WELCOME

Caribbean GeoSpatial Development Initiative
WORKSHOP

Moderators:

Linda Peters

Eric Van Praag

7 – 8 October, 2019. UNAM. Mexico City

Agenda Overview
Day 1

10:10 - 10:30	**Welcome Remarks** ▪ Paloma Merodio Gómez– Vice President INEGI President UN-GGIM: Americas ▪ Manuel Suárez Lastra – Director Institute of Geography - UNAM ▪ Introductions around the room (Name/Agency Name/Country)
10:30 – 11:00	**Kellogg Presentation**
11:00 – 12:30	**Introductory Session** **1- Overview of Agenda** **2-What is the CGDI?** **3-Art of the possible with GIS** ▪ What is GIS -- key trends for leveraging GIS across all organizations ▪ Integrated Geospatial Information Framework (IGIF) ▪ Global Statistical Geospatial Framework (GSGF) ▪ Trends in GIS, Mapping and Earth Observations – Enterprise GIS today
12:30 – 13:30	**LUNCH**

13:30 – 15:15	**Country Roundtables** ▪ Current state IT and GIS infrastructure including: o Services, Systems and Apps o Security and privacy issues o Capacity building needs o Standards (OGC, ISO, etc.) as well as adoption of frameworks (GSGF and IGIF)
15:15 – 15:45	**BREAK**
15:45 – 17:30	**Country Roundtables** ▪ Data needs and gaps including: o Data needed for planning o Dissemination of data o Data users and engaging the community o Standards (OGC, ISO etc) as well as adoption of frameworks (GSGF and IGIF)

Welcome

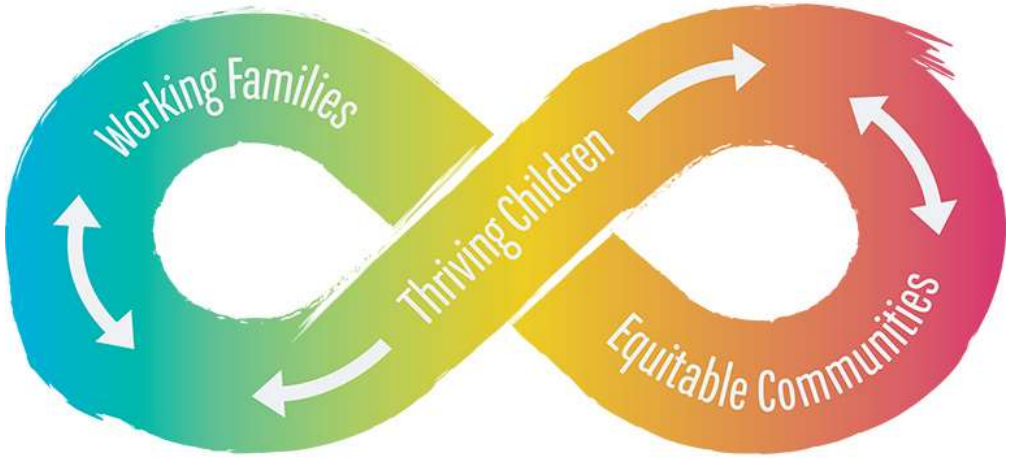
Paloma Merodio Gomez, VP INEGI, President UN GGIM: Americas

Welcome

Manuel Suarez Lastra, Director Institute of Geography UNAM

Introductions

Please state your name, Agency name and what country you are from



W.K. Kellogg Foundation

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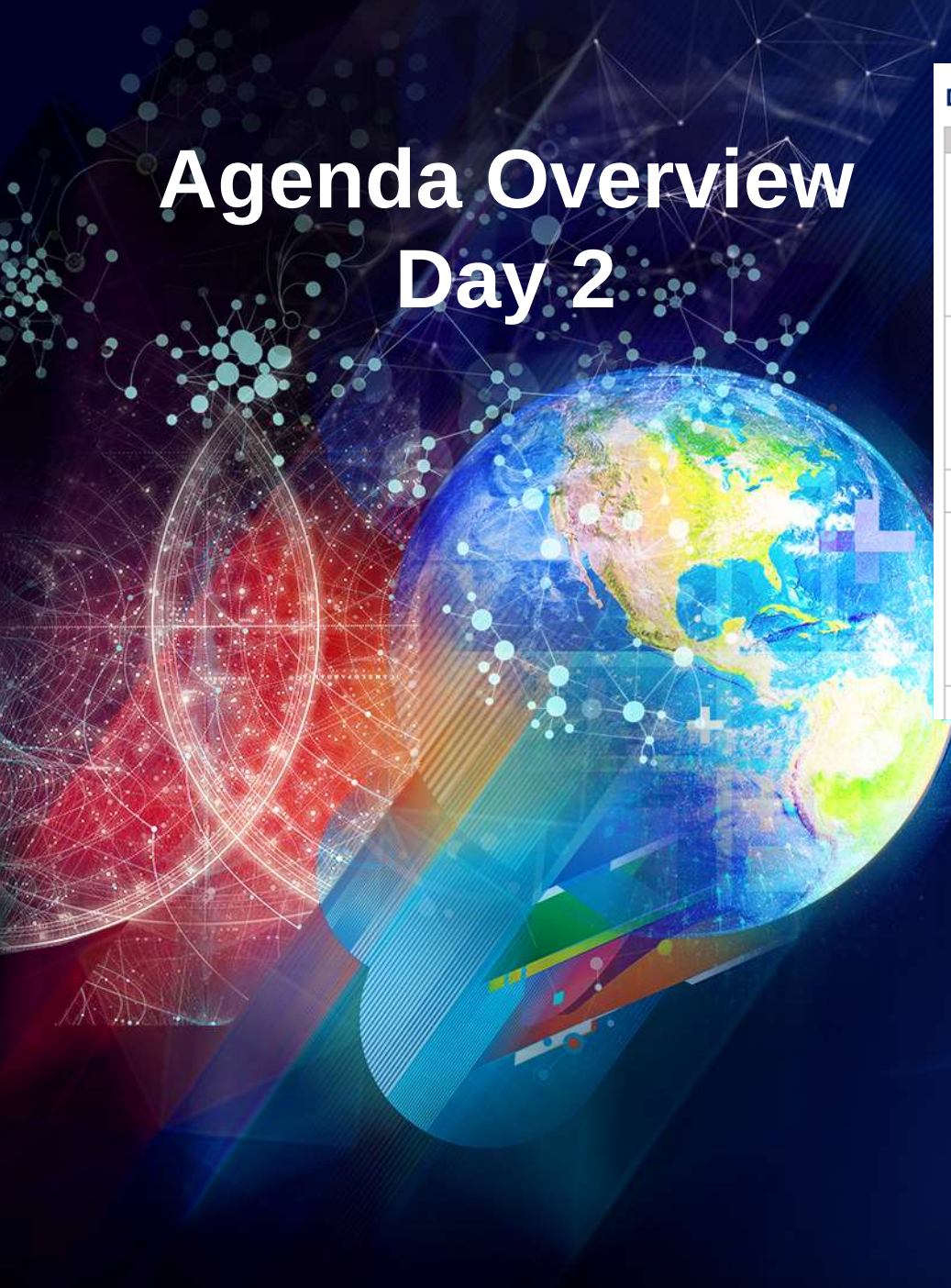
Agenda Overview
Day 2



Day 2

October 8	

9:00 - 10:20	**Country Roundtables**
	▪ How to impact change
	  ○ Governance
	  ○ Organizational and legal frameworks
	  ○ Leadership
	  ○ Change Management

10:20 - 11:00	**Country Perspective** Modernization of workflows, mapping, analysis and dissemination ▪ Statistical Institute of Jamaica ▪ Ministry of Economic Growth and Job Creation, National Spatial Data Management Division
11:00 – 11:30	**Visit to LANOT (National Laboratory of Earth Observation)**
11:30 – 12:30	**Best Practices** Examples from around the globe ▪ Best Practice Use Case Land ▪ Best Practice Use Case Statistics ▪ Best Practice Use Case Mapping
12:30 – 13:30	**LUNCH**
13:30 – 14:30	**Applying GIS and authoritative data to real world issues** ▪ Economic Development ▪ Disaster Planning ▪ Disaster Management ▪ Sustainable Development Goals
14:30 – 15:00	**BREAK**
15:00 – 16:00	**Overview of CGDI Draft Survey Instrument**
16:00 – 17:20	**Open Discussion** Review key priorities **Next steps – Tactics** ▪ Communication ▪ Calendar and timelines ▪ Creation of committees ▪ Raising awareness in donor community for support **Next steps - Strategy** ▪ Caribbean leadership engagement ▪ Community building ▪ Establish and leverage partnerships
17:20 - 17:30	**Closing remarks**

What is CGDI?

Caribbean GeoSpatial Development Initiative

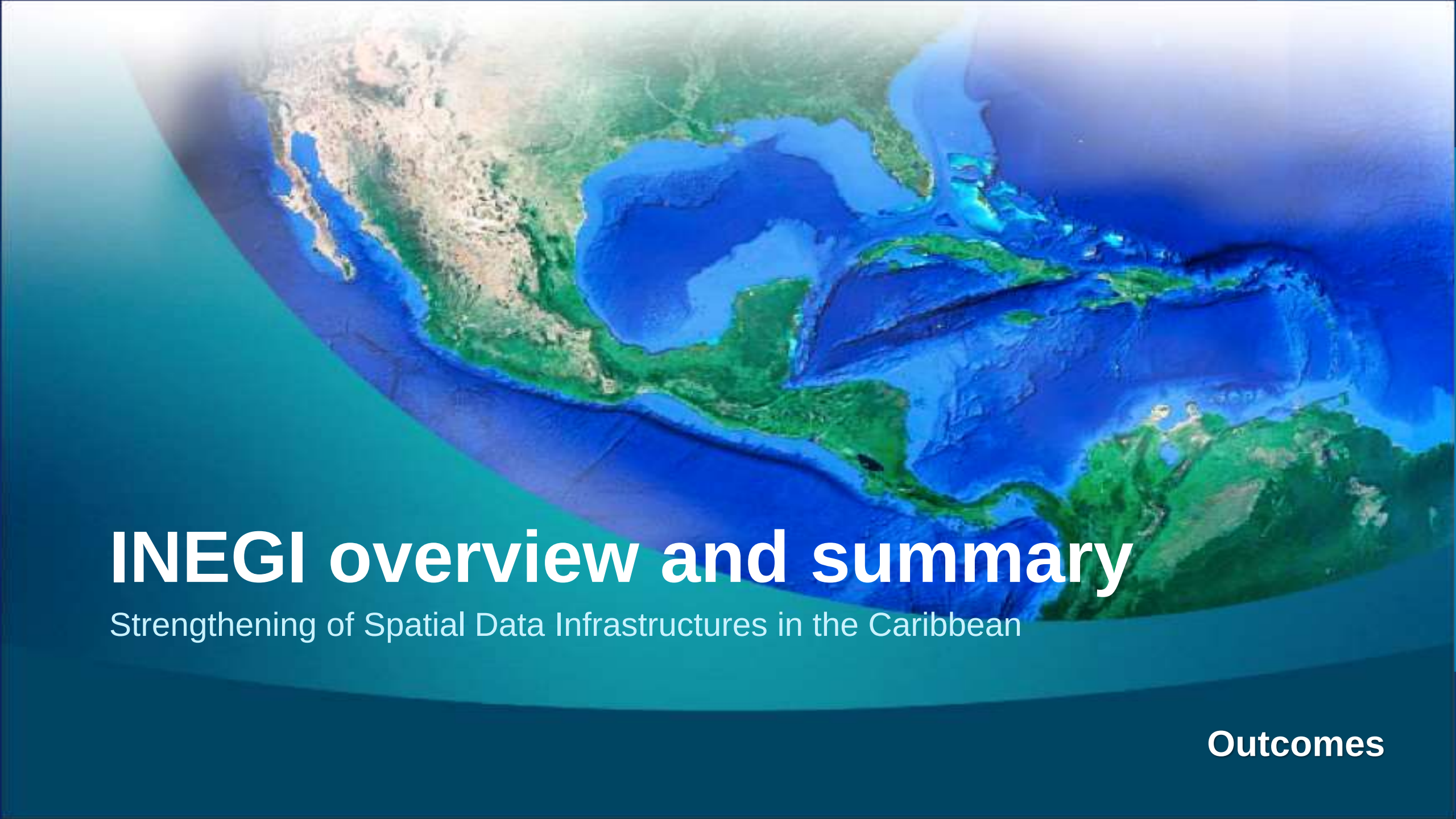
- Goal is strengthening of Spatial Data Infrastructures in Member States and Territories of the Association of Caribbean States
- Aims to support the application of GIS across the Caribbean region
- Promote the use and sharing of geospatial information across the region and in evidence-based decision making and national planning, disaster management, risk reduction and economic development as well as the formulation of sustainable development policies.
-

What do we aim to achieve in this workshop?

- **Goals:**
  - Understand the geospatial business and technical needs of participating agencies
  - Understand applicability of location and spatial analytics in the region for development, policy making and more
  - Understand the use of GIS today in planning, data collection, field operations, dissemination, production mapping and geospatial analysis

- **Outcomes**
  - Identify and prioritize business and technical gaps (hardware, software, data and more) that limit greater production and use of geospatial information
  - Identify steps for improving training and capacity building in the region
  - Define high level roadmap for the CGDI

All countries and all sectors need geospatial information for national development and decision-making



INEGI overview and summary

Strengthening of Spatial Data Infrastructures in the Caribbean

Outcomes

General Objective

To promote the development of **Spatial Data Infrastructure (SDI)** in the Caribbean, in order to strengthen the generation, use and sharing of geospatial information, including for policy making

Specific Objectives:

- Reduce Geospatial Data Infrastructure gaps within the Caribbean region, and with respect to the rest of the Continent.
- Support the integration and participation of Caribbean countries in both; the United Nations Experts Committee on Global Geospatial Information Management and the regional committee UN-GGIM: Americas

Progress achieved on the strategic Objectives

Business Unit: Caribbean Project		Strategic option:		STRENGTHEN				
Strategic Objective		Strategies		Indicators Tracing	GOALS / Specific objectives			
					minimum	medium	optimum	Real
1	Strengthen the geodetic network	Increase stations	Increase number of stations Increase data availability Increase security location	5% further in the region	3%	5%	10%	More than 10%
2	Broadcast Geographic Information	Create Digital Map of the Caribbean	Increase number of geoportals Increase dissemination of G.I. Increase the number of users	10% further in the region	5%	10%	15%	5%
3	Promote the use of G. I.	Construct Land Cover Map	Consider Project countries Ensure the quality of the project Disseminate results by geoportal	90% of the coverage for the region	80%	90%	100%	100%
4	Capacity Building	Training in geographic skills	Increase basic skills Increase intermediate skills Increase transversal competences	90% of participations for the countries in the project	80%	90%	100%	80%
5	Using geographical standards	Apply standards in processes	Increase in production processes Increase in integration processes Increase in dissemination processes	20% of processes	10%	20%	30%	20%
6	Update computer technology	Renew computers	Update servers Update computers Update network equipment	2% of equipment available	1%	2%	3%	More than 3%
7	Geographic Metadata	Promote the Application	Define a profile for the Region Train them on application Implement use	20% of the countries in the project	10%	20%	30%	Less than10%

The Future

1. Maintenance of the technological infrastructure delivered
2. Incorporate the Geodetic Network of the Caribbean into the SIRGAS Network, modernize reference frames and take advantage of data for the region within the framework of the UN-GGIM subcommittee
3. Implementation and improvement of Geomatics Solutions in each country
4. Strengthen the exchange of processes, methodologies and good geospatial practices
5. Promote the use of geographic standards and metadata individually and collectively, seeking integration and alignment with the rest of the continent

The Future

6. Promote in the countries that require it, the update of their geographical data
7. Promote open data culture and its exchange in the region
8. Motivate and encourage the participation of the representatives of the countries in UN-GGIM
9. Establish alliances with international non-governmental organizations as well as the public and private sectors
10. Encourage distance training programmes

GIS Is Advancing Rapidly

Integrating and Leveraging Many Innovations

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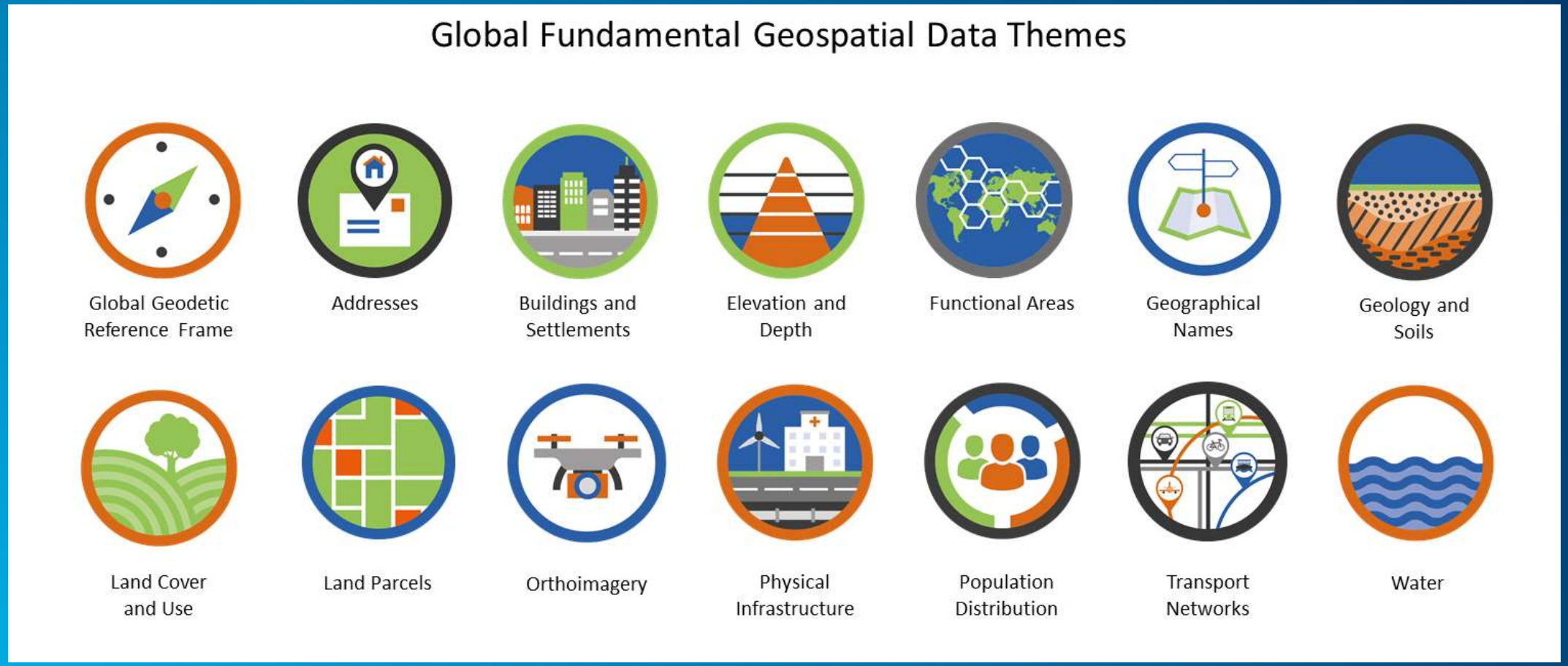
GIS Is Advancing Rapidly

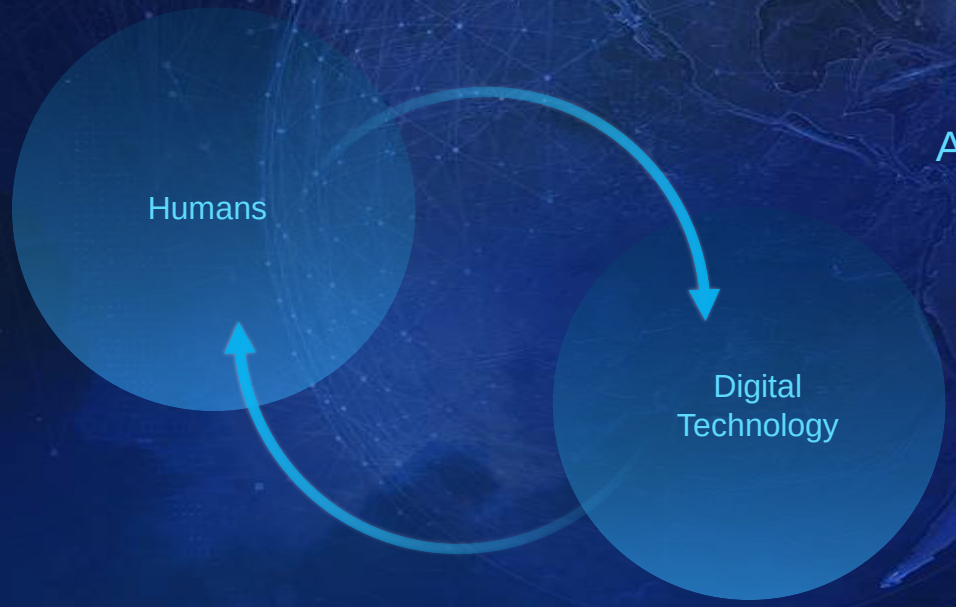
Integrating and Leveraging Many Innovations

Why is this so important today?



