

MAPS TODAY

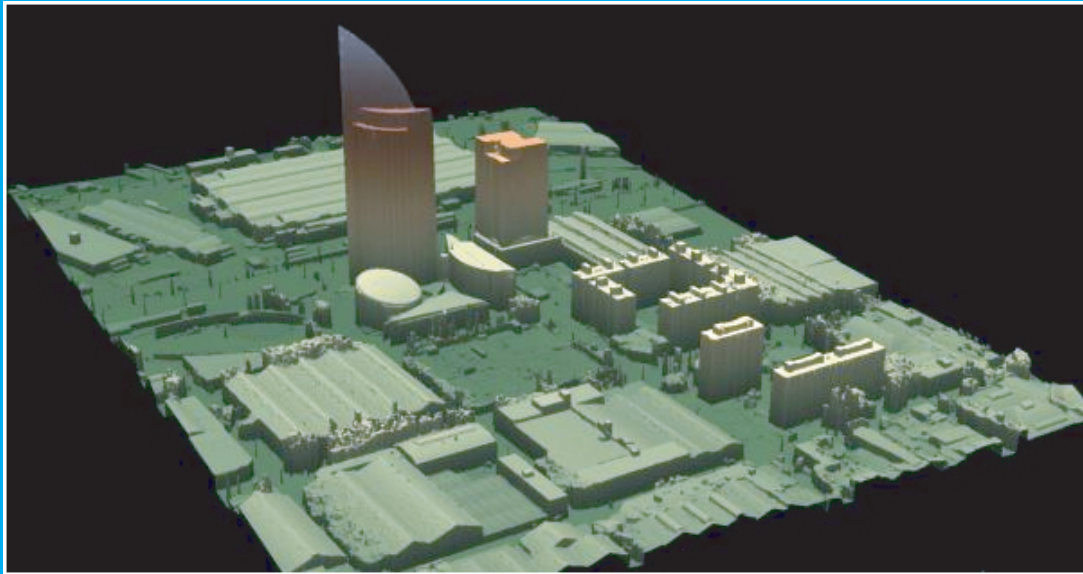
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September-October 2019

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DSM of the Antel Tower, Montevideo. (Details on page....12)



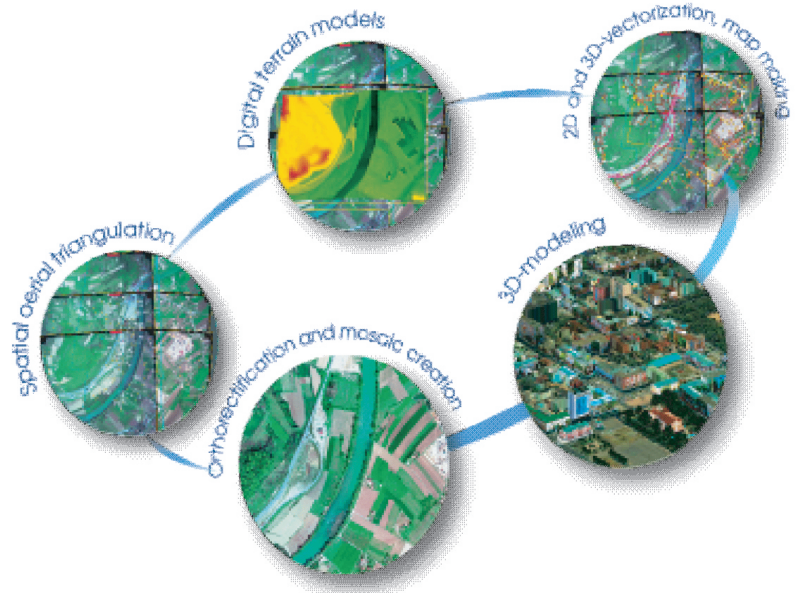
3 D model of Tokyo city (Details on page6)

Overview



RACURS, Russia

PHOTOMOD®



The PHOTOMOD software family comprises a wide range of products for the remote sensing data

photogrammetric processing. This state-of-the-art software allows the extraction of geometrically accurate spatial information from almost all commercially available types of imagery, whether obtained by film or digital cameras, [UAS](#), high resolution satellite scanners.

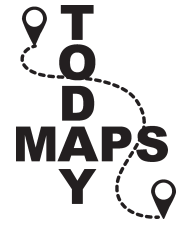
PHOTOMOD's flexible modular architecture and powerful import/export tools permit a variety of configurations: **Complete Digital Photogrammetric Workstation** (standalone configuration), high productivity distributed network environment for accomplishing large projects, complementary workplaces that can be used along with third-party systems to increase the overall productivity during the most time-consuming and labor-intensive operations like feature extraction and DTM creation.

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General questions: info@racurs.ru

MAPS TODAY

September-October 2019



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Editorial

This issue (September-October 2019) covers part one of the report of National seminar on Digital Technologies in Surveying, Mapping and Applications on 15 & 16 October 2019. Part 2 will be in next issue

Quote from Murali Mohan's Musings ".....it is once again loud and clear that the earth is being imaged at cm-level resolution and at will". Read about Survey of India's revolutionary project of Drone based large scale mapping in the country. Govt. of Uruguay undertook aerial photogrammetry to Support Sustainable Development covering 178,000 km² and took about 2.5 years. Read details in this issue.

Considering the latest trends we have included brief notes of the following in this issue.

ADRAM's Airborne Mapping System
3D printing of Tokyo city
Abstract of a property survey
"Title to property" in India
GIS in public health

Those with interest in Photogrammetry will find the concept of Rational Polynomial Functions (RPF) quite interesting.

On one side, applications of GIS i.e. Geospatial technologies are growing rapidly. But a long standing and reputed journal "GIS Professional" has closed down. Read the interesting closing last article by its editor. Bentley's answers throws light on emerging market trends in GST.

Under Students Forum, a brief report on special session for students at the national seminar on 16 Oct 2019 is included. As part of Map Awareness Programme (MAP) Question no. one is included. Prizes will be given for good submissions. More questions will follow.

Views of the authors of articles may not be shared by editors and members of Maps Today.

GIS Principles and Practices

By **GS Kumar**, former Director, Survey of India and Managing Editor, GIS India, Editor, Maps Today

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Essentials of GPS 2nd Edition

By **NK Agrawal**, former Director, Survey of India

Advisor – Geodesy & GPS

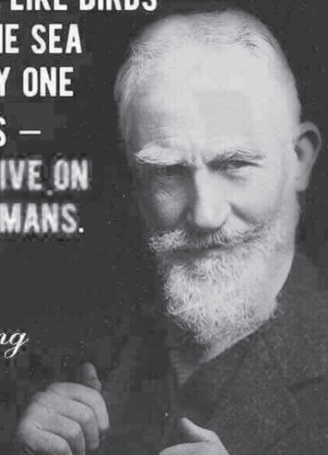
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NOW THAT WE HAVE LEARNED TO
FLY IN THE AIR LIKE BIRDS
AND DIVE IN THE SEA
LIKE FISH, ONLY ONE
THING REMAINS —
TO LEARN TO LIVE ON
EARTH LIKE HUMANS.
—GEORGE BERNARD SHAW

Good Morning



Declaration:

Printed by Maj Dr G. Shiva Kiran

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---- Editor **G.S. Kumar**

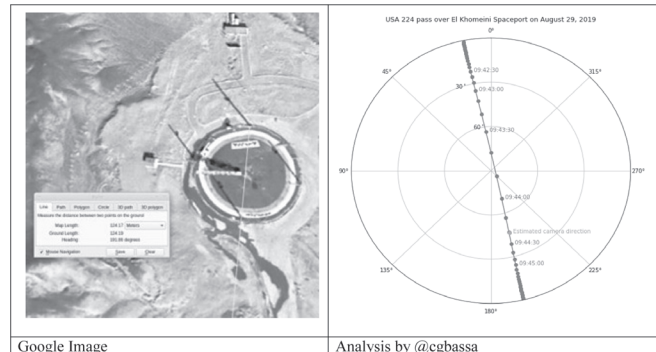
Mohan's Musings



Trumpage Tweets & Follow-up

Social media platforms have evolved and come to stay as a fixture in our daily life. Announcements such as individual's view points and policies of the Governments, besides the banter are hosted. However, it is not so common to find an intense technical discussion revolving around space imaging and involving a failed missile launch. The US president tweeted an image of the Iranian Safir launch failure.

The image is georeferenced, depicted the details of the aftermath of the disaster in very high resolution, nicely annotated, and composed in GIS environment. The Twitter community were astonished to see this kind of classified information and wondered if it was tweeted inadvertently. And then very interesting analytical tweets followed. Here is how the defining attributes pertaining to this image are dissected by tweeples.



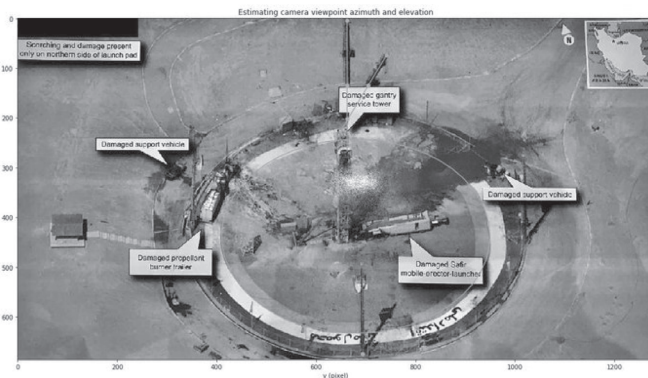
Google Image

Analysis by @cgbassa

quickly link the angle of the image to its imaging satellite. From the calculations and the deduced time of the photo, 9.44 A.M. UTC on Thursday, August 29, the satellite could be USA 224, an optical reconnaissance satellite.

Did Trump himself click it?

Trump appears to have taken the image of a printout with his phone. See the yellow line of the photographer with a camera in hand.



Elevation angle estimation:

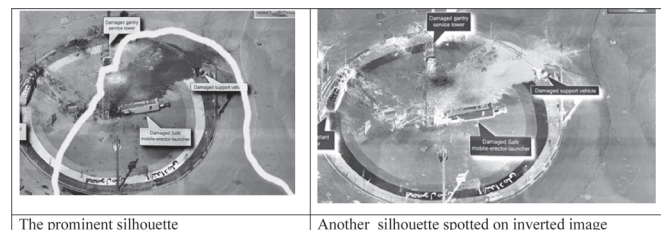
The elliptical shape of the launch pad – the red line drawn around the inner rim – the camera elevation is computed to be 46 degrees.

Camera azimuth computation:

There are 4 towers around the launch pad. Google Earth shows that the North and South towers are aligned along 192 deg azimuth. The camera azimuth is a further ~4 degrees West. From the elliptical shape of the circular launch pad, the elevation of the camera is around 46 degrees.

Which satellite imaged this?

The location can easily be read from the geographical coordinates as El Khomeini Spaceport. And then Astronomers Cees Bassa and Marco Langbroek could



The prominent silhouette

Another silhouette spotted on inverted image

How many lights were there behind Trump?

So there are atleast two light sources behind the President. In the inverted image, there are two outlines of the photographer.

What is the resolution of the satellite?

Google Earth gives the true dimensions of the facility in object space. Measure the same on the tweeted photo in pixels. It yielded close to 10cm. Quite likely that original resolution of the image could be much finer.

