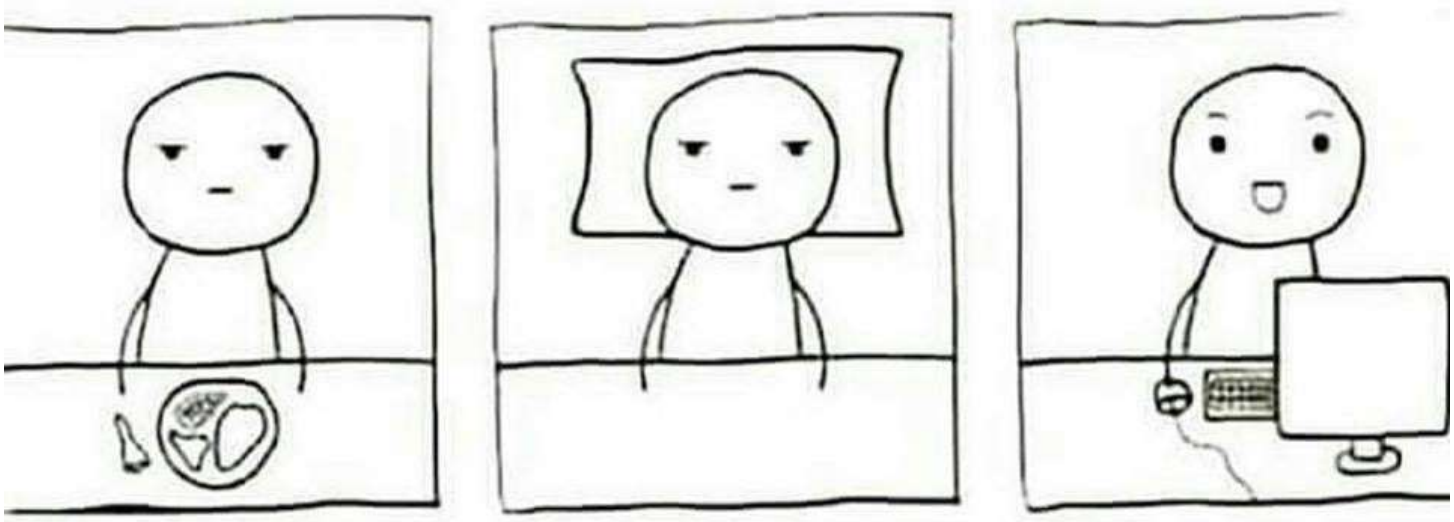
Dr. Taufik Hery Purwanto, M.Si.
Laboratorium Sistem Informasi Geografis
Fakultas Geografi UGM

MY LIFE IN ONLY 3 PICTURES...



Ana Leticia is in Los Angeles, California.

GIS Touches All Our Lives, Everyday

4

Posted: July 9, 2009 by **rohitgarg83** in **GIS**

During the past three decades, a powerful technology has quietly changed the way people view and live in their neighborhoods, towns, and cities. This technology is GIS, and ESRI has been involved in the field since its beginnings. For nearly 30 years ESRI has made GIS available to be used by people to solve real problems.

As is the case with many technologies, most people remain unaware of GIS and its impact-an impact that is as far-ranging as it is useful-despite GIS having grown immensely in the last 15 years, despite hundreds of thousands of people now using the technology, and despite it affecting the daily lives of millions.

To prove this, let's follow your daily routine(in developed countries) and see how GIS helps you in ways that you never suspected.

1. The clock radio rings at 6:00 a.m. You get up and turn on the lights.

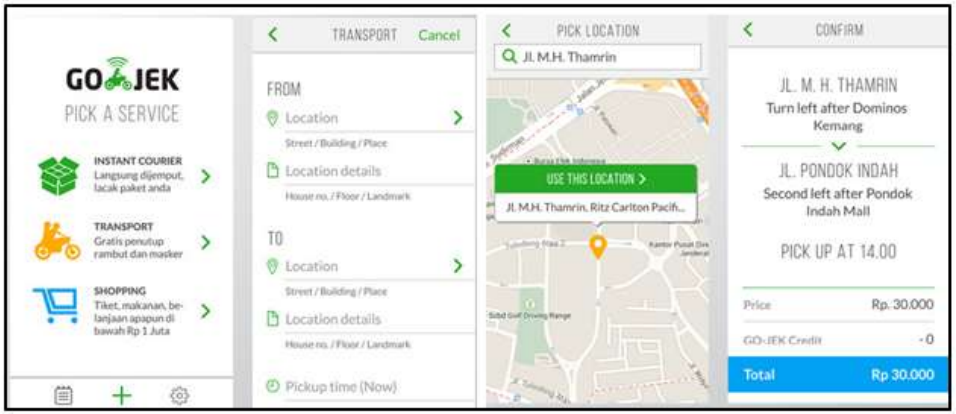
The radio and lights are powered with household electricity. A typical electric utility company serving millions of customers uses GIS to manage its complex infrastructure consisting of tens of thousands of miles of transmission and distribution lines and hundreds of thousands of utility poles, as well as thousands of employees maintaining optimal service at hundreds of sites.

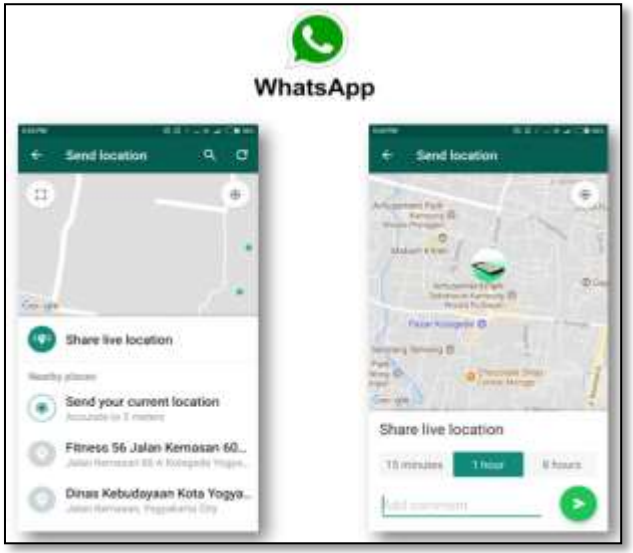
2. You go outside, pick up the morning newspaper, and head back into your house.

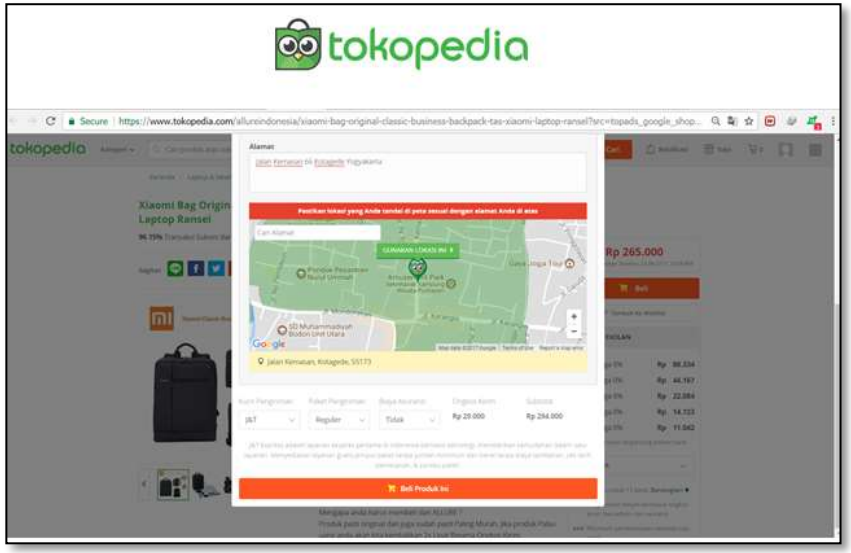
The wood that was the source for the paper and for the lumber of the house was provided by wood product companies that use GIS for sound forest management practices. GIS makes easily available for analysis property boundaries, vegetation, soil analysis, roads, streams, public land survey, contours, watershed, and sensitive areas, allowing forest managers to make the best informed decisions.

https://rohitgarg.wordpress.com/2009/07/09/gis-touches-all-our-lives-everyday/

GIS: Going In Style



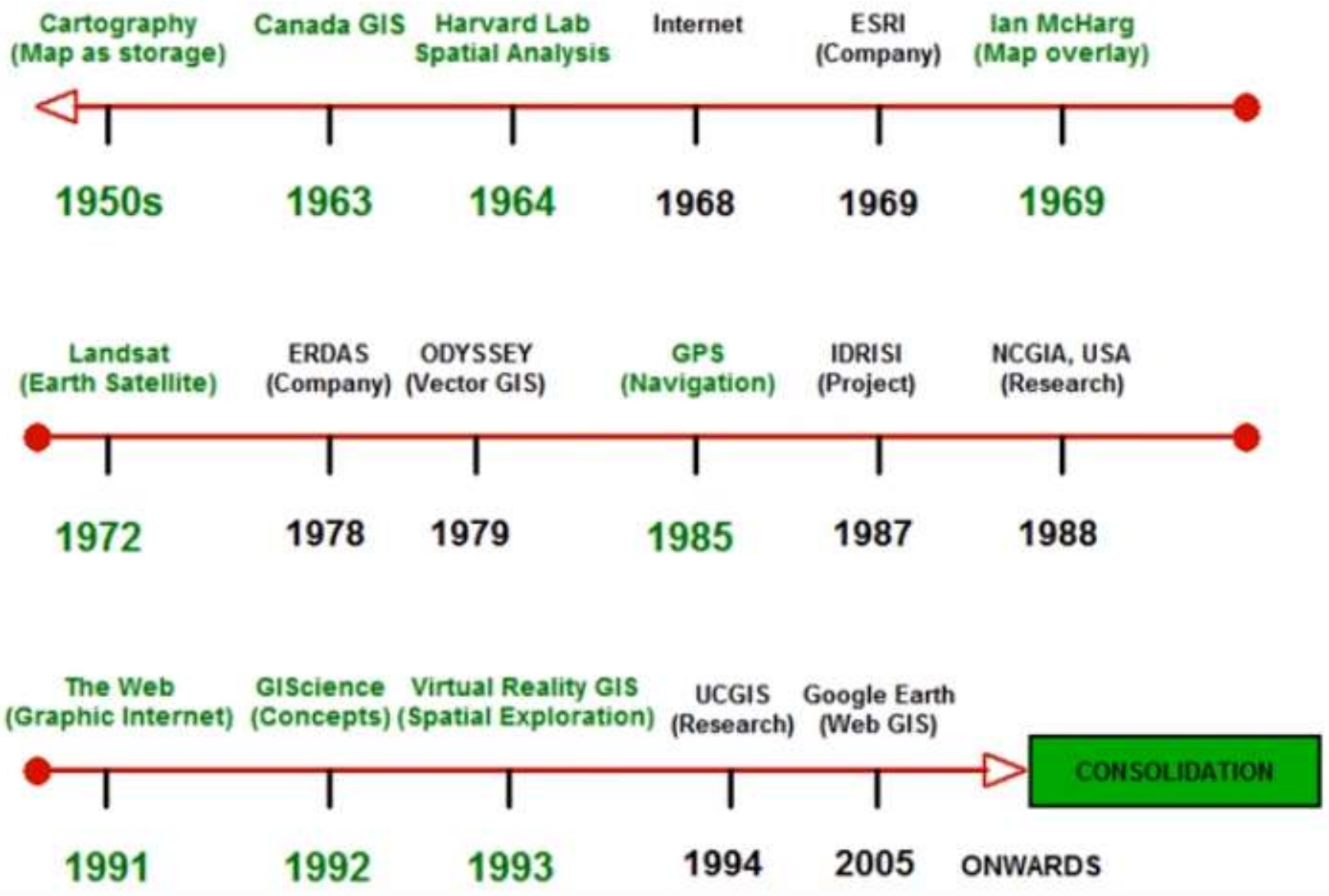




http://dusk.geo.orst.edu/gis/future/sld045.htm

SEJARAH SIG

The evolution of a discipline



GIS VideosTV

GIS History / Software

- Geography Techniques (by hand) pre 1960s: John Snow, Minard's Map (Napoleon)
- Forestry – Canada (+E Africa) - CGIS
  - First GIS – Roger Tomlinson 1960+, operational from 1971+
- USA – Government Organisations: USGS, US Forest Serv, others incl. CIA
- Academia
  - **Edinburgh** – GIMMS 1970+ (Sold from 1973), MSc GIS 1985+
  - Harvard – Computer Graphics and Spatial Analysis Lab 1965
- ESRI 1969 Env. Consultancy – Arc/Info 1982 -> ArcView Desktop 1995 -> ArcGIS 1999
- Physics/Space (Moon landings) later CAD/Utilities – LaserScan/Intergraph 1969
- Demographics/Consultancy – MapInfo 1986
- OpenSource – GRASS, Quantum GIS (QGIS), gvSIG, … link to DBMS
- Web GIS – WMS, WFS, Google Maps, Google Earth, OGC, OpenStreetMap

Dari awal manusia

manusia telah membuat sketsa kasar abstraksi geografi pada dinding gua dan batu. Ini awal peta didokumentasikan dan pengetahuan geografis dikomunikasikan oleh nenek moyang kita untuk bertahan hidup:

- ***What is the best way to get from here to there?***
- ***Where is the water at this time of year?***
- ***Where is the best place to hunt animals?***

Nenek moyang kita menghadapi pilihan yang menentukan kelangsungan hidup mereka, dan mereka menggunakan informasi geografis yang disimpan di peta untuk membantu mereka membuat keputusan yang lebih baik.

Early man used cave walls and rocks as a canvas to communicate and share geographic knowledge

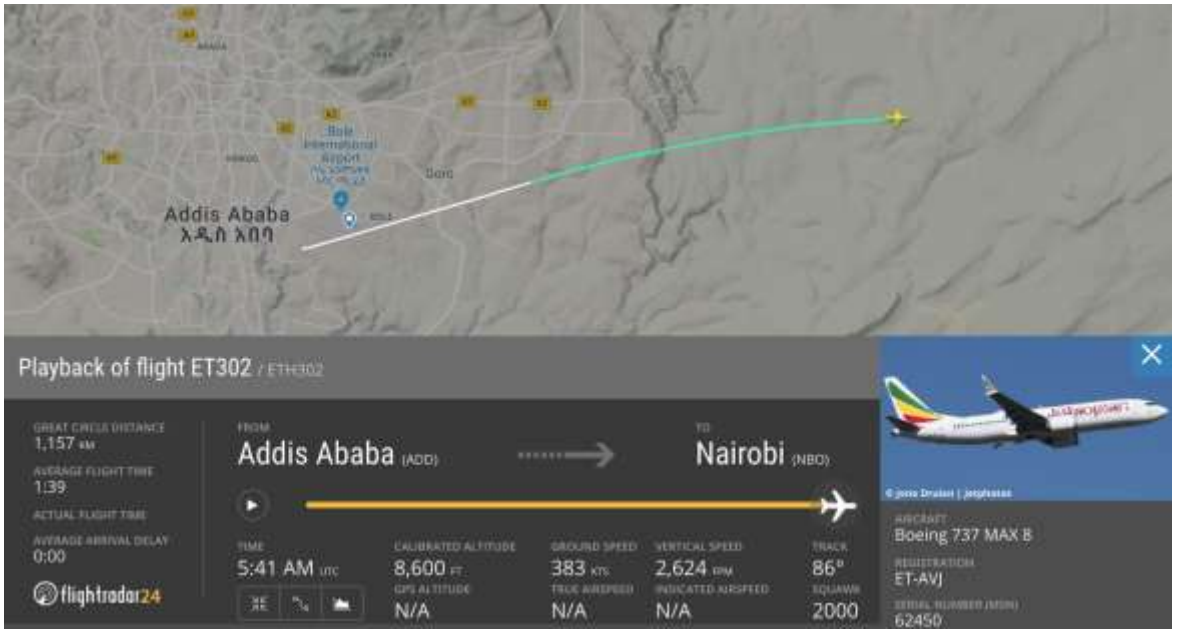
Jack Dangermond and Matt Artz, 2012

35.000 tahun

yang lalu, di dinding gua Lascaux, Perancis, para pemburu Cro-Magnon menggambar hewan mangsa mereka, juga garis yang dipercaya sebagai **rute migrasi hewan-hewan** tersebut. Catatan awal ini sejalan dengan dua elemen struktur pada sistem informasi gegrafis modern sekarang ini, arsip grafis yang terhubung ke database atribut.

http://id.wikipedia.org/wiki/Sistem_informasi_geografis

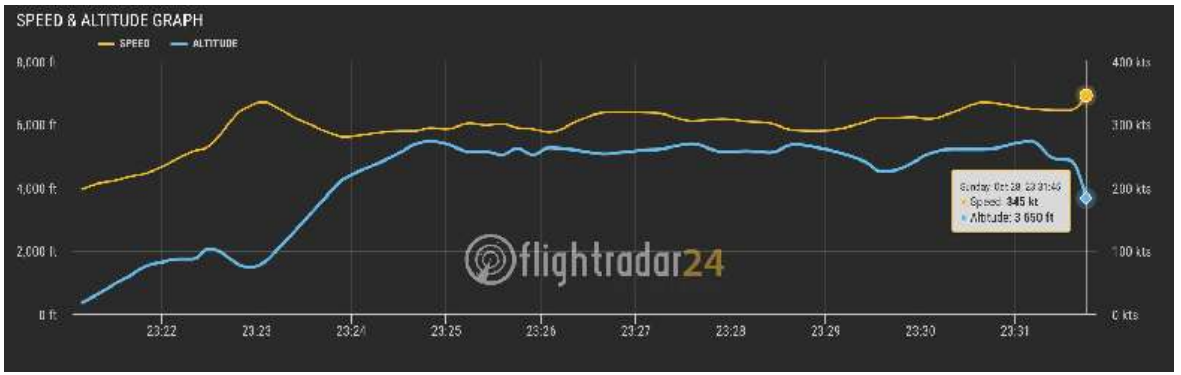
Pesawat Ethiopian Airlines ET 302 dilaporkan jatuh setelah 6 menit take off (08.38 waktu setempat) pada Minggu (10/3/2019).



Ini Rekam Jejak Lion Air JT610 di Aplikasi Flightradar 24

Pernita Hestin Untari, Jurnalis · Senin 29 Oktober 2018 11:43 WIB

Aplikasi Flightradar 24 telah berhasil merekam jejak rute terbang pesawat Lion Air dengan kode JT610. Pesawat tersebut jatuh di Tanjung Karawang setelah hilang kontak sekira pukul 06.31 WIB pada 29 Oktober 2018.




LNI566
Sleman
SPECIAL DISTRICT
OF YOGYAKARTA
Kasihan
Banguntapan
Bantul
Srandakan
3
15

Boeing's 787 Dreamliner drew a self portrait over the United States.

Pemuda bernama Fahd Qash dari wilayah Jizan, Arab Saudi, menemukan seekor elang mati di lembah *Valley of the Child* di Arab Saudi.
Saat dtemukan terdapat perangkat GPS yg telah dipasang di Rusia sekitar dua dekade lalu.

Burung yang kuat tsb. telah melakukan perjalanan ke banyak negara. Yang menarik adalah burung tsb. menghindari menyeberangi lautan.

https://playjunkie.com/gps-found-on-dead-eagle-discovers-20-years-of-his-travels/

Seorang pria menghabiskan waktu enam bulan berkeliling Jepang untuk membuat lamaran pernikahan menggunakan Google Maps. Selain itu, ia juga membuat rekor Guinness World Record karena menggambar GPS terbesar dalam sejarah.

Era geografi komputasi

Era geografi komputasi dipimpin oleh karya inovatif Dr. Roger Tomlinson, yang mengembangkan the Canada Geographic Information System pada tahun 1967.