Digital Technology Is Transforming Our World

Enabling Humans to Be Enormously Successful



. . . And Accelerating Everything

Advancing Our Civilization

Co-Evolving . . .

Changing How We Think . . .
. . . Reshaping Our Existence

. . . And Rapidly Changing Our World

Our Human Footprint

Is Creating Many Challenges . . .

. . . Creating an Unsustainable Future

Geography Is the Science of Our World

. . . Providing Content and Context

. . . And a Common Reference System

Helping Us See . . . Complexity . . .

. . . Relationships, Patterns and Associations

. . . Bringing It All Together

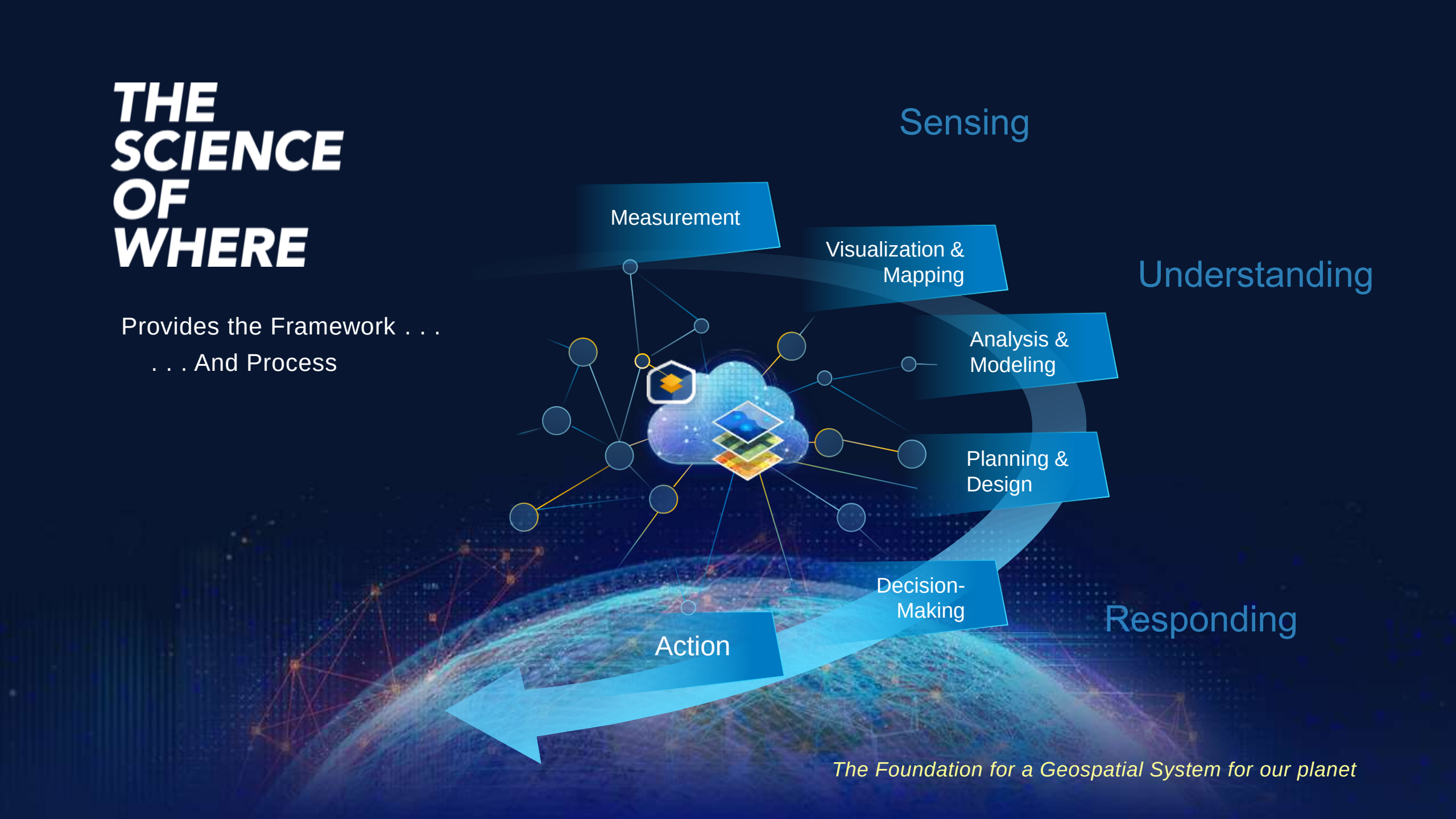
Helping Us Understand . . .

. . . And Intelligently Respond

THE SCIENCE OF WHERE

Provides the Framework . . .

. . . And Process



The Foundation for a Geospatial System for our planet

Your Work

Is Already Creating Geospatial Infrastructure

Intelligent and Responsive . . .

Integrating All Sources of Data . . .

. . . Creating Digital Systems for Your Organizations

Connecting Everything . . . And Everyone

Applying The Science of Where . . .

Your Work

Is Also Contributing to Global Geospatial Infrastructure

Connecting & Integrating

Sharing Data, Apps
. . . and Geographic Knowledge

. . . At Scale

Creating a Global System

A System for Understanding . . . And Collaborative Action

Geospatial Infrastructure

Supports Individuals . . .

. . . And Organizations of All Sizes

Communities

Engaging Everyone

Organizations

Departments

Teams

Individuals

GIS at Scale

Distributed . . . And Interconnected

Sharing and Collaboration

Providing Many Capabilities for GIS Professionals

Accessing and Leveraging Distributed Resources

Open Data

GeoEnrichment

StoryMaps

Distributed Services

AI & ML

Data Science

Tracking

Big Data

Geocoding

Content Management

Remote Sensing

Search & Discover

Publishing Services

Shared Apps

Analytic Services

Field Operations

Extensive Content

Real-Time Measurement

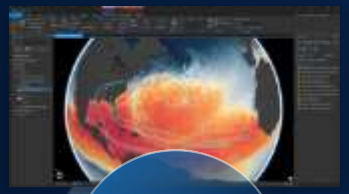
Geospatial Infrastructure

Delivering Powerful Capabilities Across Organizations

Mapping

Data Visualization

Field Operations



Analysis

Data Science

GIS Projects

Dashboards

Geospatial Infrastructure

Building Blocks . . .
For a Responsive System

Engaging and Interconnecting Communities

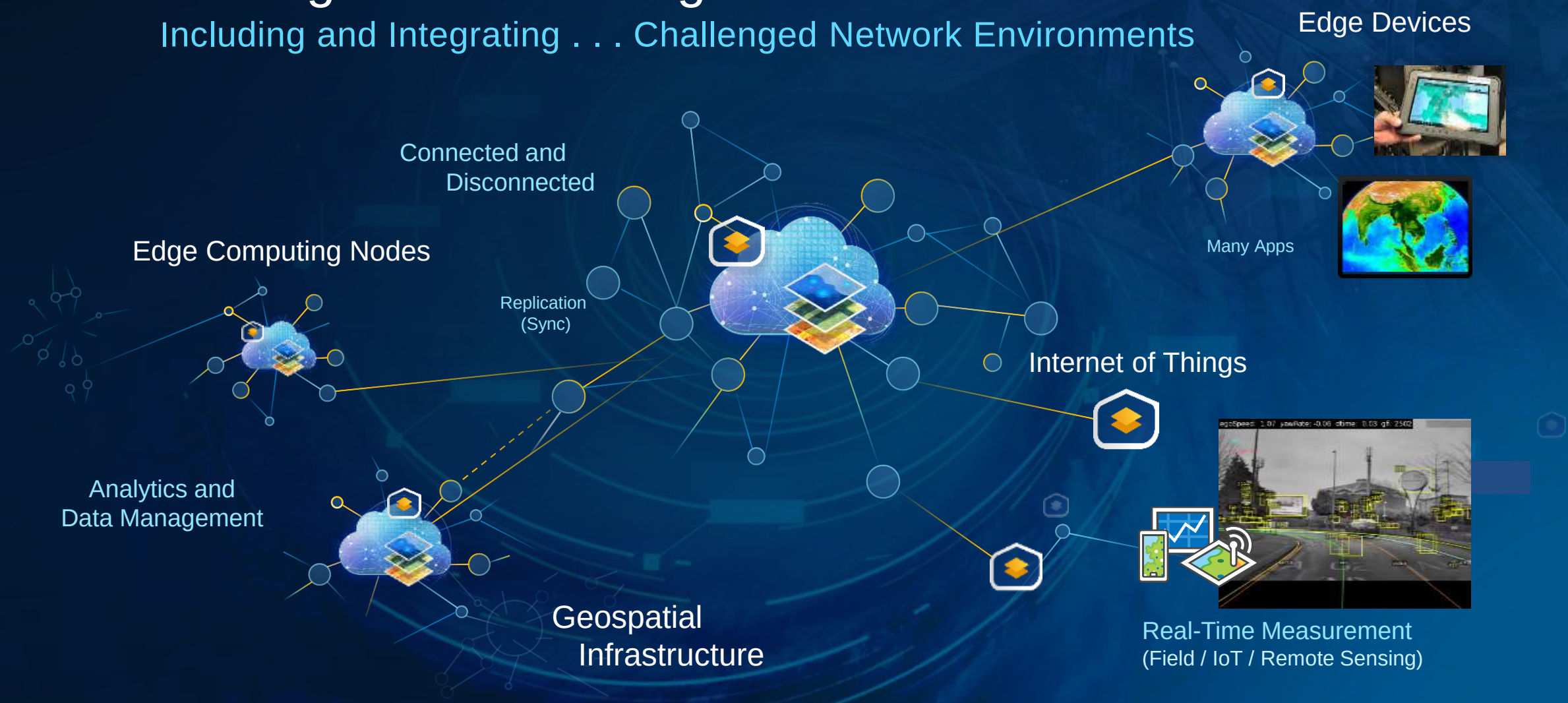
Bringing Together People, Organizations and Stakeholders

Creating New Opportunities to Participate

. . . Collaborating Around Common Interests and Initiatives

Extending GIS to the Edge

Including and Integrating . . . Challenged Network Environments



Supporting GIS Workflows in All Environments

Geospatial Infrastructure Is Transforming Organizations

Interconnecting Information, Processes and Workflows . . .

. . . All Happening at the Same Time

Creating Responsive Organizations

Using the Power of Geography to Understand . . . And Integrate Everything

Abu Dhabi

Mapping Platform Across All Government Sectors

Ordnance Survey Great Britain

Transforming Operations and Serving the Community

Raleigh NORTH CAROLINA

Interconnecting Government & Citizens

The Geospatial Revolution Is Just Beginning . . .

The Geospatial System . . .

. . . That Emerges

. . . Will Profoundly Transform Our World

Your Work Is Essential . . .

Building an Intelligent System Is More Than Just Technology

It Will Take Leadership . . .

Envisioning What's Possible

Learning, Sharing & Collaborating

Strategic Thinking

Engaging Communities

A Passion to Create Understanding . . .

. . . And to Create a Better World

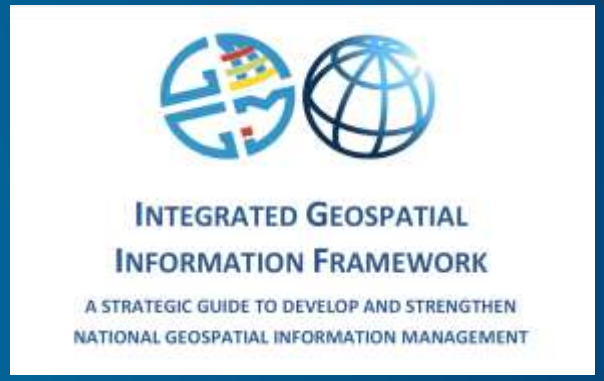
Leveraging *The Science of Where* . . .

. . . To See What Others Can't

What is the IGIF? Integrated Geospatial Information Framework

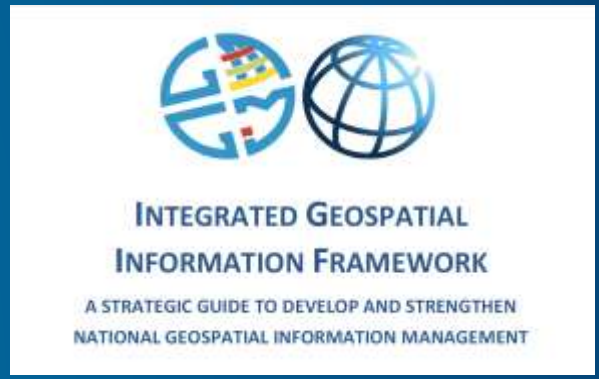
In August 2017 the United Nations Statistics Division (UNSD) and the World Bank agreed to collaborate on a joint vision to promote growth and prosperity through creating and strengthening geospatial information capacity and development.

The objective being to develop an Integrated Geospatial Information Framework that Member States can use to develop and enhance their own geospatial information management.

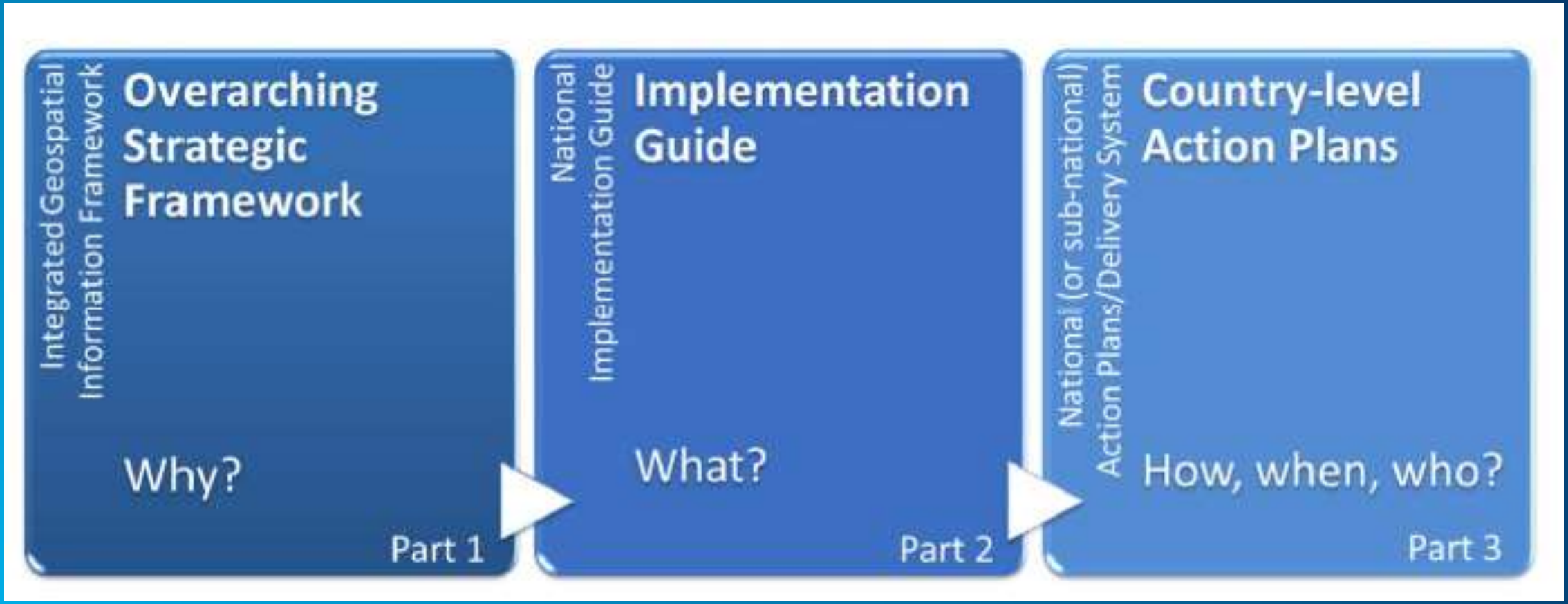


What is the IGIF?

This Framework, implemented at the national level, will assist countries to move towards e-economies, improve services to citizens, build capacity for using geospatial technology, enhance informed government decision-making processes, take practical actions to achieve a digital transformation, and be able to bridge the geospatial digital divide in the implementation of national strategic priorities and the 2030 Agenda for Sustainable Development.



What is the IGIF?



Overarching Strategic Framework: Principles

Underpinning Principles:

PRINCIPLE 1: Strategic Enablement

PRINCIPLE 2: Transparent and Accountable

PRINCIPLE 3: Reliable, Accessible and Easily Used

PRINCIPLE 4: Collaboration and Cooperation

PRINCIPLE 5: Integrative Solution

PRINCIPLE 6: Sustainable and Valued

PRINCIPLE 7: Leadership and Commitment

The 7 Principles are the key characteristics and values that provide the compass for implementing the Framework, and allow for methods to be tailored to individual country needs and circumstances.

Overarching Strategic Framework: Goals

GOAL 1: Effective Geospatial Information Management

GOAL 2: Increased Capacity, Capability, and Knowledge Transfer

GOAL 3: Integrated Geospatial Information Systems and Services

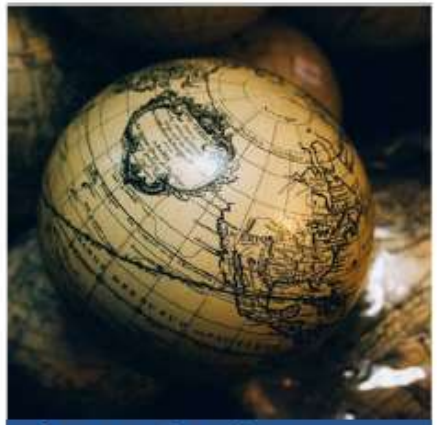
GOAL 4: Economic Return on Investment

GOAL 5: Sustainable Education and Training Programs

GOAL 6: International Cooperation and Partnerships Leveraged

GOAL 7: Enhanced National Engagement and Communication

GOAL 8: Enriched Societal Value and Benefits

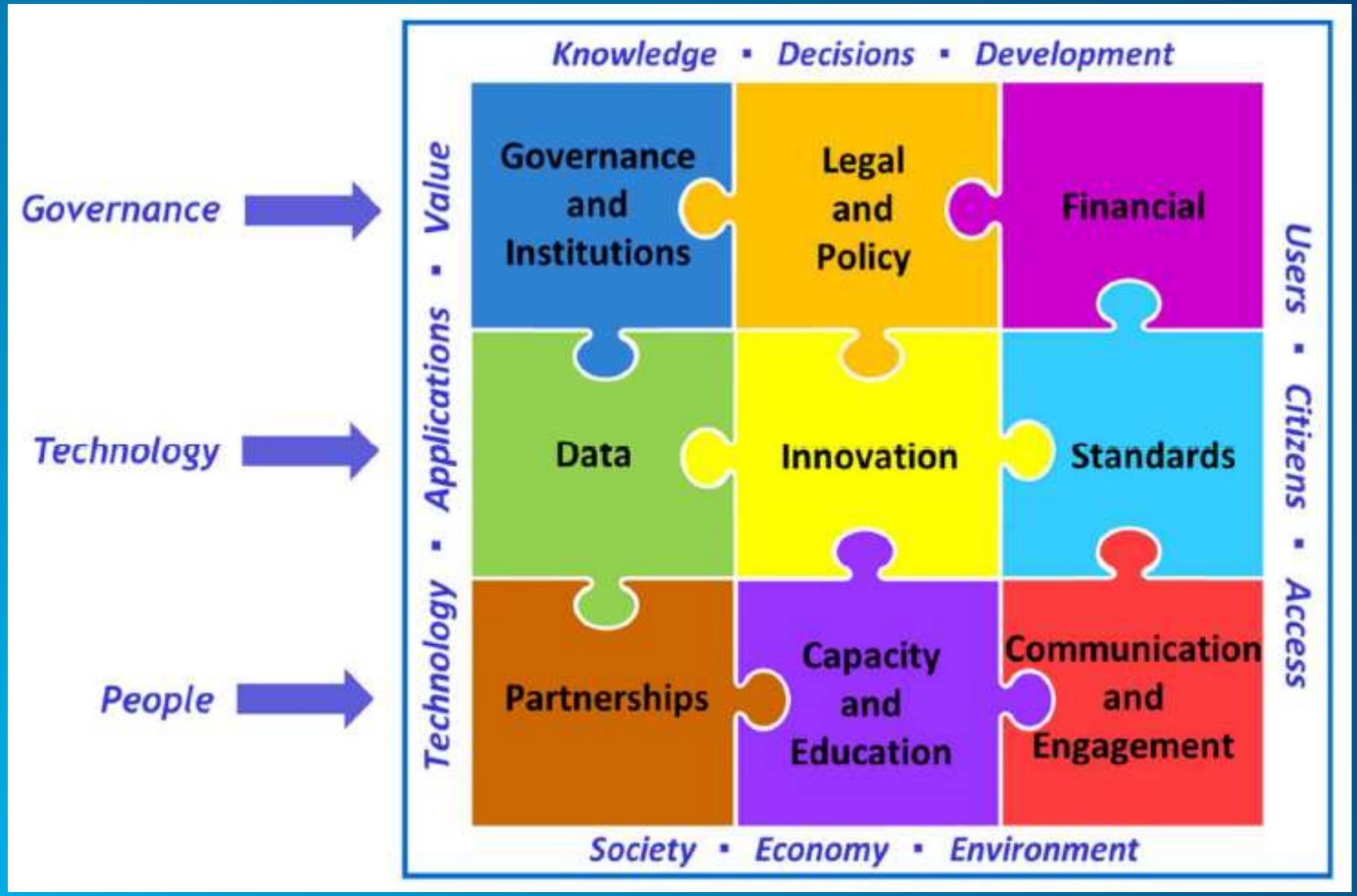


The 8 Goals reflect a future state where countries have the capacity and skills to organize, manage, curate and leverage geospatial information to advance government policy and decision-making capabilities.