Keeping aside the implications of releasing such a high-definition image, it is once again loud and clear that the earth is being imaged at cm-level resolution and at will. The civilian world has presently access to one-foot resolution data. There comes a day in coming decades when the Governments release this kind of truly powerful spy satellite data to the public – like they did release Caronacoverage of 60s.

3D printed maps of Tokyo city

<https://www.lonelyplanet.com/articles/tokyo-3d-printed-map-city>

This company is creating incredible 3D printed maps of Tokyo city

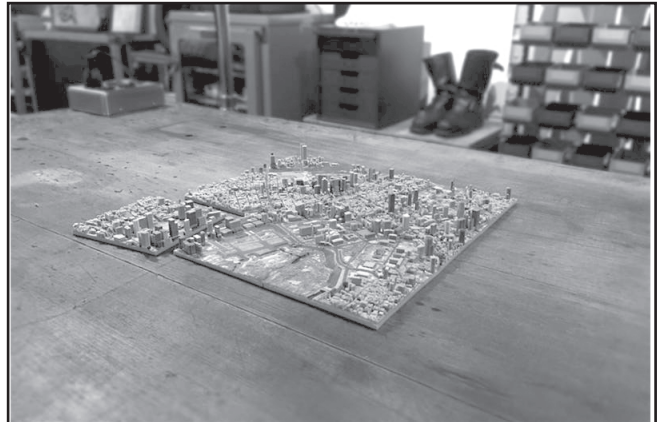
A Japanese company is creating incredible, miniature 3D-colour printed maps of Tokyo, featuring the most famous neighbourhoods of the city split up into small sections. While each of the segments is available separately, when combined, they form a one-hundred-piece scale model of the entire metropolis.



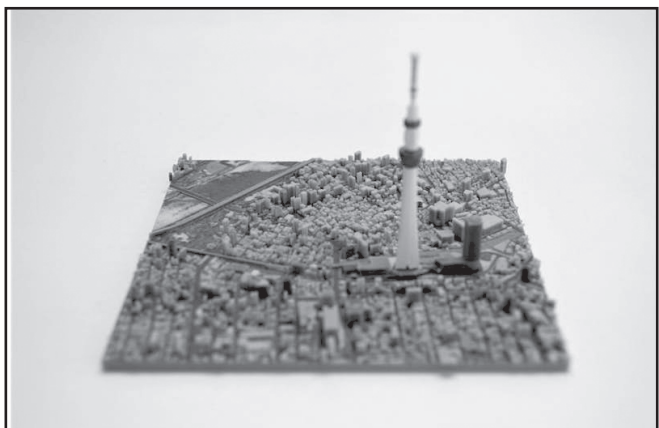
The One Hundred Tokyo project creates 3D colour printed sections of the city. Image by iJet

Created by 3D printing company iJet, the One Hundred Tokyo project is creating the miniature models based on information gathered by Zenrin, a company that provides data for Google Maps and Microsoft, among others. Each segment measures 100 x 100 millimetres, with the full set measuring 1000 x 1000 millimetres, creating an estimated 1 to 12,500 scale-model of Tokyo. After printing, the models are coated in a special resin that is then painted. Magnets are fixed on the reverse side of each piece, allowing them to be displayed on a variety of different surfaces.

The company is currently running a campaign on Kickstarter for funding and ordering. Backers can choose sections of their favourite neighbourhoods, with Shinjuku being divided up into four pieces, Odaiba being split into eight, while the popular central areas around Ginza, the Imperial Palace and Tokyo tower are each divided up into four segments that can slot together.



The entire city is made up of one hundred small segments that can be joined to make a complete piece. Image by iJet



The project is currently being backed on Kickstarter. Image by iJet

One piece currently costs \$95 under the backing programme, while a pledge of \$350 dollars buys four pieces, and a pledge of \$790 buys nine pieces. Those that just have to have the whole city of Tokyo in their homes can purchase it for the price of \$8,750. In addition to fulfilling orders, funds raised from the campaign will be devoted to developing and mass producing more 3D urban models.

The project aims to ship by November, with more information on backing One Hundred Tokyo available at their Kickstarter page.

Get inspired to travel everyday by signing up to our daily newsletter.

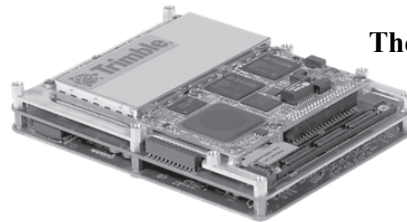
Air-borne mapping

ADRAM's Airborne Mapping System with DG from Applanix delivers professional grade mapping for ultralights

AMS is the only commercially available system worldwide that was designed from the ground up to be used in ultra-light aircraft (ULA), including gyrocopters...

Marcin Prochaska, R&D Director for ADRAM, says "From the start we designed the AMS as a "One Man Mission System" for an ultralight, meaning the pilot is also the operator. To fully realize the benefits of ULAs we had to get rid of an operator. Doing so saves more than 70 kgs of weight and means we can use passenger space for the mapping system." This design saves a lot of money for every airborne mapping project. To make it work, special design of the Flight Management System (FMS) was necessary.

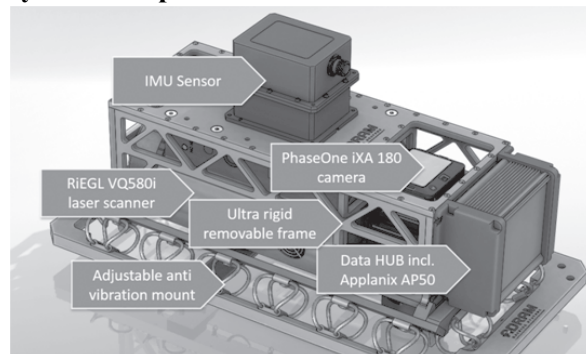
Prochaska continued, "We spent hours of research time discussing with several ULA pilots what information they need from an FMS and they kept answering "none" so we designed a pilot's interface to be as simple as possible. It has a clear map view and some simple status sensor views (IMU, camera and scanner). With this design the pilot is not distracted by unnecessary data. It's simple and effective." The system is removable, fitted in ultra-rigid frame. The frame keeps all sensors tight together and protects them. It can be easily moved from one aircraft to another. 3-years of research and development has culminated in the revolutionary ADRAM Airborne Mapping System onboard an ultra-light gyroplane. With low investment & operational costs, the AMS maximizes productivity and versatility in professional grade aerial mapping. AMS is an excellent cost-effective alternative to expensive fixed wing aircrafts and helicopters, and is highly competitive with UAVs. AMS integrates the Trimble AP50 GNSS-Inertial system for continuous mobile positioning and Direct Georeferencing (DG). ADRAM AMS can also be delivered together with full 3 axis stabilization, which is unique feature on the market.



The Trimble AP50

The Trimble AP50 is an embedded GNSS-Inertial OEM board set plus Inertial Measurement Unit (IMU) in a compact form factor. It is designed to give system integrators the ability to harness the best in GNSS multi-frequency positioning technology, with the superior capabilities of inertial data for continuous mobile positioning in poor signal environments, and for the orientation of imaging sensors

Payload Components



The AMS payload is customizable and upgradeable, meaning that any system component i.e. sensor can be replaced with newer and more advanced components at any time. The ADRAM Open Sensor Platform allows all kinds of set-ups with many sensor combinations including laser scanner, photogrammetric camera and 4 oblique cameras at once. It can also be easily equipped with a stabilized mount.

Results

For aerial imaging using a PhaseOne iXA 180 camera, high image sharpness and high dynamic range colors are attained with pixel up to 1 cm. With a Riegl VQ-580 laser scanner, up to 70 pts/m² and 100+ m range is attained. "The state of the art Applanix GNSS-Inertial system means the AMS delivers top accuracy and high density LiDAR data, even on snow and ice," said Prochaska. "Applanix is the word leader in DG, and DG makes this system the powerful mapping solution it is. Applanix is a wonderful partner. They have provided the excellent support throughout this process. The accuracy and performance of their technology is second to none. And their products are very, very reliable. It's been an excellent experience working with them." For more information on ADRAM please visit their website.

GIS - A New Direction?

24/10/2018

Valued reader,

It is with some sadness that I must inform you that this edition will be the final printed edition of GIS Professional. The difficult decision follows careful consideration by the publication's owners who feel that the geospatial industry requires a new fresh approach to content and marketing.

As maps have become more mainstream and accessible, GIS has become a less easy to define a field to explain to other non-GIS folk and to, therefore, promote as the discipline which it once was. At the same time however, locational intelligence has become of new frontier of opportunity for many industries and the geospatial knowledge and skills which our industry possesses has almost limitless potential. I therefore believe that GIS Professional is stepping aside in order to allow great new things to happen for the industry.

In terms of this final edition, we have, as always, some excellent content. This includes regular news and updates from across the increasingly satellite and data dominated geospatial world. Neil Brammall of Utility Survey Exchange shares his experience of participating in the recent NWG Innovation Festival, David Green of University of Aberdeen provides an interesting GIS-focused look on the Toll Road network in Scotland, while San Francisco's Mike Foster explains how the world has entered a 'Golden Age of Mapping' wherein new digital skills have become an essential prerequisite. In addition, we also have insights from our regular contributors Abigail Page and Adena Schutzberg.

To conclude, I would like to say that I have thoroughly enjoyed my time as editor of this well-respected publication and have endeavoured to bring new writers, new ideas and a new feel to the magazine. I would also like to thank our many readers, contributors, advertisers, and supporters, such as the AGI. Finally, a special thanks to GIS Professional's parent company, Geomares, for giving me the opportunity to work in this position. I strongly encourage you to follow their other excellent publications such as GIM International, Hydro International, Products4Engineers, and Geomatics World and/or to explore their unique marketing services.

We live in a very different world from when GIS



Niall Conway

Professional first began, one where change has become norm. However, GIS is more than just software, just as it is much more than any one publication. Rather, the discipline and its community represent a unique holistic way of thinking about the world and its challenges. In today's age especially, this way of thinking must be both protected and nurtured. If you would like to keep in touch, then please connect with me via LinkedIn.

This article was published in GIS Professional October 2018

The mystery of the Bermuda Triangle

Located between Florida, Bermuda and Puerto Rico, the Bermuda Triangle, also known as the Devil's Triangle, has seen a suspiciously high number of aircraft and ships that have disappeared under mysterious circumstances.



Many conspiracy theorists have hypothesized that the waters might contain the lost city of Atlantis, or perhaps, aliens - which have been blamed for the mystery swirling in the waters. However, years later, these theories have largely been disproved.

Geospatial industry



(Extracts from Editorial Notes)

**Durk Haarsma, Director Strategy & Business
development, Trimble**

<https://www.gim-international.com/magazines/gim-international-november-december-2018.pdf>

The November/December issue marks the end of the geospatial year at *GIM International*. We are concluding 2018 with a great variety of topics, ranging from the processing of photogrammetry and the classification of point clouds to 3D visualisations for support flood management and more. Also included in this edition are two articles on the application of UAVs, one on mapping a large copper mine and one focusing on spectral image mapping.

Inspiration

The geospatial industry is booming and there seems to be no reason why this success won't continue. Business is going well for a lot of geospatial companies, not just thanks to a thriving economy, but also due to the integration of workflows from what used to be separate silos.