Dr. Roger Tomlinson pioneered the development of GIS, ushering in the era of computational geography

GIS is the technology of our times and is uniquely suited to assist in solving the problems that we face.
—Roger Tomlinson

Geospatial Infrastructure

- Orang-orang secara intuitif lebih memahami peta, dan peta secara historis menjadi metode terbaik untuk mengkomunikasikan pengetahuan geografis.
- Sebagian besar peta masuk ke Internet.
- Perkembangan perangkat seluler sangat cepat. Perangkat seluler akan terus tumbuh mendukung lebih banyak fungsi geospasial, dan semakin mudah terhubung ke sistem yang didukung SIG di seluruh dunia, Demokratisasi data —penggunaannya secara luas menghasilkan infrastruktur jenis baru, yaitu : **Infrastruktur Geospasial**.
- Seiring waktu, masyarakat akan menjadi semakin tergantung pada infrastruktur geospasial ini, seperti ketergantungan kepada infrastruktur tradisional: infrastruktur jaringan listrik atau jaringan jalan raya.

Jack Dangermond and Matt Artz, 2012

- Hari ini semakin banyak data geografis daripada sebelumnya. Citra satelit sudah biasa. Para ilmuwan sedang memproduksi pegunungan data. Arus data yang terus meningkat dari media sosial, *crowdsourcing*, dan *web sensor*. Semua data yang terkumpul ini (pengetahuan geografis), selanjutnya dapat disintesis untuk membuat kita lebih mudah memahami dan bertindak secara bijak terhadap bumi ini.

Jack Dangermond and Matt Artz, 2012

OUR WORLD

Is Increasingly Challenged

The Evidence Is Clear…

We Need *Better Understanding*…
…and *More Collaboration*

…and *Action*

Key Issues of the 21st Century

- Energy
- Sustainable Agriculture
- Biodiversity
- Natural Hazards
- Traffic/Transportation
- Crime/political instability
- Water quality/availability
- Climate change
- Migration and Urbanization


OUR WORLD
Is Undergoing a Massive
Digital Transformation

THE SCIENCE OF WHERE

A Framework and Process

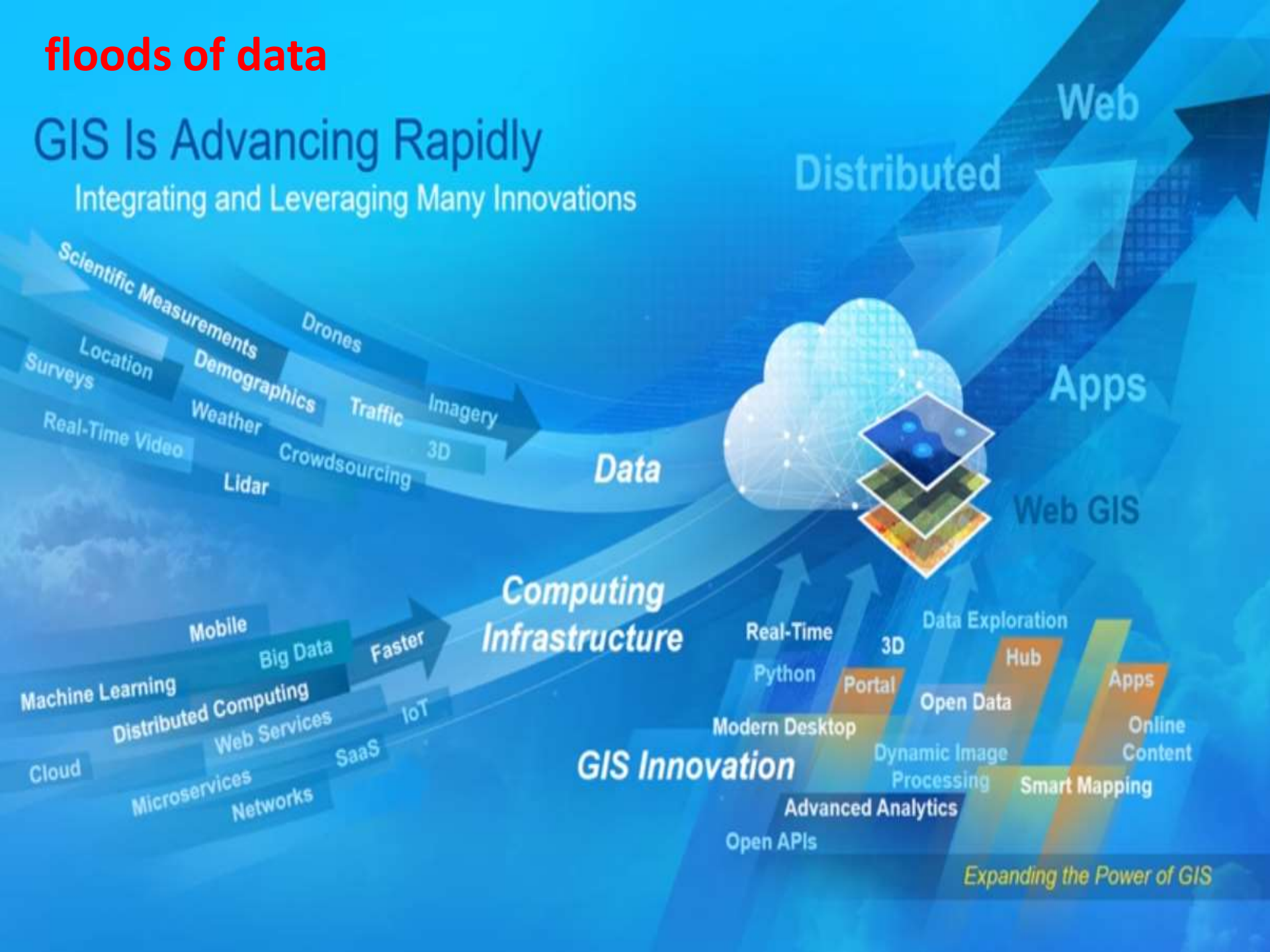
GIS Provides the Platform

For Managing, Analyzing, and Applying Geographic Information

Integrating People,
Processes, Things,
and Data About Them

Using the Power of Where
to Integrate Everything

floods of data



shared knowledge and collaboration, this is improving productivity and efficiency


Sharing Knowledge
Collaboration
ng Productivity and Efficiency

Apps are bringing GIS to life in many ways .Its bringing the power of GIS to everyone extending the reach to field people connecting them to their organization and business

*People now can get data off the web as **services**, do interactive designs look at scenarios analyze and evaluate the consequences of them, and then share disseminate the results*

Web GIS is not only helping you do your work better it's also advancing analytics and geo enabling data science.

Smart Mapping and Exploratory Data Analysis

Simplifies the Use of Analytics and Creates Beautiful Maps

Web GIS Is Revolutionizing How We Plan and Design

Integrating Science Into the Design Process

Web GIS Is Making Spatial Analysis More Accessible

Advancing Analytics and Geo-Enabling Data Science

Web GIS Is Connecting Everyone

Using Web Maps and Apps to Share and Collaborate

Web GIS Enables Community Engagement

Organizing and Managing Community Interactions

Providing Citizens Information . . .
. . . And Leaders Input

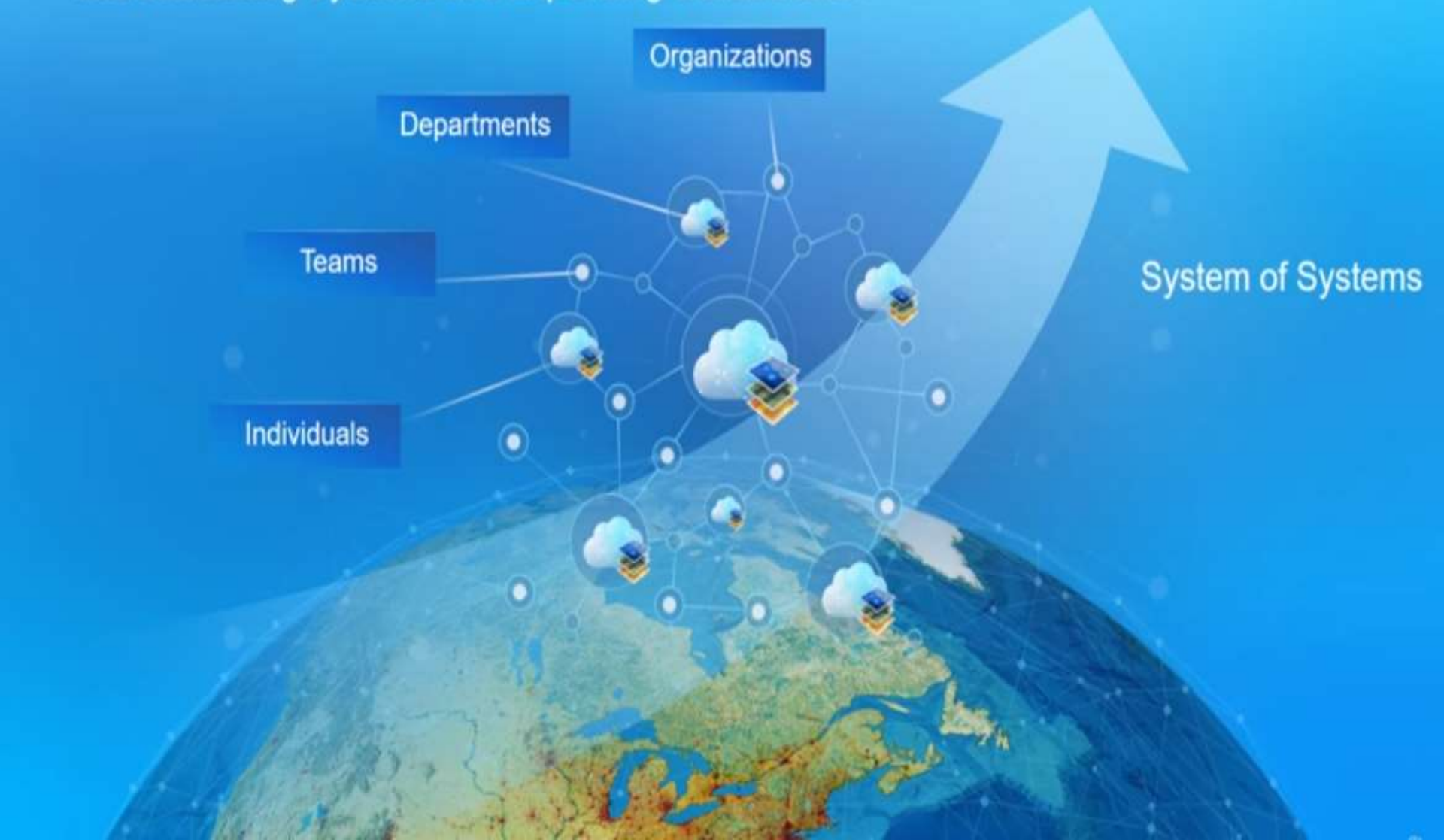
Community
GIS Hub

- Citizen Communication
- Citizen Surveys (Crowdsourcing)
- Status Reporting
- Open Data
- Storytelling
- Demographic Information

Policy Initiative Based

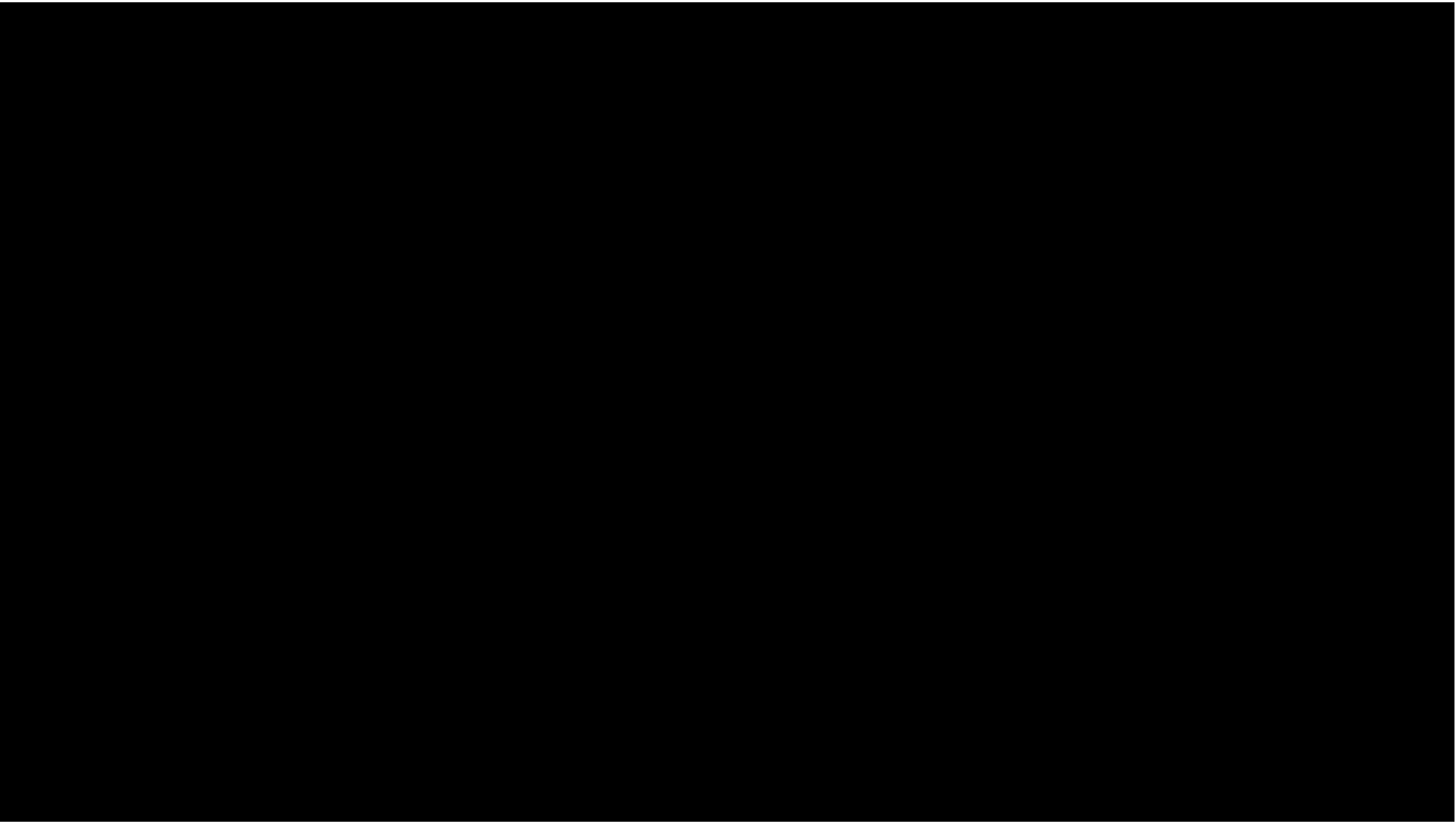
Web GIS Enables a Whole New Scale of GIS

Interconnecting Systems and Expanding Collaboration

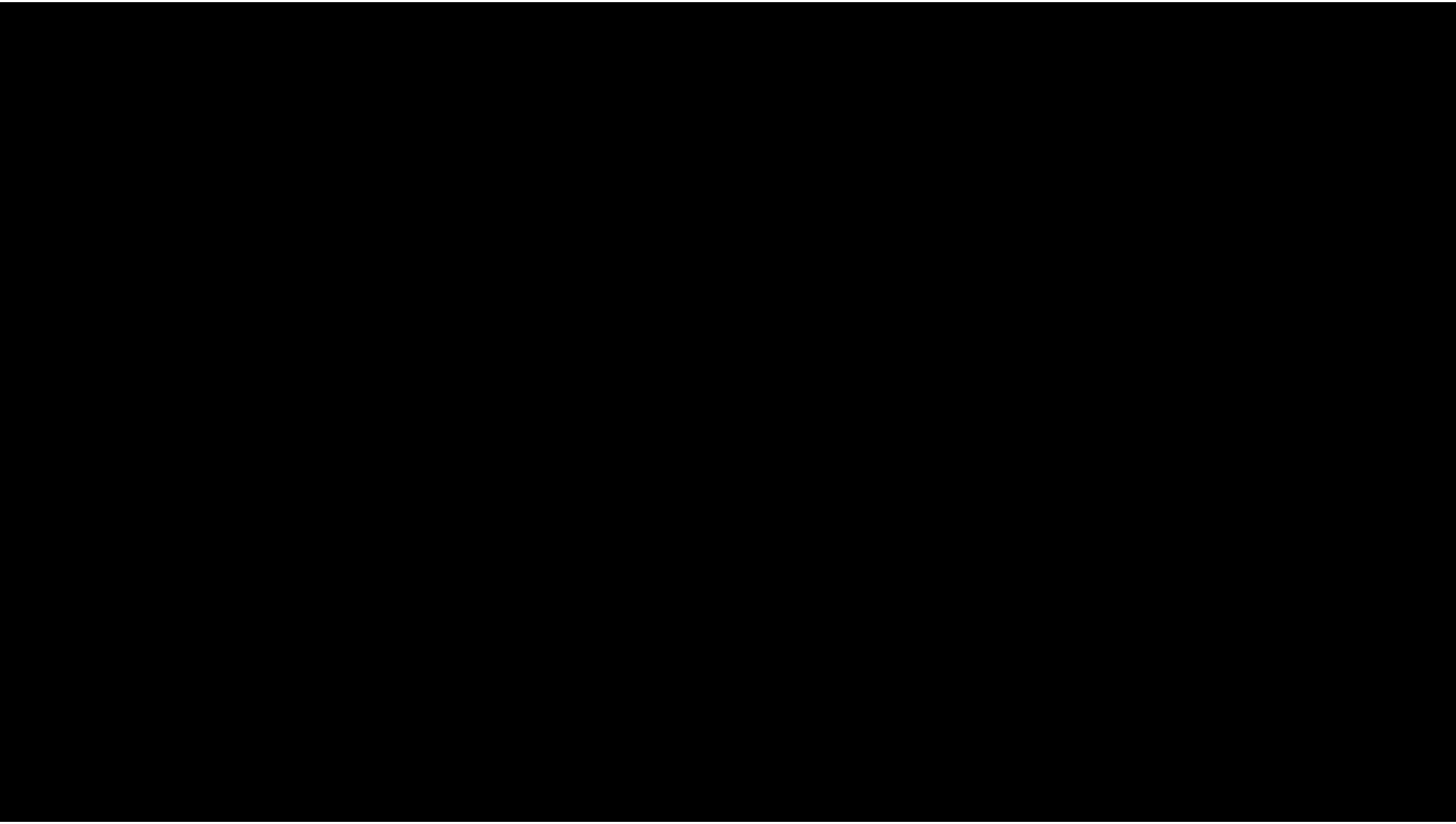



GIS Now Provides
the Means . . .
To Do Your Work Better. . .
. . . and for You to Apply
The Science of Where
. . . everywhere

Applying The Science of Where



Artificial Intelligence and Machine Learning with ArcGIS



PERKEMBANGAN INDUSTRI SIG TERKINI DI ERA REVOLUSI INDUSTRI 4.0

Jack Dangermond (President ESRI, perusahaan terbesar software SIG), memperkenalkan World Geospatial Industry Council (WGIC) pada Sesi ke-8 UN-GGIM tanggal 3 Agustus 2018.

Geospatial World
Published on Aug 3, 2018

https://www.youtube.com/watch?v=PWmVetfBSNg

Berdirinya World Geospatial Industry Council (WGIC) (https://wgicouncil.org) dipelopori oleh Sanjay Kumar (Pendiri dan CEO Geospatial Media & Communications). Visi WGIC adalah memajukan peran industri geospasial dan memperkuat kontribusinya dalam ekonomi dunia dan pada masyarakat. Badan ini bertujuan untuk memfasilitasi pertukaran pengetahuan dalam industri, menciptakan peluang bisnis yang lebih besar untuk industri, mewakili kepentingan bisnis, berbagi perspektif dan mendukung pengembangan kebijakan yang memungkinkan melalui advokasi kebijakan dan dialog dengan badan-badan yang relevan.