Part 1: Overarching Strategic Framework

- **The Overarching Strategic Framework sets out nine strategic pathways to assist governments starting the journey of implementing integrated geospatial information management practices and its inclusion in their national plans and strategies.**

- **It is to be used as an engagement tool to bring about coordination, collaboration and coherence across government when working towards strengthening national geospatial information management.**


Knowledge ▪ Decisions ▪ Development
Governance
Technology
People
Governance and Institutions
Legal and Policy
Financial
Data
Innovation
Standards
Partnerships
Capacity and Education
Communication and Engagement
Technology ▪ Applications ▪ Value
Users ▪ Citizens ▪ Access
Society ▪ Economy ▪ Environment

Part 2: The Implementation Guide

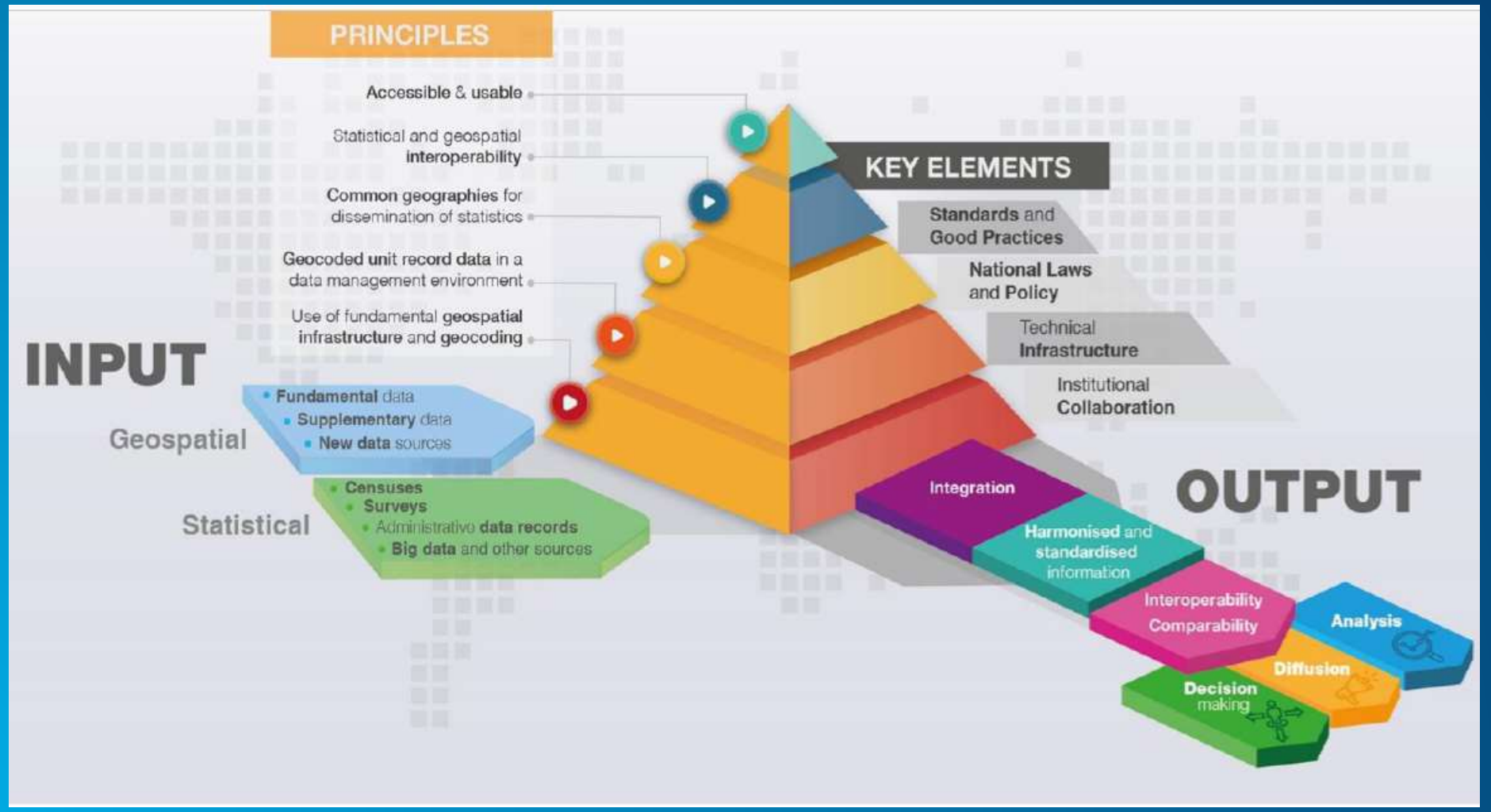
The Implementation Guide is to be used to provide the guidance and oversight to develop and follow up on the country-level Action Plans (Part 3) through indicators that include geospatial information at a national level, as well as at a sub-national level.

The Guide includes detailed actions, examples and links to reference material to support the implementation of consistent nationwide geospatial information management.

Part 3: Country Level Action Plans

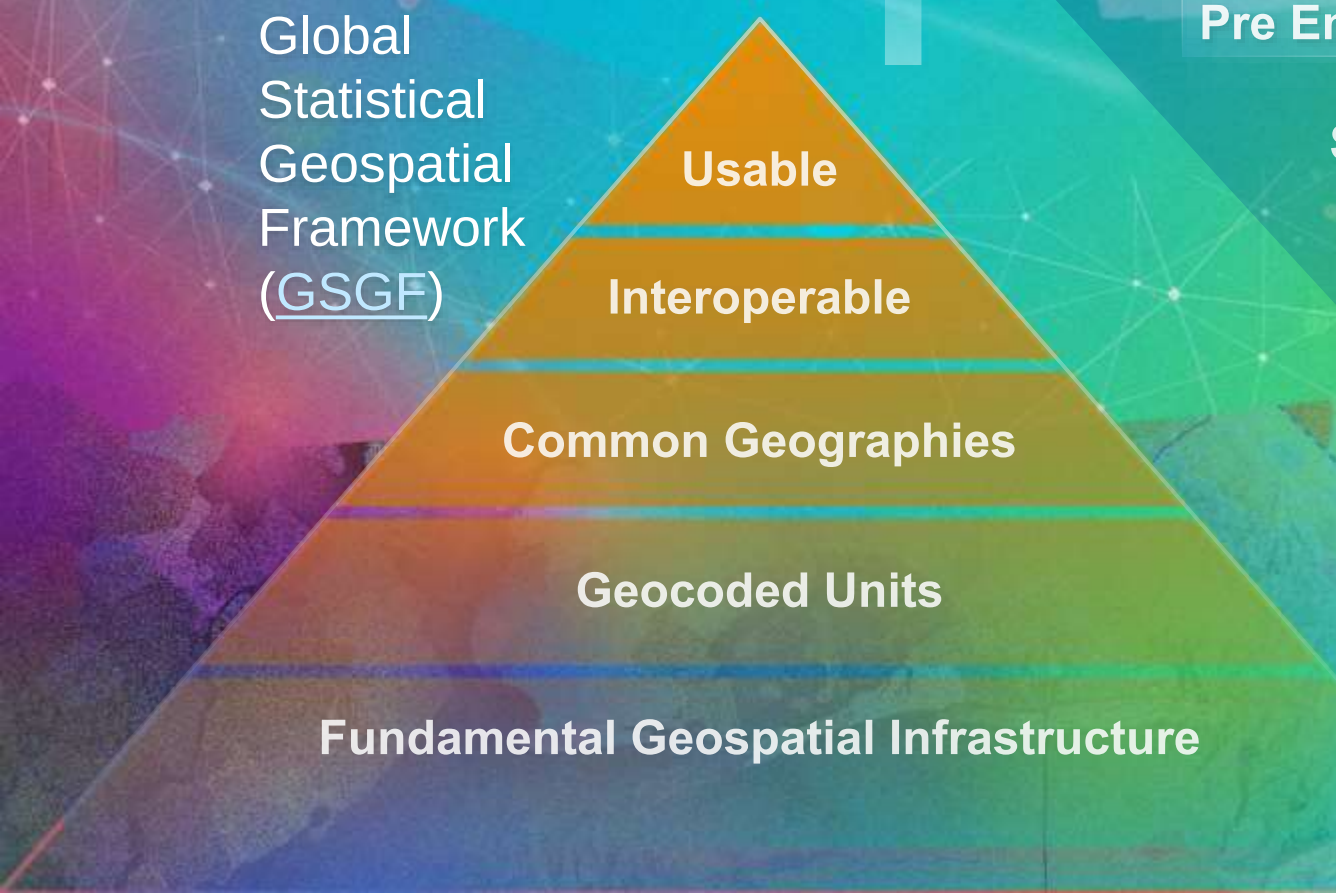
Country-level Action Plans, seek to implement the Framework at a country level, in a national or a sub-national context, taking into consideration national circumstances and development priorities.

What is the GSGF? Global Statistical Geospatial Framework?



Integration of Statistical and Geospatial Data

Global Statistical Geospatial Framework (GSGF)



Statistical Process Model (GSBPM)

Planning/ Pre Enumeration	Enumeration	Post Enumeration/ Dissemination
Specify Needs	Collect	Disseminate
Design	Process	Evaluate
Build	Analyze	

Quality / Metadata Management

Geography and Statistical Data Are Foundational

An Integrated Data Model is Essential

Nested Administrative Hierarchy

Boundaries

Key

EA Id	Area
1203501750071	42.3
1203501750072	34.8
1203501750073	26.9
1203501750074	51.2

Census Data

EA Id	Population	Male	Female
1203501750071	432	209	223
1203501750072	502	240	262
1203501750073	525	258	267
1203501750074	494	251	243

EA Id	Num HH	Avg HH size
1203501750071	89	4.9
1203501750072	98	5.1
1203501750073	102	5.1
1203501750074	85	5.8

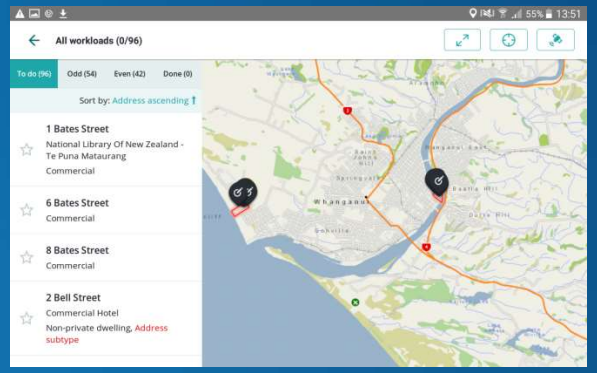
Diagram and information taken from the “Handbook on the Geospatial Infrastructure in Support of Census Activities”, Department of Economic and Social Affairs, United Nations Statistics Division

Role of GIS in Official Statistics

Generic Statistical Business Process Model (GSBPM)

Planning/Pre Enumeration			Enumeration	Post Enumeration/Dissemination			
Quality Management / Metadata Management							
Specify Needs	Design	Build	Collect	Process	Analyse	Disseminate	Evaluate

Design and production of enumeration areas



Data collection using Mobile devices, tablets and laptops

Census dissemination
Online thematic maps
Story Maps and more

ArcGIS: A Modern GIS System

A Comprehensive Geospatial Platform

Open

Services Based

Extendable

Distributed

SaaS & Software

Supporting Individuals, Teams and Organizations

Web GIS Is the Modern GIS Architecture

Helping Everyone Do Their Work Better

Distributed
. . . and
Interconnected

End Users
and Developers

Communities

Organizations

Departments

Teams

Individuals

Engaging
Everyone

Leveraging
Web Services

Sharing and
Collaboration

Web GIS Supports Multiple Implementation Patterns

Integrating Cloud and On-Premises Systems

What Makes Web GIS So Compelling?

Easy, Accessible, and Interconnected . . .

. . . Fueled by Powerful Data and Analytics

. . . a Whole New Approach for Creating Geospatial Infrastructure

Web Maps Engage and Interconnect . . . Everyone

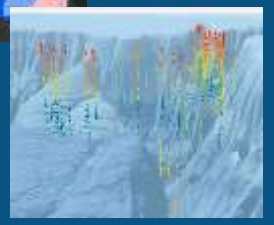
Providing a Common Language

Spatial Analysis and Data Science

- Functionality
- Scalability
- Accessibility

Spatial Statistics

Balanced Zones

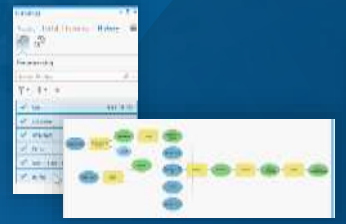


3D Interpolation (EBK)

Logistical Regression

Forest-based Classification and Regression

Improved Processing



Tool History to Models

Models to Python

Hosted Python Notebooks

Enterprise

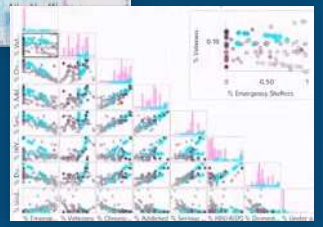
Pro

Scalable GeoAnalytics

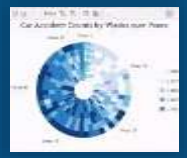
Deep Learning

Charting

Calendar Heat Map

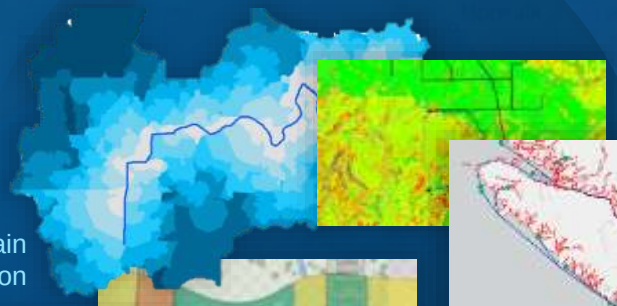


Scatter Plot Matrix



Data Clock

Raster Functions



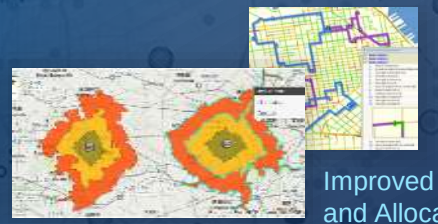
Floodplain Delineation

Cost Distance

River Classification

DEM Error

Network Analysis



Improved VRP and Allocation

Hosted Python Notebooks For Integration, Modeling and Automation

Integrating Distributed Services and Data . . .

. . . The World of Open Science & Big Data

Interactive Computing

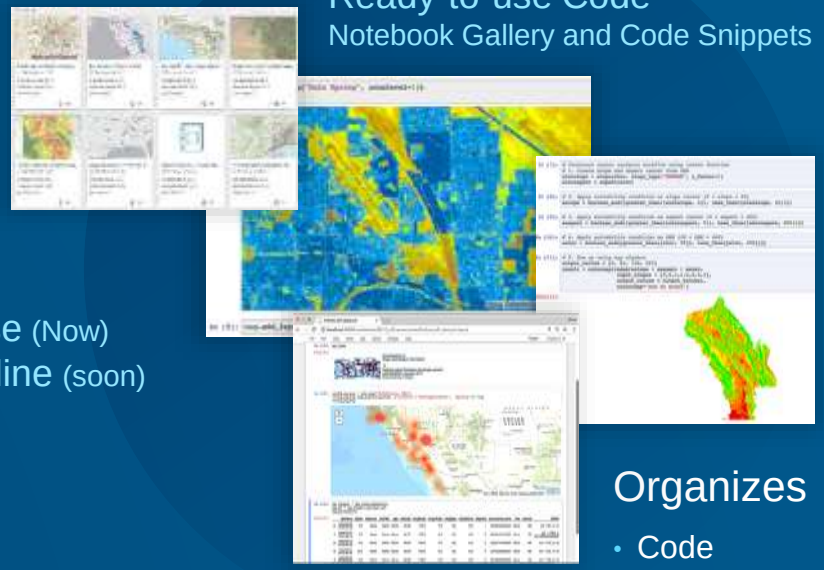
ArcGIS

Notebook Server

Enterprise (Now) and Online (soon)

Ready-to-use Code

Notebook Gallery and Code Snippets



Organizes

- Code
- Data
- Visualization
- Documentation

Data Stores / Lakes

ArcGIS Analytic Servers

(Image, GeoAnalytics, Spatial)

Open Science Libraries

Providing Notebooks as Items . . .

. . . and ArcPy Geoprocessing as a Service

Imagery A Comprehensive System for Imagery and Remote Sensing

- Image Cube Support
- Deep Learning Tools

Image Management

Image Mosaics
Dynamic

Image Cube
Pre-Processed

Imagery

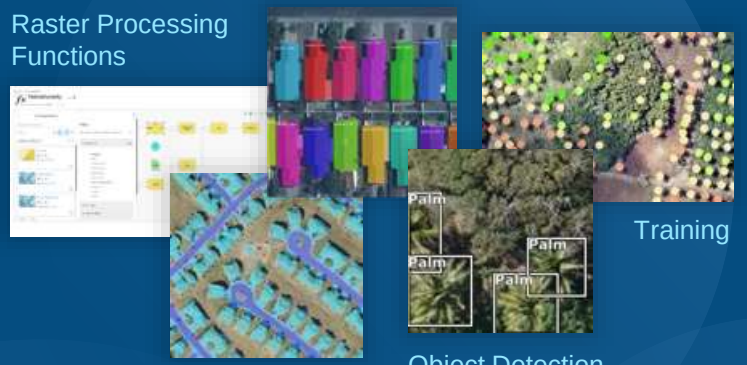
Rich Content
All Types & Formats

Analysis

Raster Processing Functions

Segmentation

Deep Learning Tools

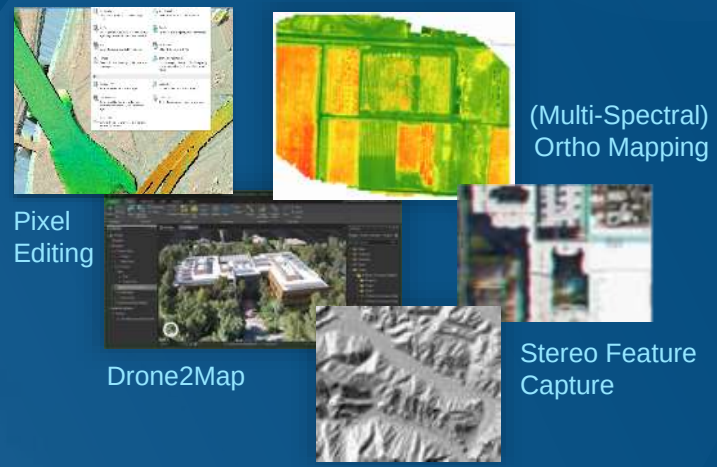


Training

Pixel Classification

Object Detection

Map Production



Pixel Editing

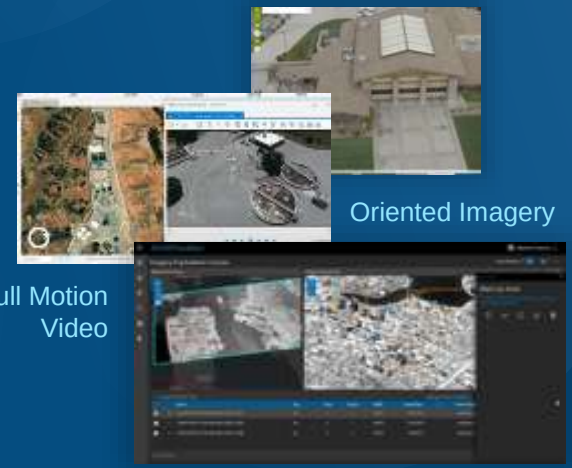
(Multi-Spectral) Ortho Mapping

Drone2Map

Stereo Feature Capture

DTM Generation

Visualization & Exploitation



Oriented Imagery

Full Motion Video

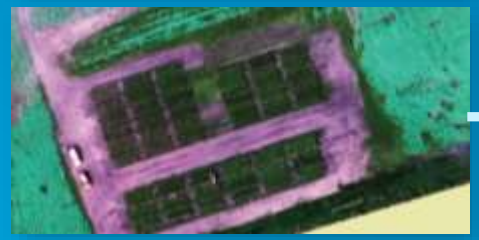
Structured Observations

Integration of GIS – Earth Observation Data

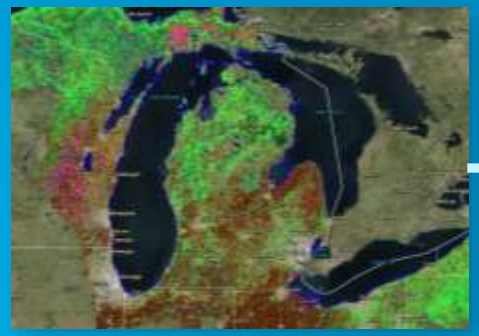
Update maps and EAs using imagery, change detection and more