During Trimble Dimensions, held from 5-7 November in Las Vegas, USA, there were numerous examples – in presentations, panel sessions and on the exhibition floor – of seamless technology that is making life easier for geospatial professionals. Moreover, this technology is putting professionals at the heart of the building process. Around 4,000 Trimble customers flocked to Sin City in the middle of the Nevada desert to witness the latest software that is rapidly changing their working environment and which will enhance their business prospects.

Trimble hosts the Dimensions event every two years and it is certainly a good opportunity to get an update on how the industry is evolving. The seamless workflow between surveyors, engineers and contractors is certainly one development that sticks in my mind. That, plus several inspirational speakers including management guru Josh Linkner and motivational activist Sarah Robb-O'Hagan, made me even more excited about new possibilities that lie ahead! It's great to feel so optimistic as we approach the end of another year. I hope you feel it too, and are eager to shape your business effectively to tap into the full potential of the combination of technology, economy and inspiration!

Extracts from Conference Proceedings 2017, Israel

Imagery to Digital Reality

Dear colleagues!

The geographical map is one of the major advancements that man has developed over thousands of years. We have come a long way from Ptolemy's maps to have our modern-day, precise, digital maps. Over time, scientists have created and developed many ways of obtaining of spatial information. More than 150 years have passed since the day French inventor Gaspard-Félix Tournachon took a photograph of Paris from an air balloon. This photograph started the phenomenon of remote sensing, which rapidly developed in the twentieth century and has continued to evolve in the twenty-first century. The appearance of the Earth's satellite imagery, new technologies of aerial survey, laser scanning, and the use of digital methods of data collecting and processing in real time have significantly changed our attitude to spatial information. These advancements, in turn, have led us to understand the necessity of development and to bring our annual conference, "From imagery to map: digital photogrammetric technologies," to a new level. This year, the name of our annual conference was changed to "FROM IMAGERY TO DIGITAL REALITY: ERS & Photogrammetry" in order to reflect current trends in visualization and use of spatial information. Digital reality is measured spatial information that is used in almost all directions of society's technological developments, be it land management, navigation, autonomous transport systems, smart cities, robotic technologies, and much more. Digital reality provides cartographic basis for the Internet of Things, and it allows building space-time models for sustainable development of society. This new conference name significantly widens the theme of the conference. We are sure that it will contribute to the growth of interest in Earth remote sensing and photogrammetry technologies, attracting new participants to the conference. We are hopeful that this year's conference will allow us to be more interesting and fruitful.

Sincerely yours,

the Organizing Committee

Large scale Mapping using Drones

(Based on new items in News papers and websites like : <https://qz.com/india/1567280/the-modi-government-is-using-drones-to-digitise-indias-maps/>)

The entire mapping community in India is very happy to know that Survey of India will be initiating large scale mapping in some States using Drone-based imagery. Surveyor General deserves appreciations for the revolutionary decision to undertake mapping on a large scale like 1:500 as reported in the news.



Presently 1:25,000 scale maps of SoI are the largest scale, that too covering about 60% of the country and most of them out-dated. It is well known that several individuals and Firms use SoI 1:25,000 scale (if available) map as base maps. Often they enlarge them to larger scales like 1:10,000. The planimetric accuracy limit of 1:25,000 scale map is 6.25 metres. When enlarged 2.5 times to 1:10,000 scale, the error could be about 16 metres, whereas accuracy of 1:10,000 scale should be about 2.5 metres.

In this back ground, mapping on 1:500 with drone based imagery is exciting news. As per reports, “Department of Science and Technology (DST), has signed agreements with 6 districts in Haryana, 2 in Karnataka and 2 in Maharashtra to undertake such drone-based mapping exercises. Every square kilometre mapped by drones will be encapsulated in 2500 pictures and thus be a trove of digital data”

Surveyor General Girish Kumar is reported to have commented “We’ve used aerial photography before for



GS Kumar,
Director, SoI (retired);
Editor, Maps Today

mapping purposes (taking pictures from planes) but that’s expensive and has its limitations. This is the right time to deploy drones,” He further says “A major consequence of the drone-based exercise will be the mapping of settled habitations in villages (called *abaadi* areas in legal parlance). Based on the availability of accurate maps, residents will finally be able to get property cards as well as proper legal titles to their lands. This is unprecedented in the history of independent India and we’ve already executed a project in Maharashtra

He is further reported to have said, “The aim is to map 75% of India’s geography— about 2.4 million sq km of the 3.2 million sq km — within the next two years. The organisation aims to procure about 300 drones — so far about 30 have been sourced — for the gargantuan exercise. However forests, hills and deserts are likely to be left out.

We ran a pilot in Maharashtra’s Sonari village. Based on our mapping, the government has already given land rights to the residents.

In future, we’ll have maps (in the open series) at the scale of 1:500 to around 1:10,000, because 1:50,000 is very coarse. We are doing projects with various state governments for developing maps on the 1:500 scale. These will form the basis of all planning purposes such as for smart cities. Technology is available, processes are available, it’s only that we need to move in a collaborative manner.

Some excerpts from the interview of Surveyor General, Survey of India on the net:

What ongoing projects do you have with the state governments?

We have signed memoranda of understanding with the governments of Maharashtra and Karnataka states. Both the projects cost around Rs70 crore (\$10 million). In Karnataka, we are using drones to digitally map five districts at first.

In Maharashtra, we are first mapping the *abadi* (residential) areas of around 40,000 villages. Every village has agricultural land and *abadi* areas. Nobody

owns property in *abadi* areas because they had never been mapped before.

We ran a pilot in Maharashtra's Sonari village. Based on our mapping, the government has already given land rights to the residents.

We are also in conversation with the governments of Haryana and Uttarakhand States. We are close to finalising a Rs150 crore project in Haryana. We will have a time frame of 15 months to map the complete state.

Urban areas have properties, but in rural areas the agricultural land is all divided into "parcels." Every parcel boundary will also be mapped in Haryana. This has never been done before. So we are gearing up the infrastructure accordingly. With the same resources and at the same pace, you can't do it. We need to have additional manpower and resources.

We also started a Rs300 crore project last year for the National Hydrology Project to map the major tributaries of five rivers including the Ganga in Uttarakhand, Uttar Pradesh, Bihar, and West Bengal states, going up to Bay of Bengal. It is a four-year project, but we are trying to finish it by 2021.

XXXXXXXXXXXXXXXXXXXXXX

We are also using air-borne lidar (a surveying tool which employs laser sensors). Now we'll go for drone-mounted lidar.

How a 250-year-old government department is digitising Indian maps using drones

<https://qz.com/india/1567280/the-modi-government-is-using-drones-to-digitise-indias-maps/>

The Survey of India is among the oldest institutions in the country.

Set up during the British colonial rule in 1767, and today under India's ministry of science and technology, the agency has been in charge of mapping the country's vast and diverse regions for centuries.

However, over the years, its maps haven't aged all that gracefully. After lagging in digitisation, it finally launched an online map portal in 2017. But the digitised collection has a primitive scale of 1:50,000—one centimetre on the map reflects 50,000 centimetres on the ground.

As India's economy grows at a rapid pace, the need for infrastructure development is also rising. And the ball is now in the agency's court to meet this demand with accurate and easily-accessible maps.

Lt Gen Girish Kumar, who heads the Survey of India, spoke with Quartz about the future of mapping and digitisation on the sidelines of GeoSmart India, an event held in New Delhi in February.



Using drones, AI and big data, India to draw up digital map with 10 cms resolution

<https://www.theweek.in/news/sci-tech/2019/09/17/using-drones-ai-and-big-data-india-draw-up-digital-map-with-10-cms-resolution.html>

India has initiated a project to digitally map the country with a resolution of 10 centimetres, using drones and technologies such as Artificial Intelligence and big data, a senior government official said on Monday.

The herculean task was taken up by the Survey of India, part of the Department of Science and Technology, a few months ago and is planned to be completed in two years, the department's secretary, Prof Ashutosh Sharma said.

"Now, we are equipping them [Survey of India] with the latest technologies like drones, artificial intelligence, big data analytics, image processing and continuously operated reference system," he told reporters on the sidelines of an event.

Once the project is completed, the data will be available to citizens and to gram panchayats and local bodies, empowering them to use it in decision making and planning process.

Institution of Engineers (India), Hyderabad in association with GeoMap Society are organising National Seminar on Surveying and Mapping on 15 and 16 October 2019 at Hyderabad. The organisers have already requested Surveyor General for support and participation. It would be in fitness of the situation if SoI makes a presentation on this Drone based mapping project. This will be the highlight of the event.

Uruguay Updates National Imagery to Support Sustainable Development

<https://www.gim-international.com/content/article/uruguay-updates-national-imagery-to-support-sustainable-development>

The last complete aerial photography collection effort in Uruguay was conducted in 1966-1967 to produce a national dataset at 1:50,000 scale. Only parts of the country have been captured since that time. In 2015, recognizing the multiple benefits of updated cartographic information to support future development, the Uruguay government, through the IDEUy (Infraestructura de datos espaciales de Uruguay), initiated a project to map the nation. Based on a thorough evaluation of the alternatives, including aerial photography, Lidar and satellite imagery, the IDEUy chose aerial digital cameras as the best technology to update the Uruguayan geographic dataset.

(this article is brought to you by Vexcel)

Project Attracted International Interest

This multi-million-dollar mapping project attracted the interest of aerial companies from all around the globe – Europe, North America and South America. Many companies visited Uruguay and presented their solutions to meet the specifications of the tender.

Ten foreign companies eventually submitted bids, and in early 2017 Topocart, an experienced Brazilian company, was announced the winner. Topocart presented the most attractive proposal incorporating the leading equipment at that time – the Vexcel Imaging UltraCam Eagle Mark 2, which offered a pan frame image footprint of more than 23,000 pixels across the flight strip and an exchangeable lens system.

“The excellence of the UltraCam Eagle M2 technology was fundamental for the success of the Uruguay project,” says Givanildo Silva, Technical Director, Topocart. “Not only the hardware components, but also the UltraMap processing software suite, which delivers a highly automated workflow with the capacity of generating true orthophotos, one of the most important requirements for the project. We worked closely with GeoToolBox Ibérica, Vexcel Imaging’s Latin American representative, to configure the most effective photogrammetric solution.”

Topocart had already successfully completed a similar project flying the entire state of Sao Paulo in Brazil, an area almost the same size as Uruguay. The company’s experience, proximity and the state-of-the-art equipment it offered for the project contributed to Topocart’s

selection as the winner of the tender.

Meeting the Strict Specifications

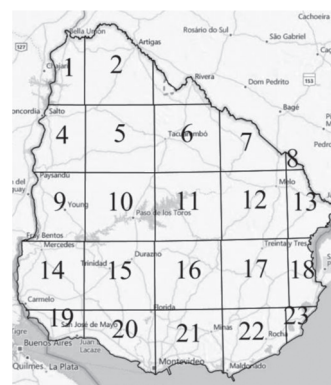
The project was divided into two subprojects: the first to capture the whole country at 32cm GSD and the second to acquire 10cm resolution imagery of the main population centers throughout Uruguay.

To meet the specifications, Topocart proposed the following:

- National flight (178,000km²)
- GSD of 32cm
- Accuracy in XY, better than 1m
- Accuracy in Z, better than 1.5m
- Urban flight (1,298 km²)
- GSD of 10cm
- Accuracy in XY, better than 0.2m
- Accuracy in Z, better than 0.3m

With the UltraCam Eagle Mark 2, it is necessary to fly at around 24,000ft to capture 32cm GSD and at 7,500ft to achieve 10cm. Topocart primarily used a Carajá aircraft, and the camera was installed with a gyro stabilization mount.

