysing spatial data can be useful for reducing travel time and transport cost, that helps in reducing the overall cost for sanitation provision. Factors such as route analysis, road network modelling with the help of hypothetical data for faecal sludge emptying, collection and transport can be managed with the help of GIS tools.

Benefits of employing GIS analysis as

a component of wastewater and faecal sludge management planning includes:

• **Providing Access to Sanitation**: The identification of areas that lack adequate access to sanitation can help in facilitating priority intervention by local municipalities in order to increase the equity of coverage of service.



Figure 1: Image of faecal sludge being collected.





3

INDUSTRY

- Identification of Underserved Areas: Enabling identification of areas from where manual or mechanical private entrepreneurs can increase the provision of service in a profitable manner, and thus helps in increasing access to faecal sludge management.
- Foreseeing Future Demand: Rapidly growing high population densities can be located, which require an increased provision in service.
- Locating Service Areas: Areas that are located outside of the boundaries of municipalities, which are being served by treatment plants that are within boundaries can be located.
- Optimisation of Locations: In order to reduce transportation costs and impacts on traffic, the siting of treatment plants and transfer stations can help in optimising transport distances.
- Characterization and Quantification of Sources: Understanding sources of faecal

sludge, that can be then combined with other tools in order to enhance the accuracy of quantification characterisation for then appropriate designing.

GIS provides an opportunity to increase the sustainability of the planning and decision-making process of smart wastewater and faecal sludge management by increasing access to service provision. Not only this, but it can also help in optimising usage of existing infrastructure as well by improving upon service delivery, management and monitoring by the introduction of technological interventions such as IT enabled single view window system, GIS in the planning and operations, customised MIS modules etc.

Furthermore, laying greater emphasis on private participation for technology partners leading to exposure of various treatment module innovations including developing GIS-based containment user data-based, GPS enabled desludging operations and monitoring systems etc. is the way forward for smart integrated wastewater and faecal sludge management and creating a sustainable ecosystem.

About Transerve

Transerve Technologies Pvt. Ltd. is a technology leader in the field of location-intelligence for effective decision making. Having been acknowledged as a top emerging and innovative company by NASSCOM and Deloitte, its spatial platform Transerve Online Stack is now being leveraged for large scale social impact by various government departments.

Transerve's expertise lies in managing, analyzing, and visualizing Big Data for enterprises. Leveraging Transerve's capabilities, users can design forms, collect information on the ground at a large scale with location-integration, manage, analyze, and publish it online. The platform has been empowering customers in segments like real estate, market research, FMCG, government, agriculture, , smart cities, land records, environment and forests, social development, and census. To know more visit www.transerve.com



Figure 3: Pictoral representation of the Faecal Sludge Management Process.

THE CALM AFTER THE STORM

Technology and Teamwork Facilitate Rapid Recovery from a Major Flood.

by John Stenmark



he rain hit on an early summer Friday in June. A freakish storm, later described as a once-in-500year rain event, dropped more than 7 inches of water on central Michigan in just 36 hours. The storm was concentrated over a relatively small area. Midland County, home to roughly 83,000 people, was hit especially hard.

Near the city of Midland, the Tittabawasse River quickly rose to flood stage and beyond. Only a day after the rains started, the river crested at 32.15 feet, more than eight feet above flood stage and the secondhighest level in more than 30 years. In less than two days, the river flow jumped from 3,200 cubic feet per second (cfs) to more than 39,000 cfs. The flooding inundated homes, businesses and infrastructure, inflicting millions of dollars in damage.

The county's roads were hit especially hard. By Saturday morning, the Midland County Road Commission (MCRC) had closed roads in more than 120 locations throughout the county. The reasons for closures emphasized safety and ranged from standing water to washouts, damaged pavement, and loss of culverts and drainage structures. The MCRC needed to act quickly to assess the damage and get repairs underway. The effort included

About Author



John Stenmark

Writer and Consultant Email - john@stenmark.us identifying areas requiring immediate attention and developing plans for temporary or permanent repairs. The amount of urgent work was overwhelming.

Rapid Response

"On Monday morning, we took stock, prioritized the damage and determined which roads we could open with minor repairs," says MCRC Managing Director Terry Palmer. "There were over a dozen water crossings that would require more major repairs—which is when OHM Advisors called and offered to assist. They had a team ready to assess our crossings and start the process of obtaining topographic data for the major failures."

A Michigan-based firm providing architecture, engineering and planning for clients in the public and private sectors, OHM Advisors employs more than 500 people in 16 offices across three states. Craig Schripsema, manager of OHM Advisors' office in Midland, deployed the firm's survey teams to the affected area.

"We work alongside Midland County on many projects," notes OHM Advisors Survey Practice Leader Ray Lillibridge. "We don't offer typical solutions; we bring forth the best solution customized for the county and not what's most profitable for us. That approach to innovation really helped strengthen our partnership."

By Monday, the county emergency services were in the field identifying washed-out bridges and culverts. The locations were marked on a paper map at the MCRC office. Lillibridge quickly added the locations to a GIS application so the information could be readily shared among OHM Advisors' teams.

"Once we started plotting known washouts, we were logistically able to create a plan of attack," he adds. "We knew a couple of sites had no access, in which case we had to wait for the county to bring in temporary solutions." On Tuesday morning, two OHM Advisors field crews began surveying the damaged areas. They needed to gather data that would enable their engineers to evaluate the damage and develop plans to repair or rebuild the sites. In addition to often-circuitous routes to the sites, the two-person field crews faced soggy conditions and unstable, potentially dangerous slopes near the edges of the washouts. Lillibridge determined that the best and safest approach to guickly producing accurate information would be a blend of field technologies, including unmanned aerial systems (UASs), GNSS and total stations.

At each site, OHM Advisors surveyors conducted a quick walkaround before setting ground control points (GCPs) for the aerial imagery, marking the points with chevron targets. The crews set a minimum of four GCPs at each site, placing two on each side of the washout. One point was set as close as safely possible to the washout, and the second on the road up to 400 feet away.

OHM Advisors captured the location of the GCPs using Trimble R10 GNSS receivers with Trimble TSC3 controllers running Trimble Access software. Connected by Network Transmission via Internet Protocol (NTRIP) to the Michigan DOT realtime GNSS network, the R10s produced precise positions for each GCP. The R10 delivered coordinates tied directly to the required Michigan state plane coordinate zone.

"We can connect our R10 receivers to the MDOT network anywhere we have cellular coverage," adds Lillibridge. "That way we can be confident everything we collect can be used in the future."