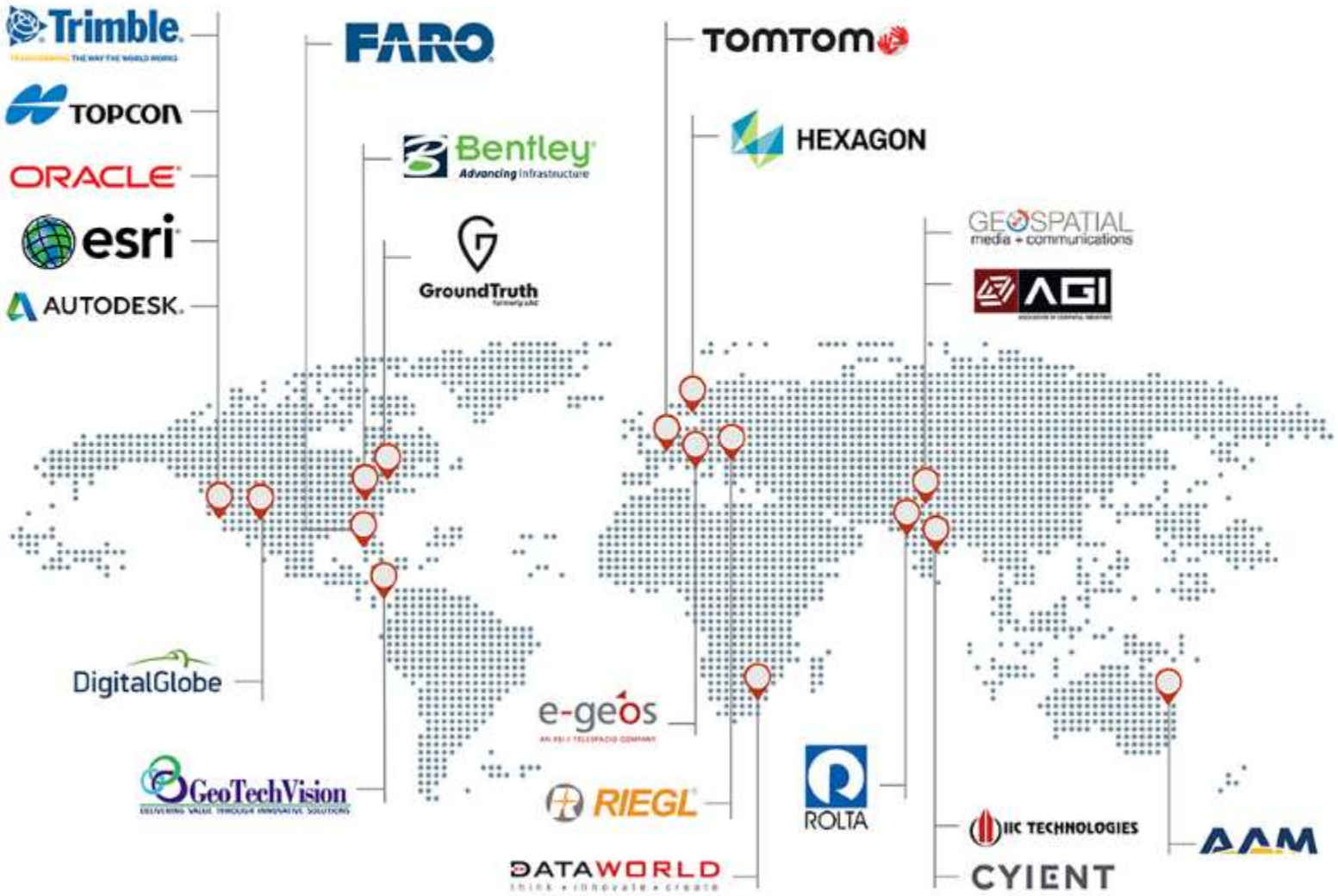
VISION:

To be a collaborative platform for advancing the role of geospatial industry and strengthening its contribution in world economy and society.

https://wgicouncil.org/index.html?adbsc=social_branding_20180806_2484771&adbid=643219144558684160 0&adbpl=li&adbpr=5311&adbid=10156402275310281&adbpl=fb&adbpr=211211155280

World Geospatial Industry Council

CO-FOUNDERS



Wadah organisasi dari perusahaan-perusahaan swasta nasional yang kegiatan usahanya mengkhususkan pada bidang Survei Pemetaan (Surta) dan Informasi Geospasial adalah Asosiasi Perusahaan Survei dan Pemetaan dan Informasi Geospasial (APSPIG) atau *Association of Surveying and Mapping Enterprises for Geospatial Information*, sebelumnya bernama Asosiasi Perusahaan Survey dan Pemetaan Indonesia (APSPI). APSPIG didirikan dengan tujuan membina dan mengembangkan para anggotanya yang bergerak dalam bidang survei-pemetaan dan informasi geospasial. Pada saat ini perusahaan (*company*) yang terdaftar sebagai anggota APSPIG adalah 128 perusahaan (http://www.apspig.com/anggota_aspig_list.php?goto=7).

Lembaga pemerintah di Indonesia yang bertugas melaksanakan tugas pemerintahan di bidang informasi geospasial adalah Badan Informasi Geospasial (BIG www.big.go.id).Kebijakan Pemerintah terkait Informasi Geospasial sejak Presiden SBY dan Presiden Jokowi yang terkenal adalah Kebijakan Satu Peta (One Map Policy).Mengingat pentingnya Kebijakan Satu Peta (KSP) ini, pemerintahan Presiden Jokowi memasukan dalam Paket Kebijakan Ekonomi VIII tentang KSP yang dikeluarkan pada tanggal 21-12-2015, bahkan Presiden selanjutnya menerbitkan Perpres No 9 Tahun 2016 tentang Percepatan Kebijakan Satu Peta pada tingkat ketelitian peta skala 1:50.000. https://www.youtube.com/watch?v=C1tXw3nDHNc

PRESIDEN
REPUBLIK INDONESIA

KEPUTUSAN PRESIDEN REPUBLIK INDONESIA

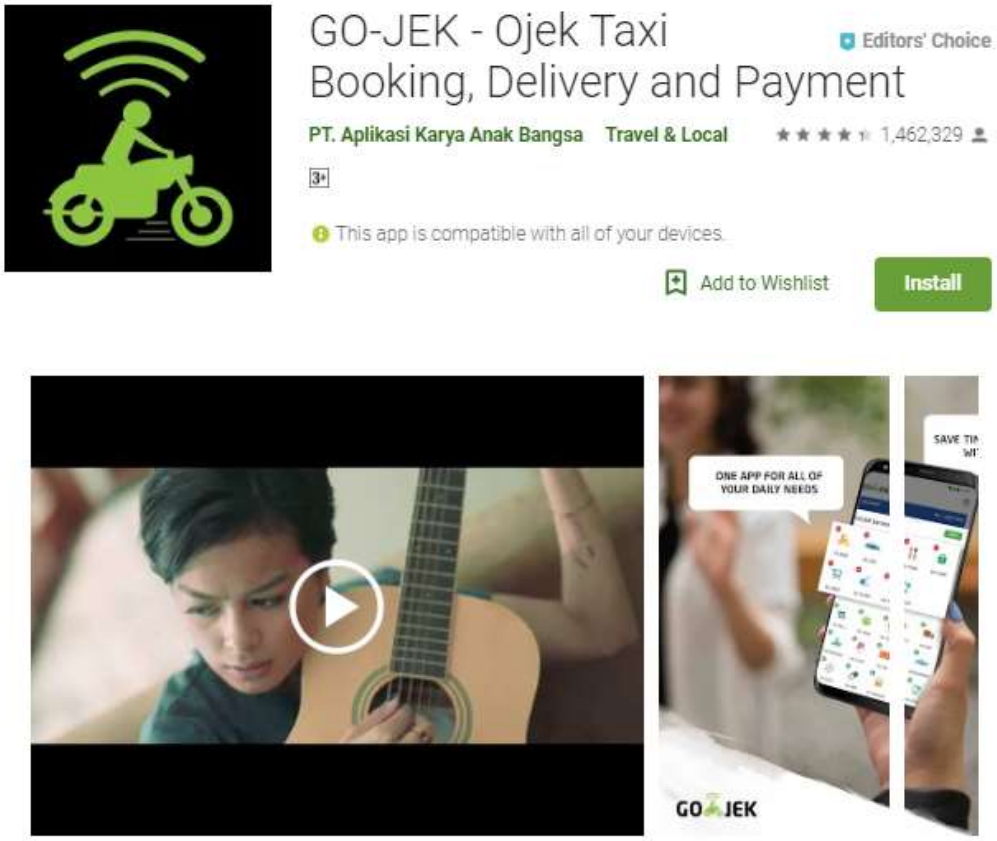
NOMOR 20 TAHUN 2018

TENTANG

KEWENANGAN AKSES UNTUK BERBAGI DATA DAN INFORMASI GEOSPASIAL MELALUI JARINGAN INFORMASI GEOSPASIAL NASIONAL DALAM KEGIATAN PERCEPATAN PELAKSANAAN KEBIJAKAN SATU PETA

KEPUTUSAN PRESIDEN REPUBLIK INDONESIA NOMOR 20 TAHUN 2018 TENTANG KEWENANGAN AKSES UNTUK BERBAGI DATA DAN INFORMASI GEOSPASIAL MELALUI JARINGAN INFORMASI GEOSPASIAL NASIONAL DALAM KEGIATAN PERCEPATAN PELAKSANAAN KEBIJAKAN SATU PETA

Industri Geospasial yang sukses di Indonesia adalah GO-JEK (https://www.go-jek.com/), yang tahun 2018 ini valuasinya bernilai 40 Trilyun Rupiah. Coba bayangkan Aplikasi Go-Jek tanpa Peta, tanpa ada gambar dan posisi tracking driver dan pemesan, pasti aplikasi ini tidak disukai dan tidak sesukses ini yang membuat nilainya sangat Fantastis.



MENTERI KETENAGAKERJAAN
REPUBLIK INDONESIA

KEPUTUSAN MENTERI KETENAGAKERJAAN
REPUBLIK INDONESIA
NOMOR 95 TAHUN 2017
TENTANG
PENETAPAN STANDAR KOMPETENSI KERJA NASIONAL INDONESIA
KATEGORI AKTIVITAS PROFESIONAL, ILMIAH DAN TEKNIS GOLONGAN
POKOK AKTIVITAS ARSITEKTUR DAN KEINSINYURAN;
ANALISIS DAN UJI TEKNIS BIDANG INFORMASI GEOSPASIAL

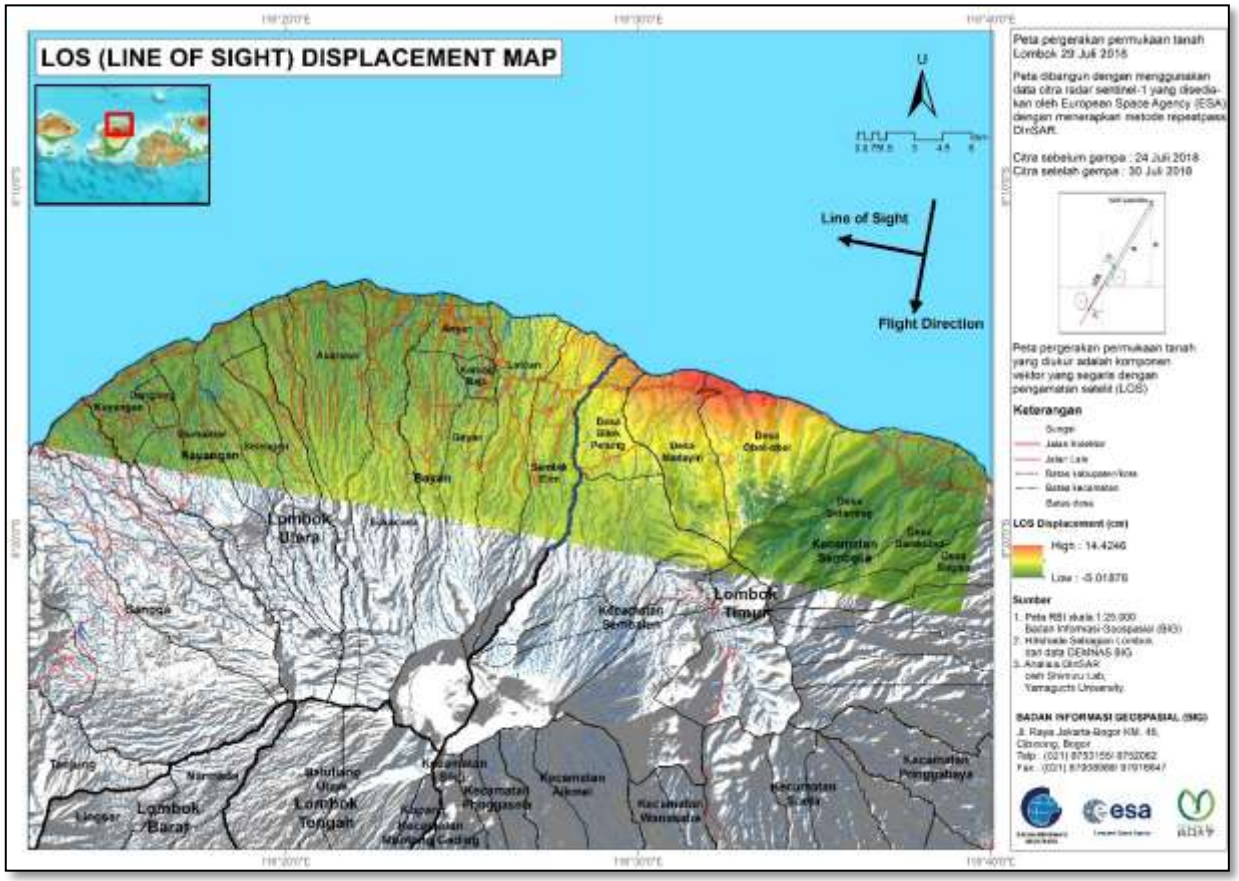
Profesi dan Kompetensi Kerja di Bidang IG pun telah ditetapkan dengan KepMen Ketenagakerjaan No 95 tahun 2017

Kompetensi Kerja di Bidang Informasi Geospasial dikelompokkan menjadi 7 Sub Bidang:

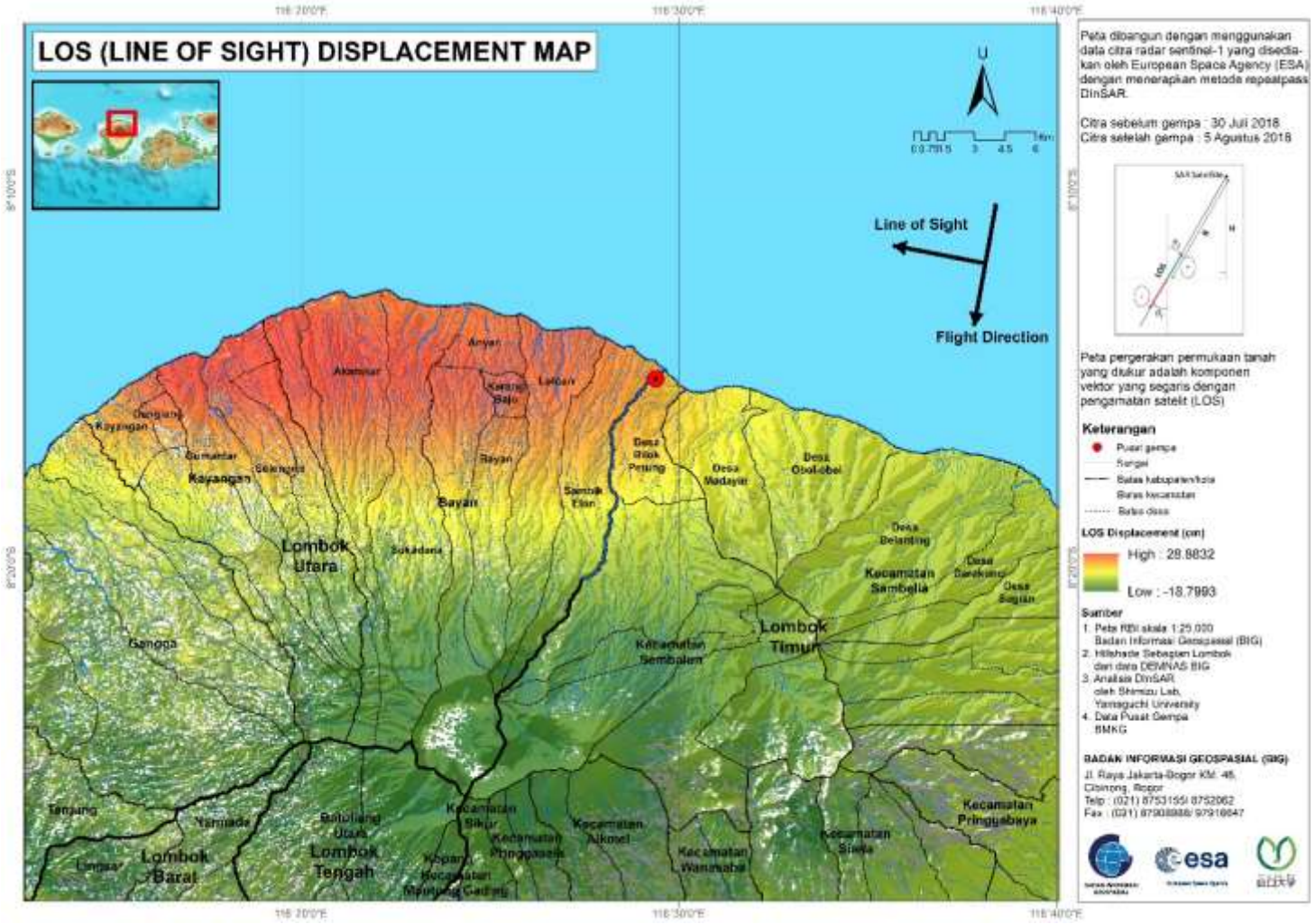
1. Sub Bidang Survei Terestris
2. Sub Bidang Fotogrametri
3. Sub Bidang Penginderaan Jauh
4. Sub Bidang Sistem Informasi Geografis (SIG)
5. Sub Bidang Kartografi
6. Sub Bidang Hidrografi
7. Sub Bidang Survei Kewilayahan.

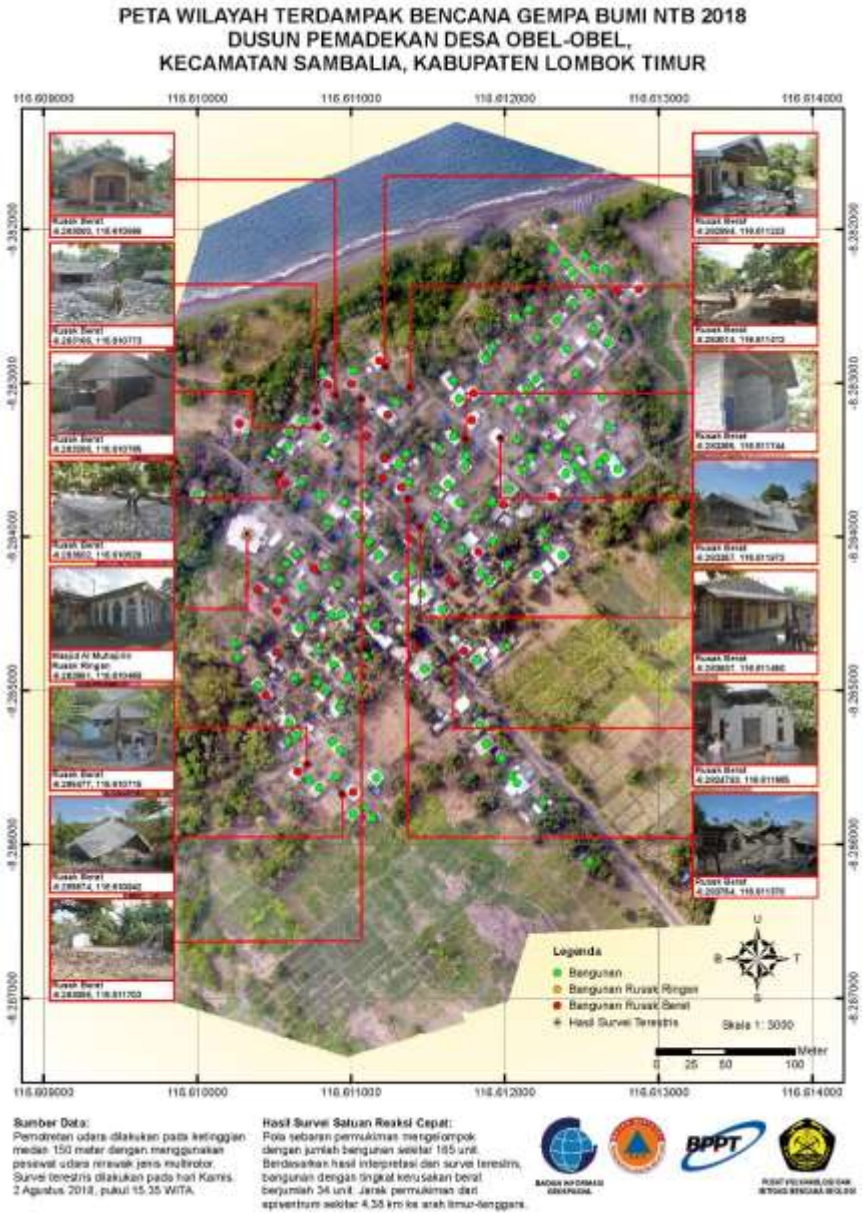
LSP yang berafiliasi dg KAN dan BNSP pun banyak yg telah melaksanakan sertifikasi sub-sub bidang IG, spt: LSP ISI, MAPIN, Geospasial, Geoprof, dll.