Along with the camera, Topocart combined the use of an Applanix GNSS system with ground control points (GCP) to achieve the requested accuracy. Only about 600 GCP were required for the whole country, which demonstrates the advantage of combining a quality IMU system with a high-performance photogrammetric camera.



divided in 23 areas within the country.

In addition to the images, the following deliverables were produced:

- National flight
- DTM of 2.5x2.5m
- Ortho Images based on DTM in RGB and NIR
- Urban flight (80 population centers)

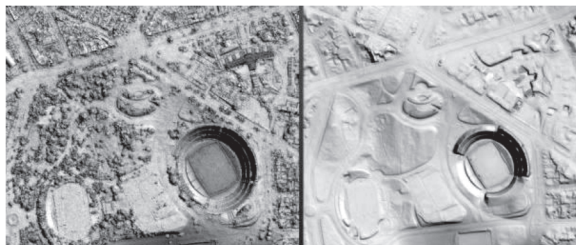
- DTM of 1.0x1.0m
- Ortho Images based on DTM in RGB and NIR
- True Ortho Images based on DSM in RGB and NIR

The project began in January 2017 and the last orthoimages were finished in June 2019 – it took approximately 2.5 years to acquire imagery and deliver all the products.

Primary Project Challenges

As with most aerial photography projects, a major challenge was the weather. Some areas of Uruguay were constantly cloudy, so it was necessary to wait for weeks, or even months, for clear skies to capture cloud-free images.

The volume of data also had an impact on the project. In total, around 30,000 images were collected for the National coverage at 32cm GSD, which meant many flight hours as well as many processing hours. It was crucial to have a software capable of handling huge amounts of data efficiently. Vexcel Imaging’s UltraMap software was selected for the job.



DSM of the national stadium in Montevideo.

Also, establishing a cost-effective process for creating True Ortho images based on the DSM requires pre-planning to collect the necessary data. In this case, the project was flown using a high overlap in urban areas and the data were processed with UltraMap software. The results exceeded IDEUY’s expectations and provided Uruguay with True Orthophotos of urban areas at 10cm, something not available yet in other big cities in the region.

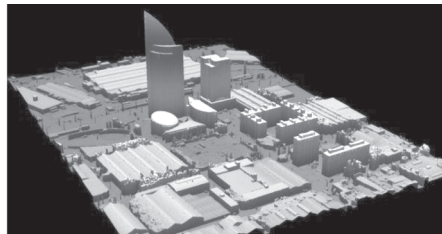
For the IDEUY, a major challenge was quality control and how to ensure all the specifications were being met. Several experts from different external organizations were hired for the project. They focused on several aspects, such as accuracy of the flights and identification of well-defined ground control points. Additionally, the True orthophotos were checked for shadows and hotspots. Overall, the resulting deliverables were very high quality.

A Dataset for Many Applications

The updated nationwide digital dataset includes cartographic maps at 1:2,000 scale – a major improvement over the 1:50,000 scale maps produced in the 1960s. Other deliverables provide useful information about population centers, contours, hydrography, and boundaries, and the locations of roads, schools, police

stations, tourist attractions, and hospitals are clearly marked.

A geoportal is being developed to make this information accessible online to the public and government agencies. Many areas of government, such as urban planning, forestry, defence, agriculture, environmental protection, infrastructure, disaster response, agriculture, etc., will benefit. The Uruguayan government is committed to sustainable development throughout their country, and the improved geographic information supports its efforts.



DSM of the Antel Tower, Montevideo.

“This nationwide digital dataset is extremely valuable to Uruguayan government agencies tasked with planning and completing all types of infrastructure projects,” says Dr Diego Pastorin, President of IDEUY’s board of directors. “We consider this project to be an important step in our country’s future development.”

About Topocart

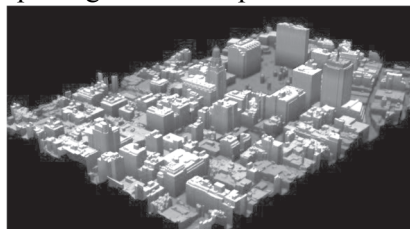
Based in Brasilia, Brazil, Topocart provides worldwide services in infrastructure engineering, urban planning, environmental studies, mapping, aerial photogrammetry, geoprocessing, and surveying and geodesy. The company has been operating Vexcel Imaging UltraCam digital photogrammetric aerial systems since 2008. It currently owns an UltraCamLp and an UltraCam Eagle Mark 2.



model of a wood processing factory.

About GeoToolBox Iberica (GTBi)

GTBi has been providing photogrammetry solutions to clients throughout Spain, Portugal and Latin America for more than 25 years. The company seeks out the best and the latest technology to create custom hardware and software packages to meet specific needs.



DSM of "Plaza de la Independencia" in Montevideo. Last updated: 19/09/2019

MAPPS

This new column covers selected current items of map-related applications.

Google's Drone in Australia

Project Wing, an offshoot of Google's parent company Alphabet, has been trialling **drone delivery** of food and drinks, medication and locally-made coffee and chocolate.

8 SEPTEMBER 2019/IN CITY OF LOGAN

Residents in the Logan suburbs of Crestmead and Marsden will be among the first residents of Queensland to experience air delivery, as Wing will be delivering a range of items to their homes, by drone, within minutes. Delivery service will initially be available to a small number of households in the suburbs of Crestmead and Marsden as part of Wing's Early Flyer program.

"We're excited to be bringing our fast, safe and environmentally friendly service to South East Queensland," Wing CEO James Ryan Burgess said

Minister for Innovation Kate Jones said the Government was working hard to make Queensland the capital of drone technology in Australia.

"Today's launch of Wing's drone delivery service to Logan residents is another feather in Queensland's cap. Being able to take advantage of drone deliveries will not only mean greater convenience for consumers but will also allow businesses to capitalise on the opportunities provided by technological advancements."

Wing plans to begin air delivery to the first customers in Logan in the coming weeks. Residents of Crestmead and Marsden interested in joining the Wing service or wanting to stay updated on the latest delivery areas, can visit wing.com/australia/logan to sign-up.

Anyone with questions about the service, can email support-AU@wing.com

Google's First Drone Delivery in US

Alphabet's subsidiary 'Wing' beat Amazon, UPS and Uber Eats by making the first drone delivery in the US, after obtaining a license from the FAA.

AFP Relaxnews - October 21, 2019

Alphabet Inc. (Google) subsidiary Wing has become the first company in the United States to deliver packages by drone. In Christiansburg, the small Virginia town chosen as Wing's test location, the 22,000 residents can order products normally shipped by FedEx, medicine from Walgreens and a selection of candy from a local

business, all of which will arrive via drone. Wing, which already operates in two Australian cities as well as Helsinki, announced in a statement that the first drone-powered deliveries had taken place on October 18 in Christiansburg, "paving the way for the most advanced drone delivery service in the nation."

The yellow and white drones are loaded with packages at a local centre of operations called the "Nest," where Wing employees pack them with up to three pounds (1.3 kilograms) of goods, deliverable within a six-mile (10 kilometre) radius. Once they have arrived at their destination, the drones don't land. Instead, they hover above the house and lower the package with a cable.



Other companies are working to launch similar services, most notably Amazon, UPS and Uber Eats. But Wing was the first to obtain a license from the Federal Aviation Administration (FAA), authorizing company pilots to fly multiple drones at the same time.

3 terror camps destroyed

Manjeet Singh Negi | New Delhi - October 20, 2019

Army Chief General Bipin Rawat on Sunday said that the Indian Army used artillery guns to target terrorist camps in Pakistan-occupied Kashmir.



"We have targeted these camps using our artillery guns. And the kind of information that we have received, the Pakistan army and the terrorists have suffered heavy casualties," he said.

We had the coordinates of these camps. We have caused severe damage to terrorist infrastructure across," General Bipin Rawat said.

The Rabbit and His Thesis

<https://www.ba-bamail.com/content.aspx?emailid=33726>

Edited By: Shai Kuritzky

One sunny day a rabbit came out of her hole in the ground to enjoy the fine weather.

The day was so nice that she became careless and a fox snuck up behind her and caught her.

“I am going to eat you for lunch,” said the fox.

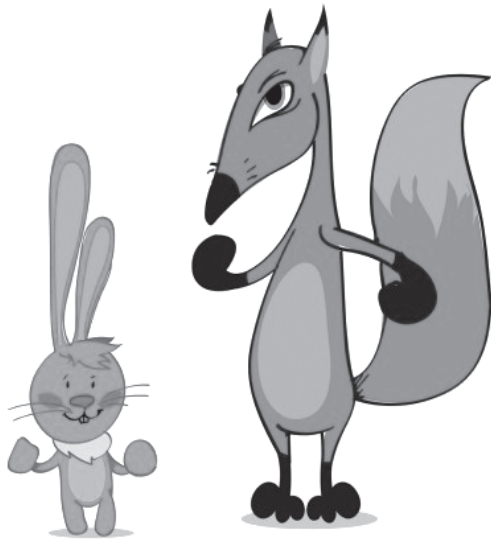
“Wait,” replied the rabbit, “You should at least wait a few days.”

“Oh yeah? Why should I wait?”

“Well, I am just finishing my thesis on ‘The Superiority of Rabbits over Foxes and Wolves.’”

“Are you crazy? I should eat you right now! Everybody knows that a fox will always win over a rabbit.”

“Not really, not according to my research. If you like, you can come into my hole and read it for yourself. If you are not convinced, you can go ahead and have me for lunch.”



“You really are crazy!” But since the fox was curious and had nothing to lose, it went with the rabbit. The fox never came out.

A few days later the rabbit was again taking a break from writing and sure enough, a wolf came out of the bushes and was ready to set upon her.

“Wait!” yelled the rabbit, “you can’t eat me right now.”

“And why might that be, my furry appetizer?”

“I am almost finished writing my thesis on ‘The Superiority of Rabbits over Foxes and Wolves.’”

The wolf laughed so hard that it almost lost its grip on the rabbit.

“Maybe I shouldn’t eat you; you really are sick ... in the head. You might have something contagious.”

“Come and read it for yourself; you can eat me afterward if you disagree with my conclusions.” So the wolf went down into the rabbit’s hole ... and never came out.

The rabbit finished her thesis and was out celebrating in the local lettuce patch. Another rabbit came along and asked, “What’s up? You seem very happy.”

“Yup, I just finished my thesis.”

“Congratulations. What’s it about?”

“‘The Superiority of Rabbits over Foxes and Wolves.’”

“Are you sure? That doesn’t sound right.”

“Oh yes. Come and read it for yourself.”

So together they went down into the rabbit’s hole. As they entered, the friend saw the typical graduate abode, albeit a rather messy one after writing a thesis. The computer with the controversial work was in one corner.

And to the right there was a pile of fox bones, on the left a pile of wolf bones.

And in the middle was a large, well-fed lion.