Figure 1: Shaffer Rd Culvert - An aerial image reveals the damage at Shaffer Road. The washed-out culvert is visible to the right of the road.



Figure 2: Photo and Model - An orthomosaic image was combined with a 3D model of damage on Shaffer Road. Permanent repairs were completed in less than three months.

At each site, the crews used GNSS to collect a handful of checkpoints needed to verify the accuracy of the aerial data. With control in place, OHM employed a DJI Phantom 4 Pro to capture aerial imagery. Where vegetation prevented aerial work, they used a Trimble S7 total station to capture details of the washout. On average, the crews spent roughly one hour surveying at each site and completed 12 sites in two days.

"Those were long days," recalls Lillibridge. "Once we were actually on a location, things went quickly. It was the logistics of getting between the sites that presented a problem. At some places, we had to go miles out of our way to get back into the other side of the sites."

During the next week and a half, the county identified an additional six sites that had been compromised. OHM Advisors crews surveyed them as well.

Integrating Data

software.

At the end of each day, Lillibridge downloaded each site's photos (roughly 60 images) to Esri Drone2Map for ArcGIS software. The GNSS data for control and checkpoints was exported in CSV format directly to the Esri software, which produced a georeferenced point cloud. Lillibridge then transferred the point cloud to Trimble Business Center (TBC)

"We're familiar with TBC for pointcloud manipulation, so we were able to clean up the clouds and pull contours," he notes. "Then we exported all of that to Civil3D. Our workflow is such that no matter where the data was coming from, our CAD technicians would see the same thing and have the same thing to manipulate, whether it was from the drone software or TBC as GNSS points or total station points. Once it gets to the CAD techs, it looks identical."

Because TBC supports all common industry data standards, transfers were accomplished via simple "drag and drop" of project files. Lillibridge also used TBC to check the accuracy of the aerial work.

"For this project, our tolerance was 0.15 feet vertical," he says. "But I cannot recall any being over a tenth in vertical difference. These projects hit their checkpoints with minimal error."

Preparation of deliverables moved quickly. OHM Advisors' inhouse engineering teams reviewed the field data and developed plans for rebuilding or replacing damaged structures. The firm had previously worked with the county to develop a design for a Geosynthetic Reinforced Soil-Integrated Bridge System (GRS-IBS), which provides flexible designs with low maintenance. They provided sizes for the replacement bridges, and the county's contractors could then mold the road to fit the structure. As a result, aside from reverifying the control, OHM Advisors didn't need to provide any construction surveying.

Visual Confirmation

As construction wrapped up, OHM Advisors used the opportunity to incorporate the Microsoft HoloLens 3D mixed-reality headset. To do this, they exported design models from TBC to Trimble SketchUp software. Next, they used Trimble Connect to load the design data polylines into HoloLens



Figure 3: Road Plan - A road repair plan was developed from aerial image data.



Figure 4: DTM in TBC - OHM Advisors used Trimble Business Center to manage and exchange data with GIS and CAD software to create a 3D model of a road washout.

along with a decimated version of the original washout surface model. In the field, they used Trimble Connect to orient to the site. They could then visually compare the finished conditions with the original surfaces.

OHM Advisors also used HoloLens, SketchUp and Trimble Connect on other projects, primarily for preconstruction design and conception. For example, they recently did a project for a community firefighter memorial. The client wanted to see how planned flagpoles impacted the park site and how the monument sizes would fit the park. OHM Advisors experts visited the site with local officials, each using the HoloLens to visualize the finished project. The design work was done using Autodesk products and loaded into Trimble Connect for the field visualization.

In reviewing lessons learned from the Midland County flooding, Lillibridge said the effort confirmed what OHM Advisors has been doing. The approach of using UAS to supplement traditional survey methods proved to be stable and efficient.

MCRC's Palmer emphasized the speed of the work. As the floodwaters receded, the commission set a goal to rebuild and reopen four key sites by the end of the year. Palmer said they completed the structure replacements with new GRS-IBSs designed by OHM Advisors.

"With minimal direction, they prioritized the areas to obtain data, collected data on multiple sites in one day and began delivering topographic data to the engineering design team in less than 72 hours," notes Palmer. "We then authorized data collection at additional sites, and that information was delivered within three days. This allowed the engineering team to accurately assess the cost to restore nine road crossings, making our applications for emergency funds faster and more accurate."

Lillibridge credits OHM Advisors' multiple technologies as the key to



Figure 5: GIS Map of Damage Locations - Yellow dots indicate the locations of road damage. Four critical locations were designated for high-priority repairs and reconstruction.



Figure 6: GIS Map of Damage Locations - Yellow dots indicate the locations of road damage. Four critical locations were designated for high-priority repairs and reconstruction.

success. "Using a mix of technologies and methods is really beneficial in emergency situations," notes Lillibridge.

"A lot of people think traditional surveying is sufficient. But from a safety perspective, that's not the best way. You can keep your personnel out of harm's way, and because of the built-in efficiencies, you're able to provide solutions much faster than with traditional methods."

"It was really interesting on the HoloLens to see the base surface from when the washout occurred," adds Lillibridge. "The original data looked like a cliff in the new road where the washout had been."

RESEARCH

NATURAL COASTAL LAND EXPANSION OFFERS HOPE TO LOW-LYING BANGLADESH

The study cashes in state-of-the-art cloud computing technology – Google Earth Engine (GEE) and publicly available satellite data.

by Kabir Uddin, Kundan Shrestha, Rajesh Bahadur Thapa



angladesh is one of the most densely populated countries in the world – almost three times as dense as India. Naturally, land is an invaluable, limited resource and a productive asset which provides not only habitat but also sustenance and livelihoods. Alarmingly, with rising temperatures, around 40% of productive land in the southern coastal region of the low-lying country is likely to be submerged by 2080. This would mean that rich coastal biodiversity would be engulfed by the Bay of Bengal, and entire communities - and their homes, livelihoods, and way of life would be displaced, putting further pressure on the country's limited land and resources. However, a serendipitous natural phenomenon could offer some respite for Bangladesh's coastal population and environment: gradual land expansion over decades in the coastal regions.

About Author



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How Are These New Land Areas Forming?

This land expansion throughout Bangladesh's coast is caused mostly by natural processes. Major rivers from the Himalaya such as the Brahmaputra, Meghna, and Padma carry around one billion tons of sediment and deposit it across northern Bay of Bengal through Bangladesh. These sediments accumulate in the estuaries of Meghna River, causing significant changes in the bay's morphology and giving birth to new lands. Human activities such as the diversion of river water, extraction of sand, and infrastructure development could exacerbate these processes of deposition.