Tree Canopy

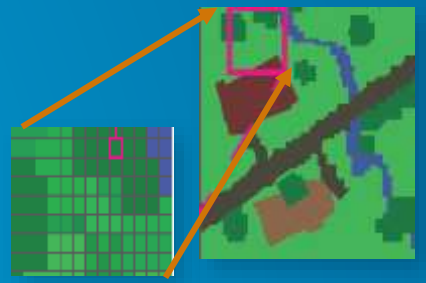
Crop Health



Land Cover



Analytics



Key

EA Id	Area
1203501750071	42.3
1203501750072	34.8
1203501750073	26.9
1203501750074	51.2

Tree Canopy

EA Id	Density	Own	Height
1203501750071	4	C	M
1203501750072	5	A	L
1203501750073	5	C	H
1203501750074	6	O	M

Crop Health

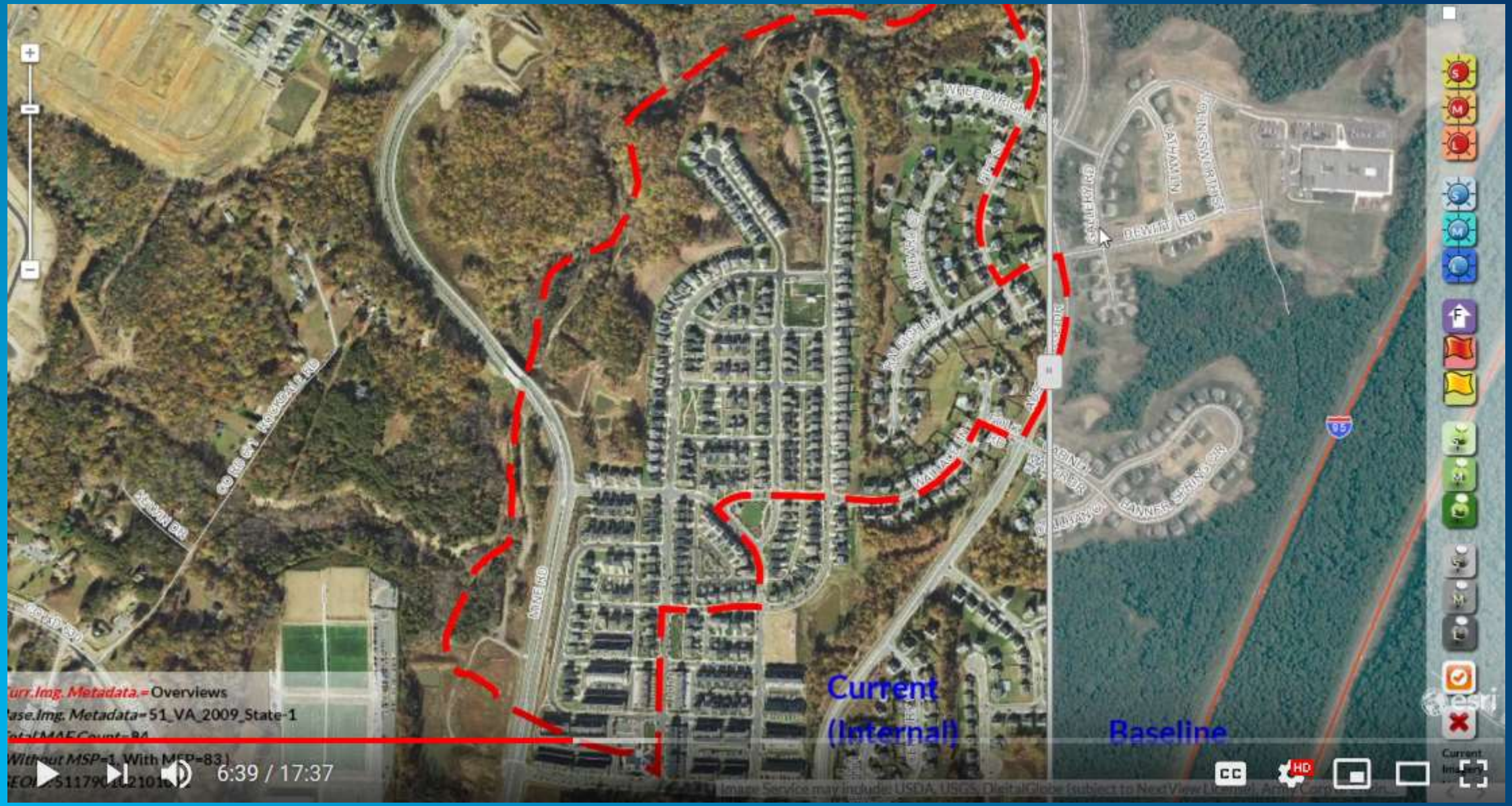
EA Id	Moisture	Vigor
1203501750071	89	M
1203501750072	98	M
1203501750073	102	H
1203501750074	85	M

Land Cover

EA Id	Primary Type	% change
1203501750071	Forest	+4.9
1203501750072	Ag	-5.8
1203501750073	Wet L	-5.1
1203501750074	Scrub	+3.5

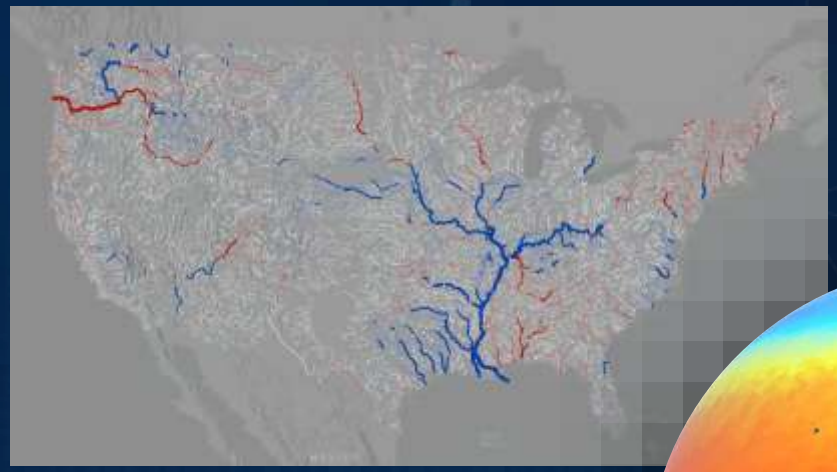
Image Integration and Machine Learning are Becoming a Fundamental Part of a Modern GIS

US Census: In office Address Canvassing



Earth Observations Combined with GIS and AI

Provide Real-Time Global Intelligence



Flood Prediction

Sea Surface Temperature

Human Footprint

Ecological Land Units

Helping Us Understand, Predict, and Make Decisions . . .
. . . at Many Scales

Real-Time Analytics | Integrating Sensor Networks and the IoT

Supporting High-Velocity Data Streams

Tracking, Monitoring, and Alerting

- Performance (2.5x)
- Scalability (10x)
- Resiliency
- Cloud IoT Connectors
- Actuation

Events

Vehicles

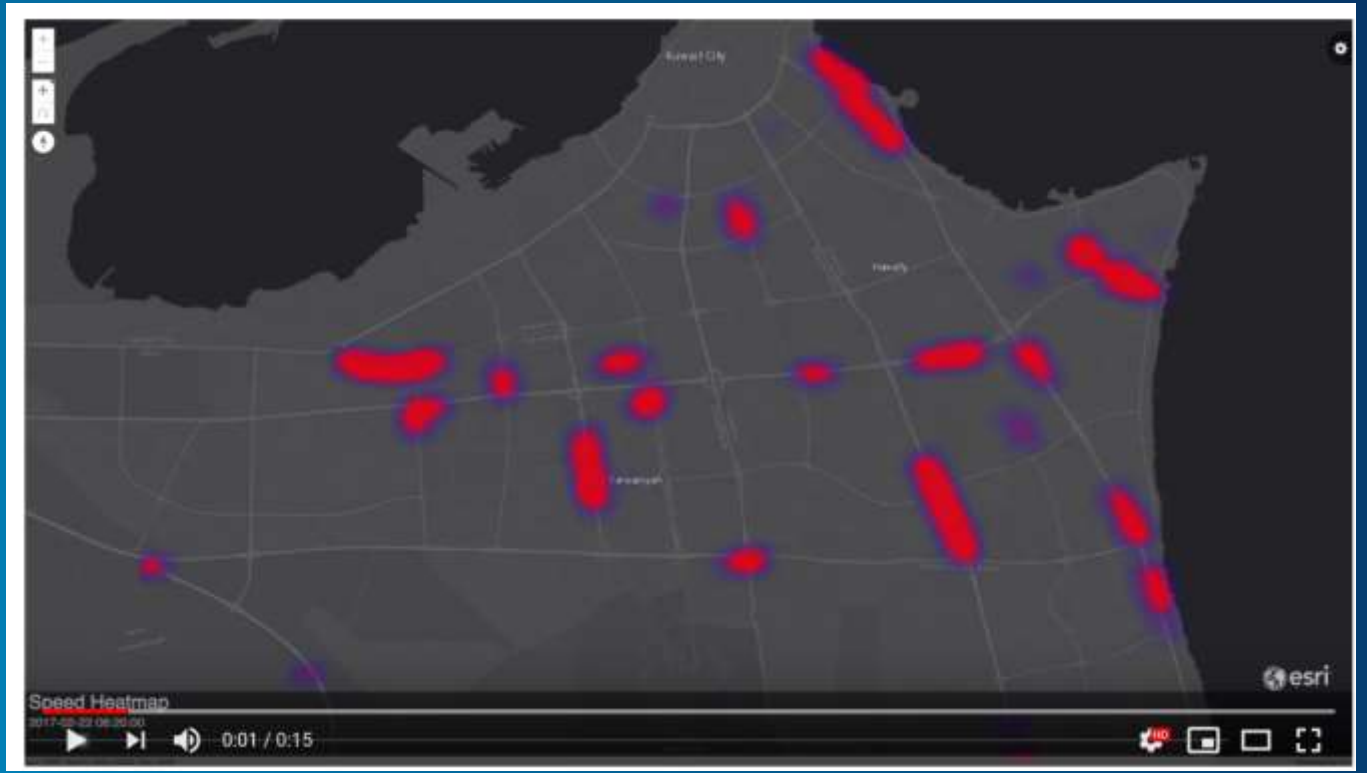
Assets

Monitoring

Supporting Real-Time Applications

PACI – Kuwait Case Study

The PACI-developed Kuwait Finder app has become very popular, helping people navigate the city and government services.

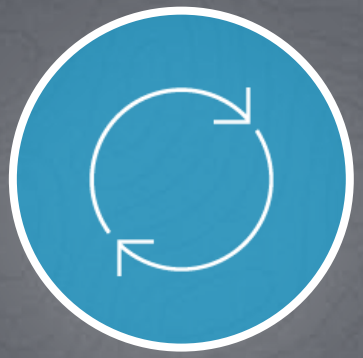


Public Authority for Civil Administration

Roundtable sessions

Challenges and Limitations

People



Process

Data

Technology

Three roundtable sessions

Monday

2:45- 4:15	▪ **Current state IT and GIS infrastructure including:** o Services, Systems and Apps o Security and privacy issues o Capacity building needs o Standards (OGC, ISO, etc.) as well as adoption of frameworks (GSGF and IGIF)
4:15- 5:45	▪ **Data needs and gaps including:** o Data needed for planning o Dissemination of data o Data users and engaging the community o Standards (OGC, ISO etc) as well as adoption of frameworks (GSGF and IGIF)

Tuesday

9:00 - 10:20	▪ **How to impact change** o Governance o Organizational and legal frameworks o Leadership o Change Management

Approach

- For the three roundtable sessions we will split participants in six groups (~6 people each)
- One moderator will support the discussion of each group and will provide sample questions to be discussed
- Each group will select one person to present the outcome of the discussion
- The agenda for each session looks like this:

Topic	Audience	Time (minutes)
Group discussion	Group	40
Summary of discussion	Group	10
Presentation on outcomes	All participants	5 min each group (total 30)
Open discussion and prioritization exercise	All participants	10

Roundtable 1: Current state IT and GIS infrastructure (90 minutes)

Sample questions

General topics/questions	Additional related questions
What type of HW is being used today at your agency? (E.g., server, desktop, mobil)	* Is the HW dated? Is this an issue?
What HW acquision is planned for next projects and initiatives?	* Is there a gap? * Is funding for HW acquisition available?
What GIS SW is currently being leveraged at your organization?	* Does it cover the basic agency needs? * What future GIS SW does agency plan to acquire? Is funding available?
Do you host GIS data and services in the Cloud?	*If you don't, are there plan to do so in the future? * Can you leverage services such as ArcGIS Online to consume base maps or to help with peak loads? * Are there any institutional or legal restrictions for hosting information in the Cloud?
Internet bandwidth	* Is your current bandwidth sufficient for day to day operations? * Or to manage volume of transactions at peak loads?
Describe overall mobile connectivity in country	* Does it meet the needs of the organization? * What percentage of the population can access 3G or 4G?
Describe capacity building needs and gaps for IT and GIS	* List three high priority training topics for your agency
Describe your GIS development platform	* Degree of configuration vs customization for your agency * What APIs and SDKs are being leveraged for GIS customization

Roundtable 2: Data need and gaps (90 minutes)

Sample questions

Describe data used for common workflows	* What data needs to be used in support of field work * What data needs to be used for analysis? * What data need to be used for reporting? *What data needs to be used to support policy making?
Describe the most pressing data needs for your agency	* Is the authoritative agency data out-of-date? * Do you have difficulties obtaining the source data?
Discuss data storage conditions and needs	* Is the geodata stored in tables, databases, geodatabases? * Do you need to improve data storage (e.g., upgrade SW, upgrade HW, move to Cloud)?
Discuss data Sharing - policy, limitations	* Does the agency have guidelines for data sharing? (e.g., Open Data Policy, agreements with other government agencies) * Do you have difficulties sharing data with others, or obtaining data from others? * Is there good communication with the key community stakeholders?
Who are the main users of your data?	* Are they government agencies? * Is data shared predominantly with the public?
Discuss information products	* What are the main information products created by your agency? * What are the new information product you envision developing in the next 5 years?
Describe capacity building needs for data production, maintenance and sharing	* List three high priority training topics for your agency

Roundtable 3: How to impact change (80 minutes)

Sample questions

What governance issues or challenges does your agency face?	* Do you have governance policies and guidelines in place today?
Discuss your legal framework	* Are there areas that cause restriction in how you do business? (E.g, US Census had to change law on need to knock on every door each census) * Is the legal framework appropriate to support the work of your agency?
Discuss senior management's role	* Is senior management informed and supportive of role of GIS and geoinformation for the business? * What can be done to elevate the visibility of GIS in your agency?
Discuss funding: availability, restrictions	* Are there financial or budget concerns? * What are the main budgetary gaps?

Approach

- Last roundtable will be shorter:

Topic	Audience	Time (minutes)
Group discussion	Group	30
Summary of discussion	Group	10
Presentation on outcomes	All participants	5 min each group (total 30)
Open discussion and prioritization exercise	All participants	10

Jamaica Country Examples

AI, ML and Deep Learning Integrating Open Science

- Clustering
- Prediction
  - Classification
  - Regression
  - Interpolation
- Object Identification

- Feature Extraction
- Site Selection
- Event Prediction

ArcGIS

Pro

Python Notebooks

AI, ML and Deep Learning

Feature Extraction

Accident Prediction

Object Detection

OpenCV

Keras

TensorFlow

scikit learn

PYTORCH

Multiple Frameworks & Platforms

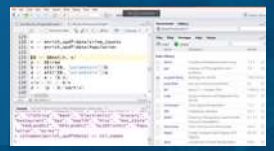
Spatial Machine Learning

Empirical Bayesian Kriging Regression Prediction

Density-Based Clustering

Training Data Preparation

Data Science



R Integration

pandas

SAS

Jupyter

AI > ML > DL

Artificial Intelligence

Reasoning

Knowledge Representation

Perception

NLP

Robotics

Machine Learning

Machine Learning

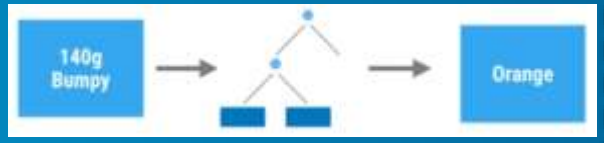
Supervised Learning

1. Training *features* *Labels*

Weight	Texture	Label
150g	Bumpy	Orange
170g	Bumpy	Orange
140g	Smooth	Apple
130g	Smooth	Apple
...	...	...

Examples

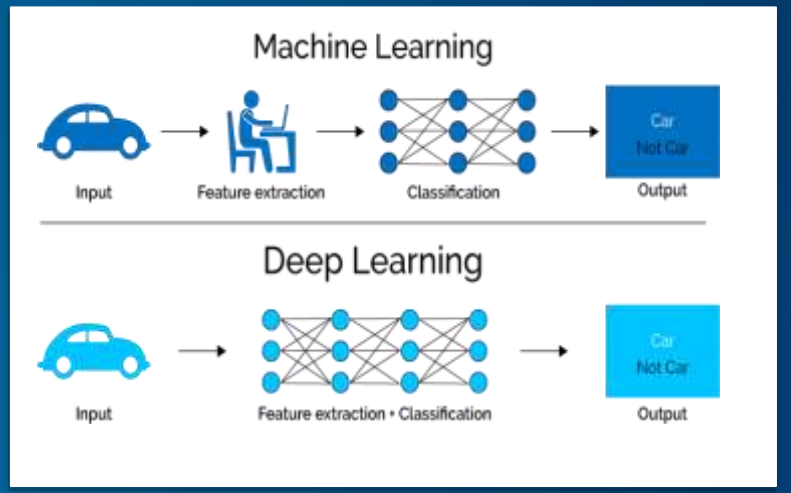
2. Predicting



Unsupervised Learning
Reinforcement Learning

Deep Learning

Deep Supervised Learning



Dog

Can be applied everywhere..

Autonomous Cars

Sentiment Analysis

Chatbots

Advanced Video Analytics

Predictive Maintenance

Crime Prediction

Cancer Detection

Facial Recognition

Personalized Marketing

Stock Market Prediction

Advanced Satellite Intelligence

AI can help with

Prediction

Object & Feature Detection

Clustering

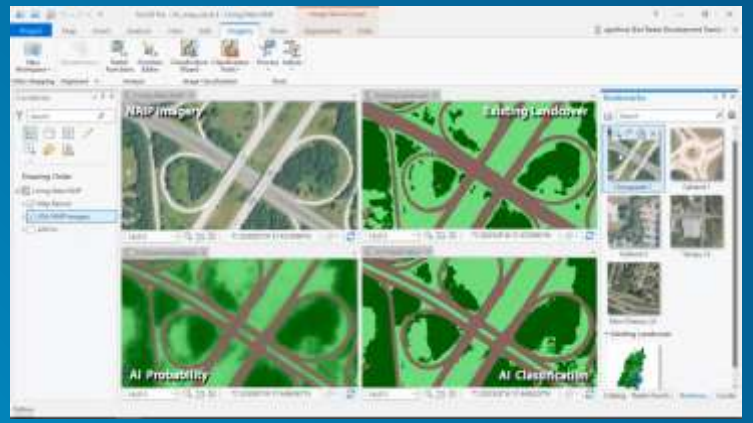
Land Classification

Anomaly Detection

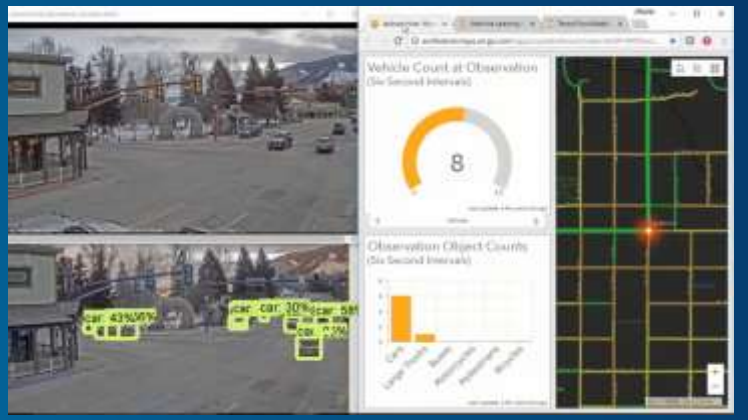
GeoAI Sample Use-Cases (Videos)

Object Detection from Imagery

High Resolution Land Cover

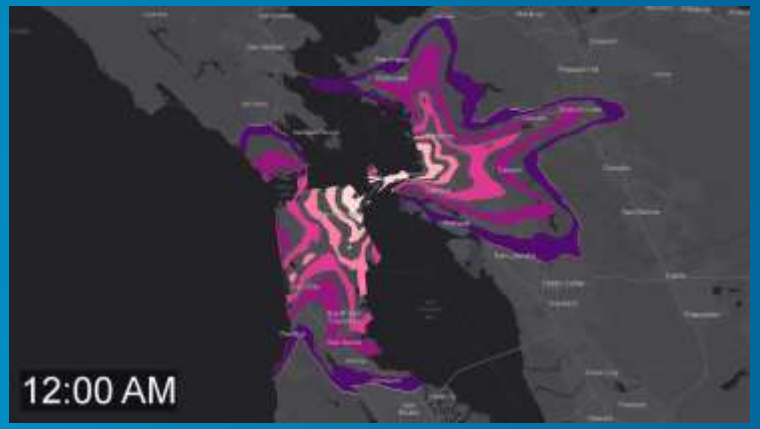


Object Detection from Videos



Accidents Probability Prediction

ETA Prediction



Smart Road Digitization

New Orleans

Blight, Overgrowth, Graffiti Detection

Custom Vision: Overgrowth - Tra

https://www.customvision.ai/projects/33f16d86-ca89-4424-8c4c-f29bed7dc66a#/manage