The moral of the story: The title of your thesis doesn’t matter. The subject doesn’t matter. The research doesn’t matter. All that matters is *who your advisor is*



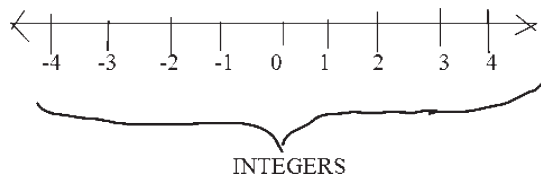
Rational Polynomial Functions - An Introduction

A. Bindu Sowjanya

In satellite photogrammetry, gone are the days where one was searching for sensor parameters such as focal length, misalignments, distortions etc - for modeling operations such as EO, Block Adjustment, space intersection - thanks to the advent of Rational Polynomials. Considering their versatility, the operator need not worry even about the sensor - and hence they are appropriately termed Universal Sensor Models. Introduced in early 90s, their usage gained huge momentum in the geospatial niche. Here is an article that introduces the basics of Rational Functions.- Editor

Rational Polynomial functions are also known as Rational functions, but before knowing about the concept of RPF, let us recall the basics of Rational numbers and Polynomial functions.

RATIONAL NUMBERS: All of us know what a number line is...



The numbers which are represented on the number line are called *INTEGERS*. But what about expressions like this $1/3, -4/7, 51/7, \dots$

We don't use them as often as we use counting numbers. Such numbers are called Rational Numbers. So in terms of definition, we say that they are of the form P/Q where P and Q are integers and $Q \neq 0$.

Examples: $-1/2, 3/4, 8/9$

REAL LIFE APPLICATIONS OF RATIONAL NUMBERS: When we are

Shopping, we see the sale boards saying that we need to pay $1/2$ the price only. Here sale is represented by a fraction which is a rational number.

POLY+NOMIAL=MANY TERMS

50%

OFF

POLYNOMIALS: We know the basic algebraic equations like $X-3=0$

But what if the equation is more complex? Polynomials are the expressions containing an unknown raised to a series of positive whole number exponents.

$$\text{Example: } 2X^2+4X^1+10X^0=0$$

The powers of the variable are 2,1,0 which are whole numbers.

In short *POLYNOMIAL* is a combination of *POLY-meaning many* and *NOMIAL-meaning terms*.

POLY+NOMIAL=MANY TERMS

It follows a general form of

$$a_n X^n + a_{(n-1)} X^{(n-1)} + a_{(n-2)} X^{(n-2)} + \dots + a_1 X + a_0$$

Polynomial can be an expression with one term or two terms or more number of terms.

Example: $4x$ [MONOMIAL as it has one term]

$4x+2y$ [BINOMIAL as it has two terms]

$4x+2y+3$ [TRINOMIAL as it has three terms]

Polynomials are widely used in mathematics to construct polynomial equations. Another familiar application is in Healthcare - to help determine the schedules.

Now that we are familiar with the concepts of Rational numbers and Polynomials, let us expand the treatment to **RATIONAL POLYNOMIAL FUNCTIONS**.

A Rational function is any function which can be defined by a rational fraction such that both the numerator and denominator are polynomials where the polynomial in the denominator is not equal to zero.

$$\text{Example: } R(x) = \frac{x^2+4x-1}{3x^2+9x-2} \quad (\text{polynomial})$$

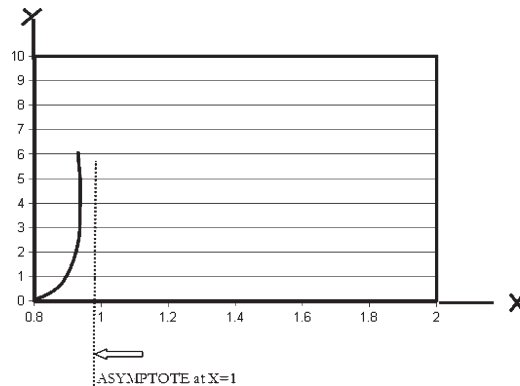
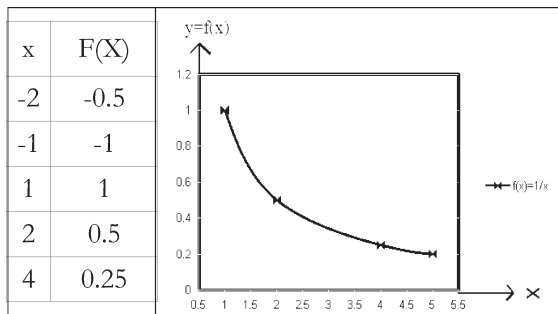
$$\text{Generic form is } F(x) = \frac{P(x)}{Q(x)} \quad \text{where } Q(x) \neq 0$$

GRAPHING A RATIONAL FUNCTION

Let us consider a simple rational function such as

$$F(x) = \frac{1}{X} \quad \text{where } X \neq 0 \quad \text{and express it in graphical form.}$$

When we plug in every value of X and plot the graph,



By observing the above graph we come across the ASYMPTOTES concept.

An Asymptote is something like a “BLACK HOLE” which cannot be determined or explained completely but it does exist. In the same way ASYMPTOTE is a curve which extends toward infinity but does not touch any of the axis. There are three types of ASYMPTOTES.. they are

- o VERTICAL ASYMPTOTE
- o HORIZONTAL ASYMPTOTE
- o OBLIQUE ASYMPTOTE

To find the number of asymptotes we need to find the roots.

FINDING ROOTS OF RATIONAL

FUNCTIONS: A root is where the value of the expression is equal to zero.

To find the roots of a Rational expression we only need to find the roots of the top polynomial so long as the rational expression is in the lowest terms.

LIMITATIONS OF RPF:

- o Rational functions can have only one or zero number of HORIZONTAL ASYMPTOTES.
- o It can also have only one or zero number of OBLIQUE ASYMPTOTES.

FINDING VERTICAL ASYMPTOTES: Vertical

Asymptote is formed by

the bottom polynomial of a Rational function, But make sure that the rational function is in lowest terms it means that both the numerator and denominator should not have a common factor. Whenever the bottom polynomial is equal to zero then we get a vertical asymptote.

Example: (X^2-3X)
 $(2X-2)$

The bottom polynomial is $2X-2$ which factors into $2(X-1)$. And the factor $(X-1)$ means there is a vertical asymptote at $X=1$.

FINDING HORIZONTAL OR OBLIQUE ASYMPTOTES:

It is easy to find them but it depends on the degree of the numerator and denominator polynomials.

Case 1: DEGREE OF NUMERATOR POLYNOMIAL LESS THAN THE DENOMINATOR POLYNOMIAL:

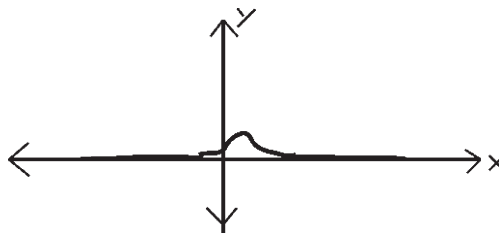
The denominator polynomial will dominate and there is a HORIZONTAL ASYMPTOTE at zero.

Example: $3X+1$
 $4X^2+1$

Now let us plug in x value as 1000

$f(1000)=3001$
 4000001

As X gets larger, f(X) gets closer to 0



Case 2: DEGREE OF NUMERATOR POLYNOMIAL IS EQUAL TO THE DENOMINATOR POLYNOMIAL:

Neither dominatesThe asymptote is set by the leading terms of each polynomial.

Example: $8x^3+2x^2-5x+1$
 $2x^3+15x+2$

Both have a degree of 3

Just look at the leading coefficients of each polynomial,

Top is 8 (from $8x^3$)
 Bottom is 2 (from $2x^3$)

So there is a HORIZONTAL ASYMPTOTE at 8 which is equal to 4.

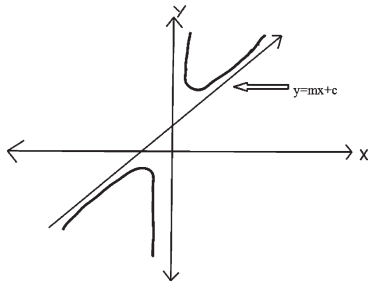
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Case 3: DEGREE OF NUMERATOR POLYNOMIAL GREATER THAN THE DENOMINATOR POLYNOMIAL:

This is a special case for which we get an OBLIQUE ASYMPTOTE and we need to find the equation of the line. To work it out we can use polynomial long division method in which we divide the numerator polynomial by the denominator polynomial to find the quotient.

Example: $f(x) = \frac{3x^2+1}{4x+1}$

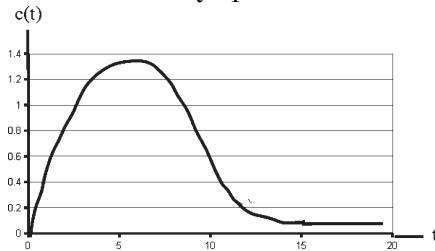
By dividing we get an equation in the form of $y=mx+c$ that's the reason we get an oblique or slant asymptote.



RATIONAL FUNCTIONS IN REAL LIFE:

MEDICAL USE: Before surgery a patient might be injected with some medication, When the concentration of the drug in the bloodstream is at a desired level the operation will begin. One can model the concentration of the drug in the patients bloodstream using a RATIONAL FUNCTION. Here is a hypothetical RATIONAL FUNCTION representing the concentration of a drug in the patients bloodstream with respect to time.

$c(t) = \frac{4t}{t^2+1}$



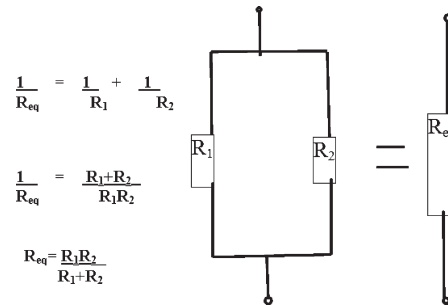
Being able to analyze this RATIONAL FUNCTION can help a nurse or doctor determine when the drug will wear off on the patient.

USE IN ECONOMICS: You can use rational functions to find out the average cost functions. Average cost functions can help a business determine the cost of producing a certain product. Suppose your company makes light bulbs and you want to determine the average cost of making light bulbs you can model the average cost function for making light bulbs using the rational function below

$c(X) = \frac{\text{fixed cost to run business} + \text{cost of each bulb} * X}{\text{number of bulbs produced}}$
 where X is the number of bulbs produced

and $c(X)$ is the average cost function

ENGINEERING: Any electrical circuit is a combination of resistors, capacitors, ICs.....etc when the circuit is very complex and if we need the combined value of resistors or capacitors rational function concept is used: for example the combined resistance of the below circuit is



IN MATHEMATICAL PROBLEMS:

They are widely used to find out the rate of work done or to find the initial velocity, speed, acceleration etc

$W = r(t)$

W = total work done

r = rate of work done by an individual

t = time taken to complete the work

CONCLUSION: We just recalled the basics of rational numbers and polynomial functions and then we extended the concepts to what are now widely is geomatics as RATIONAL POLYNOMIAL FUNCTIONS. Their significance in real life with some applications has been illustrated. Interestingly since early 90s, RPFs are widely used in relating directly the image and objects spaces. Such a provision obviated the information about the sensor or satellite. Indian satellite imagery – delivered usually in Tiff format are accompanied by the RPF coefficients – thus enabling the bundle block adjustment, ortho-rectification, DEM processing.

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Q&A with... Aidan Mercer, Bentley Systems -



<https://www.gim-international.com/content/article/q-a-with-aidan-mercero-bentley-systems>

To gain real insight into today's geospatial business landscape, 'GIM International' decided to ask some of the sector's most influential companies for their opinions. This series of Q&As captures the current state of the industry from various perspectives, such as which technological and societal developments will have the most impact on the geomatics market, which market segments are the most promising and which areas offer the most substantial growth. The questions also explore the trend towards open data and open-source software. This time, Aidan Mercer from Bentley Systems shares his views.