We studied this interesting

development – just another example of the complex interaction between mountains and oceans using multi-temporal satellite data over a 30-year period (1989–2018) and found that the coastal region is gaining significant land area through newly formed islands (called "char" locally) and the extension of the main land mass. Land expanded every year by an average of 20 km2 along the coast, totaling 592 km2 of new land in the three decades. To put this into context, this is almost double the size of the Maldives - another lowlying South Asian country.

From Muddy Barren Lands to Grasslands

Most of the offshore islands have formed in the estuary of the Meghna River. Among the quickly formed islands, Bhashan Char, Char Nizam, Jahajerchar, and Urir Char are prominent. When these islands were newly formed, they were muddy and barren. A field mission (under the Bangladesh National Geographical Association and led by Professors M. I. Chowdhury and Bir Protik M Shamsul Alam) in January 1977 to the newly formed Nijhum Island in Hatia reported sparse grass cover and no settlement. Considering salinity issues, groundwater was the only source of drinking water.

Today, a combination of coastal

greenbelt initiatives by the Ministry of Environment, Forest and Climate Change and other agencies, along with natural vegetation growth, has transformed some of these islands into



Figure 1: Coastal land expansion in northern Bay of Bengal (1989–2018): Dark green represents regained land area that is unchanged, light green shows gradual reformation into a new island area, and pink represents land area lost into waterbodies. The net gain in land for Bangladesh during this period was around 1.15% (590 km2). (Image: Uddin et al., 2020).



Figure 2: Study area: (a) a river that originates in the mountains drains into the northern Bay of Bengal, forming the largest riverine delta in the world; (b) study area comprised the Meghna estuary and Northern Bay of Bengal, represented by Landsat natural-color images (Image: Uddin et al., 2020).

grasslands with closed tree canopy cover. These efforts have prevented these new islands from being submerged in tidal waters or tropical storms. This has led to more settlements in islands. These newly formed islands are not suitable for agriculture in the early years of formation, but soil fertility can increase because of the silt transported by Himalayan rivers.

Managing the New Lands

What these new land formations mean for the Bangladeshi population is yet to be fully understood. Natural land expansion is expected to continue in Bangladesh, and the government has also been working on projects to reclaim land by taking advantage of the sediment flow. Increased land area could indeed relieve pressures on dense settlements, but the integrity and evolution of these new lands also need to be scientifically studied. Islands such as Bhola, Hatiya, Manpura, and Sandwip have experienced erosion in their northern parts. Soil erosion removes fertile topsoil and sedimentation can block inland river flow, disrupting navigation along rivers and causing floods. Bangladeshi settlements have popped up in new islands. The Government of Bangladesh has announced that it has built

embankments to protect against storm surges, along with cyclone shelters, hospitals, and schools. Monitoring, feasibility studies, and appropriate interventions are vital if Bangladesh is to make good use of these new lands.

Vegetation growth on the new islands is good news for their sustainability. Vegetation growth and plantation of native species on barren islands could support biodiversity, protect from coastal erosion, and help stabilize the newly formed islands. This needs to be complemented by government- and community-led plantation efforts to mitigate erosion and sedimentation.

Short- and long-term land use plans can be formulated by identifying priority areas of soil loss. The government can establish remote sensing-based monitoring systems to biannually provide projections of future morphological changes along the coast. This will help identify erosion-prone areas where settlements will be at higher risk and prioritize the allocation of stable zones for resettlement.

Baseline studies are needed in the high-risk areas to determine the actual sources of erosion on the ground and sedimentation load, and where interventions can potentially be most useful in reducing erosion rates. Earth observation can play a vital role in monitoring these coastal morphological and ecological transformations and planning for the resettlement, restoration, conservation, and management of these newly formed islands. With proper monitoring, planning, and development, these islands could be a boon from the Himalaya to the coasts of Bangladesh.

Technology Underpins Research in the Environment

The study cashes in state-of-the-art cloud computing technology – Google Earth Engine (GEE) and publicly available satellite data. ICIMOD and its partners in the HKH region have harnessed this technology in the **Regional Land Cover Monitoring** System (RLCMS) to operationalize the generation of land cover maps using a harmonized classification system on a near-annual basis. In developing the RLCMS, ICIMOD focused on collaboration and co-development with partner organizations to define different land cover typologies/classes, collect reference data samples, and validate results. Land cover maps for the HKH region spanning 2008–2018 have been produced under its SERVIR-HKH Initiative.



Figure 3: Tree plantation and ecological transformation across coastal areas by the Bangladesh Forest Department can help mitigate coastal erosion and stabilize the newly formed islands. (Photo: Kabir Uddin/ICIMOD).

TECHNOLOGY CONNECTING FARMERS TO A FRIEND AT HIGH HEAVENS

A Talk with Ankur Omar, Founder of Farmonaut

armonaut has been at the forefront of providing satellite data directly to the farmers through its award-winning developed mobile apps (Android and iOS) and web platforms and has monitored lakhs of hectares of farm lands nationally as well as internationally.

Farmonaut has experience working with and providing services to international corporations such as Sunpalm Australia, Troforte Fertilizers Australia, Agro drones Israel, Grupo Los Grobo Argentina, Godrej Agrovet, etc. Farmonaut majorly provides satellite-based crop health monitoring services as well as field mapping services to farmers and business partners through our own platforms, API, and website linking options.

We had a chance to have a small questionnaire with Ankur Omar, Founder of Farmonaut. He has shared some interesting insights about the motivation behind Farmonaut, and how farmers are using technology can apply fertilizers, chemicals, insecticides, pesticides, plant growth regulators, etc. only in those areas where the crop growth is not normal.

The questionnaire follows as...

GIS Resources - Tell us about Farmonaut and how the idea of Farmonaut incubated?

Ankur Omar - Farmonaut started in 2018 with a vision to bridge the technological gap between farmers and bring the latest state-of-the-art technologies in the hands of each and every farmer in the most cost-effective way.

When I experienced technology contributing to the agricultural sector first hand while studying Telecommunications at the Polytechnic University of Catalonia, Barcelona, the only thought that loomed large in my head was, 'Why not in India?'. This idea that was planted in December 2017, grew into what is now known as Farmonaut today.

GIS Resources - Give us a brief about products/ services offered by Farmonaut.

Ankur Omar - We provide satellite-based crop health monitoring services as well as field mapping services to farmers and business partners through our own platforms, API, and website linking options, wherein, farmers/business partners can select fields on the Farmonaut platform (android, iOS, or web app) and identify the regions of the fields at which the crop growth is not normal through satellite data. Business Partners can also integrate their existing platforms with our API to provide our satellite data to their existing user base. A Farmer can apply fertilizers, chemicals, insecticides, pesticides, plant growth regulators, etc. only in those areas where the crop growth is not normal.