Salah satu aplikasi Teknologi Informasi Geospasial dalam Tanggap Darurat Bencana Gempa LombokSalah satu analisa cepat menggunakan citra satelit penginderaan jauh sentinel oleh temen pelaku bidang Informasi Geospasial untuk melihat pergerakan permukaan yang tentunya berkorelasi dengan dampak kerusakan. Hal ini sesuai dengan fakta dilapangan saat pemetaan cepat UAV dimana kerusakan berat banyak ditemukan di 3 desa Lombok timur (tanda kuning dan merah)



Analisa Citra PJ sentinel setelah gempa bumi 5/08/2018, diindikasikan kerusakan di lombok utara sangat parah, ini dapat dijadikan acuan untuk pemetaan prioritas daerah yang akan ditanggulangi





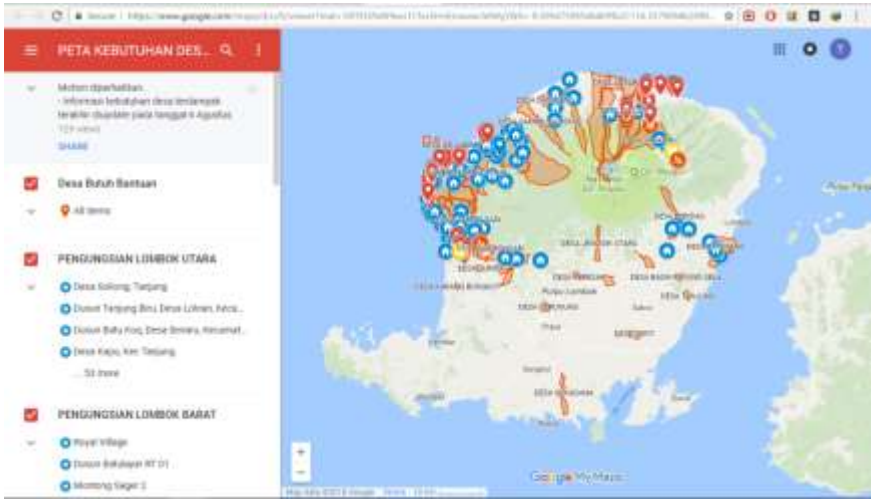
salah satu dusun yang direkam UAV/Drone terdampak gempa bumi NTB

Peta Kebutuhan Desa Terdampak Gempa di Lombok tahun 2018

http://ugm.id/petabencanalombok2018

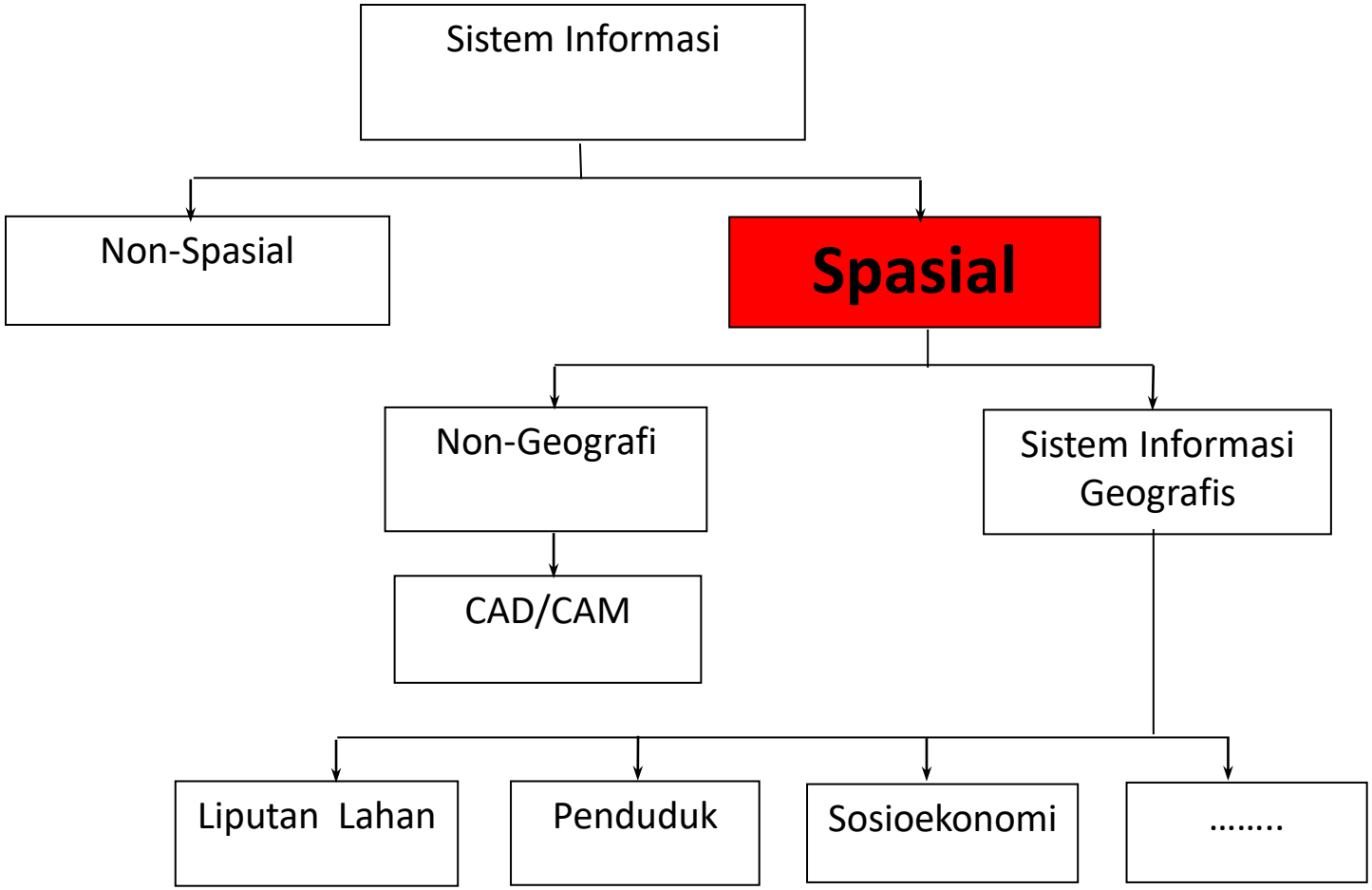
http://ugm.id/petabencanalombok2018a

Sistem ini dibuat oleh tim Laboratorium Sistem Informasi Geografis (SIG) Fak Geografi UGM, dimana kami menjadi bagiannya, sbg pengabdian lab. Kegiatan ini telah dimulai sejak tsunami Aceh 2004, yg melibatkan mhs utk menerapkan ilmunya daripada bawa kardus di perempatan jalan.



PENGERTIAN SIG

Taxonomi Sistem Informasi

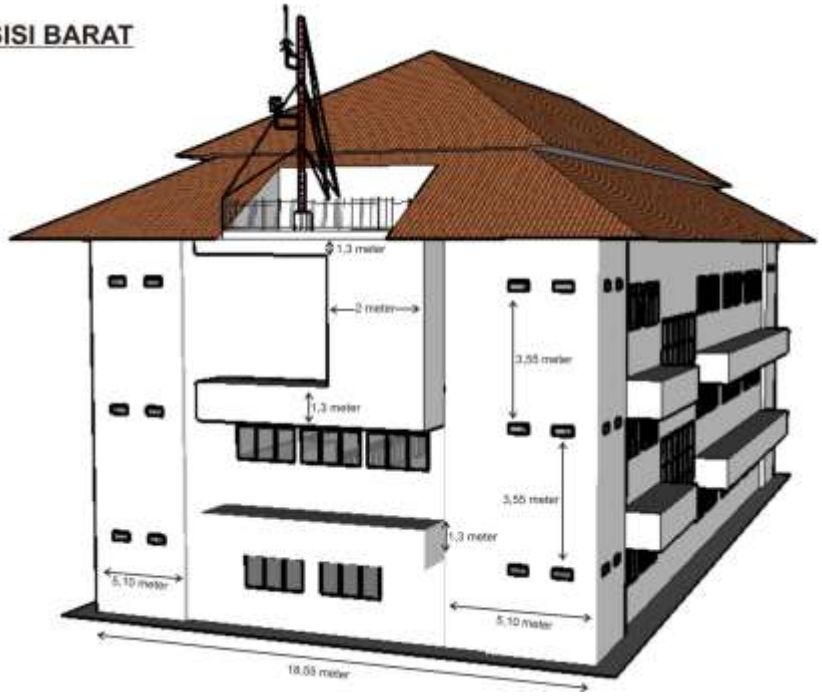


Information has always been the cornerstone of **effective decisions**.

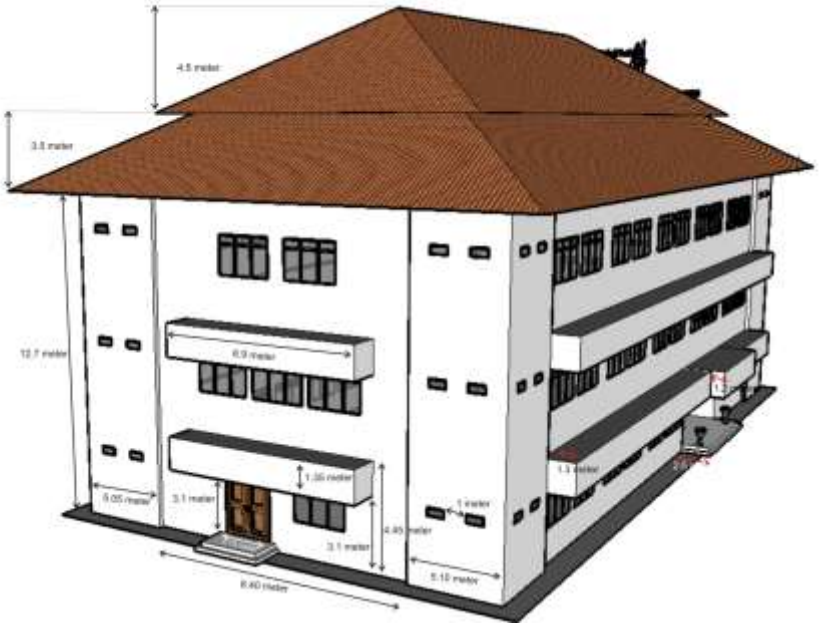
Spatial information is particularly complex as it requires two descriptors — **Where** is **What**

Spasial non SIG

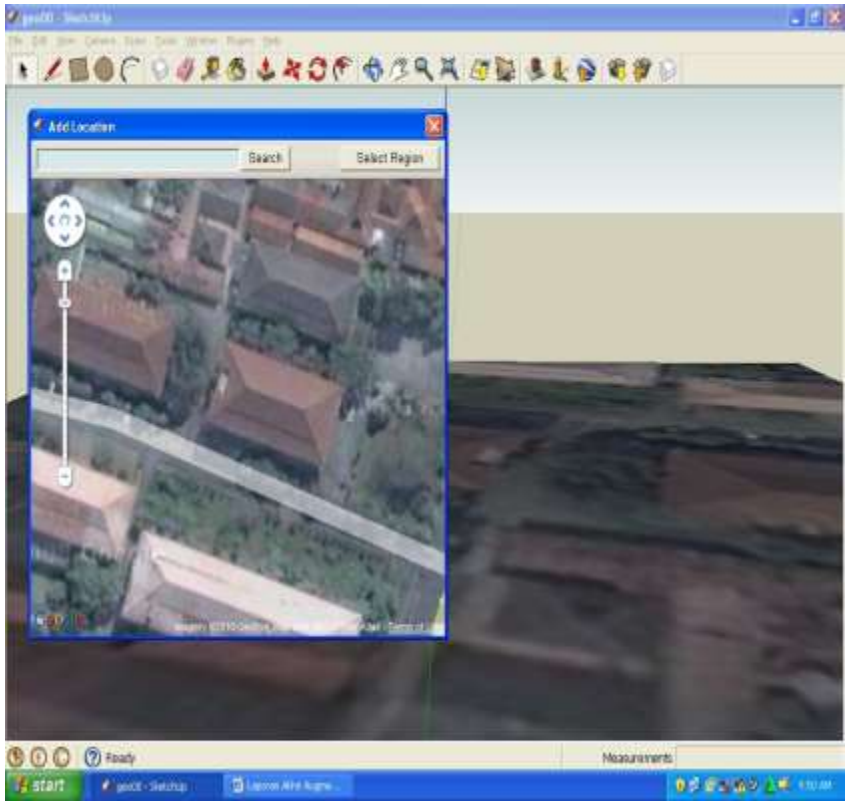
SISI BARAT

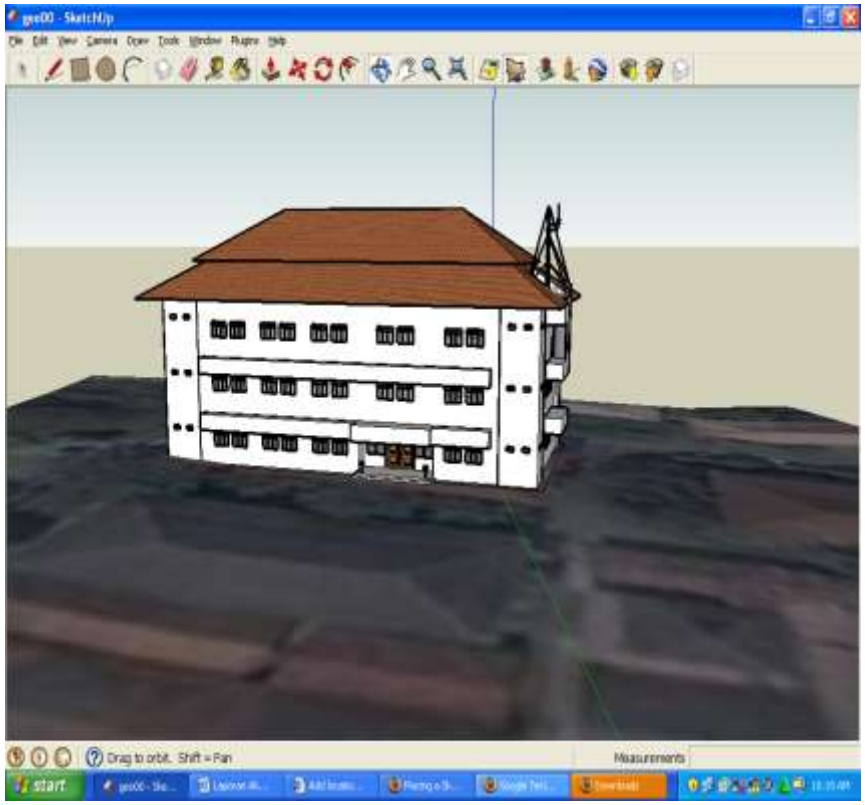


SISI TIMUR



Spasial - SIG





Google SketchUp juga mempunyai kemampuan ***Geo-locating***

yaitu kemampuan memberikan lokasi geografi yang presisi bahkan bisa memperhatikan aspek *terrain* dari lokasi model SketchUp melalui model penempatan di Google Earth.

Differences between GIS and CAD

A GIS (Geographic Information Systems) is an interoperable system of software, hardware, and users that aims to capture, analyze, store, query, and represent geographic information in digital media.

CAD (Computer-Aided Design) is a system of hardware and software used by users to create or design objects.

The main differences between a GIS or a CAD are analyzed as follows:

- A GIS necessarily requires a spatial reference, whereas a CAD can dispense with it.
- In a GIS scale change is very simple, in a CAD scale change can be problematic.
- A GIS data is stored in multiple files, while a CAD data can be stored in a single file.
- GIS applications usually use a common terminology (for example, a **layer** is the same in ArcGIS, QGIS, Erdas, Envi), in a CAD some terms may conflict (for example, a layer in AutoCAD is understood as a **layer**, but MicroStation understands it as a **level**).
- In a GIS, analysis predominates, a CAD places greater emphasis on detail and precision (for example, the design of park elements).
- A GIS is very efficient for managing databases, but it is not a strength of a CAD.
- In a GIS, lines or polygons are representations of their associated data, whereas in a CAD the lines and polygons are of paramount importance, because they can be used to represent a plane.
- A GIS represents the real world, a CAD can represent existing or non-existent objects of the real world (design and creativity are dominant).

https://geogeek.xyz/differences-gis-cad-formats.html

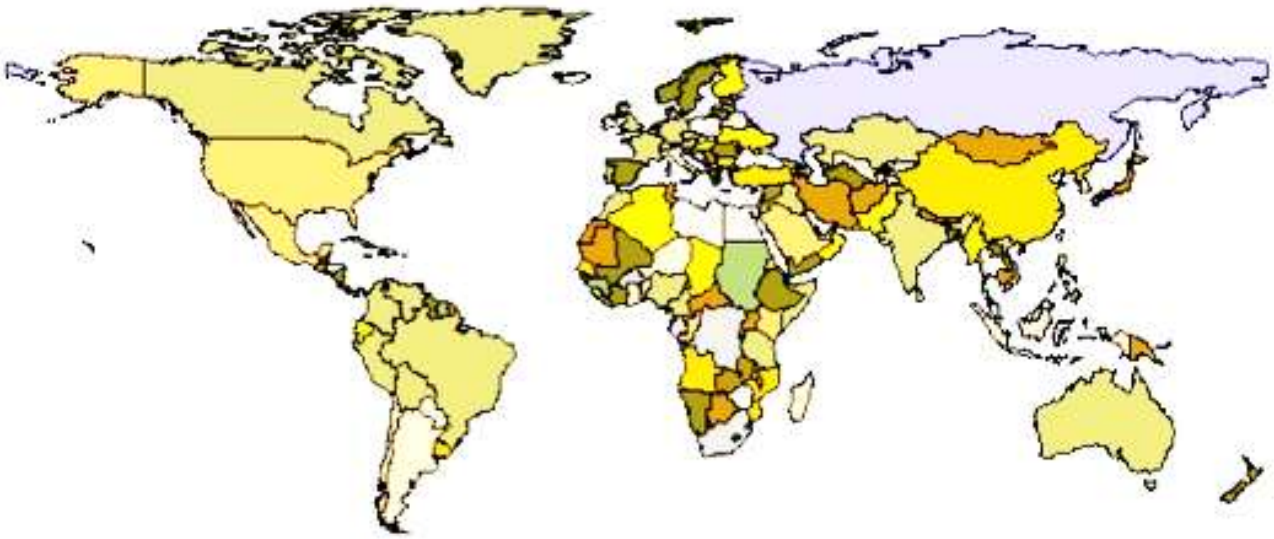
Geographical Information System (GIS)

Geographical = *Location-based/*
location of spatial features is known in the form of geographical coordinates

Information = *Database/*
case-specific information can be provided as maps, figures and tables

System = *consists of Hardware, Software, Data, and Liveware (Human Resources)*

- GIS-**G**eographic **I**nformation **S**ystems
- Computerised information systems designed to handle geo-spatial data
  - **data which relates to location in the world**



GIS is an acronym for:

1. Geographic Information Systems (US)
2. Geographical Information Systems (UK, Aust., Canada)
3. Geographic Information Science (Academia)

GIS: Going In Style

"Spatial is special" (Longley, *et al.*, 2011).
Geospatial – subset of "spatial" (on earth)

All Assets are 'Spatial'

The Science of Where: Our Promise

I am excited to share with you Esri's renewed emphasis on our brand, its meaning and its promise. We have captured our long history, our values, and mission in a new tagline, "The Science of Where," which we feel represents Esri's essence.