Which technological developments will affect your product/service portfolio the most in the coming years?

One of the most exciting developments at Bentley are Microsoft Azure-based cloud services that enable our users to achieve better project delivery and asset performance. This is known as our CONNECT Edition portfolio. This next generation of software is helping firms in 'going digital' – this is the ability for data residing in applications to interact with data in other applications in a fully digital environment, one we may describe as 'connected'. The benefits are unbounded, e.g. performance improvements, scalability, efficiency gains, accessibility and more. The ability for our users to access on-premise or cloud-based services gives them choices and flexibility as well as exciting new features like '365 Services' and a range of CONNECT Edition applications.

Which societal developments will influence your share of the geomatics market the most the coming years? How and why?

The world's population is growing by a staggering 200,000 people every day. By 2025, the global population is expected to reach over eight billion people and by 2040 this number could hit nine billion. Experts predict such rapid growth will increase the population to a massive

11 billion people by the turn of the century. Urban expansion is driving new ways of working and a heavy reliance on technology. We've made great progress with our reality modelling applications, in particular ContextCapture CONNECT Edition, which rapidly captures existing site conditions through digital photographs or laser scanning data. This is helping urban planners develop space for new housing, develop new roadways, expand water capacity and understand how to deal with future growth, to name but a few use cases, because of its ability to capture assets or entire cities. It is slowly becoming the must-have technology and we are excited about the contribution it provides to society.

Which market segments are the most promising for your products/services?

Bentley covers all infrastructure asset types with a concerted focus on advancing infrastructure projects. One major focus for us in 2018 and the coming years will be 'digital cities'. This, I believe, is an evolution of smart cities by applying the emerging technological advancements that can deliver significant value, like the Internet of Things (IoT) or machine learning. When applied to cities, with all the data they create, the value or outcomes could be hugely significant.

In which parts of the world do you envisage substantial growth in users of your products/services?

At our annual Year in Infrastructure Conference held in Singapore in October 2017, we recognised the best projects from around the world at the Be Inspired Awards. Of the 23 categories, ten of the winners were from China. These projects were selected by independent jurors, and it goes to show the quality of infrastructure projects in the region and the innovative use of Bentley software on these projects. Also, the burgeoning use of ContextCapture on all types of infrastructure projects is enabling a new way of working, inclusive of engineering workflows that are bringing real excitement to the market.

Open data is becoming increasingly available all over the world. How will this trend affect your business?

Open data is very important. We have many users that are publishing data, like cities and local authorities. Bentley has been committed to open standards for many years, particularly on the geocoordination of applications. An example would be a GIS database, like CityGML, which has been developed as the Open Geospatial Consortium (OGC) standard describing such things as 3D urban objects as an application schema and which comprises different thematic areas. Although the model is in XML format, it is geometrically compatible with Oracle Spatial for RDBMS. Such standards provide the framework for semantic and geometric relationships and have the functionality of representing differing levels of detail required for complex infrastructure projects. These standards can also ensure the same object is represented in different levels of detail simultaneously, and integration with BIM, for example, is very important. Bentley has been a corporate sponsor of OGC for many years and continues to see value in open data.

Will the tendency of increasing use of open-source software be a threat or an opportunity for your business?

We certainly see the value in open source and actively encourage third parties to contribute to aspects of our software. For example, our IModelHub 2.0 Platform has an API that allows third parties to create bridges within the cloud services of the offering as we address change management for certain aspects of a project making it very powerful and adaptable. You must harness the tremendous potential and expertise in the ecosystem so that projects can benefit, and we see real value in this.

Aidan Mercer

Aidan Mercer joined Bentley in 2010 and is currently industry marketing director for AEC. He has held various roles in geospatial and utilities marketing with Bentley and previously held various marketing roles in similar high-tech organisations. Mercer's global responsibilities include reality modelling and smart city initiatives. Aidan graduated with a bachelor's degree in history and holds a master's degree in marketing from the University of Gloucestershire as well as various CIM marketing qualifications. Aidan has written extensively on global topics such as BIM and 'going digital' as he aligns the company message to audiences around the world.

Last updated: 24/09/2019

ANDHRA PRADESH

'Land Titling Act on the anvil'

Appaji Reddem Amaravati

**APPAJI REDDEM,
SEPTEMBER 30, 2019**

**UPDATED:
SEPTEMBER 30, 2019 23:01 IS**



Govt. will take equity in industries instead of giving sops: Kallam

The State is most likely to witness at least two major changes the way land registrations are made and investments are executed. The government will be coming up with a 'Land Titling Act' and will be issuing permanent titles, instead of the existing 'prescription titles.'

This apart, in an innovative investment model, the State will be taking equity in the industries at the time setting them up instead of giving mere subsidies, according to Principal Advisor to Chief Minister Ajeya Kallam.

In an exclusive interaction with *The Hindu* at the Secretariat on Monday, Mr. Kallam said, "Land records in the State are in a mess. We are coming up with the Land Titling Act in a couple of months and will be going for an overall survey of land using satellite-linked rovers and base registration offices. The Act will be a game changer. Over 11,000 surveyors will be hired soon for the purpose."

Under the new system, the government will stand guarantee for the proposed permanent land title, which means that the owner will be compensated for the loss in case it fails to stand judicial scrutiny.

The changes will substantially reduce civil disputes, Mr. Kallam said.

The government apparently has taken a serious view of the liberal subsidies and heavily subsidised land given to unyielding industries. Instead of subsidies, the government plans to ease the investment burden of the industries by indulging in equity participation. "The new process will ensure sure shot income and at the same time, benefit the government. We are already working on it and will make a notable announcement soon," the Principal Advisor said

Surveying a Property with No Legal Access

<https://elsurveying.com/surveying-property-no-legal-access/>

The Challenge: Forgotten “GAP” Parcels Separate Land from Perimeter Road, Hurting the Value of Land Offered for Sale.

Downers Grove High School District 99 purchased a 44-acre tract of land in 1972 for a future high school site without the benefit of a land survey. In 2005, the district decided to sell the land. The land’s highest value was for its development potential, but that was threatened because, as Compass uncovered, a forgotten 10-foot-wide strip of land prohibited legal access to the dedicated roadway.

The Solution: Research, Fact-Finding and Land Boundary Expertise

Compass went well beyond the traditional work of a surveyor. We began by researching prior surveys, historical maps, title commitments and dedication plats of adjoining roadways. We discovered the existence of “gap” parcels (10 to 15 feet wide) deliberately created and shown on 1972 roadway dedication documents. Through further research, Compass identified the owner of the “gap” parcels as a Chicago Title Insurance trust.

We prepared redlined copies of all documents and identified the suspected owner of the gap parcels, a trust number, and approximate year the gaps were created and forwarded that information to the title company and real estate attorney. Since the trust had been closed, no land was thought to have been left in the trust. However, title to the problem gap parcels was still vested in the trust.

Compass helped both the title company and attorney by preparing new legal descriptions for the proper conveyance documents, giving the school district “free and clear” ownership of the gap parcels, eliminating the access issue to the dedicated road and maximizing the land’s development potential and value.

The Benefits: Client Avoided Potential Costly Litigation and Time Delays by Using Compass

By going above and beyond the service of other surveyors,

Compass identified problem issues, conducted the in-depth research that uncovered mistakes that had occurred in the past, and provided solutions for correcting those mistakes to the satisfaction of all other professionals involved in the process.

In addition, because of Compass’ strong relationships with all affected parties and the company’s ability to work with all professionals involved in land boundary issues, Compass saved the school district:

- The time and money it would have cost to litigate a solution in court
- The expense and energy associated with hiring additional consultants to protect everyone’s interests
- The time and resources the district would have spent identifying the problem itself or finding someone else to identify and resolve the problem

GOOD MORNING



Coffee never knew it would taste so nice and sweet, before it met milk and sugar.

We are good as individuals but become better when we meet and blend with the right people.

Report on Students Forum

All India Seminar, on, 'Digital Technologies in Surveying, Mapping & Applications' held on Oct.15-16th,2019

This report of the seminar forms part one, covering Students forum prepared by Dr. V.Raghava Swmay. The second part covering other aspects of seminar will appear in next issue of Maps Today - Editor



Dr V Raghavaswamy, Former DD (NRSC/ISRO),Hyderabad & Chairman Seminar Technical Committee

receiving Memento from Shri B P Acharya, IAS, Director General, MCRHRD & Special Chief secretary to Govt.of Telangana, Hyderabad, in presence of

L-R : Er T Anjaiah, Hon.Secretary,IEI, TSC; Dr G Rameshwar Rao, Chairman, Institution of Engineers, Telangana State Centre; Dr V Raghavaswamy; Shri B P Acharya, IAS; Shri M V Krishna Rao, IPS , Former DGP (AP) & Er V Jambul Reddy, Member, IEI,TSC, Hyderabad

In the All India Seminar, jointly organized by Instn. of Engrs & GeoMap Society (GEMS) on, 'Digital Technologies in Surveying, Mapping & Applications' held on Oct.15-16th,2019, at Institution of Engineers (IE), Telangana State Centre, Hyderabad, one of the highlight was an exclusive, ' **Students Paper Presentation** ' in Technical Session-V. It was held on Oct.16th in the auditorium of the Institute. A total of 14 papers were presented by students coming from different colleges / universities from Hyderabad, Trichy (TN), and Manipal

(Karnataka). They include, JNTUH, JNAFAU, CVR College, GNIT &Science, Matrushri college of Engineering, GIT, MIT (Manipal), VBIT and Vaishnavi School of Architecture & Planning, Hyderabad.

Dr K Jayachandra, c0-chair of the session said "Mr KK Pappan, former scientist, (erstwhile NRSA) deserves special credit for enabling participation of the students". Based on the merit of the presentations made by the students, the Judges (Dr V Raghavaswamy & Dr K Jayachandra) selected two best papers for prize & certificate. The prize money was sponsored by Mr M V Krishna Rao IPS, Retd. DGP (erstwhile AP) and President Pure Earth Foundation (PEF), Hyderabad. The prizes were given to the two students by the Chief Guest Shri B P Acharya, IAS, in the Valedictory Function.

The First Prize awardees were : Veda Apurva & G Sai Likhita, JNAFAU, and V Chowdhary, GIT, Hyderabad for their paper, '*Preservation of Archaeological and Architectural Sites using Survey and 3D Imaging Techniques*'.

The Second Prize awardees were : V Sai Prasanna & A Divya, JNTUH, Hyderabad for their paper, '*Geo-Database and Spatial Analysis of Schools Data for Developmental Planning and Decision Making by the School Education Administration of Telangana State*'.



The First Prize awardees : Veda Apurva & G Sai Likhita, JNAFAU receiving Prize from Shri B P Acharya, IAS, in the presence of Shri M V Krishna Rao, IPS, Dr G Rameshwar Rao, Chairman, Institution of Engineers, Telangana State Centre, Hyderabad & others

IGU-YECG AWARD 2019

International Geographical Union Taskforce for Young & Early Career Geographers.