Ankur Omar

Ankur Omar is a graduate from BITS Pilani Goa (2016) with B.E. (Hons.) Electronics and Instrumentation. He has published multiple grant receiving single-authored IEEE research papers, one of which he presented at the Cambridge university back in 2015.

He has been developing ag-tech solutions for the last 4 years and has co-founded two agri-tech companies : Farmonaut in 2019 and Kheti-X in 2020. Both the companies are bringing the latest technologies in terms of software and farm machinery in the reach of even the smallest farmer in India. Apart from this, farmers also receive vegetation water stress, evapotranspiration, and soil organic carbon data as well every 3-5 days through satellites on top of the weather forecast data from the nearest weather station. We also have the capabilities to provide uninterrupted crop health satellite data even during cloudy weather through synthetic aperture radar (SAR) sensors.

We have made geotagging farmer fields more streamlined and a faster process. Our interconnected app ecosystem facilitates our clients to map fields through our android app and monitor, manage, and access data of the mapped fields through our robust and advanced web app. This interoperability is a gamechanger for organizations that find it difficult to map and manage fields at a faster pace. On top of this field mapping, our advanced app ecosystem will provide the latest and continuous satellite data of all the mapped fields to the users to help them take farm-level actions well in advance.

GIS Resources - How are these products/services helping Farmers to have better crop yield, especially in India where the per-acre landholding is small in comparison to other countries in the world?

Ankur Omar - Farmonaut is not only using geospatial technology to give a detailed report out of the data pointers related to fields but also helping farmers to cut down on the investment required for healthy crop yield, and eventually enabling them to increase the yield. Even for a small-scale farmer, the cost of 1 month of satellite monitoring is less than what one bottle of fertilizer/chemical costs.

An Indian farmer, on average, spends between Rs. 41500 (550 USD) to Rs. 332000 (4300 USD) annually on each hectare of arable land. By using highly processed remote sensing results on Farmonaut, a farmer can save approximately 30% of the expense on chemicals, insecticides, pesticides, plant growth regulators, etc.

GIS Resources - Could you share a success story of a farmer with Farmonaut?

Ankur Omar - Viswamatha Farms has been using Farmonaut's Satellite-Based Crop Health Monitoring System since September 2019. In parallel to the natural farming practices, Viswamatha farms have also been referring to the satellite data provided by Farmonaut, to take field-level actions and minimize the efforts even further. Viswamatha farms own and cultivate pulses, millets, rice, spices, groundnut, ginger, vegetables, and fruits. The farm is situated in Andhra Pradesh, South India.

Quite often they get a profit three times the amount they spend on the crop through their natural farming practices combined with remote sensing data.

GIS Resources - What are the underlying technologies used by Farmonaut to deliver actionable insights for crop monitoring?

Ankur Omar - Since decades, researchers have been strongly

claiming and have proved that remote sensing can improve a farmer's productivity tremendously. Observing field changes through specialized sensors from space can reveal field information that is not perceivable through the human eye and can help them take preventive actions and manage fieldrelated jobs in a much easier way.

The easiest way to understand precision agriculture is to think of it as everything that makes the practice of farming more accurate and more defined when it comes to the growing of crops and raising livestock as well. One of the key components of this farm management approach is the use of information technology and a wide array of items such as GPS guidance, sensors, variable rate technology, GPS-based soil sampling, and most importantly a software component to help unify all these components. It can help us determine everything from what factors may be stressing a crop at a specific point to estimating the amount of moisture in the soil. This kind of data enriches decision-making on the farm.

GIS Resources - How Farmonaut sees the future of leveraging technologies such as Machine Learning, Artificial Intelligence, and Big Data in precision agriculture?

Ankur Omar - Farmonaut is already using all these cuttingedge technologies to provide detailed information about important crop parameters and environmental influences embedded within a single image available on the platform as a Hybrid Image. Farmers can assess meaningful data of 7 different satellite images into a single image and take farmlevel actions at even faster rates. With this proprietary developed image type, farmers get information about:

- 1. Locations with good crop health and water stress
- 2. Locations with bad crop health
- 3. Locations with bad water stress
- 4. Locations affected by clouds

All this information embedded within a single image. Users who want the high-level analysis (NDVI, NDRE, EVI, VARI, NDWI, etc.) can switch to the advanced version of the app just by a tap on the screen. Now we are sure, with time our farmers will be gaining more insights on using the technological advances in the agriculture industry and benefit the most out of it.

The technology for sure is going to evolve and we will touch some unidentified aspects of ML and AI.

GIS Resources - As a Founder of a start-up, what is your opinion about the Government of India's Start-up India initiatives?

Ankur Omar - It has certainly motivated young minds to put their energy into thinking out of the box and come up with mind blowing projects. The initiative is helping the youth to take risks and help our country in solving the untouched challenges with their talent and rigour.

BUSINESS

March 16 - June 15, 2021

TCarta Delivers Satellite-Derived Bathymetry to NOAA for U.S. Coastal Mapping Pilot

TCarta Marine, a global provider of marine geospatial products, has supplied the National Oceanic and Atmospheric Administration (NOAA) with satellite-derived bathymetry (SDB) validated by green laser altimeter data from the NASA ICESat-2 satellite for two U.S. shallow-water coastal areas. TCarta created products in the two project pilot areas to enable NOAA to test the use of SDB in shallow coastal zones. This provided updated bathymetry and infilled data gaps from traditional bathymetric measurement technologies, such as airborne lidar or marine sonar. The SDB data sets measured the seafloor to a depth of 20-25 meters, with validation using ICESat-2.

Bentley Systems Announces Acquisitions of sensemetrics and Vista Data Vision, Leaders Respectively in Software for Infrastructure Instrumentation and Sensor Management

Bentley Systems has announced its acquisitions of sensemetrics (agreement executed) and Vista Data Vision (closed), leading providers of software for Internet of Things (IoT) applications used extensively in infrastructure. sensemetrics and Vista Data Vision will expand the scope of the Bentley iTwin platform to add intrinsic IoT capabilities for infrastructure digital twins to incorporate real-time sensor data. By virtue of the resulting "infrastructure IoT" standardization, the full IoT ecosystem will finally be seamlessly accessible for IT/OT/ET integration, through infrastructure digital twins, to advance asset performance and to mitigate environmental risks.