From its earliest days, Esri's values have been rooted in purpose and service and a mission to inspire positive change. For nearly half a century, we have relentlessly pushed the boundaries of geographic science and opened the world to the possibilities of powerful geospatial technologies.

With the advent of the digital transformation, we stand on the edge of a new technological frontier. The release of Esri's ArcGIS 10.5 is The Science of Where, in action. With ArcGIS 10.5, we provide the next generation of GIS that will simplify and amplify the work of our users everywhere. Together with our user community, we are pioneering a common visual language that combines mapping and advanced analytics to connect real-time data to the people and organizations that need them most—you, our users.

The Science of Where, is the perfect representation of our past, our present, and our future because The Science of Where, is—quite simply—what we do. It's also what our users do too, every day. Our users around the world practice The Science of Where, by mapping the ocean floor; by making organizations smarter; by implementing retail location strategies; by building strong, resilient economies. They understand and embrace the knowledge and commitment to make these kinds of projects really work, which is something you will see again and again as you read the stories featured in this issue of *ArcUser*.

The Science of Where, is the science of digital transformation, the science of exploration and navigation, the science of commerce and ecology. It's the science of insight and innovation. It inspires us and drives us to offer the most high-powered, high-performance mapping and analytics capabilities in the world.

The Science of Where, is the context layer for all of our content and visualization capabilities. It streamlines the spatial analysis of geographic and enterprise data through intuitive maps, charts, and graphs.

The Science of Where, is our brand. Our brand is our promise. It reflects our commitment to geoscience and to innovating the great technologies that harness it so that our customers can continue to create the maps that run the world.

Please join me in embracing The Science of Where, as an articulation of our joint mission to make the world a better place.

Warm Regards,

Jack Dangermond

The Science of Where

The Science of Where is the perfect representation of our past, our present, and our future because The Science of Where is, quite simply, what we do.

http://www.esri.com/esri-news/arcnews/winter17articles/the-science-of-where-our-promise

Winter 2017

What is The Science of Where

It in corporates (ESRI) many other sciences, like:

- geography,
- data Science,
- analytics,
- modeling,
- computer science,
- the science of visualitation,
- decision support science.

It actually integrates all of these that kinds of it's like a meta science. Well without going to abstract on you I'ill also simply sy what is it? What is The Science of where.
The Science of Where is the framework for apllying sciences to almost everything

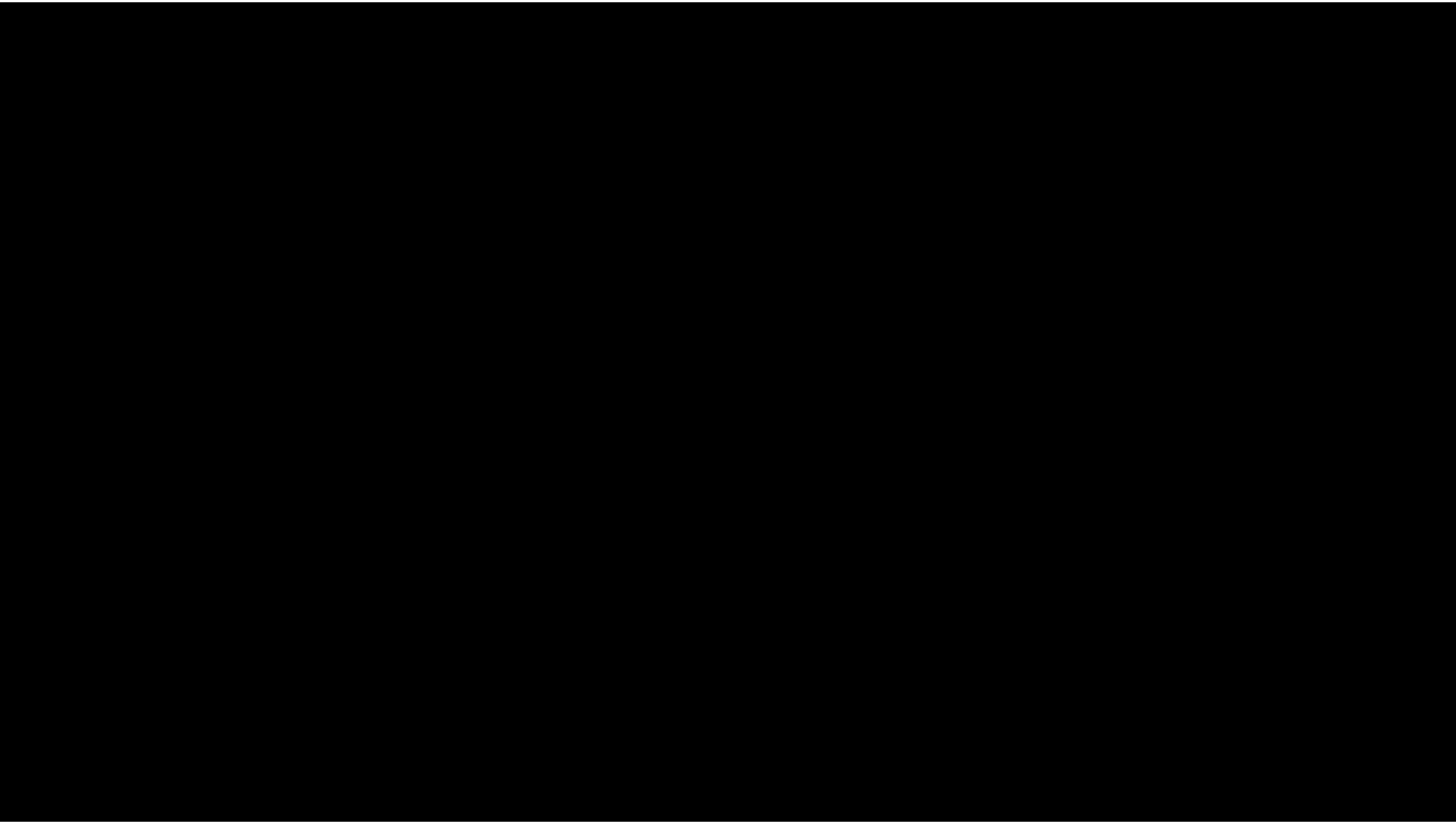
Simply stated it's the sciences of geography, and the technology of GIS.

(Jack Dangermond, 2017)

Esri UC 2017: Applying The Science of Where

https://www.youtube.com/watch?v=HkehjoYK6hY&t=102s

The Science of Where



GIS and Science

By David Maguire

The term *science* originates from the Latin *scientia*, or knowledge. In a general sense, science is concerned with the discovery and organization of knowledge. Scientifi c knowledge is created by employing scientifi c methods that are founded on the twin principles of observable events and empirically testable theories. It is common to subdivide science into natural—including biological, environmental, and physical—and social sciences. Geography is concerned with the patterns and processes that describe and explain the form and function of the surface of the earth. It is somewhat unique in that it falls at the boundary and overlaps a number of the classes of science (it especially covers both environmental and social science). Indeed, a central axiom of geography is that it is concerned with human-environmental interactions and specializes in the synthesis of multiple concepts, theories, methods, processes, and information types. In this sense, **geography is the science of understanding our world**.

All sciences have their portfolio of commonly used tools: astronomers use telescopes to view stars and information systems to record their characteristics, biologists use electron microscopes to visualize the structure of cell organelles and supercomputers to simulate ecological systems, and computer scientists develop new computer architectures using computer-aided design software. **Geographic information scientists also have their tools—geographic information systems (GIS)—which are a fundamental and integral part of pursuing geographic information science. GIS is the technology for capturing, managing, manipulating, and visualizing geographic information. GIS is essential to modern geographic information science, for without GIS, it would not be possible to collect large volumes of information about observable events and build and test theories about geographic patterns and processes.** Without information system technologies, many interesting geoscientifi c problems are intractable.

ITC | DISTANCE EDUCATION

WHAT DO YOU REALLY KNOW ABOUT USING SPATIAL DATA TO HELP EARTH?

GIS is a core technology.

GIS is an enterprise technology.

GIS is an embedded technology.

Every day, millions of decisions are being powered by GIS…

From pinpointing new store locations… to predicting climate change… to reporting power outages… to analyzing crime patterns.

You might be wondering: **But why use GIS**?
Because geographic problems require **spatial thinking**.

In a GIS, you connect ***data*** with ***geography***.
You understand ***what*** belongs ***where***.

http://gisgeography.com/what-gis-geographic-information-systems/

HISTORY V. GEOGRAPHY

- Historians
  - When and why?

- Geographers
  - Where and Why?

Types of Geography

- Eratosthenes – first to use geography
  - Geo = “Earth” Graphy = “to write”

- Physical Geography
  - **Where** and **why** natural forces occur

- Human Geography
  - **Where** and **why** human activities occur

Considering how people, places, phenomena are organized and arranged on the surface of the Earth.

The “Whys” of “Where”


Fahmi Razali
Solutions Engineer, Esri Malaysia
"Location is an important factor to consider when making any big decisions."
14 November 2017

Where? Why There? Why Care?

https://www.tweetping.net/#/


LOCATION
MATTERS

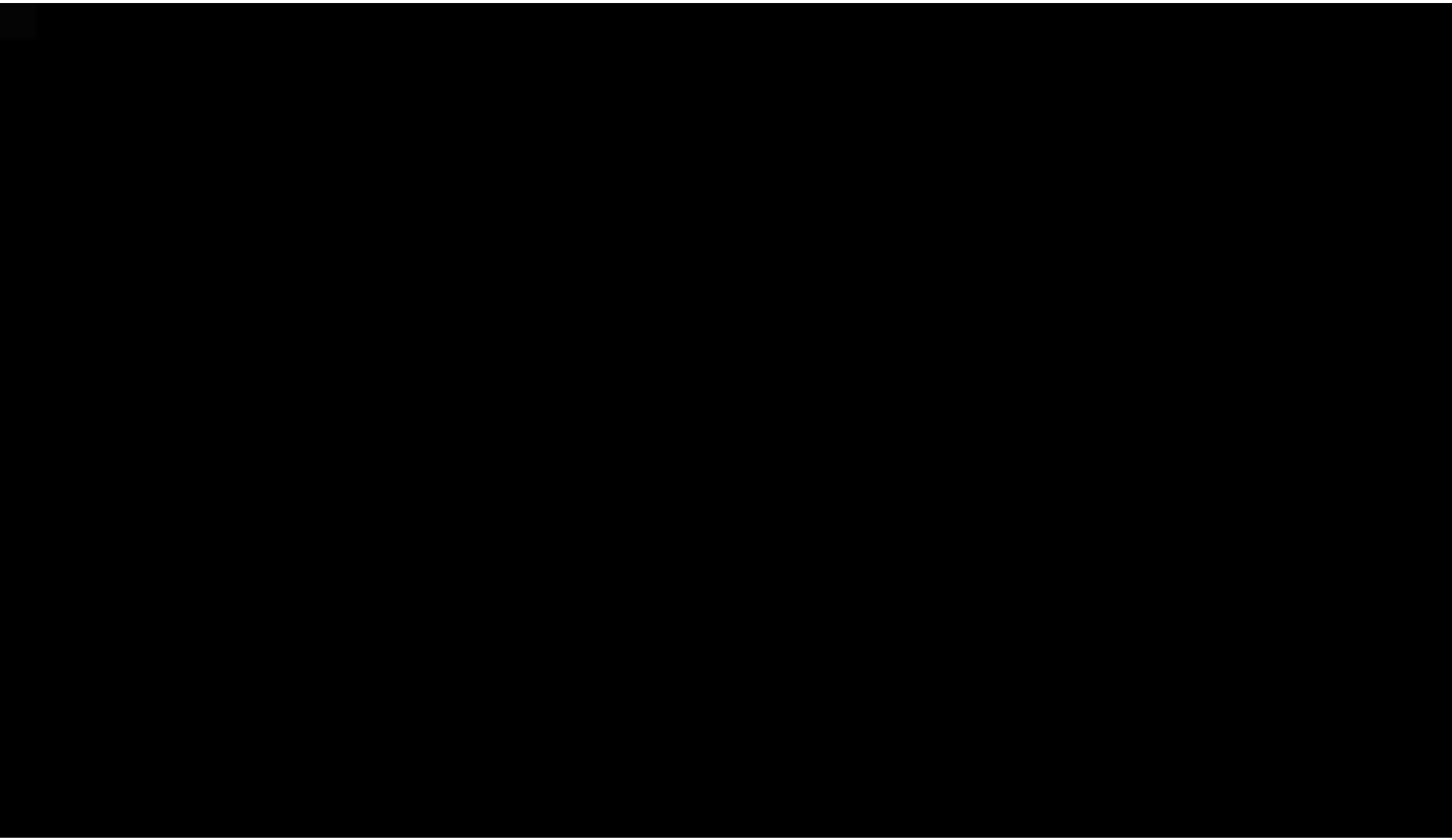
WITH GIS WE UNDERSTAND

WHAT HAS HAPPENED
WHAT IS HAPPENING
WHAT WILL HAPPEN

GEOGRAPHIC
SPACE

CREATE

A BRIGHTER FUTURE



Why is GIS valuable

GIS is used, according to some estimates, by 1.5 million people each day, and by over 400,000 organizations. Even these estimates are a few years old. The point, though, is that to these people and organizations, GIS adds value. Otherwise, they wouldn't use it.

GIS technology adds value to everyday work because it makes that work more efficient. We can accomplish more in a given workday. This is true for those managing a city's bus system to those managing wildlife habitats, and in thousands of other situations. It is also true in education.

Everyone uses location-based services

The proliferation of web-based technologies, cell-phones, consumer GPS-devices, and location-based social media have facilitated the widespread use of location-based services. Internet services such as Google Earth and OpenStreetMap have brought GIS to the masses. With cell-phones and consumer GPS-devices, services such as Enhanced-911 (E-911) and navigation applications are consumed by billions of individuals. Facebook check-in and other location-based social media are also used by over a billion people around the world.

www.cra.org/ccc/

Why and how does GIS add value?

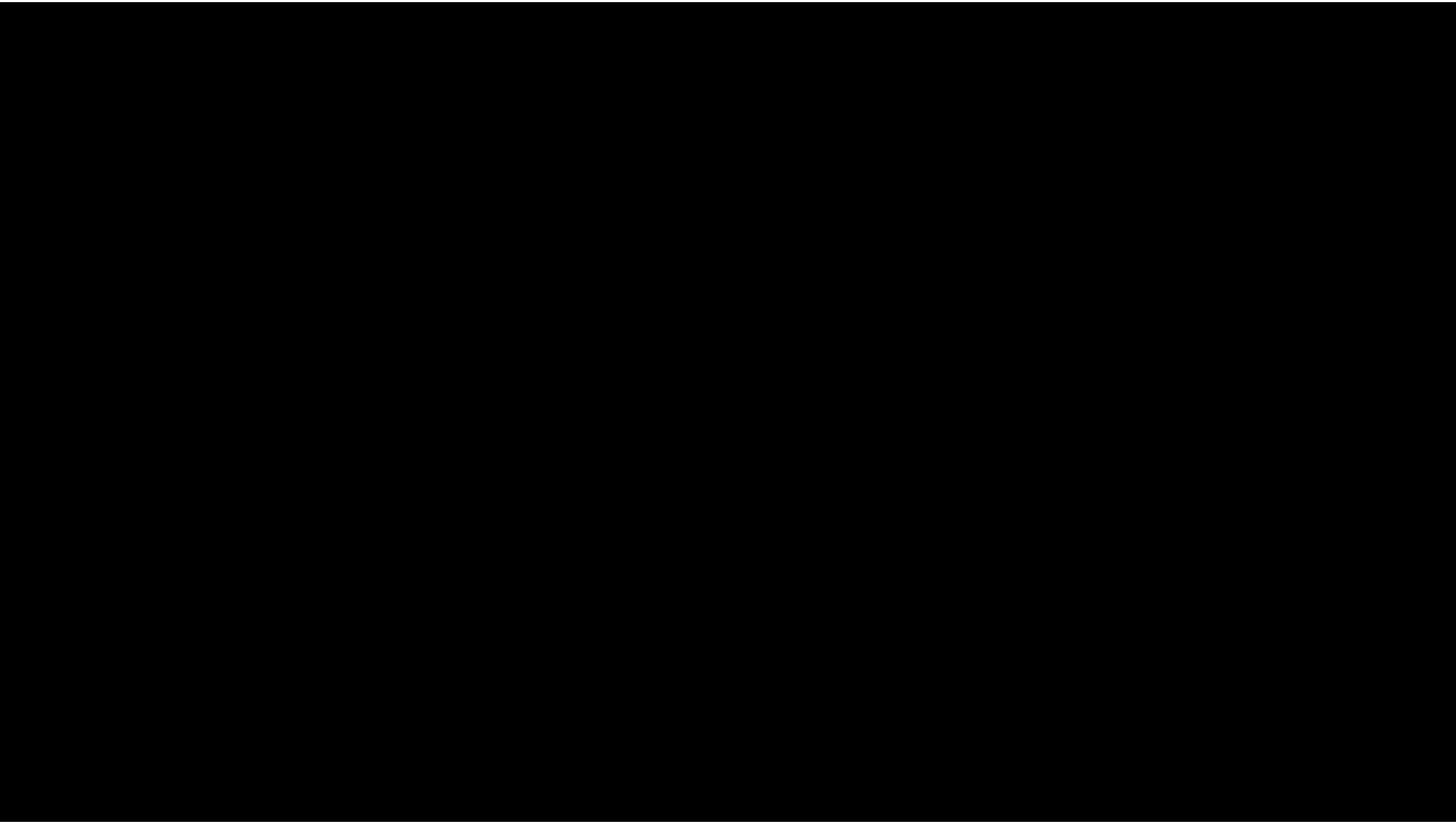
GIS is also valuable because it is not one tool but a system containing hundreds of tools in a single environment. GIS also is valuable because it is an interdisciplinary toolkit. It is used to analyze social zones on a campus, the locations of hazardous chemicals or fiber optic cables, and species of plants in the gardens on that same campus. Globally, this same toolkit can be applied to subjects as diverse as urban planning, epidemiology, demography, wildlife management, and seismology. GIS is also valuable because it helps communicate complex ideas because it uses the powerful medium of the map, which for centuries has helped to explain connections.

“Katakan Peta! .....

“Katakan Peta! .....

“Katakan Peta! .....