(Presents, late Dr Manju Singh Memorial Young Scientist Best Paper Award)

The primary aim of the award is to stimulate young geographers to participate in IGU activities. MPhil/PhD/ Postdoc researchers within five years of doctorate degree are eligible to participate & present papers on the theme / sub-theme of IGU conferences held in India & abroad. The papers submitted will be shortlisted by a jury, before the invitation is sent to the prospective presenters. The award carry prize money and a certificate of merit. The winner's name will appear on the official website of IGU (<https://www.igu-online.org>). Further details contact Dr Gaurav Sikka, Secretary IGU-YECG (gauravsikkageo@gmail.com)

2019 IGU-YECG Awardee

Dr Rani Singh, Department of Geography, Rajasthan University, Jaipur, for her Paper on, *'Geospatial Assessment of the Ground Water Quality on Diseases through Health GIS in Phagi Tehsil, Jaipur District, Rajasthan'*.



Dr Rani Singh receiving the award at the 13th IGU Conference held from October 19-21st, 2019 at Central University of Haryana, Mahendergarh, Haryana, India. Prof R B Singh, Sec.Gen.IGU, Prof Brij Maharaj from South Africa, Prof Esther from UK, Dr Gaurav Sikka, Sec. IGU-YECG, Dr Kheraj, Convener of Conference & others

GS Oberoi Inspired Map Competition

Map Awareness Programme (MAP) organized by GeoMap Society (GEMS) email: geomapsociety@gmail.com

This competition is part of Map Awareness Programme (M A P). Two participants forms a team. At least one should be a student. No entry fee. Prizes for selected entries. The objective is to develop map-using skills and create awareness about growing importance of maps, related technologies and applications useful for society.

Question No. 1

Open Google map on the web. Select two points A and B, identifiable on the ground, preferably less than 100 metres apart. Measure the distance between them on the image. Identify the same two points on ground. Measure the distance on ground using a tape. Send the following information by email to geomapsociety@gmail.com with subject MAP Q No 1

1. Names of participants Mobile/email
 - i. (student, school/college name and class)
 - ii.
2. Latitude and longitude of A and B from the image

Latitude	Longitude
----------	-----------
- Point A
- Point B
3. i. Distance A B from Google map in metres
 - ii. Distance A B on ground in metres

Difference in metres
4. Comments if any

Perfect number

In mathematics a perfect number is a +ve integer which is equal to the sum of its proper positive divisors excluding the number itself. The first perfect number is 6 because 1 2 and 3 are its proper positive divisors and $1 + 2 + 3 = 6$! It is unknown whether an odd perfect number exists or not

GIS in Health sector

Extracts from Technical report on national geospatial public health data and management system

A National Networking Project Sponsored by NRDMS Division; Submitted by Administrative Staff College of India, March 2018

As a National Coordinator I have submitted Project Completion Report (NCPCR) to Head, NRDMS, DST, which, essentially comprises of Salient Findings and Summary details of the work done along with

possible areas for way forward, including analysis of the work done by each PI / Co-PI team, with specific reference to the Project objectives. This is the Executive Summary of the NCPCR. I have great pleasure in submitting this Executive Summary of Report to serve as a source for quick appraisal and reference.

Dr. V. MURALIKRISHNA, PhD(IISc-Bangalore)

National Coordinator- DST Networking Project on Geospatial Public Health

Former Professor, JNTU-Hyderabad

And Dr. Raja Ramanna Distinguished Fellow DRDO

Phone: +91-9848049624, E-mail: iyyanki@icorg.org

Public health being a geographic issue and related to geospatial analyses, finds many solutions in geospatial technology and epidemiology, so as to carry out the description and analysis of geographic variations in diseases with respect to demographic, environmental, behavioral, socioeconomic, genetic, and infectious risk factors.

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The focus of health care system is the patient. GISs are applicable to the care of patients with both infectious and chronic diseases. Geospatial analytic techniques, such as proximity estimations and cluster analysis, are built on statistical methods that incorporate distance and direction measurements to generate geospatially accurate maps and graphic reports. Disease clustering classified as temporal clustering, spatial clustering or space time clustering. For example, SaTScan software is very useful software that can perform geographical surveillance of a disease, detect clusters and test whether these clusters are statistically significant or not. These are examples of tools and technologies that can be made applicable to public health management. It is further envisaged that the integration of Geospatial analysis and modeling would strengthen the Health Management Information Systems.

The Health-DMS networking program comprises of pilot studies in different parts of the country addressing the following issues:

- Methods for disease and Risk mapping
- Spatial patterns of diseases
- Hotspot detection of diseases
- Spatial diffusion of disease outbreak
- Road map for Spatial Epidemiological Model
- Geospatial analysis and visualization
- Geospatial public health Interoperability
- Location based hazard vulnerability assessment.

The following categories are addressed during the networking project study time,

with varying amounts of emphasis. The networking project has 14 Principal

investigators and 15 Co Investigators. The unique nature is that each one is

addressing the project on different components so that the whole effort becomes a comprehensive public health system applicable for communicable and non-communicable diseases.

- 1) Health care and disease mapping
- 2) Location based hazard vulnerability assessment and health Care emergency management
- 3) Geospatial interoperability for public health
- 4) Geospatial data analysis and visualization

Project Title

Geospatial technology applications to public health:

Strengthening surveillance and Modeling of Selected Mosquito Borne Diseases through Process Automation of Community Remote Sensing in Pune District, India.

Geospatial mapping of Diabetics, CVD and cancer risk hot spots and study of risk assessment

Geospatial Governance and ICT for Disease Mapping, E- Surveillance & Health Care among School Children in a Rural Area

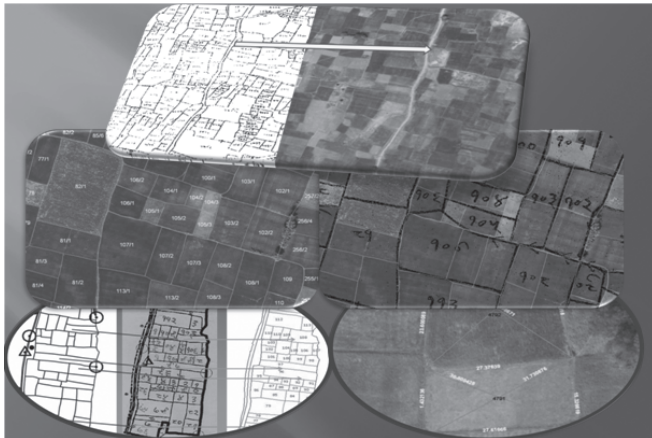
Development of Semantics Driven Geospatial Public Health Management System.

PROJECT METHODOLOGY AND RESULTS OBTAINED UNDER EACH PROJECT AS

contd.....27

Registration of Land deeds - Need to be replaced with Registration of title

By **Brig J S Ahuja (Retd)**
107, Gun Rock Enclave,
Secunderabad -500009
Email jagjit.ahuja@gmail.com



There has been a common belief that we are the owners of the land, but the fact remains land owns us.

Introduction

Land, having its own importance, is the most valuable resource for any country. Land Records containing complete details of every parcel of land has been a subject of great interest to the land owners as well as the government. Land parcels get fragmented every now and then due to sale purchase or divided by the will of the owners. These records need to be kept updated at regular intervals by the State.

Updating of land records are most essential to the proper planning and execution of schemes

But in our country these records are in shambles as the process of updating has not been done by the State Governments for a long time. A proper system of Cadastral Survey and registration of rights is the essential basis of ownership in a country. Such a system is even more important in undertaking development involving land acquisition. Updating of land records are most essential to the proper planning and execution of schemes. None of the projects for developing infrastructure will be possible without accurate and up-to-date large-scale maps of the area affected.

At present Land Deeds are only being registered for various transactions which in no way grant conclusive rights to the land owners. This has been the main reason that land related disputes account for two thirds of all

pending cases in the courts of our country because we do not have a system of granting conclusive rights by registering the Title of the land. In the present system Deeds registered only give land owners presumptive rights of ownership because it has no legal sincerity as no entries are made in the Cadastres before registering the land parcels.

Viewpoints

This has been a very touchy subject but has a lot of importance for the land owners, private and even the Government for granting legal rights of ownership. Currently Land Records are maintained across multiple departments and are in poor condition. This has resulted in the process of updating land records slow.

The news published recently in "The Hindu" have quoted the line to be adopted by the Supreme Court in handling the Babri Masjid case. It has published the following on front page in their headlines

SC to handle Ayodhya title dispute only as a land issue

Bench led by CJI refuses to entertain any third party intervention in the case

Importance of Land Resource

There are only two resources available in a country – Land and Labour i.e. the man power. Land has been the most important resource of a country because its extant is almost fixed. The British rulers, wherever they had ruled, gave lot of importance to the land in their possession. During their rule of our country, they gave greatest importance to the security of maps as well as to the surveying profession and professionals. The surveyors were made to treat their work as secret with strict instructions not to pass on the copies of their work to the unauthorized officials, may be mainly, because of their sinister motives to keep this vital information confidential about the land in their possession. Internally they were surviving on the land revenue which was collected strictly and on regular basis. British Rulers in India transferred this job of maintaining Land Records to Provincial Governments in the year 1905, which was earlier done by Survey of India

All this situation changed after independence, as the practice of collecting land revenue was stopped resulting in losing completely, ownership details of this important resource by the States. Prof Ram Singh in his article 'The Problem of Land Hoarding' published in the Hindu' included in this book as one of the Appendix has said

The Center, by its own admission, does not know exactly how much property it owns. Imagine what would happen if a citizen or a private entity made such a claim before the tax man – they would be fined and very likely land up in jail . The actual size and value of government owned land resource is thus a matter of speculation. The information provided by the Government Land Information System is both incomplete and patchy

Today even the Government does not know which land they own and how much is under encroachment. The Hindu from Hyderabad very recently has reported that Telangana might be among the top in the ‘Ease of doing business’, but it is not easy to obtain mutation certificates from the municipal authorities This has been the state of affairs in other states of the country too.

Some time back Mr Michael Gadbow* made the following remarks when asked what his take on liberalization in India has been? His reply was –

“India is an ancient country , a great countryIt is a tiger waiting to be un-caged.....an elephant ready to move....But why is perpetually standing on the edge of greatness , why does this greatness never come”.

The answer to this pertinent question can be found because of mismanagement of this resource. This matter needs to be addressed on priority basis by the governing system as the current practice in the country is to register all the mutations of land deals by way of sale - purchase and other modes of transfers by Deeds which give the land owners presumptive ownership rights only. This system of registering Deeds need to be changed by undertaking registration of Titles to enable land owners to get the conclusive ownership rights. This can only be possible by maintaining updated Cadastres where all transactions are first entered therein before the transactions are registered , giving them the ownership rights legally.

* ...Mr. Gadbow has been Chairman of GE’s International Practice Group and was the internal champion for policies on Improper Payments and International Trade Controls. He was founding Chairman and founder of the India Interest Group.....

□ Management □ of □ Land □ Resource

This requires regular surveys to pick up fragmentations of land parcels to keep the Cadastres updated which will enable the States to undertake the registration of rights by granting ‘Title’, being the most essential basis of ownership. Such a system is even more important in undertaking development, involving land acquisition.

Further updating of land records will be most essential

for the proper planning and execution of schemes, most of which being land based.