Maptitude 2021 Released for Sales and Marketing Business Development

Maptitude 2021, a major release of the popular GIS (Geographic Information System) and mapping software, is available now. Maptitude provides a comprehensive solution for sales and marketing business development analysts in sectors ranging from healthcare, franchising, communications, logistics, retail, real estate, banking, consulting, and many more. Maptitude 2021 includes the most up-to-date and accurate data available that encompasses expenditure, geodemographic segments, gross domestic product, medical and banking locations, branded business locations, traffic counts, building footprints, address points, financial assets and the tools to leverage this information to improve the location intelligence of any organization.

Bentley Acceleration Initiatives Acquires Indian Project Controls Specialist Nadhi Information Technologies

Bentley Acceleration Initiatives has announced the acquisition of Chennai, India-based Nadhi Information Technologies Pvt. Ltd., a specialist in project controls, analytics, and decision support for construction supply chains. Nadhi serves some of India's leading construction sector participants, including contractors Larsen & Toubro and Kalpatary Power Transmission Ltd., real estate developers Mahindra Lifespaces and RMZ, and owner-operators DMRC (Delhi Metro) and Welspun Enterprises. Founded in 2008. Nadhi was incubated in the IIT Madras Research Park with advisors from the IIT Madras Building Technology and Construction Management faculty and the Lean Construction Institute.

Pix4D Launches Survey-grade 3D Modeling on Mobile Devices with RTK Accuracy

Pix4D has announced the commercialization and worldwide exclusive distribution of the viDoc RTK rover, enabling ground-based RTK-grade 3D scanning with iOS mobile phones and tablets through the Pix4Dcatch app. The viDoc RTK rover, synchronized with Pix4Dcatch, geotags the images of a 3D scan in real-time, while connected to any NTRIP service. Extensive research has revealed that it is possible to achieve 3D models with an absolute geolocation accuracy of less than 5 cm.

Bentley Systems Announces Acquisition of Mobility Simulation Leader INRO

Bentley Systems, Incorporated has announced the acquisition of INRO Software, a global leader in multimodal transportation planning, traffic simulation, and mobility visualization software. The acquisition expands Bentley's capabilities in the important growth area of mobility digital twins, just as countries including the U.S. are poised to make a generational investment in infrastructure, and as transportation systems must evolve faster to accommodate both urbanization and carbon reduction goals, and the transition to electric and autonomous vehicles.

HERE Appoints Jason Jameson as Senior Vice President (SVP) and General Manager for Asia Pacific

HERE Technologies, the leading location data and technology platform, has announced the appointment of Jason Jameson as Senior Vice President (SVP) and General Manager for Asia Pacific. In his new role, Jameson will be responsible for identifying opportunities for customers, partners and developers, across industries, and will leverage the power of location to solve business problems. Jameson is replacing Stanimira Koleva who left HERE to pursue a new opportunity.

Dubai Municipality Announces Launch of DMSat-1 Atmospheric Monitoring Microsatellite Built by Space Flight Laboratory (SFL)

Dubai Municipality announced the successful launch and deployment of DMSat-1, an atmospheric monitoring microsatellite built by Space Flight Laboratory (SFL). SFL developed DMSat-1 under contract to the Dubai-based Mohammed Bin Rashid Space Centre (MBRSC) in the United Arab Emirates (UAE). The 15-kg microsatellite was built on SFL's space-proven Next-generation Earth Monitoring and Observation (NEMO) platform. SFL was selected to build DMSat-1 for its compact size and performance, including the missioncritical importance of attitude control and precise sensor pointing.

HERE Ranked No.1 in Strategy Analytics Benchmarking Report on Location-based Services

HERE Technologies, the leading location data and technology platform, secured the number one spot in Strategy Analytics' Location Based Services (LBS) benchmark report, confirming its leading position in the report for the seventh consecutive year. In its annual competitive assessment of global location platform market leaders, Strategy Analytics recognized HERE as the industry leader in automotive, industry growth vision, and openness. HERE also scored highly in map making and freshness, as well as making improvements in developer strategy and visualization.

New Pointly AI Training Service for Efficient Point Cloud Classification

Pointly recently introduced a new Al Training Service to extend their Pointly Service offering. This Service offers you not only automated and customer-specific classifications of point clouds but also tailor-made neural networks that are trained and tested with your data. Like this, automatic object detection in large point clouds becomes efficient and scalable, whereas the effort of manual annotation can be significantly reduced.

Esri Recognizes Avineon as a Cornerstone Partner

Avineon, Inc. is pleased to announce its recognition by Esri as a Cornerstone Partner. The announcement was made by Robert Laudati and Richard Cooke from Esri, during the closing session of the 2021 Esri Partner Conference, which was conducted virtually this year. The Cornerstone Partnership award recognizes organizations that have participated in the Esri business partner program for 20 years while demonstrating a commitment to improving the Esri and broader geospatial communities. Avineon has been working with Esri products since shortly after the company was founded in 1992. Avineon contributed to Esri's expansive growth by assisting hundreds of utility and government customers in implementing Esri products.

Amazon Web Services Becomes USGIF Strategic-Level Member

The United States Geospatial Intelligence Foundation (USGIF) is pleased to welcome Amazon Web Services (AWS) as its newest Strategic-Level Member. AWS is the latest company to join the growing list of USGIF organizational members and is its 27 th Strategic-Level Member, AWS is a leading cloud platform, offering over 200 fully featured services from data centers globally. Many enterprise and government customers use AWS Cloud to transform their organizations and businesses. government customers use AWS Cloud to transform their organizations and businesses. AWS offers the most comprehensive and broadly adopted platform of services and features, which allow their customers to be more agile while reducing computing costs.

Golden Software Enhances 3D Functionality in Surfer® Surface Mapping Package

Golden Software, a developer of affordable 2D and 3D scientific modeling packages, has added new and enhanced 3D capabilities to the latest version of its Surfer gridding, contouring, and surface mapping software. New functionality available now, as well as capabilities in Beta development, are focused on making it easier for Surfer users to visualize, display, and analyze complex 3D data. The Surfer package is used by more than 100,000 people worldwide, many involved in oil & gas exploration, environmental consulting, mining, engineering, and geospatial projects.

Bentley Systems Announces New Bentley Education Program, Putting Students on the Path to Infrastructure Careers

Bentley Systems, Incorporated, (Nasdaq: BSY), the infrastructure engineering software company, has announced the Bentley Education program, which encourages the development of future infrastructure professionals for careers in engineering, design, and architecture. The Bentley Education program is initially available in the United Kingdom, Australia, Singapore, Ireland, and Lithuania, with plans to expand to the United States, Canada, Mexico, Latin America, and India by mid-summer. The program's student and educator entitlements allow no-cost learning licenses for Bentley infrastructure engineering applications and proven learnings through the new Bentley Education portal.