Overgrowth

Training Images | Performance | Predictions | Train | Quick Test

Filter

Iteration

Workspace

Tags

Tagged | Untagged

Showing:

Overgrowth

Search for

Not_Overgrowth 70

Overgrowth 125

Add images | Delete | Tag images | Select all

< 1 2 3 >

Get started

Custom Vision: Overgrowth - Tra

https://www.customvision.ai/projects/33f16d86-ca89-4424-8c4c-f29bed7dc66a#/manage

Overgrowth

Filter

Iteration

Workspace

Tags

Tagged

Showing:

Overgrowth

Search for

Not_Overgrowth

Overgrowth 125

1 2 3 >

Get started

Image Detail

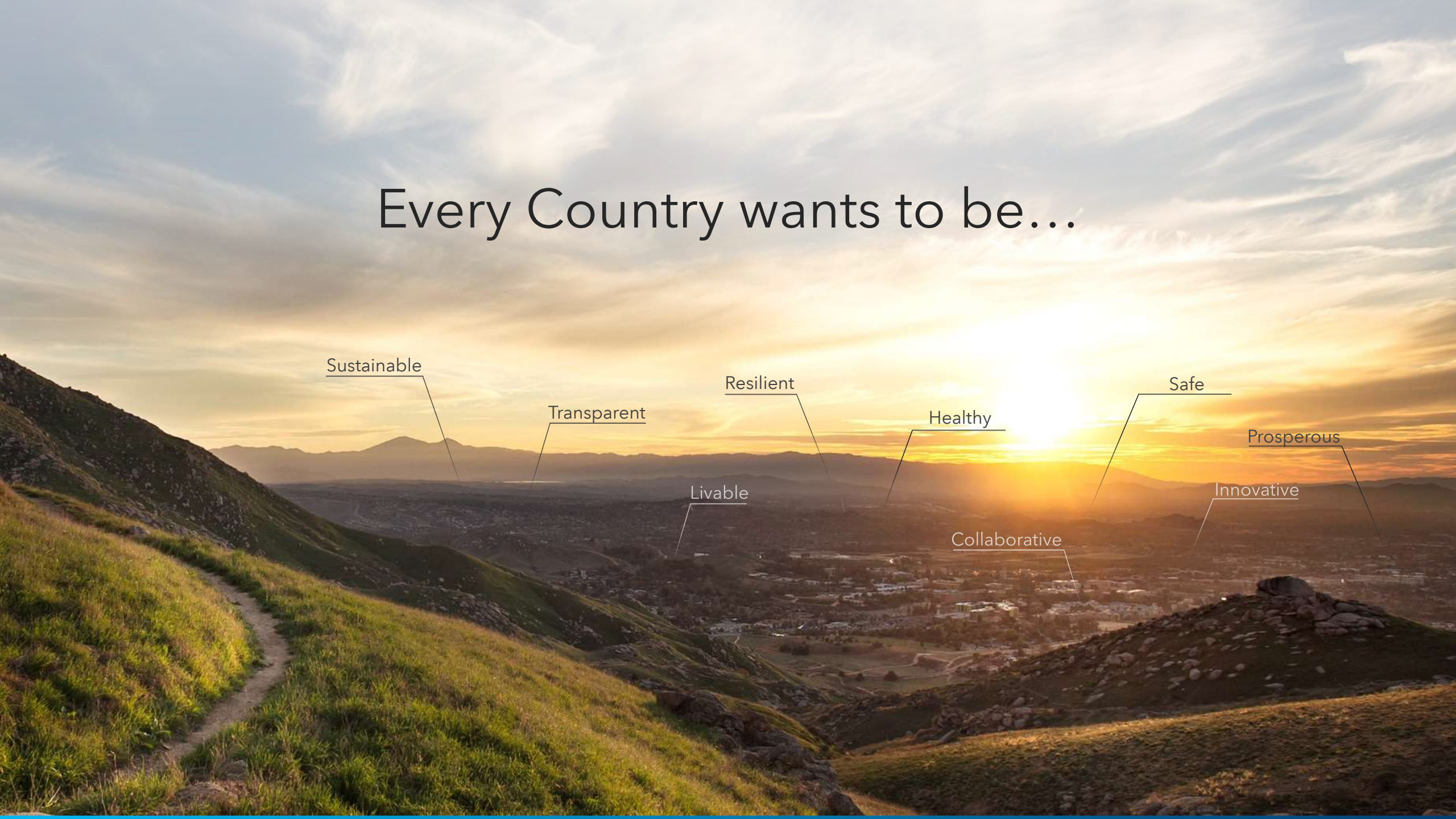
My Tags

Add a tag and press enter

Overgrowth

The **future** is NOW

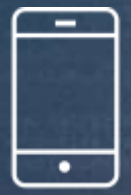
Every Country wants to be…



Today's Cities and Communities Need Synergy

People Process Technology Data

Data is Everywhere...



Personal devices

Messages

Email

Social media

Online search

Financial transactions

IoT sensors

Connected vehicles

Satellites

Industrial systems

Drones

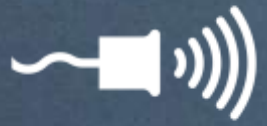
Cameras

Data is Everywhere… Authoritative data and more

Opportunistic Data

Data collected for one purpose and then used for another

Purposely-sensed Data



Data captured by sensors for a specific purpose

User-generated Data

Data from engaging with people via social media or crowdsourcing

GIS Is a Foundational System

What are the common travel patterns?

Are there areas that need better public safety measures?

What facilities do I need to provide for the country?

Where should I target budgets for asset maintenance?

How can I get greater awareness of public health issues?

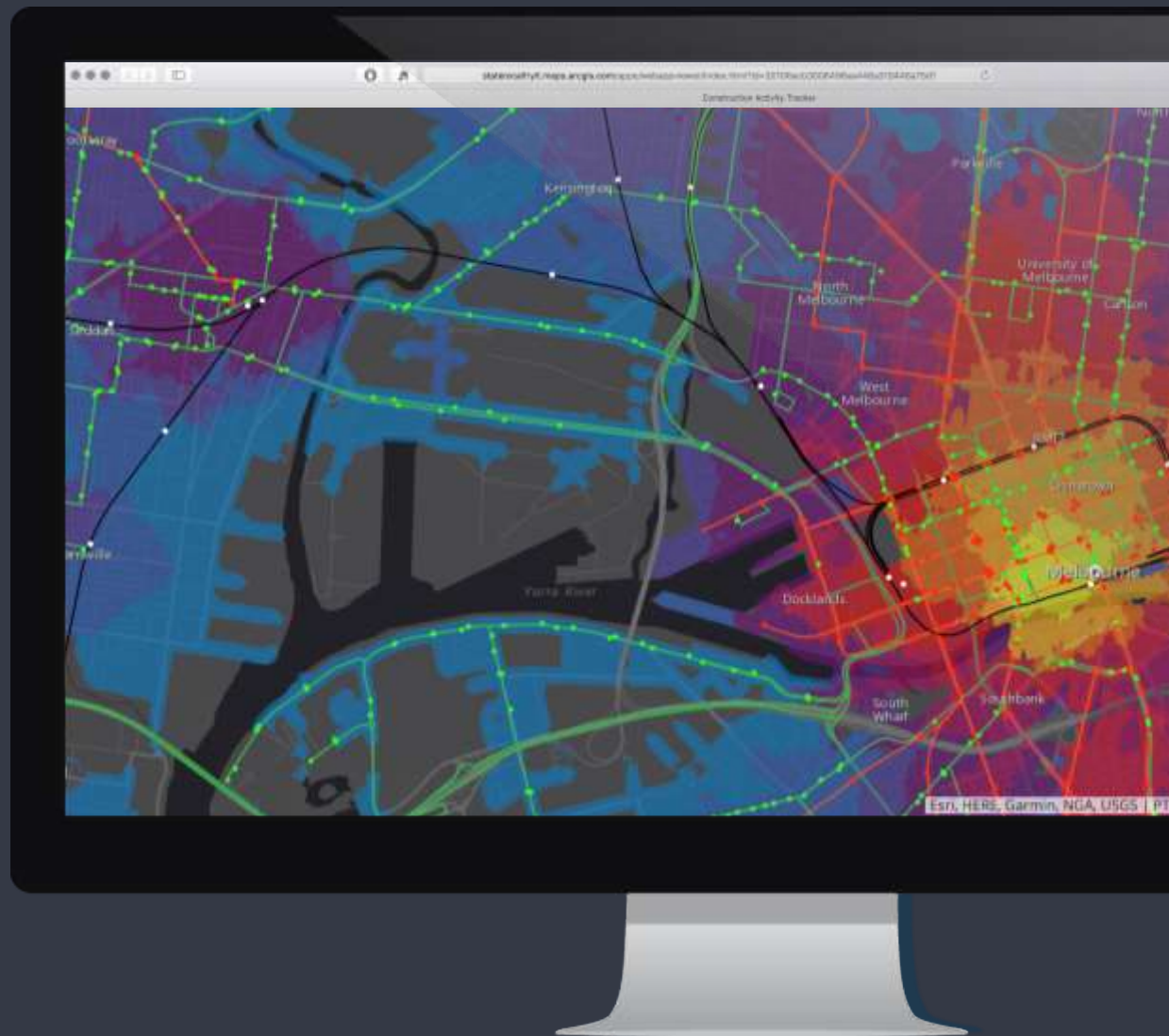
How can I understand where congestion is a problem?

Do public transit services have enough capacity to serve the citizens well?

What can I do to make the country run more efficiently?

What industries are driving the country economy and how?

How can I more effectively engage with residents and citizens?



National Agencies Need to Modernize

People Process Data Technology

National Agencies are reorientating themselves

Relevant

Contributing to National Objectives

Responsive

Actively engaging other agencies & citizens

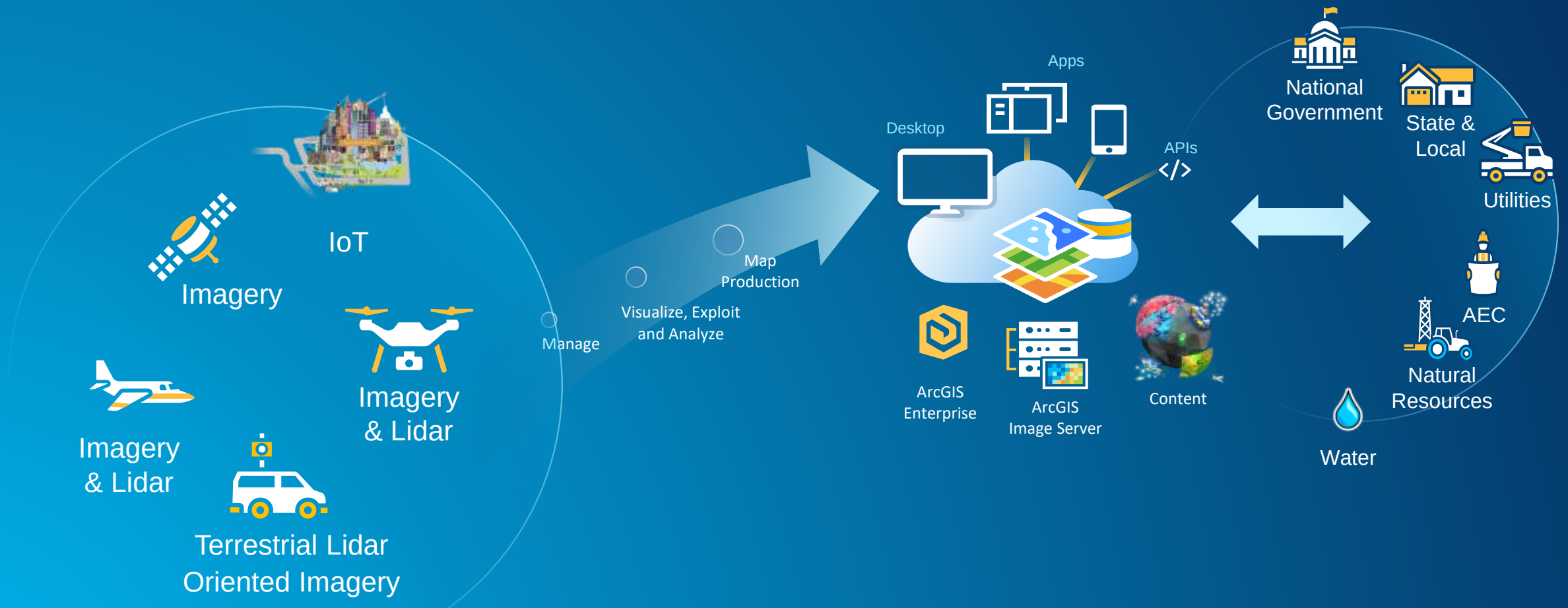
Authoritative

Producing quality, safe, trusted, timely information

Efficient

Aligning people, processes & technology

We Must Transform Volumes of Data into Meaningful Information

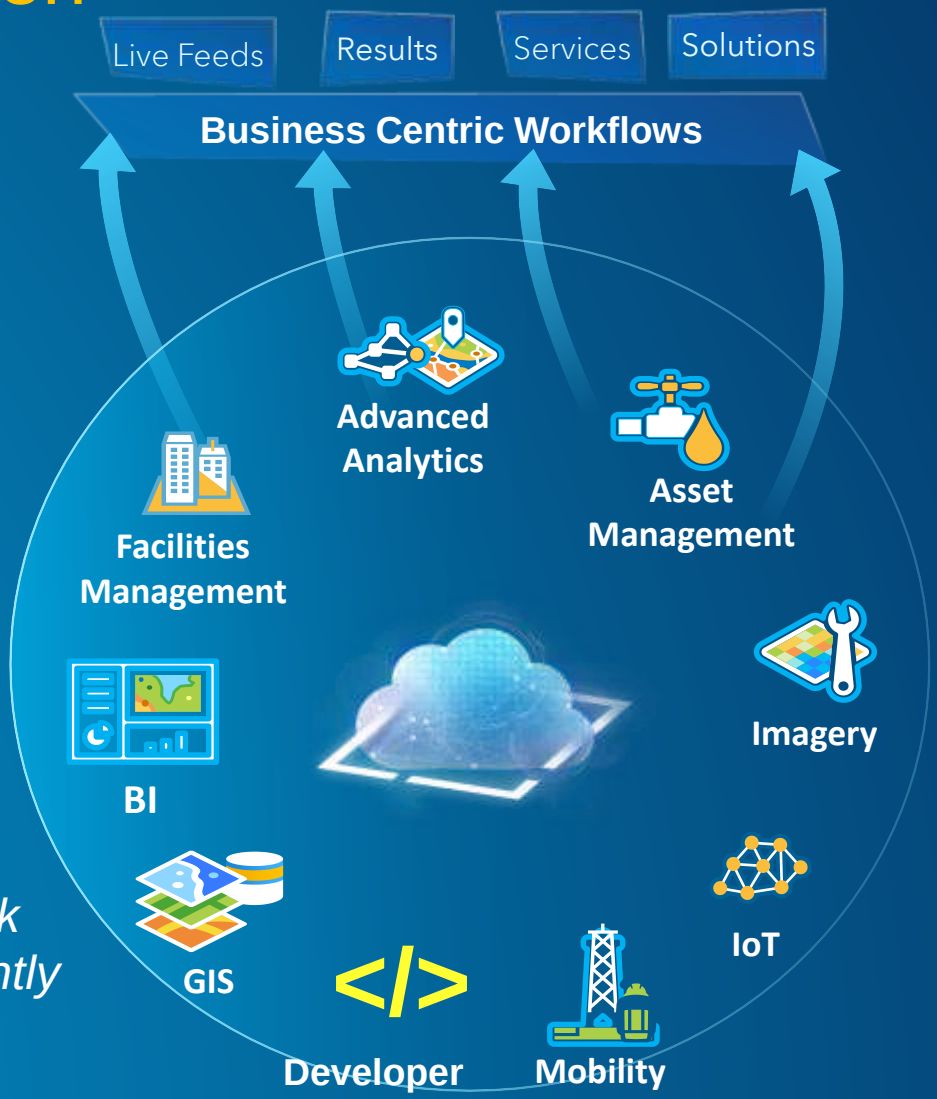


Creating an information rich multi-dimensional view of the world

We Must Change The Discussion from Being Technology Driven to Business Driven

More Diverse Groups Are Now Stakeholders

…And we talk about it differently



Business Drivers

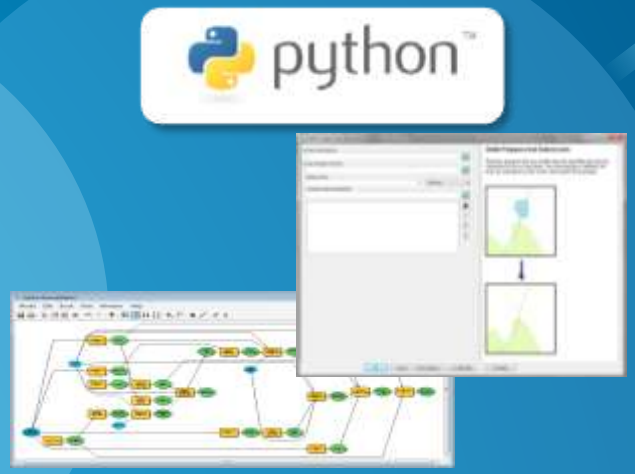
Challenges for our Organizations

Multi-Scale Map Automation

- **Producing many medium and small scale products from one large scale master database**

Largest scale data available

Generalization Rules

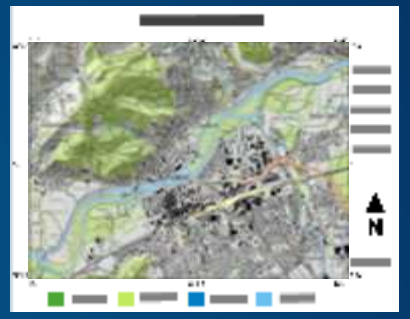


Python, Geoprocessing, and Model Builder

Multiple Scale Data products

Cartographic Rules

Multiple Scale Map Products

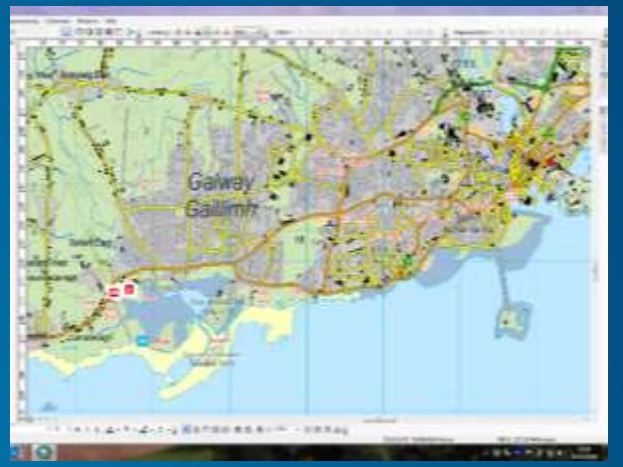


Delivering Cost Efficiencies

Transforming Map Production through Automation

Dutch Kadaster

Ordnance Survey Ireland



swisstopo

Ordnance Survey GB

Case Study - Dutch Kadaster

Efficient Map Production

Dutch Kadaster transformed their mapping process implementing the ArcGIS platform to create standard topographic maps for the country. ArcGIS was configured to completely automate map production out of the box by creating sophisticated models that reflected the cartographers' vision, with no customization. Using ArcGIS, including tools for automatic generalization, Dutch Kadaster realized a 5,000 percent savings in the time required by traditional cartographic methods for map production.

"ArcGIS helped us reach our goal of creating a standard map product in a streamlined, replicable fashion."