THE POWER OF MAPS



thinking spatially

Table 2: Example Dataset Which Ignores Space and Place Data

# of Annoying People	Total Population	Average Age	Average Income	# of SUVs	County	State
72	998	26	48000	72	Hatchback	Wholefood
48	2000	65	32000	48	Dialupia	Wholefood
776	2250	44	72000	750	Sriracha	Traderjo
789	3500	36	12000	700	Muffintown	Wholefood
469	1200	31	22500	461	Fixieplaid	Traderjo
525	1400	43	66000	400	Burb-on-Burb	Wholefood
62	65	33	92000/td>	59	Bluetooth Village	Wholefood
2300	16450	51	35000	1950	Pabsto	Traderjo
9654	52510	44	49000	8912	University Collegeville	Traderjo
779	1459	41	61000	398	Kingo	Traderjo

https://www.e-education.psu.edu/maps/l2_p3.html

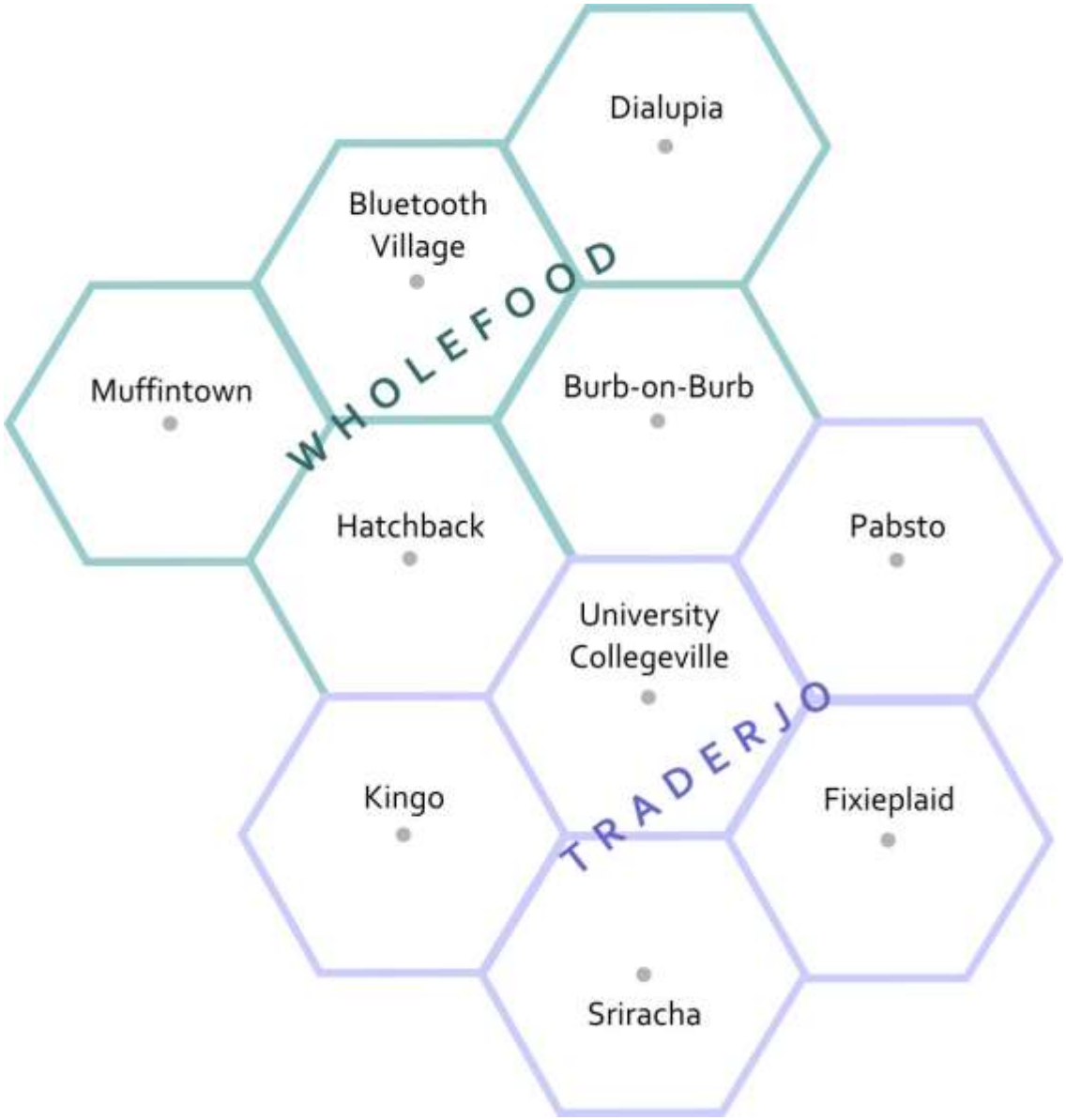
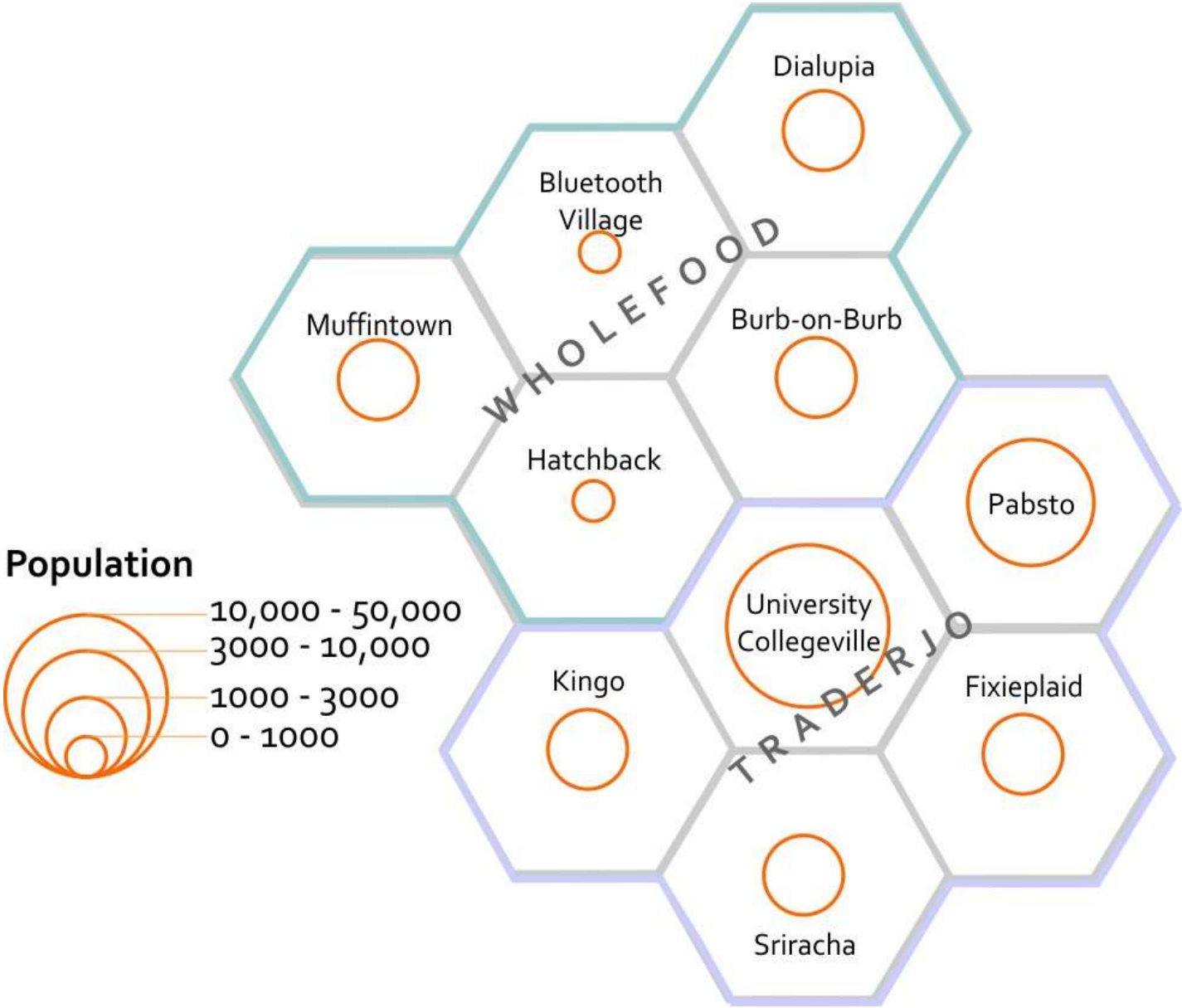


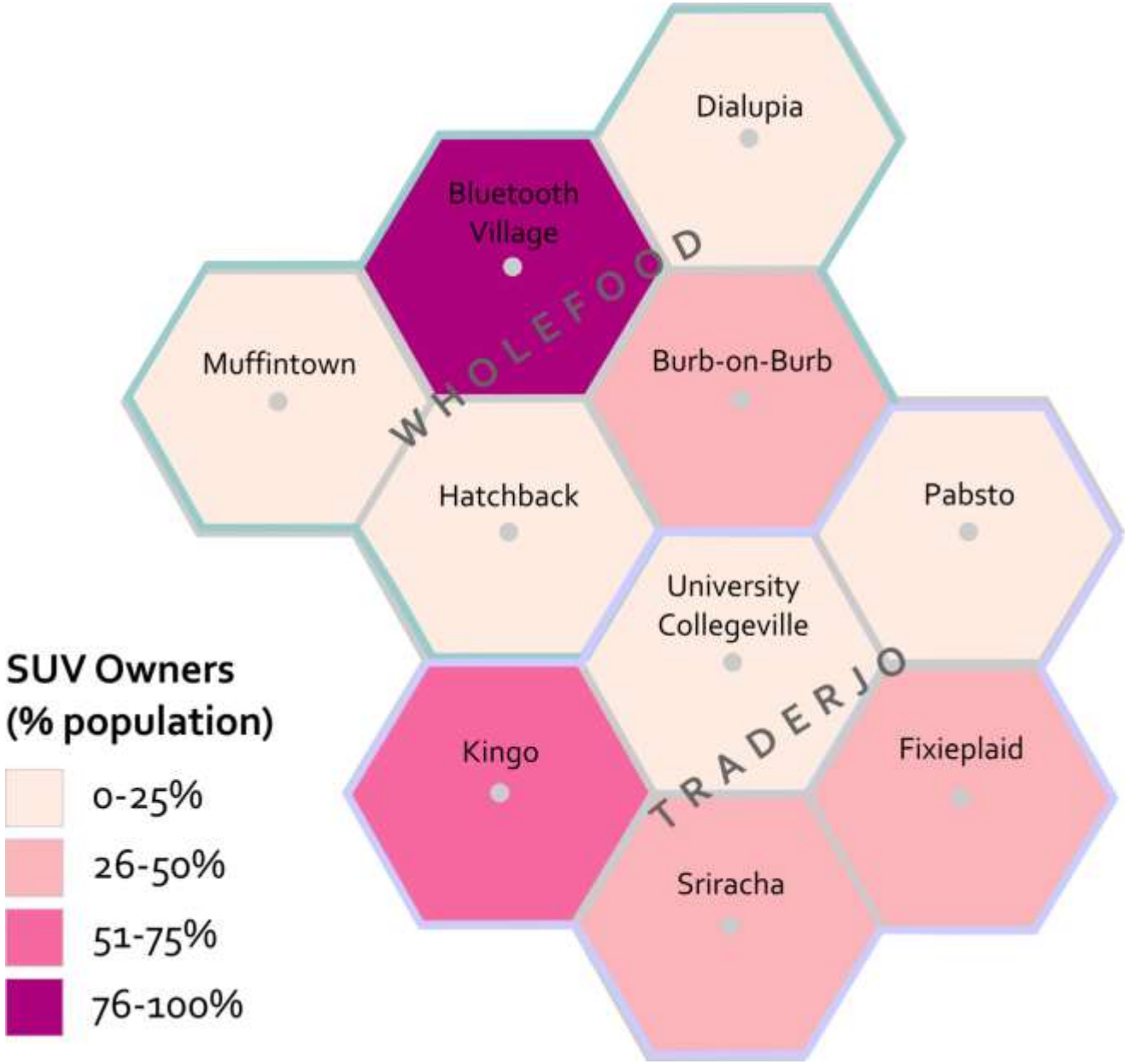
Figure 1. Map of the fake states and counties from Table 2.1.

Credit: A. Robinson https://www.e-education.psu.edu/maps/l2_p3.html



Same map as in Figure 1 - with additional information.

Credit: A. Robinson https://www.e-education.psu.edu/maps/l2_p3.html

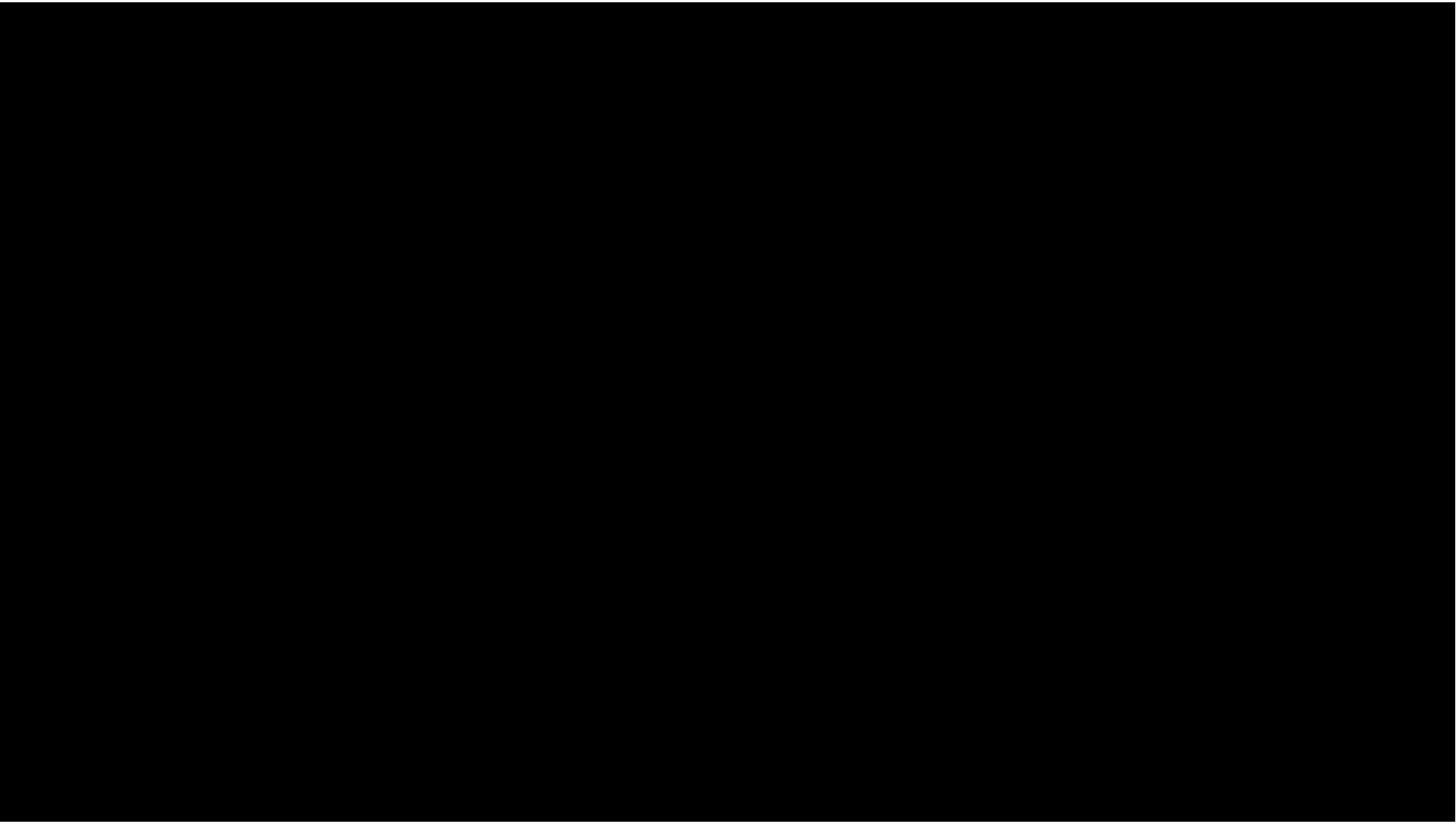


Same map as in Figure 1 - with even more additional information.

Credit: A Robinson https://www.e-education.psu.edu/maps/l2_p3.html

http://gisgeography.com/gis-applications-uses/

Location Intelligence Revolution across Europe



The application of GIS is limited only by the imagination of those who use it

— Jack Dangermond —

AZ QUOTES

Examples of Applied GIS

- **Urban Planning, Management & Policy**
  - Zoning, subdivision planning
  - Land acquisition
  - Economic development
  - Code enforcement
  - Housing renovation programs
  - Emergency response
  - Crime analysis
  - Tax assessment
- **Environmental Sciences**
  - Monitoring environmental risk
  - Modeling stormwater runoff
  - Management of watersheds, floodplains, wetlands, forests, aquifers
  - Environmental Impact Analysis
  - Hazardous or toxic facility siting
  - Groundwater modeling and contamination tracking
- **Political Science**
  - Redistricting
  - Analysis of election results
  - Predictive modeling
- **Civil Engineering/Utility**
  - Locating underground facilities
  - Designing alignment for freeways, transit
  - Coordination of infrastructure maintenance
- **Business**
  - Demographic Analysis
  - Market Penetration/ Share Analysis
  - Site Selection
- **Education Administration**
  - Attendance Area Maintenance
  - Enrollment Projections
  - School Bus Routing
- **Real Estate**
  - Neighborhood land prices
  - Traffic Impact Analysis
  - Determination of Highest and Best Use
- **Health Care**
  - Epidemiology
  - Needs Analysis
  - Service Inventory

What is Spatial Computing?

- Transformed our lives though understanding spaces and places
  - Examples: localization, navigation, site selection, mapping,
  - Examples: spatial context, situation assessment (distribution, patterns), …

ArcGIS ESRI

Google Earth

SaTScan™
Software for the spatial, temporal, and space-time scan statistics

OpenStreetMap

OGC™
Open Geospatial Consortium, Inc.

bing maps

Ushahidi

waze
Outsmarting Traffic, Together.

ORACLE
SPATIAL

IBM Smarter Planet

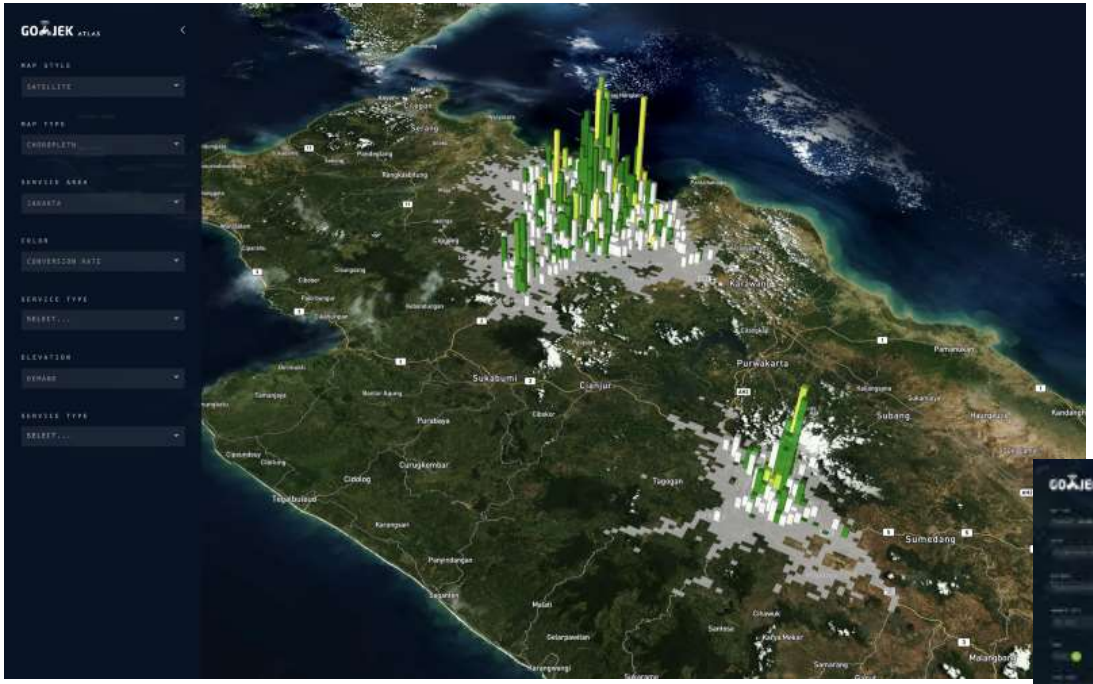
GIS: Going In Style

Dengan kemajuan teknologi yang terus berlanjut, data spasial telah mudah dan semakin tersedia dalam beberapa dekade terakhir dan menjadi sumber informasi penting dalam pengambilan keputusan setiap hari.