Virtual Surveyor Introduces Enhanced Stockpile Reporting in Drone Surveying Software

Calculating and reporting stockpile inventories are now easier and faster in the latest version of the Virtual Surveyor drone surveying software. Virtual Surveyor Version 8.2 allows users to accurately calculate stockpile volumes in drone imagery with just a few mouse clicks and then generate a professional PDF report detailing material tonnage and value.

Unity and HERE Collaborate On Real-Time 3D In-Vehicle Experiences

Unity the world's leading platform for creating and operating real-time 3D (RT3D) content, has announced a collaborative agreement with HERE Technologies, the leading location data and technology platform, to partner on developing nextgeneration embedded automotive HMIs with state-of-the-art, RT3D rendering capabilities. The collaboration will also extend to work on next-generation location technology for autonomous driving, simulations, city planning and digital twins.

CATALYST Collaborates with Amazon Web Services (AWS) to Deliver Geospatial Insights to Decision Makers

CATALYST is collaborating with AWS to take satellite-based earth observation intelligence to the mainstream business community via AWS Cloud. The CATALYST-AWS collaboration will deliver actionable geoscience analytics to users. CATALYST and AWS's disruptive approach will make geospatial information accessible, affordable and consumable across all industry domains to produce better business decisions and investments," said June McAlarey, President and CEO of PCI Geomatics.

Trimble Expands its Geospatial Automated Monitoring Portfolio with Worldsensing Geotechnical IoT Solutions

Trimble has announced the addition of a geotechnical portfolio to its geospatial automated monitoring portfolio through a collaboration with Worldsensing, a wireless connectivity technology provider and an industry-leading manufacturer of geotechnical IoT monitoring systems. The collaboration enables survey, geotechnical and structural engineers to seamlessly expand their monitoring business opportunities with a comprehensive solution that incorporates geotechnical and geospatial data. Data from a variety of geotechnical and geospatial sensors—from tiltmeters, piezometers and crack gauges to GNSS receivers and total stationscombined with wireless communication and robust software create powerful monitoring solutions. This provides unparalleled movement analysis to monitor infrastructure, buildings, structures, mines as well as landslides and natural hazards.

VeriDaaS Initiates California Statewide LiDAR Collection Project

VeriDaaS has announced that it has completed test flights necessary to begin its statewide California mapping project by acquiring high-density LiDAR elevation data on multiple areas of interest (AOIs). This data will be used for evaluation purposes by various state, federal and commercial stakeholders. In April 2021, VeriDaaS collected data at a minimum of 30 points per meter on a number of AOIs each with different terrain, vegetation and feature densities. These test flights will also be used to baseline sensor collection parameters to ensure the resulting data satisfies a wide range of use cases.

Seequent Appoints New CEO

Geoscience software company Seequent has promoted Graham Grant to Chief Executive Officer, following six years as the company's Chief Operating Officer. In a planned transition, Grant succeeds Shaun Maloney, who has retired after a decade in the role. Seequent provides innovative solutions to geoscience challenges in over 100 countries around the world.

Scottish Forestry Uses Bluesky Aerial Photomaps to Monitor Tree Health During Lockdown

Scottish Forestry, the government agency responsible for forestry policy, support and regulations in Scotland, is using specially commissioned aerial photography to help identify trees in distress. Trees are facing an increased threat due to pests, disease and climate change, and, as a result of social distancing regulations, Scottish Forestry was unable to undertake its usual helicopter inspections. To maintain its survey programme and help keep the forests flourishing, experienced foresters undertook desk-based studies using the latest, high-resolution aerial photography from Bluesky.

Bluesky 5cm Aerial Photography Reveals Hidden Parts of London

Southwark Council is using the highest resolution photography from Bluesky to inform frontline service provision and decision making across its planning, transport, housing and environment operations. The 5cm data offers previously unseen detail and feedback from users has already shown its applications for CCTV camera planning, investigation of 'beds in sheds' and the measurement of green infrastructure within the London Borough. The Bluesky aerial photography has also helped to operate during lockdown when site visits were not possible.

Airborne Snow Observatories, Inc. Takes Delivery of the All-New Cutting-Edge RIEGL VQ-1560 II-S LiDAR System

Airborne Snow Observatories, Inc. has taken delivery of one of the first in North America cutting-edge RIEGL VQ-1560 II-S airborne laser scanners, just as the ASO program at NASA pioneered the use of the first of RIEGL's dual laser scanner, the LMS-Q1560 in 2013. This new LiDAR system, with its doubled laser power and high pulse frequency, will allow ASO Inc. to far more efficiently achieve its needs to uniquely measure snow water across extensive mountain basins. Through coupling of RIEGL LIDAR, imaging spectrometer data, and physical modeling, ASO Inc. maps mountain snow depth, snow water , and snow albedo.

NEWS DIGEST

Intermap and TATA Communications Signed Agreement for 5G Network

Intermap Technologies has announced strategic agreement with TATA Communications. Intermap will initially support TATA's expansion of its 5G network in selected Indian cities. Intermap's turnkey and customizable products make the world's best 3D geospatial data accessible to non-expert users. They are scalable and sufficiently flexible to help address TATA's vast global ecosystem of geospatial requirements. The agreement is further expansion of Intermap into Asian infrastructure markets, with TATA Communications as its first commercial client in India. as well as continued work in the Middle East for a new public infrastructure client in Saudi Arabia.

Golden Software Enhances Grapher Package with Faster Run Times and Improved Functionality

Golden Software has announced significant upgrades to its scientific graphing package, Grapher™. The new version released is faster and offers a broader, more consistent selection of features across all plot types. Grapher is used extensively by scientists and engineers in oil & gas operations, environmental consulting, climate research, mineral exploration, and academic pursuits. The package offers deeper insights into diverse data sets, including chemical, physical, geologic and geospatial data, through 80 different 2D and 3D plotting types.

Bentley Systems Completes Acquisition of Seequent, Global Leader in 3D Modeling Software

Bentley Systems has announced the completion of its acquisition of Seequent Holdings Limited, for approximately \$900 million in cash (for a debt free business and subject to final working capital adjustments) plus 3,141,342 BSY Class B shares. When announcing its second quarter 2021 operating results (scheduled for August 10, 2021) Bentley Systems will update its full-year 2021 financial outlook, reflecting the inclusion of Seequent.