– Ben Bruns,
Product Manager for Topographic Mapping, Dutch Kadaster

Return on Investment (Roi): Dutch Kadaster

Original map

25 man/years effort

6 year update cycle

0% automation

New map

3 weeks production time

1 year update cycle

100% automated

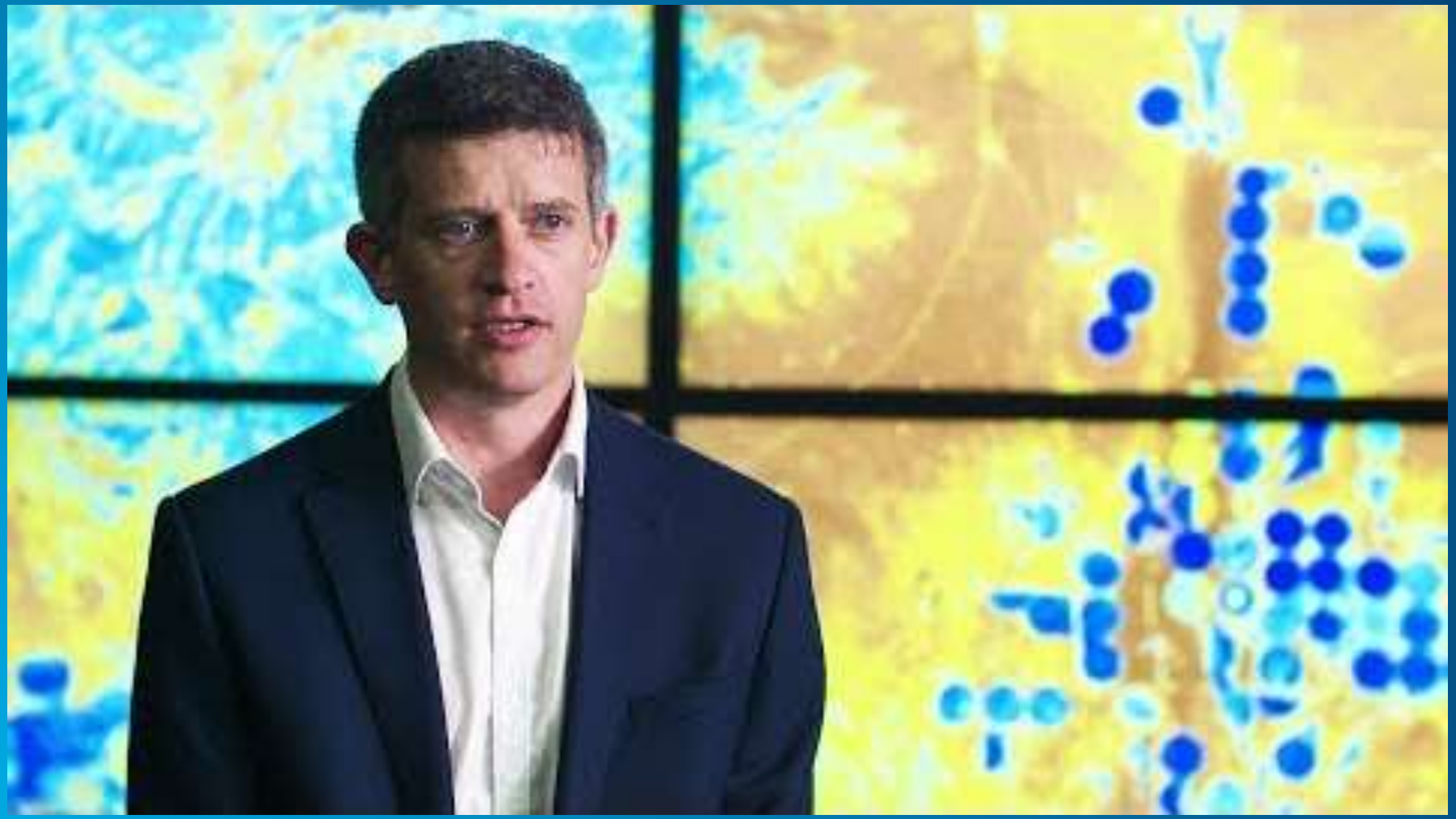
75% cost reduction

Digital Transformation

Ordnance Survey - Great Britain

National Mapping Organizations – Building Relevance for All of Government

- David Henderson – Managing Director, Ordnance Survey, Great Britain



https://youtu.be/AxIj-Og6Yt8

Ordnance Survey (GB) Return on Investment (RoI)

- $1M USD/year in cost savings in Workflow Management
- 100% Automation of derived products from OS large scale database
- Automated map production improved product currency in many derived products, such as 1:10K VectorMap Local, from 3 year currency to 3 month currency, allowing over 20 staff to be redeployed
- Land Parcel Polygon data took 6-8 weeks with manual intervention, is now done in 14 hours and completely automated

“These are not insignificant financial savings, but actually the real benefits come to the customer through enhanced product quality and currency.”

- Neil Ackroyd, Chief Executive Officer (Acting), Ordnance Survey Great Britain

Many Approaches to Securing Land Rights

Community Led

Bottom Up Approach

State Led

Top Down Approach

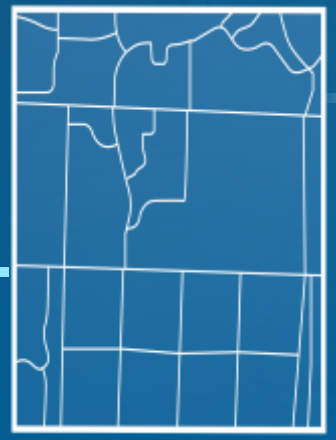
Leveraging Web GIS for Land Tenure Security

Enabling New Workflows with High Accuracy

High Accuracy

Choose your own GPS

Boundaries



Documents/Testimony

Pokey	Smith	Kargi	Marsibit	Lease	4.1
Jerry	Akombe	Uhuru	Marsibit	Lease	1.5
Clifford	Walli	Kalacha	Marsibit	Joint	2.3
Ayoni	Kapo	Choba	Baragoi	Joint	3.5
Nauri	Laura	Bubisa	Baragoi	Use	4.2
William	Mistta	Suani	Baragoi	Fee	6.8
Serra	Wayno	Merille	Baragoi	Fee	3.9

ArcGIS Online

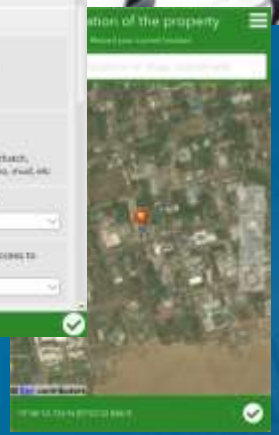
Certificate

Odisha India

Tata Trust

Cadasta Foundation

- 50,000 Land Certificates
- Bottom-up Approach
- Easy-to-Use
- Standards-based – LADM



Medeem

Demand Driven Model

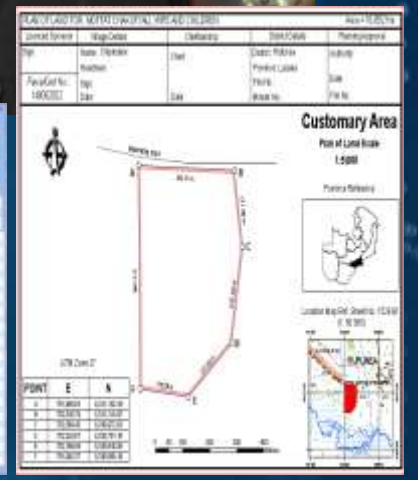
- Private sector solution to making land rights affordable and accessible
- Locally staffed and managed enterprise
- Cost effective scale up:

  In Zambia, Medeem is engaged in regularization of the second largest unplanned settlement in all of Africa – more than 3.2M landholders

Zambia

Medeem

- Tenure security on demand
- Survey grade accuracy through mobile apps
- Land rights awareness
- Operations dashboards
- Cloud storage
- Informal settlement upgrading



National Land Agency Jamaica

Silburn Clark

Jamaica

National Land Agency

Spatial Innovision

- Manage country-wide parcel fabric, street centerlines and civic features
- WebApp Builders to publish Survey Control Maps, Valuation Roll and Property Sales Data
- Pilot project for 3D cadastre
- Leveraging Drone2Map for processing of drone imagery and 3D map products

ArcGIS | Common Patterns of Use

Mapping & Visualization

Understand locations and relationships with maps and visual representations

Data Management

Collect, organize, and maintain accurate locations and details about assets and resources

Field Mobility

Manage and enable a mobile workforce to collect and access information in the field

Monitoring

Track, manage, and monitor assets and resources in real-time

Analytics

Discover, quantify, and predict trends and patterns to improve outcomes

Design & Planning

Evaluate alternative solutions and create optimal designs

Decision Support

Gain situational awareness, and enable information-driven decision making

Constituent Engagement

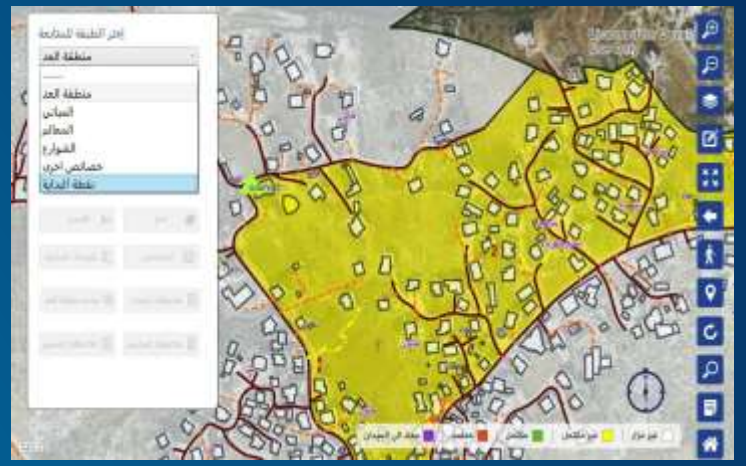
Communicate and collaborate with citizens and external communities of interest

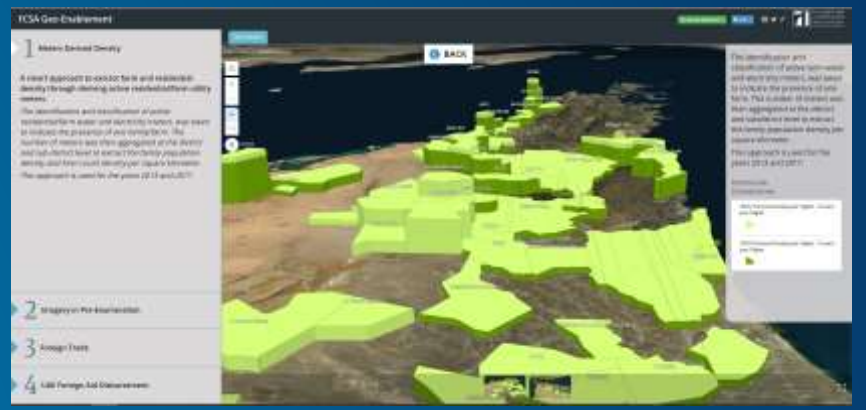
Sharing & Collaboration

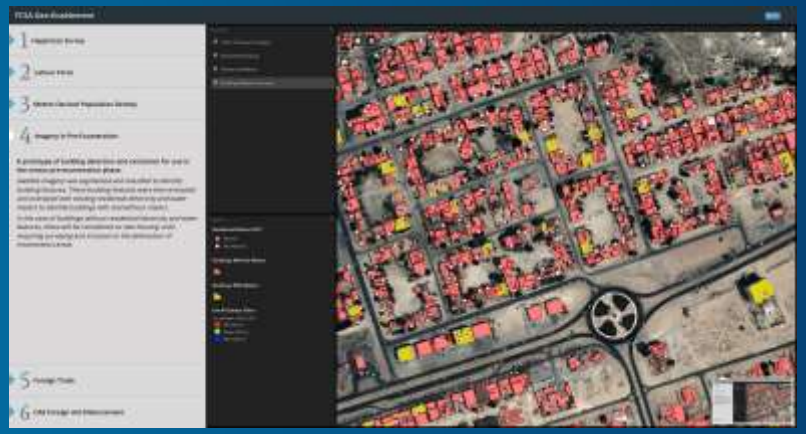
Empower everyone to easily discover, use, make, and share geographic information

Statistics Business Processes and GIS

- Creation of GeoDatabase
- Creating efficient enumeration areas (EAs)
- Ensuring compatibility with previous census
- Optimizing site placement of field offices
- Optimizing capital and asset distribution
- Optimizing routes
- Marketing the census and educating the public regarding the importance of being counted
- Integrate Admin Data
- Integrate Big DATA







Field Operations | Empowering Mobile Workers

Integrated Apps for the Field

Connected and Disconnected

Survey123

Collector

Smart Forms

Tracker

QuickCapture

Workforce

Navigator

Explorer

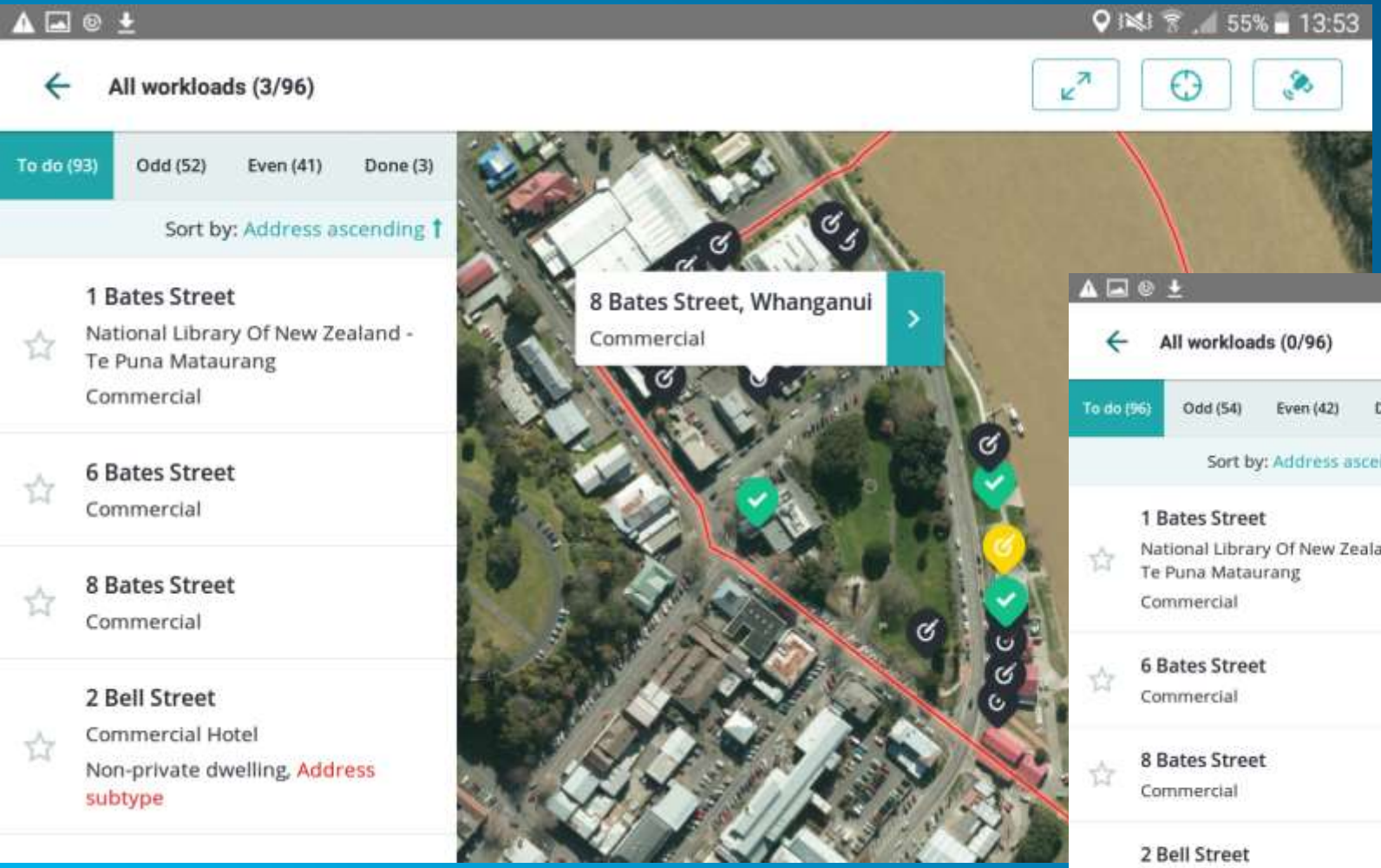
Digital Map Book

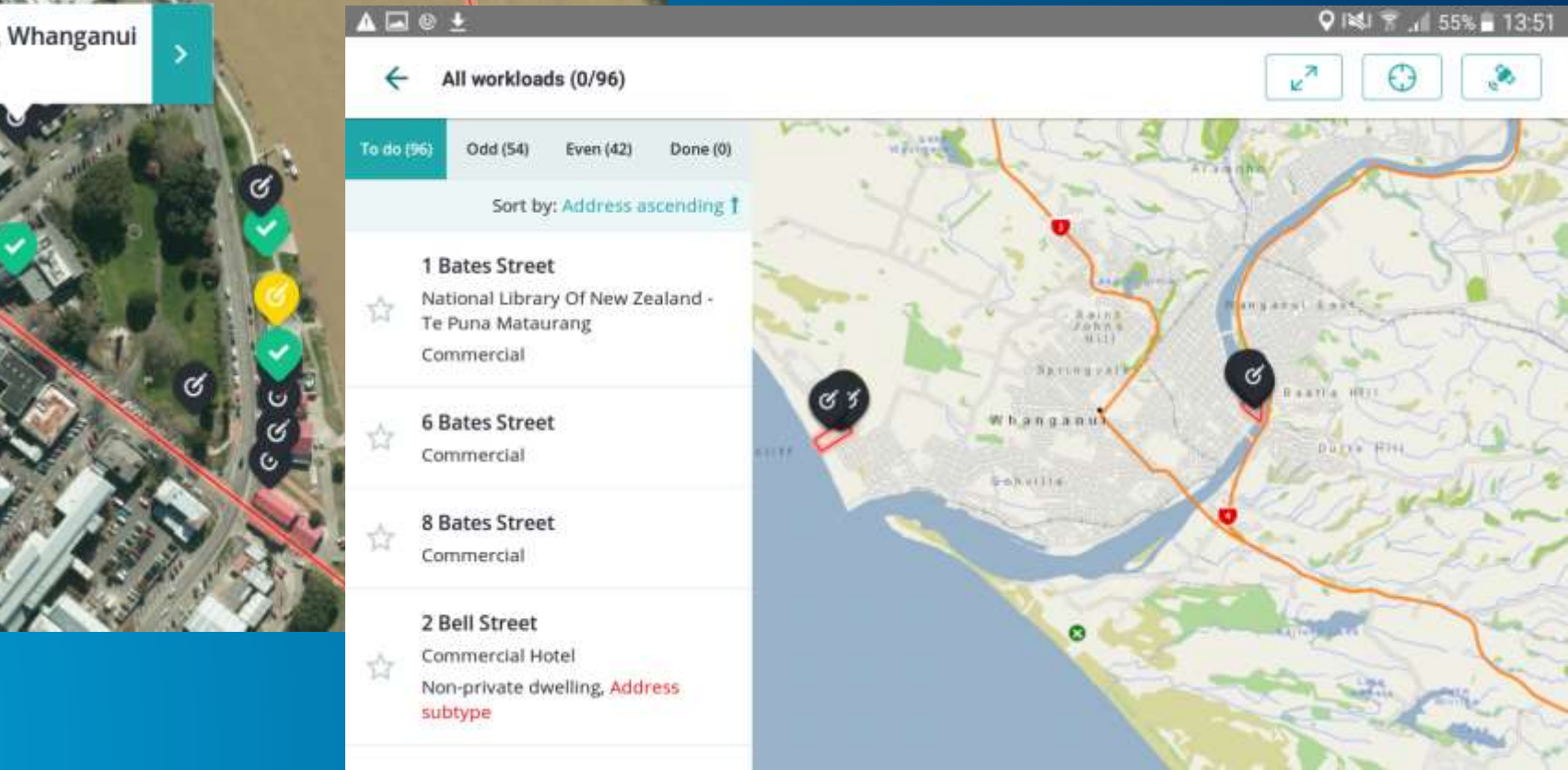
- Data Capture
- Coordinating Work
- Navigation
- Mapping & Markup
- Tracking
- Location Tracking

Dashboard

Plan & Monitor

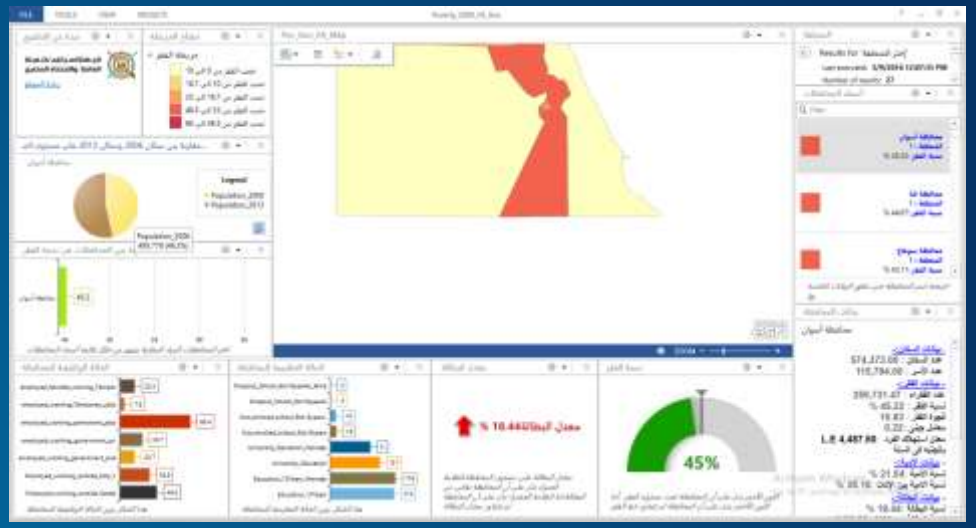
Configurable apps – allowing you to adapt to your workflow