ATLAS: GO-JEK's real-time geospatial visualization platform

Aggregation and visualization of billions of data points daily

[Ravi Suhag]
Award-winning designer, developer, maker, data journalist and entrepreneur
Feb 19



John Renard, President-Utilities and Geospatial, Cyient, UK

Location is at the heart of digital economy- John Renard, Cyient

By

John Renard -

February 23, 2018

This has to be one of the most exciting times to be in the geospatial industry. Not since the early adoption of digital mapping in the 1980s and the subsequent emergence of GIS as a powerful decision support and planning tool, has the industry been so relevant, visible and of interest to so many new entrants and players. Location has come of age and has rightly taken its position at the heart of our increasingly digital economy and society.

User expectations are evolving. Firstly, they aspire to see measurable value and return on their technology investments. This has prompted many companies to move from product-centric and service-centric approaches to solution-led initiatives, often requiring geospatial capabilities. Secondly, geospatial technology is increasingly finding traction in other industries as a horizontal capability and no longer finds itself in a specialized category. For this reason, a large corporation (IT or engineering) which plays in several industries is developing geospatial capabilities in-house or through acquisition.

Building capabilities is the way forward

The technology landscape is rapidly evolving and keeping up with that pace are client expectations. A company that constantly strives to live up to client expectations has innovation as its bedrock and industry best practices as its brick and mortar. It is persistent on improvements to make sure it leads the change.

We have adopted a 'S3 Strategy' of offering a strong and evolving mix of 'services, systems and solutions'. We are investing in developing new capabilities in platforms for the IoT, RPA, machine learning and operational technologies as we believe building capabilities proactively at various levels is the way forward for companies like Cyient.

Technology Integration: A game changer

The Fourth Industrial Revolution is defined less by individual technologies and more by the interplay and inter-lock of digital technologies with the physical and biological/ecological systems and the consequences of the convergence. In that respect, the integration of geospatial data with other technologies will prove to be a game changer for organizations — both public and private.

Take the case of electric utilities. The impact of natural disasters on utility infrastructure is potentially devastating and often causes severe disruption to the continuity of energy supply to consumers. In the past 12 months, natural disasters around the world have cost utilities an estimated $10 billion in repairs and fines.

A Cloud-based solution could potentially leverage machine learning and Big Data analytics to improve forecasting and response planning in the event of natural disasters. When integrated with GIS, outage management, mobile workforce management and social media platforms, such a solution creates an end-to-end schema that allows utilities, emergency response services and disaster management authorities to coordinate efforts in real-time — seamlessly. This is the power of technology integration.

https://www.geospatialworld.net/article/location-heart-digital-economy/?utm_content=bufferf4c4e&utm_medium=social&utm_source=facebook.com&utm_campaign=buffer

The GIS industry has a "Field of Dreams" delusion

"We believe that our work will make the world a better place".

Ai Isaak, 2018, https://www.evarigisconsulting.com/blog/2018/5/29/gis-has-a-field-of-dreams-delusion

GIS Is Changing

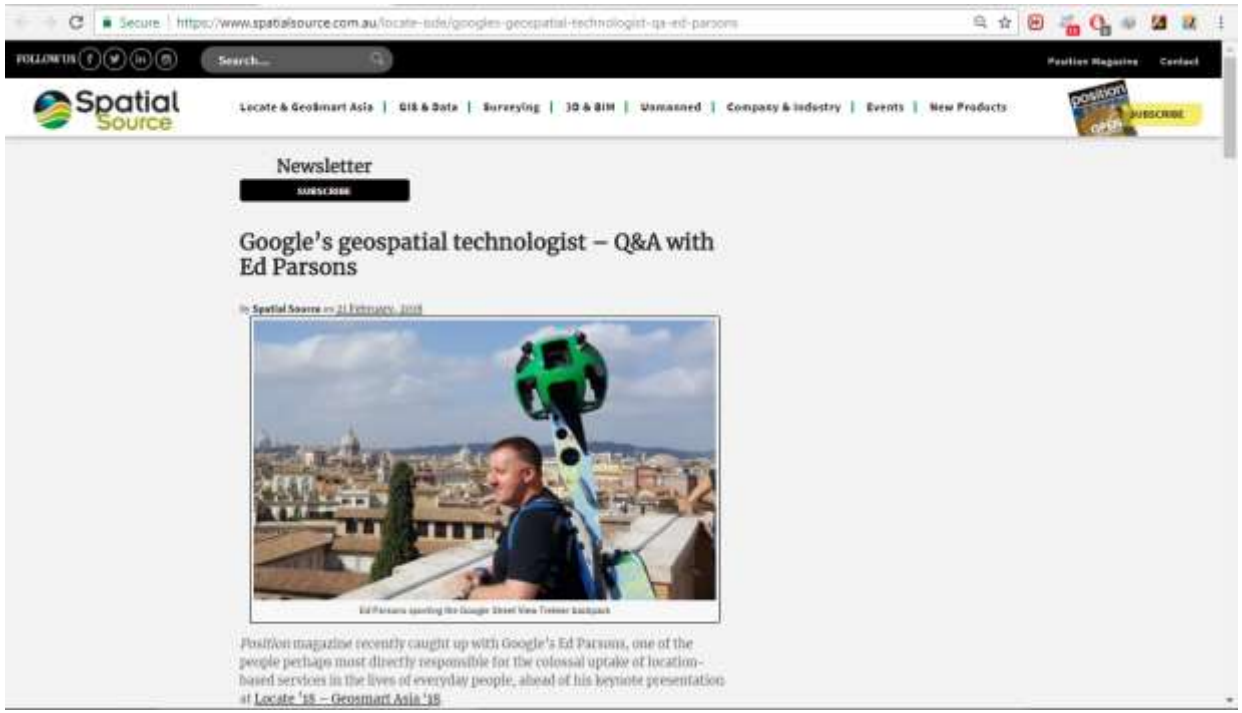
GIS has proved to be a flexible, adaptive technology, evolving as the information technology ecosystem around it changes.

At each step in this evolution, GIS has not just adapted to these changes but embraced them, becoming more powerful and more valuable.
Recent technological advances are helping us reenvision what a GIS is in a new context. As a web-hosted or cloud-based system with ready-to-use maps and apps, ***GIS is rapidly moving toward the vision of use anywhere, anytime, by anyone****.*

Jack Dangermond and Matt Artz, 2012

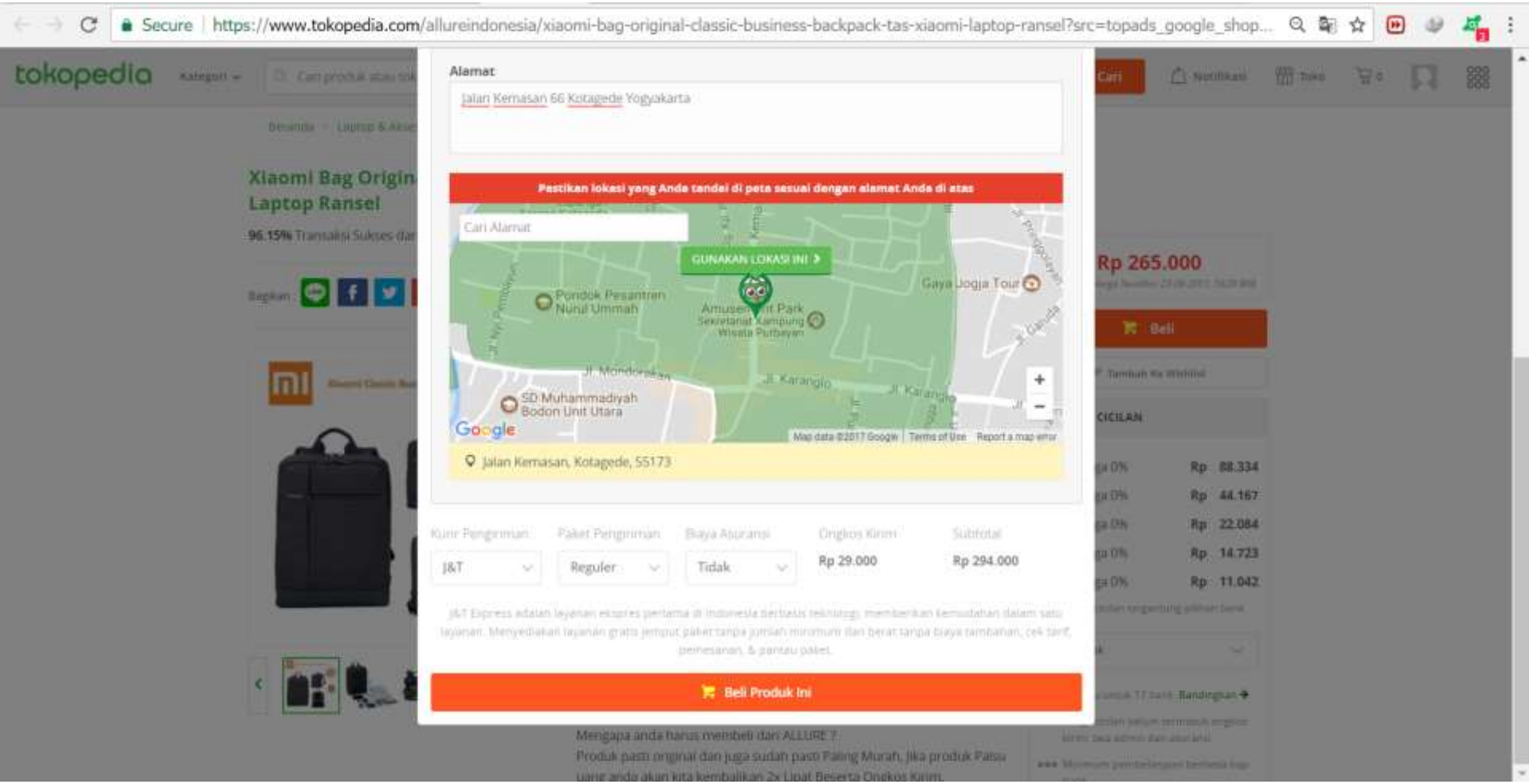
Google’s geospatial technologist – Q&A with Ed Parsons

By Spatial Source on 21 February, 2018



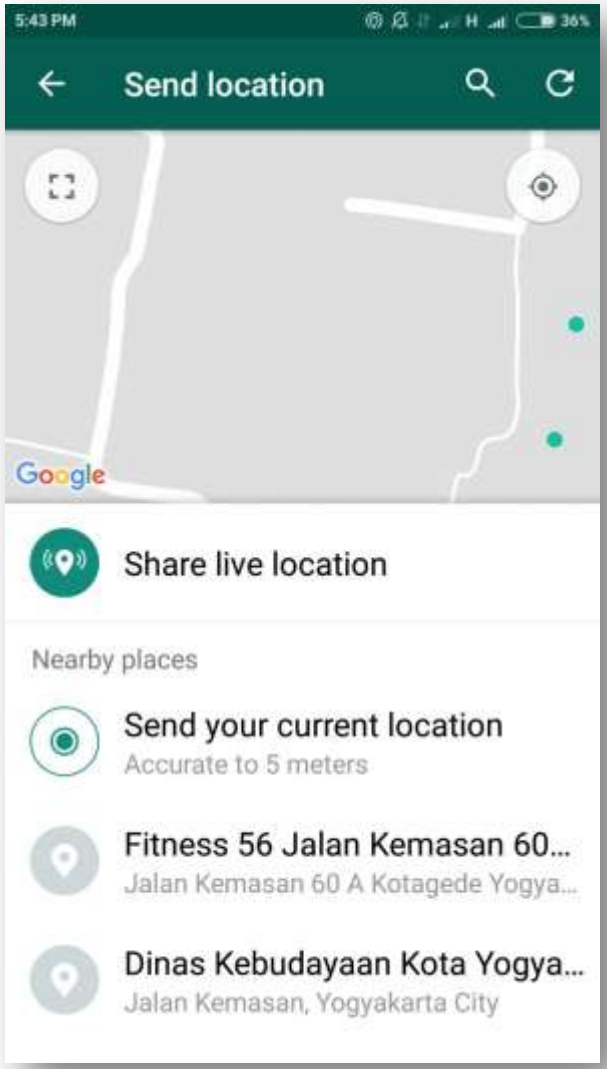
Position magazine recently caught up with Google’s Ed Parsons, one of the people perhaps most directly responsible for the colossal uptake of location-based services in the lives of everyday people, ahead of his keynote presentation at Locate ’18 – Geosmart Asia ‘18.
Ed Parsons is Google’s geospatial technologist, with responsibility for evangelising Google’s mission to organise the world’s information using geography. He maintains links with governments, universities, research and standards organisations that are involved in the development of geospatial technology.

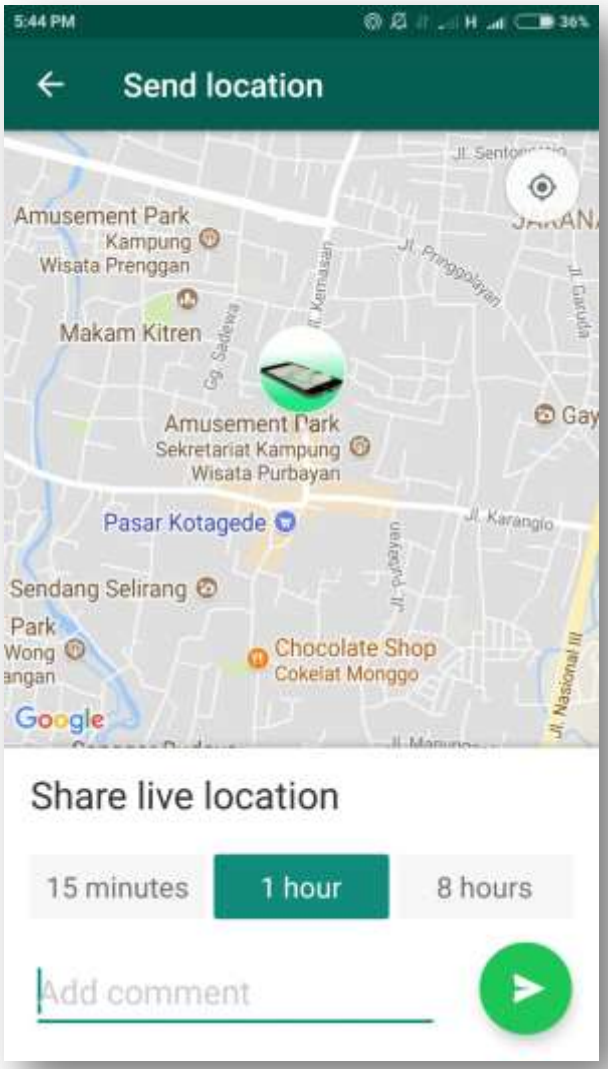
https://www.spatialsource.com.au/locate-isde/googles-geospatial-technologist-qa-ed-parsons



https://www.tokopedia.com/allureindonesia/xiaomi-bag-original-classic-business-backpack-tas-xiaomi-laptop-ransel?src=topads_google_shopping&topads_info=HAthHse7H_yh6_th6snEH_1F6Andoseh6AtpHAnEHn&gclid=EAIaIQobChMIiLvr2caL1wIVSwYqCh2nbQ1oEAQYBCABEgLbh_D_BwE&gclsrc=aw.ds&dclid=CO-hsMDJi9cCFQy9jgodjnYOqQ

WhatsApp


5:43 PM
Send location
Google
Share live location
Nearby places
Send your current location
Accurate to 5 meters
Fitness 56 Jalan Kemasan 60...
Jalan Kemasan 60 A Kotagede Yogya...
Dinas Kebudayaan Kota Yogya...
Jalan Kemasan, Yogyakarta City


5:44 PM
Send location
Amusement Park
Kampung
Wisata Prenggan
Makam Kitren
Amusement Park
Sekretariat Kampung
Wisata Purbayan
Pasar Kotagede
Sendang Selirang
Chocolate Shop
Cokelat Monggo
Google
Share live location
15 minutes
1 hour
8 hours
Add comment

Pemenang Kompetisi Blog #Geospasial untuk Kita

http://big.go.id/pemenang-kompetisi-blog-geospasial-untuk-kita/

JUARA 1
Rifki Fauzi : https://spasialkan.com/2017/09/21/anda-orang-tua-yuk-hindari-anak-membolos-sekolah-dan-hilang-dengan-geospasial

JUARA 2
Deddy Wijaya : http://deddyhuang.com/2017/10/03/geospasial-untuk-traveling/

JUARA 3
Akhmad Aljohan :
https://www.kompasiana.com/aljohan/59b76782085ea640fd3e1c42/pos-lintas-batas-negara-skouw-jayapura-pentingnya-informasi-geospasial

Definitions of GIS

- A GIS is an information system that is designed to work with **data referenced by spatial or geographic coordinates**. It is both a database system with specific capabilities for spatially referenced data as well as a set of operations for working with the data."
  Star and Estes, 1990

- A GIS is a system that contains **spatially referenced data** that can be analyzed and converted to information for a specific set of purposes, or application ... The key feature of a GIS is the **analysis of data to produce new information**."
  Parent, 1988

- "A system of computer hardware, software, and procedures designed to support the capture, management, manipulation, analysis, modelling, and display of **spatially referenced data** for solving complex planning and management problems."
  U.S. Federal Interagency Coordinating Committee, 1988

Definitions of GIS

- A GIS is an information system that is designed to work with **data referenced by spatial or geographic coordinates**. It is both a database system with specific capabilities for spatially referenced data as well as a set of operations for working with the data."
  Star and Estes, 1990

- A GIS is a system that contains **spatially referenced data** that can be analyzed and converted to information for a specific set of purposes, or application ... The key feature of a GIS is the **analysis of data to produce new information**."
  Parent, 1988

- "A system of computer hardware, software, and procedures designed to support the capture, management, manipulation, analysis, modelling, and display of **spatially referenced data** for solving complex planning and management problems."
  U.S. Federal Interagency Coordinating Committee, 1988

Definitions of GIS

- A GIS is a computer-based system that provides the following four sets of capabilities to handle **georeferenced data**:
  - ❑ input
  - ❑ data management (data storage and retrieval)
  - ❑ manipulation and analysis
  - ❑ output

  Aronoff, 1989

- A geographic information system (GIS) integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of **geographically referenced information**.
  ESRI, 1997

Definitions of GIS

GIS (Geographic Information System) as a structure constituted by a powerful set of instruments and technologies committed to acquire, store, manage, transform, analyze and visualize **georeferenced spatial data**.

Brovelli

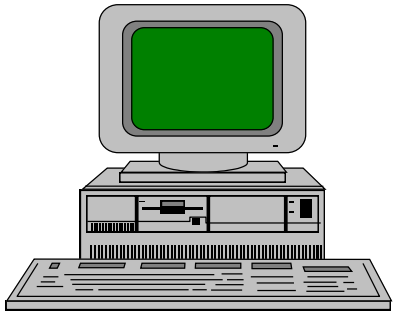
Definitions of GIS

GIS as a system of hardware, software and procedures to facilitate the management, manipulation, analysis, modelling, representation and display of georeferenced data to solve complex problems regarding planning and management of resources" (NCGIA/National Center for Geographic Information and Analysis, 1990)

A geographic information system (GIS) can be defined as a computer application capable of performing virtually any conceivable operation on geographic information, from acquisition and compilation through visualization, query, and analysis to modeling, sharing, and archiving (Longley et al., 1999, 2010).