SIIS and UP42 Agreement Makes KOMPSAT Satellite Imagery Available on the Marketplace

SI Imaging Services (SIIS) of Daejeon, South Korea and UP42, have signed an agreement to make imagery from the KOMPSAT satellites available on the UP42 marketplace and developer platform. The deal includes high-resolution optical imagery from KOMPSAT-3 and -3A, and Synthetic Aperture Radar (SAR) data from KOMPSAT-5. KOMPSAT imagery is a valuable addition to the more than 50 geospatial data sets now available on the UP42 marketplace, including satellite imagery from five international organizations. UP42 users will find imagery from the Korean constellation complements other data products by offering diverse spatial and spectral capabilities, broad dynamic ranges, afternoon acquisition times, extensive archives, and attractive price points.

Animal Dynamics Adopts Centrik – 'The Management System of Choice for UAS Operators

Animal Dynamics, the bio-inspired engineering company, has adopted Centrik to manage all facets of its increasingly complex operation as the business continues to grow. Animal Dynamics occupies a unique place in the UAS sector, using flight mechanics found in nature to build efficient and robust products with a low environmental impact. The company is currently commercialising STORK, an autonomous cargo delivery system for military and commercial use, designed to reduce the need to deploy people in hazardous environments.

Pix4D Announces New Tokyo Office to Strengthen APAC Commercial Operations

Px4D is reinforcing its presence in APAC, moving its Tokyo office which opened in 2019 to Shibuya Jinnan to accommodate the expansion process. Pix4D will be working closely with its local partners to meet the growing regional demand for its photogrammetry and image analytics solutions. This office will also collaborate closely with the Pix4D Shanghai office to best serve China as well as other countries across Oceania, East, South and SE Asia.

Farmonaut Partners With GarudaUAV to Provide Drone-Based Remote Sensing Technologies for Farming in India

Farmonaut has come together with a leading Indian drone services company, GarudaUAV, engaged in aerial data acquisition, analysis, and reporting for the promotion of drone-based remote sensing technologies for farming amongst the farmers. Through this partnership, Farmonaut is working towards educating Indian farmers about the benefits of remote sensing technology in farming and promoting the use of drone-based crop health monitoring services to the farmers. Farmonaut will be providing the technological support for data processing, storage, and access, while Garuda UAV will be working on providing the drones, and allied inventory to make this partnership a success.

Unearth Joins Trimble's GIS Partner Program to Provide Greater GNSS Accuracy and Streamlined Data Collection for Users in Municipal Applications

Trimble has announced that Unearth Technologies, a provider of map-based project tools that help built-world industries to manage physical assets, has joined Trimble's Mapping & GIS Partner Program. Unearth's map-based project management software connects field and office teams by providing a unified platform for data collection and work management. As part of the program, Unearth has implemented the Trimble® Precision software development kit (SDK) to enable field teams to perform highprecision GNSS data capture in real-time, directly from their Android and iOS apps. With Unearth's centralized, map-based platform, project and asset managers across the U.S. have a simple way to digitize analog processes - saving time and money while providing a single system of ground truth for internal and external stakeholders. By integrating the platform directly with Trimble's highprecision systems, Unearth's map-based workflows make collecting highly accurate field data simple, enhancing precision in the placement and tracking of physical assets.

USGS Developed High-Resolution Imagery of Coastal Wetlands to Identify Vulnerable Marshes across the US

Scientists at U.S. Geological Survey (USGS) have developed a new technology and made available a new mapping resource to identify vulnerable marshes across the US. Scientist have used a combination of remote sensing and satellite technologies. These maps give crucial information to land managers and aid in the development of marsh conservation and restoration programmes without the need for costly and time-consuming site-specific studies. According to the USGS, marsh resilience can be assessed by measuring the ratio of Unvegetated to Vegetated area over a whole marsh system. A marsh system includes marsh plains, channels, ponds, and intertidal flats. The method is known as the UVVR (UnVegetated-Vegetated marsh Ratio).

Dewa and Dubai Municipality Sing MoU on developing a Geolocation Infrastructure Project in Dubai

According to the news in the Gulf News, as a part of the GeoDubai initiative, Dubai Electricity and Water Authority (Dewa) has signed a Memorandum of Understanding (MoU) with Dubai Municipality to cooperate on developing geolocation infrastructure project in Dubai. The MoU includes planning, designing, and managing development projects in the future between both the government entities in Dubai. The MoU also underlines the process and guidelines to share information and data to provide an inclusive, updated, and unified geolocation map for Dubai. It is believed that the MoU will help to develop a comprehensive and sustainable geolocation infrastructure as the highest international standards to support the decision-making process. The GeoDubai initiative designed, implemented, and managed by the Geographic Information Systems Center (GISC) in Dubai Municipality. The aim of GeoDubai is to provide unified and comprehensive base-map geospatial data layers of the Emirate of Dubai to its stakeholders. The geospatial map data, provided by GeoDubai, are meant to serve as a core platform for all stakeholders.

PRODUCT LAUNCH

March16, 2021 - June 15, 2021

NavVis IVION Core, a Reality Capture Platform that Adds More value to Buildings and Assets

Previously known as NavVis IndoorViewer, NavVis IVION Core is a reality capture platform for laser scanning and AEC professionals to manage their 3D scans with ease. NavVis IVION Core enhancements include multisite functionality, updated user management, and site coordinate systems for survey-grade geo-registration of data. With a refreshed look and new features and improvements, NavVis IVION Core makes mobile mapping workflows more efficient, speeds up model creation and delivery, and adds value to your data.

Phase One Introduces Next-Generation Aerial Systems: PAS 280 & PAS 150

Phase One, a developer of digital imaging technologies, has introduced its nextgeneration Phase One Aerial Systems (PAS). Among its many enhancements, PAS is now supported by the new iX Controller series which incorporates an Applanix GNSS-Inertial unit, making airborne mapping more efficient with the possible use of direct georeferencing. Designed for increased productivity in shorter flight time, the PAS 280MP is setting new standards in RGB largeformat aerial imaging in terms of image guality and return on investment. The high image capture rate of 2fps and 20,000-pixel swath combined with advanced blur control motion compensation technology ensures sharp image collection at high flight speeds.

SlantRange Now Available for DJI M300 Drones

Agriculture professionals can now use DJI Matrice 300 drones with SlantRange multispectral sensors to get quantitative plot-level analytics across your trials throughout the season. DJI Matrice 300 support is the latest development in our ongoing focus on bringing our industryleading analytics to research programs of all sizes. SlantRange's patented aerial phenotyping platform gives you access to accurate and specific trait measurements to improve your trial efficacy. With metrics validated in several crops across millions of plots, SlantRange data products are trusted by agricultural leaders worldwide.