I am reproducing below an extract from the book “Mystery of Capital” written by *Hernando De Soto in which he has argued about the transformation of dead capital into live capital through the institution of formal property rights. He has laid stress on unlocking the surplus value in land is a crucial step toward economic development. The most important part of De Soto’s book, explores how to revive this dead capital by granting formal property rights. Currently, there are political roadblocks that stand in the way of an average person gaining legal property rights. As such, this is a problem we must accept as inevitable and need to address. Particularly, urbanization must be addressed as these countries lack the institutions to deal with the mass migration to their urban centers and thus are resulting in “the fragmentation of their property arrangements and the unavailability of standard norms that allow assets and economic agents to interact and governments to rule by law.” Land title allows an owner to use the asset as collateral for credit, which gives access to seed, fertilizer and equipment, raising the productivity of land and reducing human labour. The result is more free capital — both monetary and human.

It looks like a win-win situation, so no wonder land titling has turned into a major development goal, especially for women. The United Nations and the World Bank back programs to build national land registries to document land ownership in Africa, Asia and Latin America.

No major engineering projects for developing irrigation canals, drainage system and laying power lines will be possible without very accurate large-scale maps of the area affected. The orderly investigation, conservation and exploitation of forest resources demand the proper mapping of forest areas, and maps are even more important in all schemes of reforestation or afforestation.

This needs regular updating of Cadastral Maps and other records forming part of the Cadastre for various purposes. Further, this registration of rights greatly facilitates the operations of any scheme for the supply of agricultural credit, especially to small farmers. The fact that the land is properly mapped and that rights are clearly registered is of the greatest benefit to both the State as well as the private landholder. It will provide the fullest possible security of tenure, and minimizes the possibility of disputes and litigation. It will save the land owners from illegal encroachments taking place in our country, giving rise to court cases.

Let this be monitored by the Ministry of Land Resources, Government of India making the administrative machinery in the States responsible and accountable.

Few litigation cases as appeared in the news papers are reproduced below-

Waqf Board fails to produce Title-Deeds in court .Link documents for several Endowment properties unavailable in Telangana State Waqf Board, admit officials.

The Hindu 03 December 2017

Fake mutation entry racket busted in city. Over 2000 fake mutation entries made, 2 GHMC officials held.the racket came to light after officials from the Serilangampally Circle found that the ownership of a land parcel was changed to another person's name without the owner's knowledge.....

The Deccan Chronicle 03 December 2017.

It is my proud privilege to pen down the Foreword of this book (by author of this article) in giving solution to this ever increasing problem of non granting conclusive ownership rights to the land owners. The author who had served in Survey of India has described well how to manage this most important resource by modernizing the Cadastres by undertaking regular cadastral surveys as and when fragmentations of land take place. I feel that the common man will be educated about his rights as to how to get conclusive ownership rights of land owned by him. This problem needs an urgent solution as it has been aggravating to develop a system to facilitate registration of Titles . Once such a system is introduced than bottlenecks in acquiring land required for various projects will get reduced to a great extent .

This book may act as a treatise for the Central Government , State Governments / Union Territories in managing the land by understanding various issues related to this resource.

Concluding comment

It takes years to resolve the land disputes which has been a great burden on the courts too. To reduce large number of litigations and grant conclusive rights to the land owners, the system of registration of Deeds has to be changed to registration of Titles.

** Hernando De Soto, 1496-1542, was an economist. He was a Spanish explorer who participated in the conquests of Central America and Peru . He finally settled in Peru where he led the Institute for Liberty and Democracy (ILD). He worked with the developing countries to implement property and business rights reforms that provide the legal tools and institutions required for citizens to participate in the formal national and global economy based on the premise that all people have equal access to secure rights to their real property and business assets in order to pull themselves—and their countries—out of poverty.*

contd.....24

GIS in Health sector

CARRIED OUT BY THE 14 PRINCIPAL INVESTIGATORS (PIs)

Data was collected by Dr. Haseena Hashia from Jamia Milia Islamia University, Delhi from the Srinagar and Ladakh districts in Jammu & Kashmir State, regarding the most prevalent diseases with specific reference to Acute Respiratory Infection (ARI), Acute Diarrhoeal Disease (ADD) at high altitudes. In addition it was also seen that the psychological disorder among the residents of the district is high and on the rise due to the political situation in the region. However for this study the ADD and ARI are considered to be predominant. Monthly data for these two diseases were collected for 3 years, 2013 to 2015. The overall analysis shows that the winter months are prone for the Acute Respiratory Infections (ARI). It can be correlated with the environmental conditions and the indoor air pollution due to the use of heating devices in the regions. It is generally observed that females are more affected with ARI probably due to being indoors for greater periods of time.

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The study utilized GIS spatial analysis tools to integrate dengue fever and female Aedes mosquitoes' notification records at state, districts and block level for identifying and visualizing the spatial patterns hotspots. The hot spots identified in these analyses could explain the entire variance and they could predict risk in dengue fever transmission.

Salient Findings / Research Outputs / Advancements:

.....It is further observed during the project that the integration of Geospatial analysis and modeling would strengthen the Health Management Information Systems.

.....collection. ASCI-Hyderabad, Bharatiya Vidya Peeth-Pune, Apollo Hospital-Hyderabad and Adhiyaman College of Engineering, have developed the predictive models for communicable diseases.

Bharatiya Vidyapeeth, Pune, carried out a novel community remote sensing approach for prediction of mosquito borne diseases such as Malaria and dengue.

The Assistive technology and remote health monitoring system development at MIT -Anna University is a very significant one linking the cloud, Patient and Doctor on one to one communication in real time.

.....More importantly, to judge the efficacy and value of forecasting a trend and ultimately changing behavior, both the predictor and the intervention must be integrated back into the same system and workflow.

EVENTS

LADM 2019 - Geomatics Geospatial Technology	Oct 1-3 2019	Malaysia	isoladm.org/LADM2019Workshop ;
2019 AGIC	October 1 - 4, 2019	AZ USA	http://www.agicsymposium.org
GITA's Pipeline Technology Forum	October 2 – 3, 2019	TX, USA	https://web.cvent.com/event
GEOVET 2019	October 8 - 10, 2019	CA, USA	https://web.cvent.com/event
National Seminar Regional Studies	Oct 9-10, 2019	Hyderabad	www : uohyd.ac.in
AGIC Education & Training Symposium	October 1 - 4, 2019	USA	www.agicsymposium.org/
Digital Technologies in Surveying & Mapping	Oct 15-16 2019	Hyderabad, India	telanganasc@ieindia.org
State conference for networking with fellow GIS peers	October 15 - 18, 2010	Lawrence, KS, USA	https://www.kansasmappers.org/confgeninfo
International Conference of IGU	Oct, 19-21,2019	Haryana, India	www.cuh.ac.in
Future of Mining Americas 2019	October 21-22 2019	CO USA	https://americas.future-of-mining.com
Mining : Present & future IAC 2019	Oct 23 – 25, 2019	Hyderabad	
	Oct 21 - 25 2019	Washington D.C,USA	media@iafastro.org
Imagery to Digital Reality: ERS & Photogrammetry	Oct 28-31 2019	Seoul, Korea	http://conf.racurs.ru/conf2019/eng/
Annual World Congress of Ocean.	Nov 2-4 2019	China	www.bitcongress.com/WCo2019
GIS Day Celebration	November 13, 2019	Texas, USA	www.google.com/texas
Africa GIS 2019.	Nov 18 – 22, 2019	Kigali, Rwanda	www.eis.africa/
National Symposium on Innovation in Geospatial Technology	Nov 20-22,2019	Shillong, India	www.isgns2019.in
National Conference on 'Building A Disaster Resilient Society'	Nov21-23,2019	Raipur, India	www.prsu.ac.in
Amsterdam Drone Week,	Dec 2-6, 2019	Amsterdam	www.amsterdamdroneweek.com
Geosmart India 2019	Dec. 3-5, 2019	Hyderabad	www.geosmartindia.net
Globalization, Entrepreneurship and Emerging Economies (ICGEEE)	Dec 8 - 10, 2019	Dhaka, Bangladesh	https://ciln.org/conference_details
Conference on Cities	11-13 Dec.2019	Roorkee	www.icfc2019.com
3rd Asian Regional Conference on Peri-Urbanisation, , SPA ,	17-20 Dec.2019	Bhopal	www 3rdperiurbanconference@spabhupal.ac.in
Indian Engineering Congress	17 – 29 Dec 2019	Hyderabad	iecietsc@gmail.com
Indian Geographical Congress of NAGI	Dec , 28-30, 2019	Sagar, M.P. India	nagi.org.in
InfraTech 2020	14-16 Jan 2020	Germany	https://www.infratech.de
Mountain Cartography Workshop	April 14 - 18, 2020	CO USA	www.shadedrelief.com
FIG Working Week 2020 - "Smart surveyors for land and water management"	10-14 May2020	Amsterdam	http://www.fig.net/fig2020/
FME International User Conference	16-19 June 2020	Vancouver, Canada	https://fmeuc.com/
Mining : Present & future	Oct 23 – 25, 2019	Hyderabad	IEI TSC ieitelanganasc@gmail.com

Information about events has been compiled from different sources. Readers are advised to check correctness from the organisers



Drone hovering above the house and lowering the package with a cable.
(Details on page.....14)

150 years of Mahatma Gandhi identified on the image showing roads of Hyderabad.
(Developed by Maj Shiva Kiran and Mr. Venugopal)



Dr V Raghavaswamy, Former DD (NRSC/ISRO),Hyderabad & Chairman Seminar Technical Committee receiving Memento from Shri B P Acharya, IAS, Director General, MCRHRD & Special Chief secretary to Govt.of Telangana, Hyderabad,
L-R : Er T Anjaiah, Hon.Secretary,IEI, TSC; Dr G Rameshwar Rao, Chairman, Institution of Engineers, Telangana State Centre; Dr V Raghavaswamy; Shri B P Acharya, IAS; Shri M V Krishna Rao, IPS , Former DGP (AP) & Er V Jambul Reddy, Member, IEI,TSC,Hyderabad
(Details on page.....22)

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- Right of Way Acquisition & Permitting and Clearance
- Software & Web Enabled Geoportals Development Services

Investigation and Services

- Photogrammetry, LiDAR & Remote Sensing
- Aerial LiDAR & Imagery, Mobile LiDAR data Acquisition and Processing
- Geotech Engineering and Geophysical Surveys
- Underground Utility Detection (GPR)
- Underwater Leak Detection and Turnkey Solution
- Airborne and Ground Geophysical Surveys
- Route Planning & 3D Corridor Mapping
- GIS/CADD Data Processing
- Geodetic, Topographic, Cadastral, Hydrological Surveys

HONOURS & AWARDS

Geospatial World Excellence Award 2018

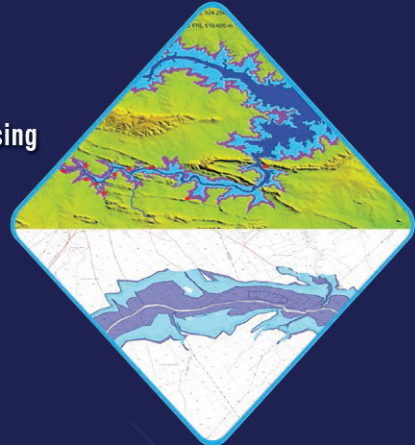
Best Professionally Managed Company 2014

Geospatial Company of the year 2013

National award for Excellence in Engineering Consultancy 2012

Project of National Excellence - Urban Infrastructure 2011

Export Excellence Award 2008 & 2010



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