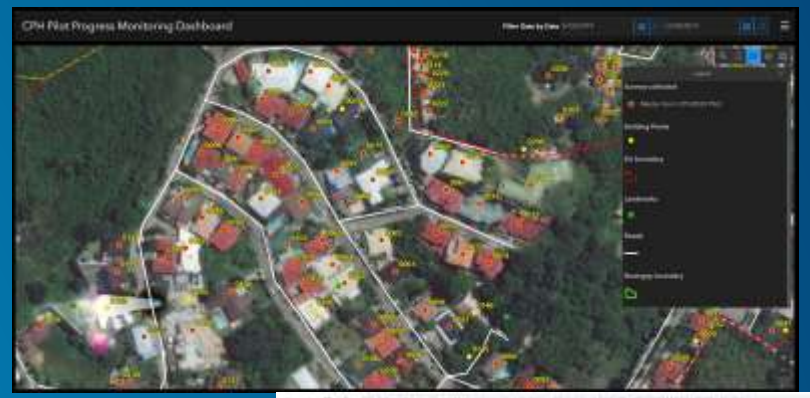


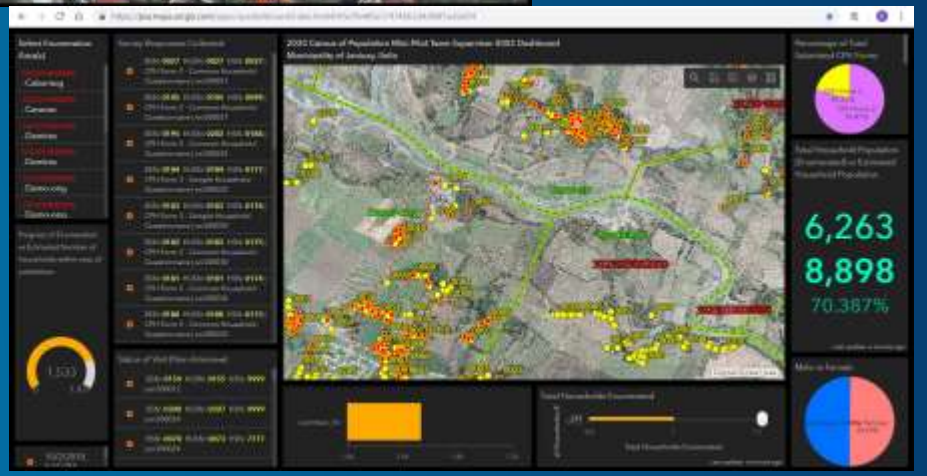


Statistics Business Processes and GIS

- Field data collection
- Field data verification and quality checks
- Field operations management
- Workforce automation/optimization
- Optimized workloads
- Monitoring of census operations
- Real Time awareness of project status and workers
- Project management oversight and ID of trouble spots
- Updating enumeration area maps
- Quality control and quality improvements to base maps

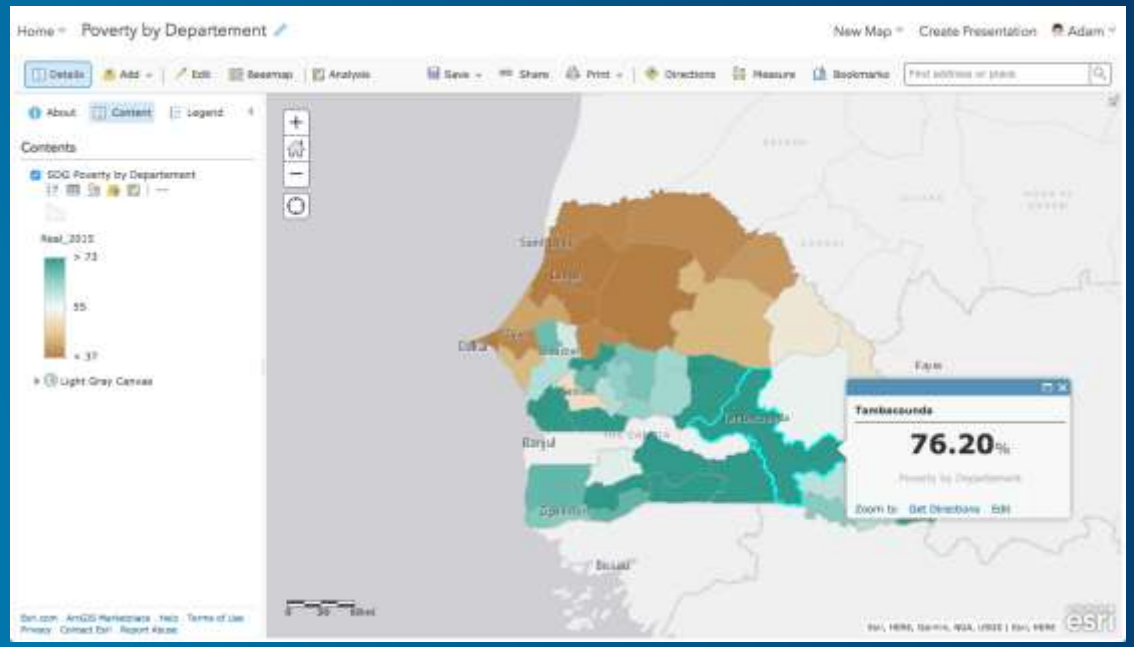




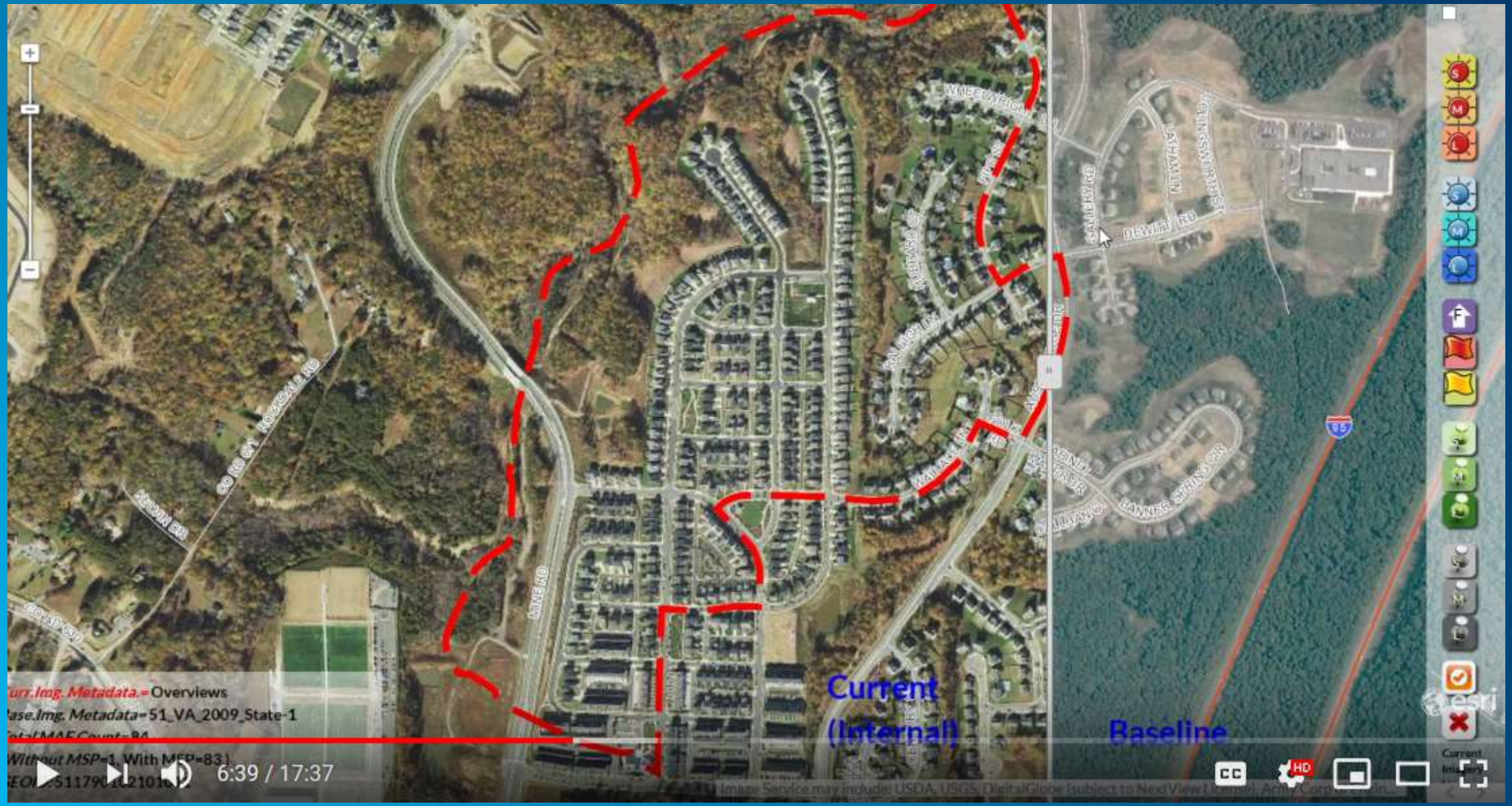


Statistics Business Process and GIS

- Incorporation of updates/changes
- Aggregation of data
- Tabulation of data
- Database archiving
- Creation of information products used to communicate census findings to other agencies and the public
- Dissemination of geographic census products including maps, reports, atlases, and interactive websites
- Marketing of geographic census products
- Outreach and education
- SDGs – measure, monitor and report



US Census: In office Address Canvassing



US Census Today: Research and Testing

Reengineering Address Canvassing

[eliminating 2/3 field work]

Optimizing Self-Response

Utilizing Administrative Records

Reengineering Field Operations

Bharat GeoHub

Survey of India

BharatGeoHub Current State

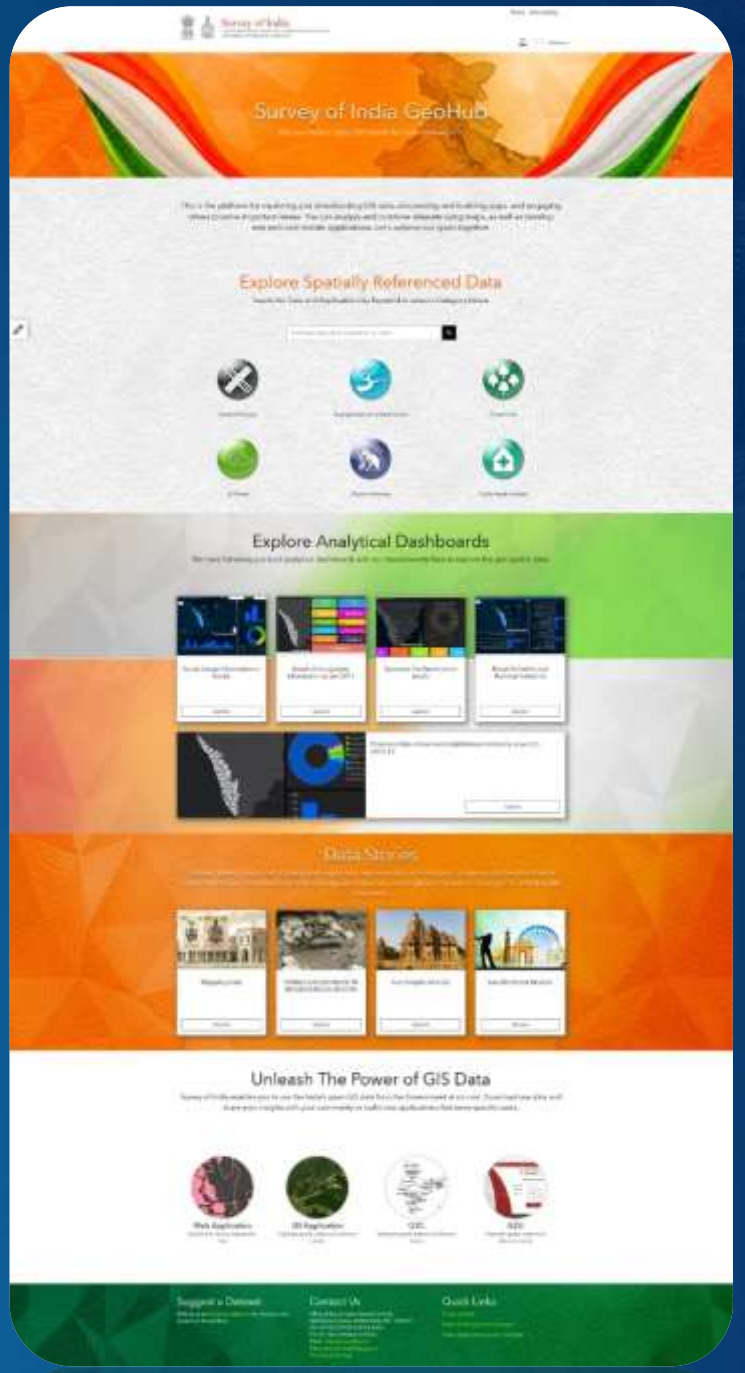
204 Items created by 11 Contributors

Items

- **204 (116 of which created in Jan 2019)**
- **2 Base Maps**
- **20 Web Maps**
- **16 COTS Web Apps**

Administration

- **Configuration of the BharatGeoHub**
- **Management of users and content**



Collaboration – SOI & MOSPI

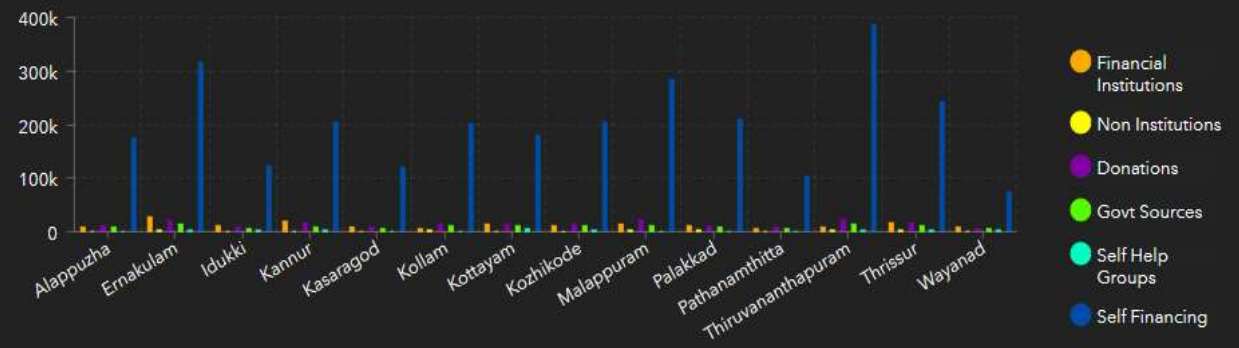
Business Sponsorship Economic Census 2012-13

Survey of India
A SETU HIMACHALAM - FROM CAPE COMORIN TO THE HIMALAYAS
DEPARTMENT OF SCIENCE & TECHNOLOGY
&
Government of India
Ministry of Statistics and Programme Implementation

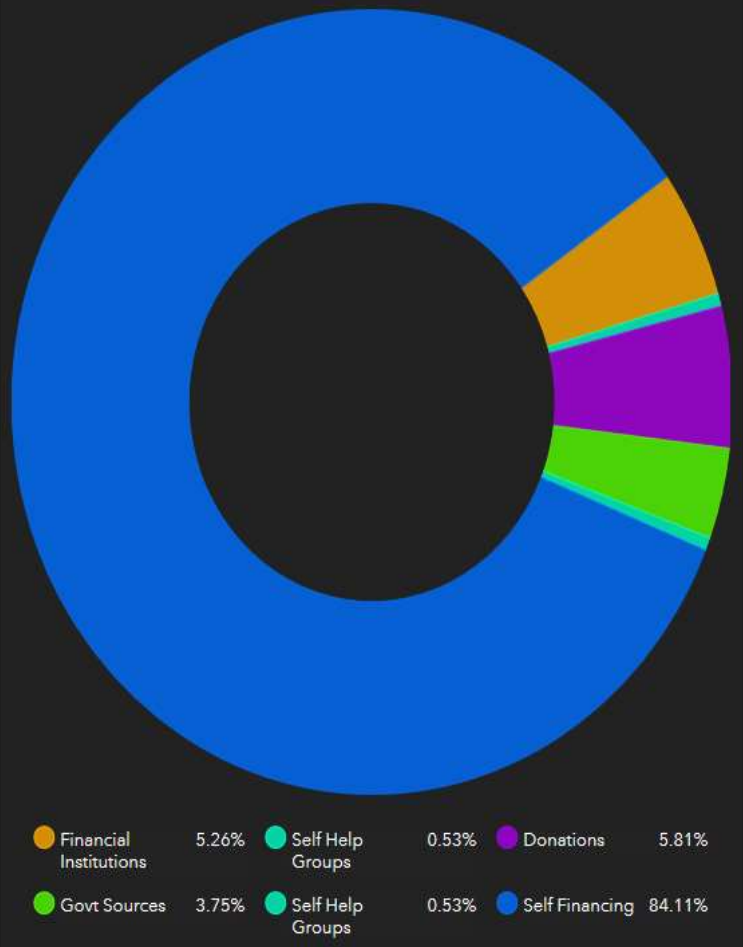
Districts of Kerala

- Alappuzha
- Ernakulam
- Idukki
- Kasaragod
- Kannur
- Kollam
- Kottayam
- Kozhikode
- Malappuram
- Palakkad
- Pathanamthitta
- Thiruvananthapuram
- Thrissur
- Wayanad

Sponsorship Analysis



Sponsorship Percentage



Self Help Groups	Govt Sources	Self Financing	From Non Inst	Financial Inst.	Donations
1,530	10,734	240,869	1,991	15,061	16,647

Collaboration – SOI & MOSPI

Broad Activities and National Industrial Classification Information

Survey of India
A SETU HIMACHALAM - FROM CAPE COMORIN TO THE HIMALAYAS
DEPARTMENT OF SCIENCE & TECHNOLOGY
&
Government of India
Ministry of Statistics and Programme Implementation

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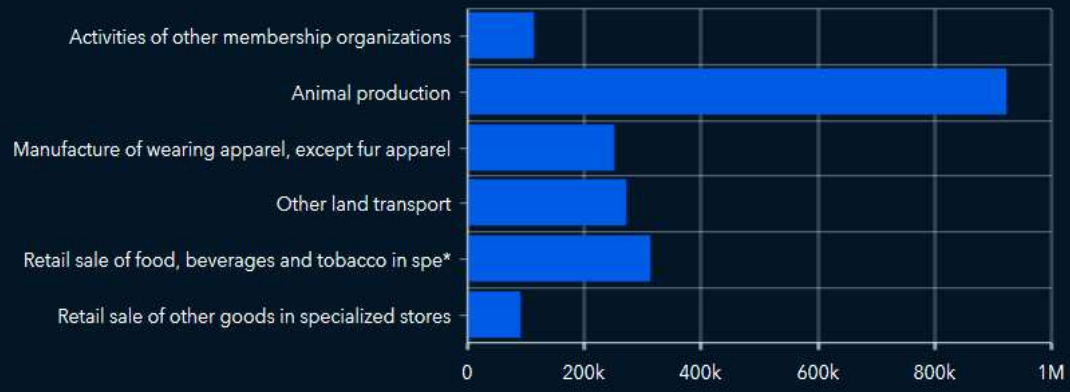
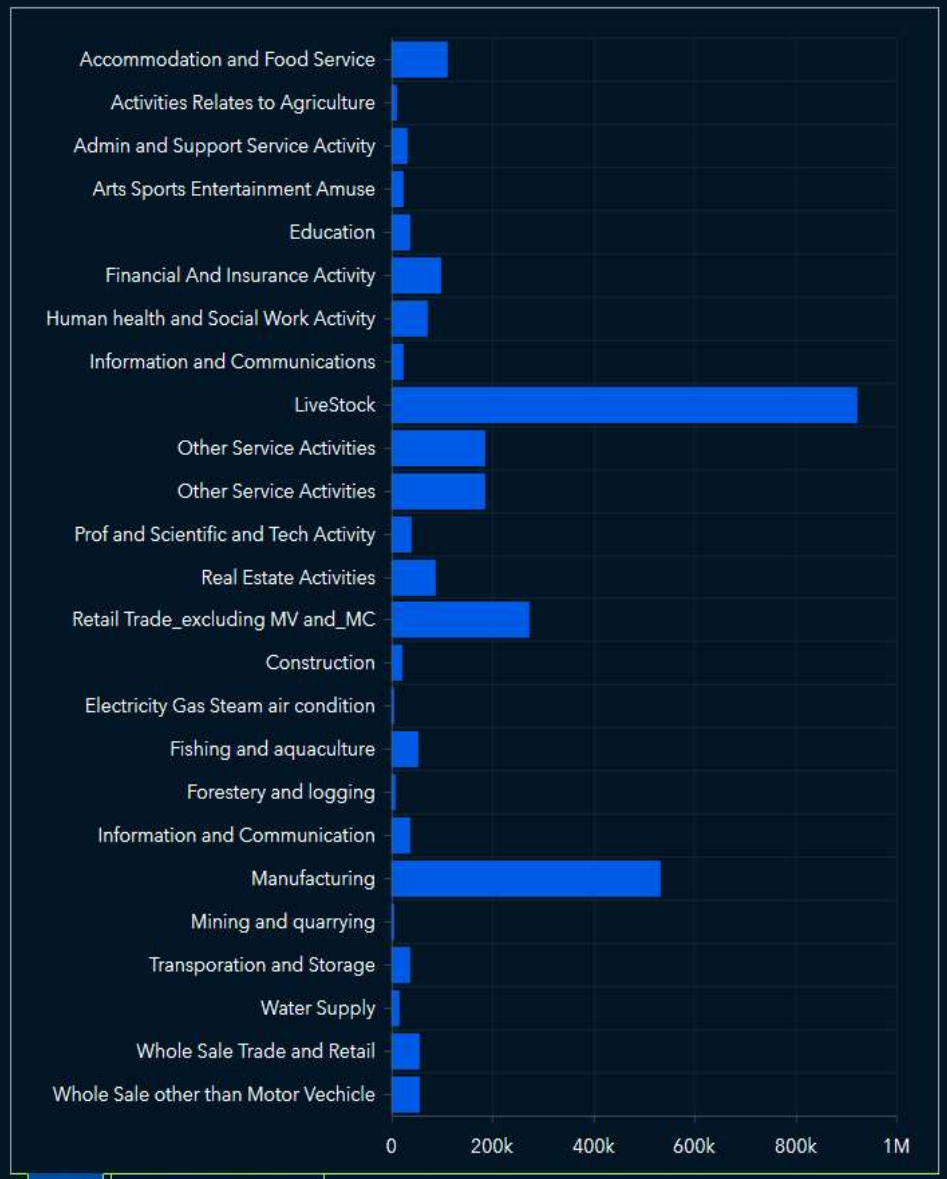
- Palakkad
- Pathanamthitta
- Thiruvananthapuram
- Thrissur
- Wayanad

National Industrial Classification Information





BACT | Broad Activities Analysis

Collaboration – SOI & MOSPI

Demography Information Census 2011

Survey of India
A SETU HIMACHALAM - FROM CAPE COMORIN TO THE HIMALAYAS
DEPARTMENT OF SCIENCE & TECHNOLOGY
&
Office of the Registrar General & Census Commissioner, India
Ministry of Home Affairs, Government of India

Districts of Kerala

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- Idukki
- Kasaragod
- Kannur
- Kollam
- Kottayam
- Kozhikode
- Malappuram
- Palakkad
- Pathanamthitta
- Thiruvananthapuram
- Thrissur
- Wayanad

Sex Ratio
1,102
Sex ratio is the number of females per 1000 males in the population

Child Sex Ratio
953
Child Sex Ratio is defined as number of females per thousand males in the age group 0-6 years in human population.