A New Release of ArcGIS Earth

This is a major release for ArcGIS Earth on desktop, bringing users more capabilities for sharing data as well as configuration settings – from mobile, to desktop, to the organization portal. A new release of the ArcGIS Earth mobile app is also available now, with some minor enhancements. One of the biggest features added to ArcGIS Earth is the ability to manage and share configuration settings across the organization – including to mobile users. A new Time Span panel has been added in time slider settings; both feature service and image service are supported for this feature.

Virtual Surveyor Introduces Dropbox Integration for Easy Collaboration and File Access from Anywhere

Virtual Surveyor has introduced Dropbox integration in Version 8.0 of its popular drone surveying software. This means Virtual Surveyor users can now access their project files from anywhere while enjoying easy and affordable collaboration with team members and file sharing with external clients – even in low-bandwidth situations.

CATALYST Develops Automated Workflow for South African National Space Agency to Convert SPOT Archive to Analysis Ready Data

CATALYST, a PCI Geomatics brand, has delivered an automated workflow for the South African National Space Agency's (SANSA) Earth Observation Department to convert decades of SPOT satellite imagery to CARD4L Analysis Ready Data (ARD). The scalable workflow enables SANSA to prepare its entire SPOT archive for immediate analysis using the Open Data Cube, machine learning, and AI models. CATALYST's ARD workflow automatically converts optical satellite imagery into ARD measurements.

Hexagon Introduces HxGN Connect, a SaaS Workspace Enabling Seamless, Citywide Collaboration, Planning and Response

Hexagon AB has announced the introduction of HxGN Connect, a SaaS workspace for citywide collaboration enabling government agencies and other diverse organisations to share data and coordinate action for ad-hoc, routine and emergency situations. Hosted in Microsoft Azure, HxGN Connect provides a networked workspace and unified view of information within and between different entities. Participants can actively collaborate and securely share data as events unfold, overcoming the technical and political barriers that often result in missed opportunities, conflicting actions, errors and delays.

NovAtel Introduces GPS Anti-jamming Technology for Marine Applications

NovAtel has recently introduced GAJT-410MS GPS anti-jamming antenna for marine operations. GPS signals are susceptible to jamming, interference, and spoofing attacks, which is a growing thread worldwide for civil and military applications. An unprotected GPS signal reception results in poor accuracies. The GAJT-410MS protects civil and military receivers from interference, jamming and spoofing through dynamic protection on M-Code signals as well as GPS L1 and L2, Galileo E1, QZSS L1 and L2 and SBAS L1. GAJT uses an adaptive digital null-forming algorithm to identify interference and jamming signals, adjusting its gain on reliable satellite signals to maintain continuous positioning, navigation and timing. Its direction-finding capabilities enable to identify and locate source of jamming and spoofing attacks. GAJT mitigates interference and jamming by creating nulls in the antenna gain pattern in the direction of jammers. This process enables advanced anti-jam protection even in dynamic multi-jam scenarios. Whether intentional or unintentional interference, GAJT identifies and mitigates the threat to continuous positioning, navigation, and timing. GAIT is easy to integrate into new and existing fleets with legacy and modern GPS receiver compatibility.

Concept3D Introduces New 360° Map

Concept3D, a leader in creating immersive online experiences with 3D modeling, interactive maps and virtual tour software, has announces the launch of its latest product, 360° Map, which takes interactive mapping to the next level by creating true 3D models for significantly enhanced wayfinding, appearance and functionality. A major advancement from traditional 3D rendered maps which only allow the user to view a building or location from a single, fixed perspective, the structures, grounds, and even the trees in Concept3D's new 360° Map can be viewed from North, South, East and West, providing a realistic experience unlike any mapping system available.

Trimble Introduces VRS Now Correction Services to Norway

Trimble has announced the expansion of its VRS Now® correction services across mainland Norway and most outer islands. As part of an ongoing global correction service strategy, the company is adding over 400,000 square kilometers (156,000 square miles) to its European footprint, which now totals 2.5 million square kilometers (975,000 square miles). VRS Now delivers reliable, easily accessible, centimeter-level accuracy that is ideal for professionals in the surveying, GIS and mapping, construction and agriculture industries, as well as many emerging autonomy applications in the automotive and robotics industries.

Teledyne Optech Launches CZMIL SuperNova, a Bathymetric LiDAR Solution

The CZMIL SuperNova boasts the best depth performance and the highest green laser point density in its class. Introducing SmartSpacing technology for even and efficient point spacing, realtime processing capability for reduced post-processing time and configurable modes for maximizing performance in different water environments, the SuperNova provides a wide range of inputs for climate change modelling and is Ideal for inland water environments, base mapping for coastal zones and shoreline.

Esri's ArcGIS Insights Introduces New Cloud Data Warehouse Accessibility Features

Esri has announced its location analytics product ArcGIS Insights now supports connecting to cloud-native databases—Snowflake, Google BigQuery, Amazon Redshift, Microsoft Azure SQL, and others—that many organizations have been adopting for scalability, cost of ownership, and performance reasons. With cloudnative storage, these databases are now directly accessible for Insights users. Organizations can now easily analyze their GIS data and cloud-native databases together.

Topcon Positioning Group Announces the Newest Release of MAGNET 7 Software

Topcon Positioning Group announces the newest release of its suite of software for construction and survey professionals. MAGNET 7 is designed to utilize the strength that cloud-based connectivity can play in streamlining workflows through GNSS receivers, total stations, and other positioning tools and instruments, and addresses common needs to increase productivity, efficiency, and profitability levels across the job site spectrum. The software is also designed to improve accuracy while efficiently managing data and collaboration - in real-time with the project team. Enhancements in the field version of the software were made to improve 3D model support, reporting, and interactivity in working directly on a visual map. Additionally, there are improvements in data handling for large and complex 3D projects.

NEWS DIGEST

GEO EVENTS

July 12-15, 2021 ESRI User Conference 2021 Online https://www.esri.com/enus/about/events/uc/overview

August 24-27, 2021 FME International User Conference 2021 Vancouver, Canada

https://www.safe.com/fmeuc/

September 07 – 09, 2021 Commercial UAV Expo, Americas

Las Vegas https://www.expouav.com/

September 27 – 30, 2021 11th international Conference on Geographic Information Science Poznań, Poland https://www.giscience.org/

September 27 – October 2, 2021 FOSS4G Online https://2021.foss4g.org/

October 11-14, 2021 3D GeoInfo 2021 Online https://3dgeoinfo2021.github.io/

October 25-28, 2021 Northwest GIS User Group conference Yakima, Washington, USA https://nwgis.org/nwgis2021



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