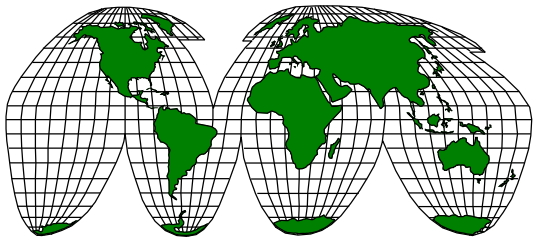
What is a GIS?

Information System



+

Geographic Position

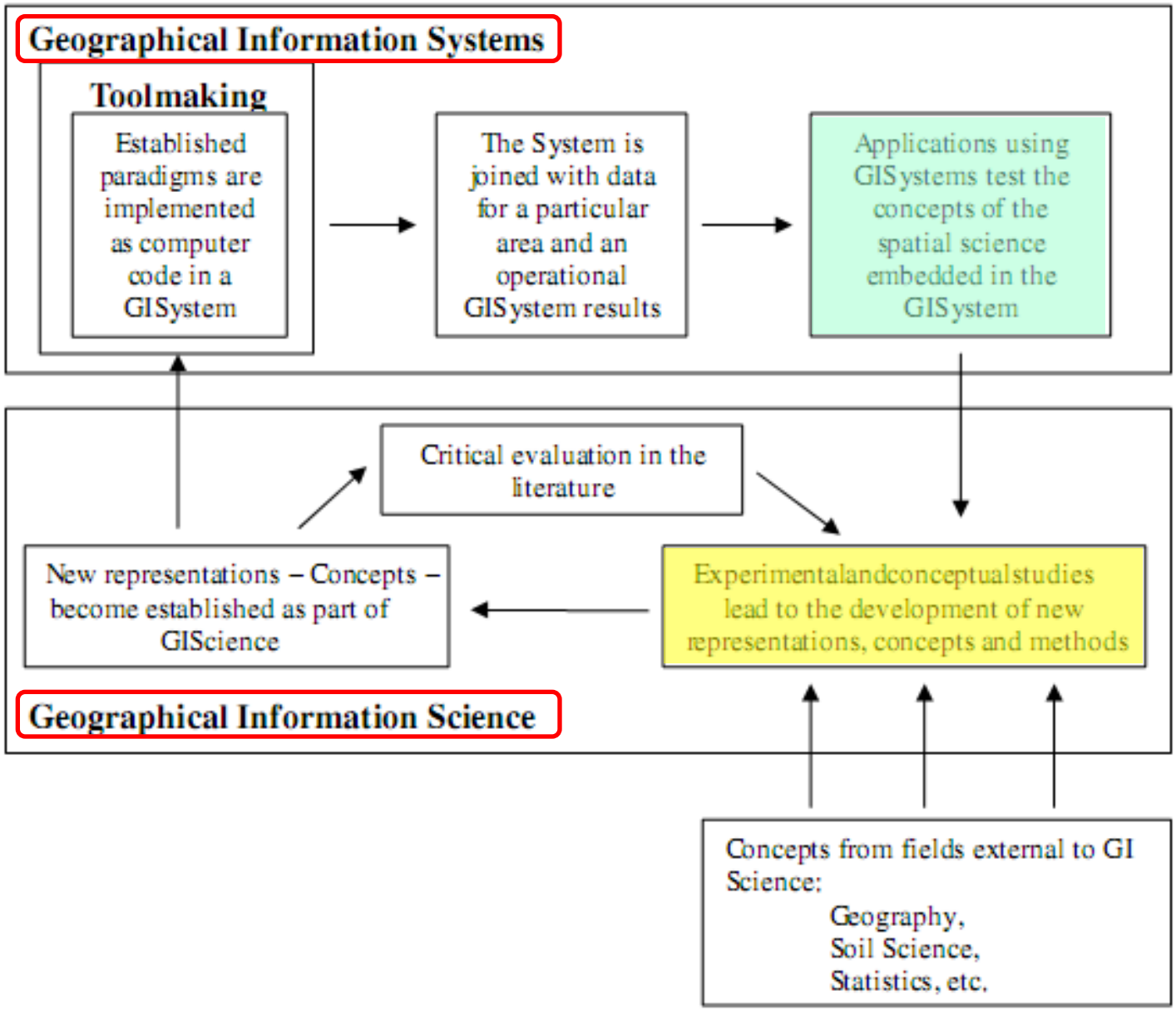


= **GIS**

A means of storing, retrieving, sorting, and comparing <u>spatial data</u> to support some analytic process.

to produce new information

accurate decision making



The GI Science–System cycle (Fisher, 1998)

GISystems, GIScience, GIStudies , GIServices

GIS or GI**Systems**: Geographic Information Systems *(**tools, software, hardware**).*

- Emphasis on technology and tools

GI**Science**: Geographic Information Science *(**Scientific research domain**).*

- Used by Michael Goodchild in 1990.
- Fundamental issues raised by the use of GIS and related technologies (e.g. Spatial Representation, Spatial Modeling, Spatial Analysis, Map Projections, Accuracy, and Scientific Visualization).
  I am a GI Scientist. http://en.wikipedia.org/wiki/STEM_fields

GI**Studies**: Geographic Information Studies

- Systematic study of the use of geographic information

GI**Services**: Geographic Information Services *(**Web-based services**).*

http://map.sdsu.edu/geog104/unit-1.html

System, science, study and service

- **Geographical information system**
  - Emphasising infrastructure
- **Geographical information science**
  - Emphasising principle and theory
- **Geographical information study**
  - Emphasising data and data mining
- **Geographical information service**
  - Emphasising socio-economic service

Copyright, 1998-2014 © Qiming Zhou

GISystems and GIScience

It is now widely agreed among researchers that GIScience….

- is the science behind the technology
  - considers fundamental questions raised by the use of systems and technologies
  - is the science needed to keep technology at the cutting edge
- is a multidisciplinary field
  - many disciplines contribute to these issues
    - e.g. cartography, geodesy, photogrammetry, ...
    - today we should extend the list to include areas like cognitive psychology, spatial statistics
  - the terms 'geomatics' and 'geoinformatics' have similar meaning
    - 'geomatics' is more popular in Europe and Canada
- is it 'spatial' or 'geographic'?
  - 'geographic' has to do with the Earth
    - its two-dimensional surface
    - its three-dimensional atmosphere, oceans, sub-surface
  - 'spatial' has to do with any multi-dimensional frame
    - medical images are referenced to the human body
    - engineering drawings are referenced to a mechanical object
    - architectural drawings are referenced to a building
  - 'geographic' is a subset of 'spatial'
    - often the terms are used interchangeably
  - 'geospatial' is sometimes used
    - does 'geographic' sound too 'soft'?

Source: http://www.ncgia.ucsb.edu/giscc/units/u002/

Geographic Information Science (GISc or GIScience) is the scientific discipline that deals with the geospatial data. This discipline emerged 30 years after the creation of the first "*modern"* Geographic Information System (GIS) by Tomlinson in 1960, called Canada Geographic Information System (Tomlinson 1984; Tomlinson 1998).

The term GISc was introduced by Goodchild (1992) and it is concerned with "*the development and use of theories, methods, technology, and data for understanding geographic processes, relationships, and patterns.*

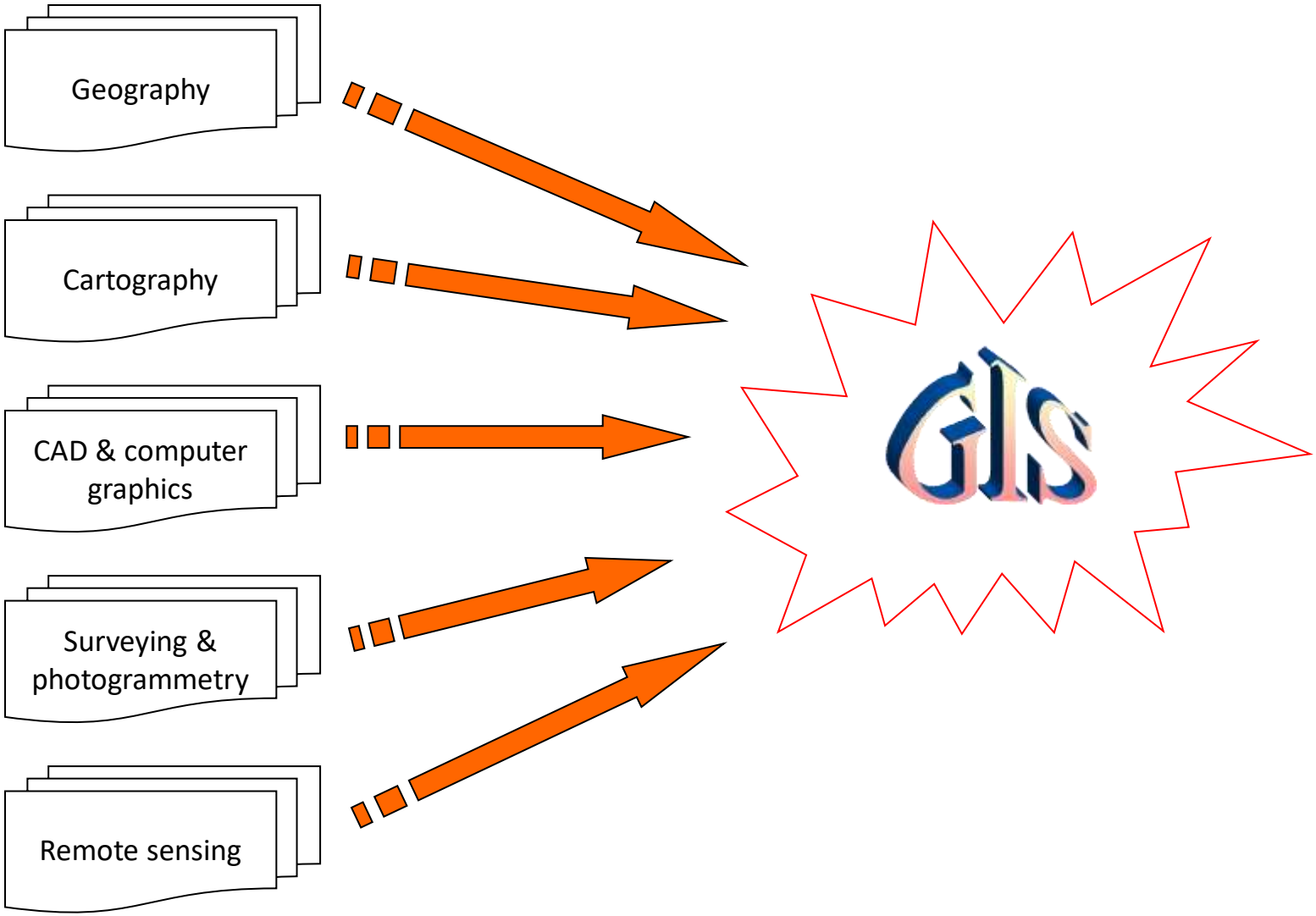
GIS as a 3-legged stool

1. **Content Knowledge**
2. **Skill**
3. **The Geographic Perspective**

Joseph J. Kerski. Ph.D., GISP
Education Manager ESRI, 2014

https://www.youtube.com/watch?v=wOfZI6yPrjo

Origins of GIS

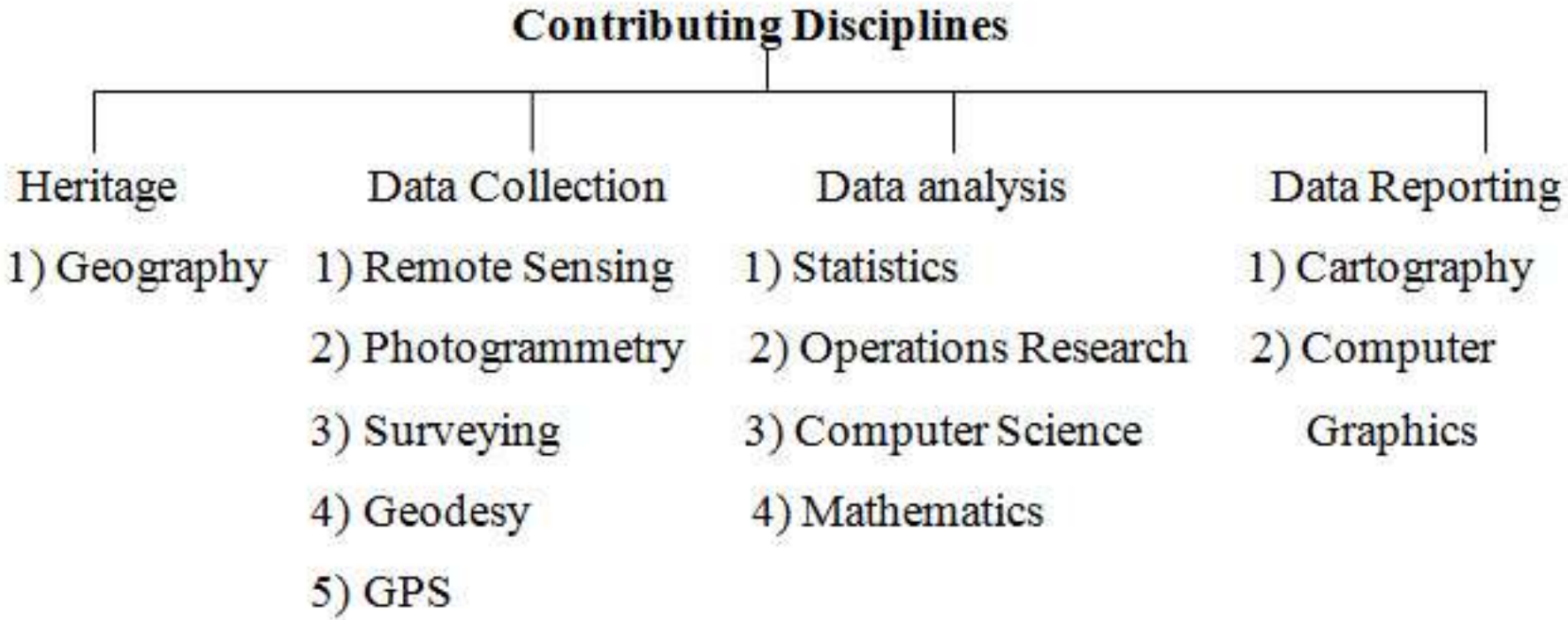


Copyright, 1998-2014 © Qiming Zhou

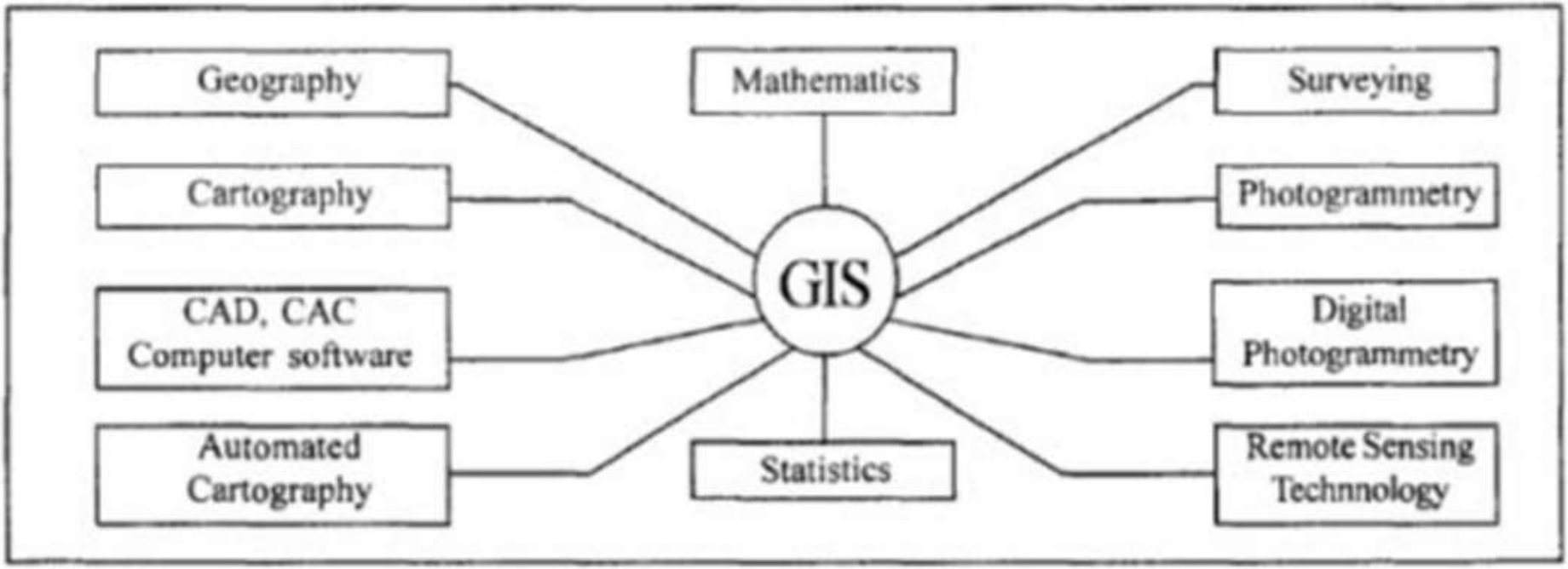
Geographic Information Technologies

- Automated Cartography
- Remote Sensing (RS)
- Global Positioning Systems (GPS)
- Geographic Information Systems (GIS)

(Briggs, 1999)



http://ecoursesonline.iasri.res.in/mod/page/view.php?id=2070



GIS: the result of linking parallel developments in many separate spatial data processing disciplines.

(Source: http://www.geog.ubc.ca/courses/klink/gis.notes/ncgia/u01.html#SEC1.2)

TEKNOLOGI TERKAIT DENGAN SIG

Teknologi	Peranan teknologi dalam rangka peningkatan kemampuan teknologi GIS
Data Base Management System (DBMS)	Menyimpan atribut untuk ditampilkan di GIS; Pelacakan data, penyortiran, penggabungan, penambahan, memperbarui, restrukturisasi, terkait table dan field-field.
Computer Aided Design (CAD)	Memperluas geometri data 2D menjadi data GIS 3D Kemampuan dalam rendering.
Land Information System (LIS)	Memperluas kemampuan GIS untuk survei tanah dan perekamannya dalam aspek legal/hukum, administrasi dan untuk tujuan perencanaan dan pembangunan.
Automated Mapping/Facilities Mapping (AM/FM)	Meningkatkan fungsi GIS dalam pemetaan automatis dan peta pemeliharaan utilitas untuk umum seperti : air, drainase, gas dan listrik.
GPS	Meningkatkan akurasi lokasi dan obyek memverifikasi akurasi atribut dalam SIG; Kemampuan dalam navigasi dan tracking/pelacakan.

TEKNOLOGI TERKAIT DENGAN SIG

Teknologi	Peranan teknologi dalam rangka peningkatan kemampuan teknologi GIS
Remote sensing and Photogrammetry (RSP)	Integrasi fungsi-fungsi SIG dan analisis dan hasil pengolahan data dan analisis data. Sumber data Raster
Statistical Software (SS)	Integrasi GIS dan prosedur statistik
Spatial Decision Support Systems (SDSS)	Memperluas fungsi GIS untuk pengambilan keputusan
Spatial Expert Systems (SES)	Mengintegrasikan kemampuan Expert Systems dan fungsi GIS
Planning Support Systems (PSS)	Memperluas fungsi GIS untuk perencanaan
Multimedia Systems (MS)	Meningkatkan visualisasi dari informasi geografi dengan penggunaan suara, video, gambar, hypertext dan hotlink
Internet-based Systems (IS)	Meningkatkan komunikasi, berbagi data (data sharing), *joint task operation* dan layanan online GIS
Groupware Systems (GW)	Mengaktifkan beberapa pengguna (*multiple users*) di lokasi yang berbeda untuk melakukan tugas-tugas yang terkait dengan perencanaan dan pengambilan keputusan


to be continued