Literacy Rate Male
87.819 %

Female Literacy Rate
86.114 %

Agri. Labours Male
67.659 %

Agri. Labours Female
32.341 %

House Hold Industry Male Workers
50.578 %

House Hold Industry Female Workers
49.422 %

Male Casual Labours
86.104 %

Female Casual Labours
13.896 %

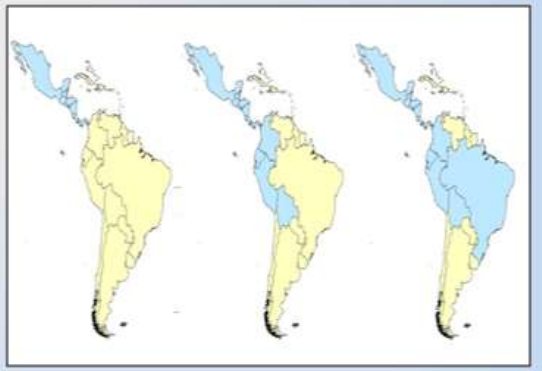
Population
1,684,006
2011 Census

Integrated Map of the Americas: A collaborative project of the NMOs

Progress of the Integrated Map

Integrated Map of Central America

Integrated North Andean Map in the Viewer of the GeoSUR Program



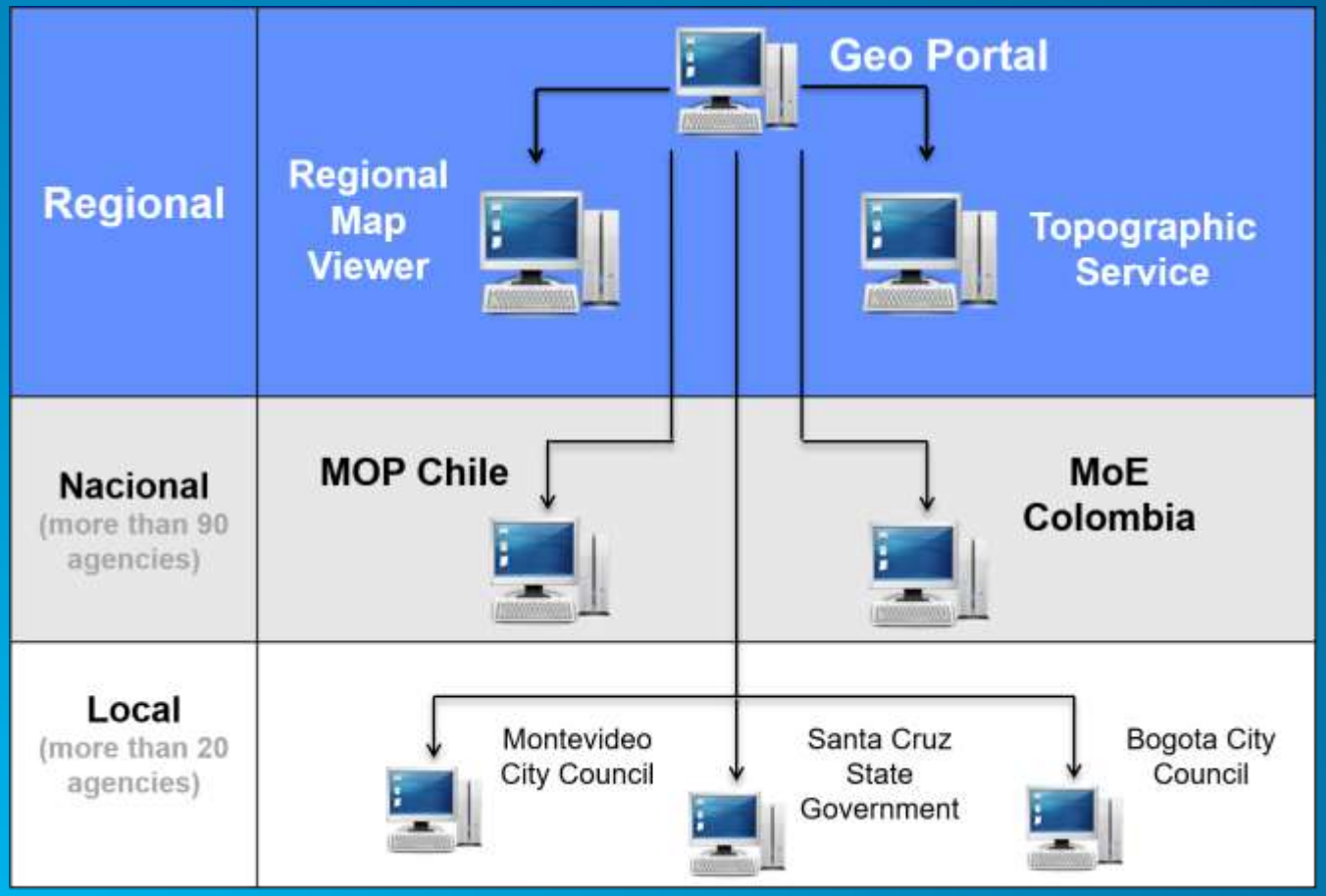
Integrated Map of Central America, the MIAN and the recent inclusion of Brazil

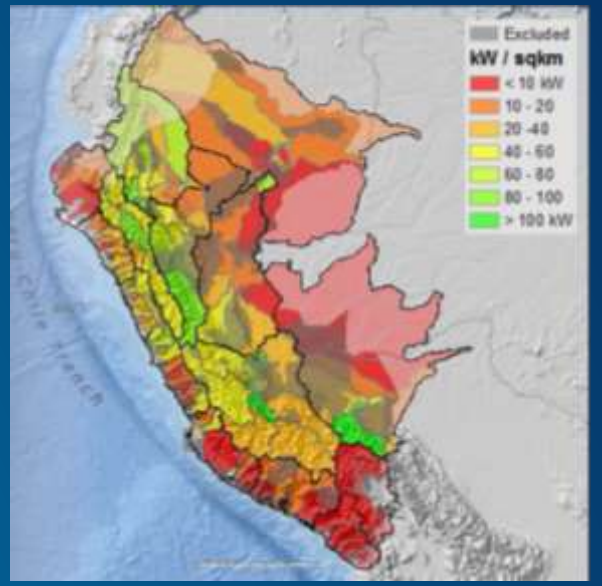
- 10 thematic layers
- 1:250.000 scale
- Produced in regional workshops with NMO specialists from the Americas
- Supported by PAIGH, CAF, the USGS and CNIG Spain
- Available in GeoSUR´s Viewer
- **Goal**: A seamless Americas Map!

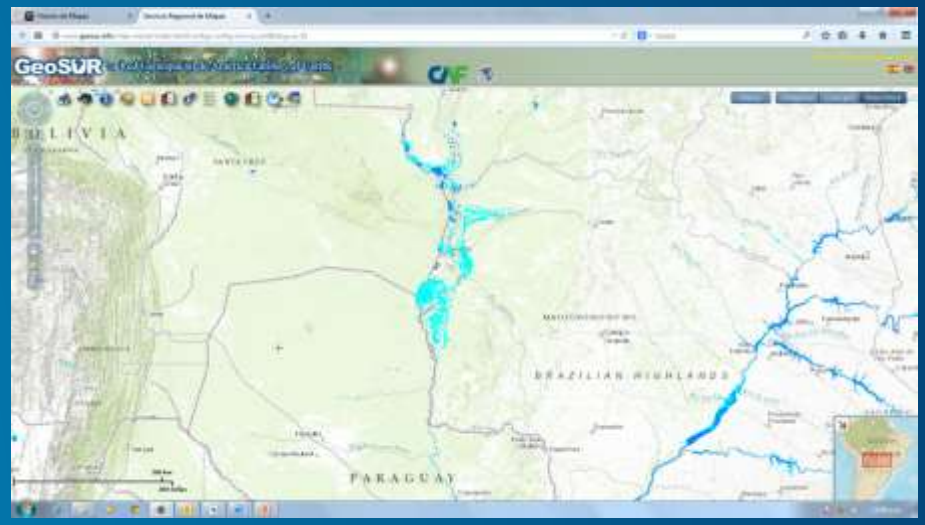
Timeline

GeoSUR, the Regional Geospatial Network of Latin America

12 years in operation







Applying GIS to Real World issues

Smart Communities & **Smart Nations** through a Geospatial Strategy


What is
smart?


smart communities
smart tech
smart luggage
smart roads
smart appliances
smart tv
smart watch
smart traffic
smart garden
smart car
smart transit
smart parks
smart bulbs
smart bed
smart security
smart phone
smart government
smart planning
smart app
smart banking
smart growth
smart engineering
smart maps
smart house
smart clothes
smart operations
smart cities
smart devices
smart performance
smart factory
smart refrigerators
smart view
smart tablet
smart packaging
smart budget
smart goals
smart buildings
smart mirror
smart pets
smart plugs
smart school
smart hubs
smart glasses
smart solutions
smart software
smart business

In Government, Location is Never an Afterthought

GIS is Recognized as a Foundational System

Citizen

Health
Connected
Homelessness
Equity
Livability
Opioid Crisis
Mobility
Housing
Public Safety
Aging Population
Economic Opportunity

Infrastructure

Broadband
Aging Structures
Telecommunications
Airports
Highways and Roads
Buildings
Water
Bridges
Land Use
Sewer

Environment

Green Infrastructure
Open Space
Climate
Sea-Level Rise
Air Quality
Inclement Weather
Renewable Energy
Pollution
Habitat Preservation

Technology Advancements

Sensors
Artificial Intelligence
Autonomous Vehicles
Machine Learning
Intelligent Things
Cloud
AR/VR
Drones
Internet of Things

GIS supports all aspects of government

It starts with identifying priorities…

Four Technology Tenets

Smart Community Information System

Planning and Engineering

Urban and Community Design

Operational Efficiency

Good Government Services

Data-Driven Performance

Through Data and Analytics

Civic Inclusion

Connecting with the Community


smart
Planning
& Engineering
Modeling
Broadband
Multi-Modal
Mobility
Economic Growth
Natural
Environment
Sustainability
Green Infrastructure
Infrastructure
as a Sensor
Transit
Imagery
Climate Change
Human-Centered Design
Infrastructure
3D
Resiliency

PLANNING &
ENGINEERING

A Redevelopment Success Story

Oshkosh, WI

Seeing industrial businesses leave their community, the city decided to use GIS to develop a new plan called Imagine Oshkosh to secure economic and investment opportunities for the future.

PLANNING &
ENGINEERING

A Revolution in Urban Planning

Boston, MA

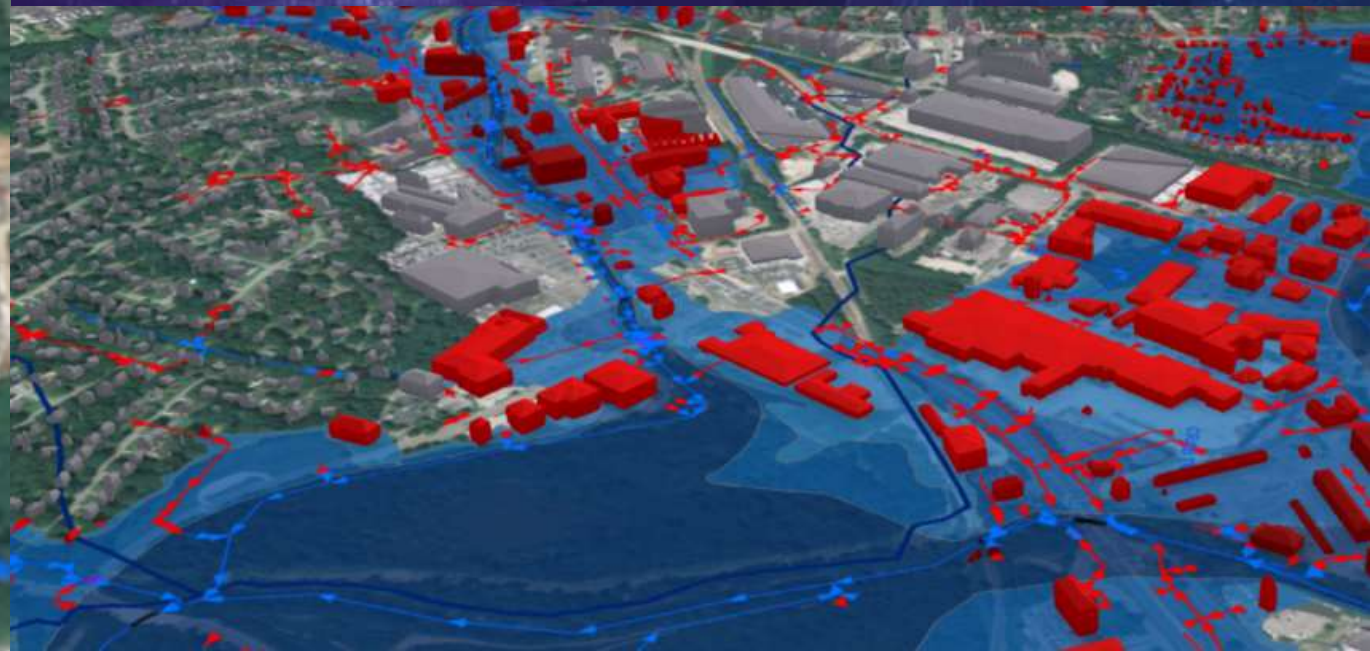
With massive spikes in population growth, the city needed to plan for their existing city and the generations to come.

PLANNING &
ENGINEERING

Mitigating Flood Risk

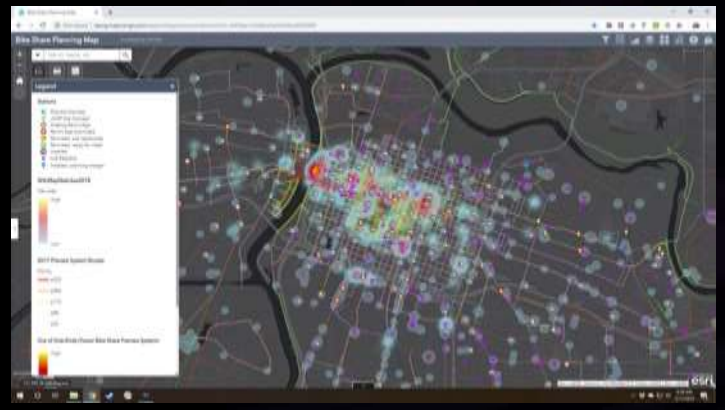
Raleigh, NC

Using 3D analysis to help understand flooding risk and sea-level rise to Inform storm water strategy

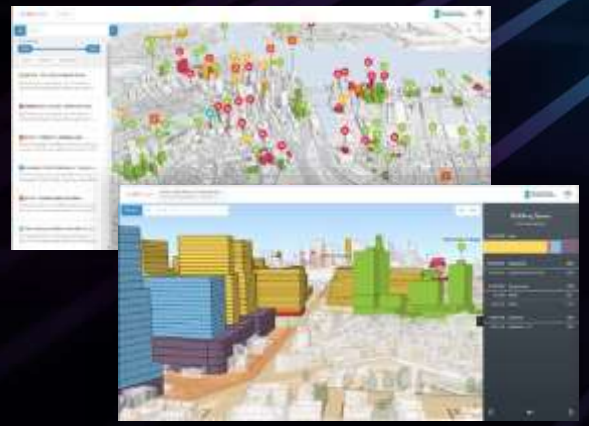


Planning and Engineering

Smart Communities Happen When Location Helps Great Things Get Built

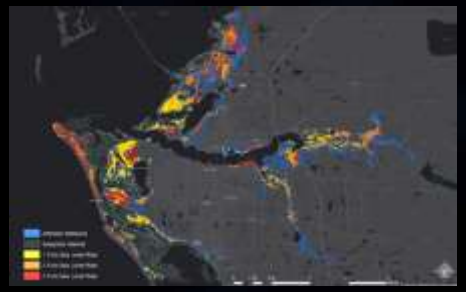


Sacramento Area Council of Governments, CA – Identify Key Locations to Install Bike Parking

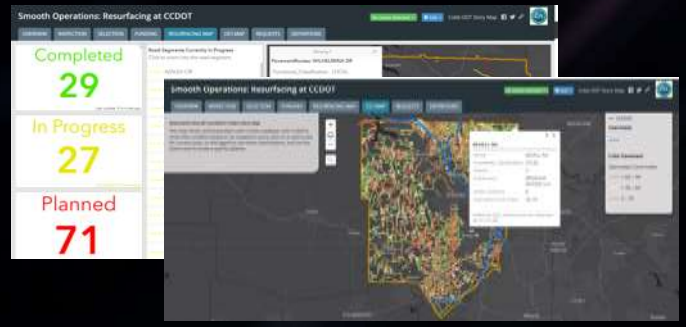


Impact of Proposed Development

City of Peachtree Corners, GA – Autonomous Vehicle Test Track

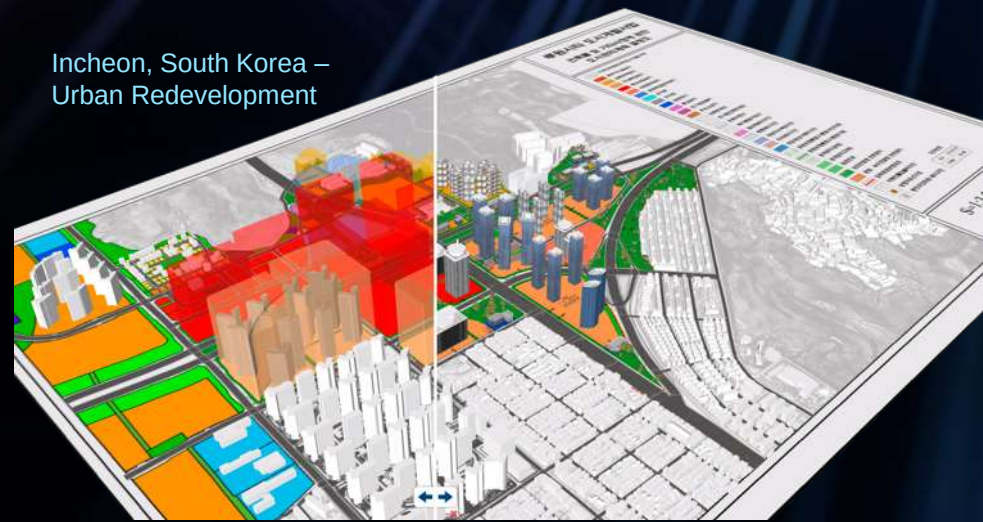


Manatee County, FL – Sea-Level Rise Analysis



Cobb County, GA – Prioritization of Street Repaving

Incheon, South Korea – Urban Redevelopment



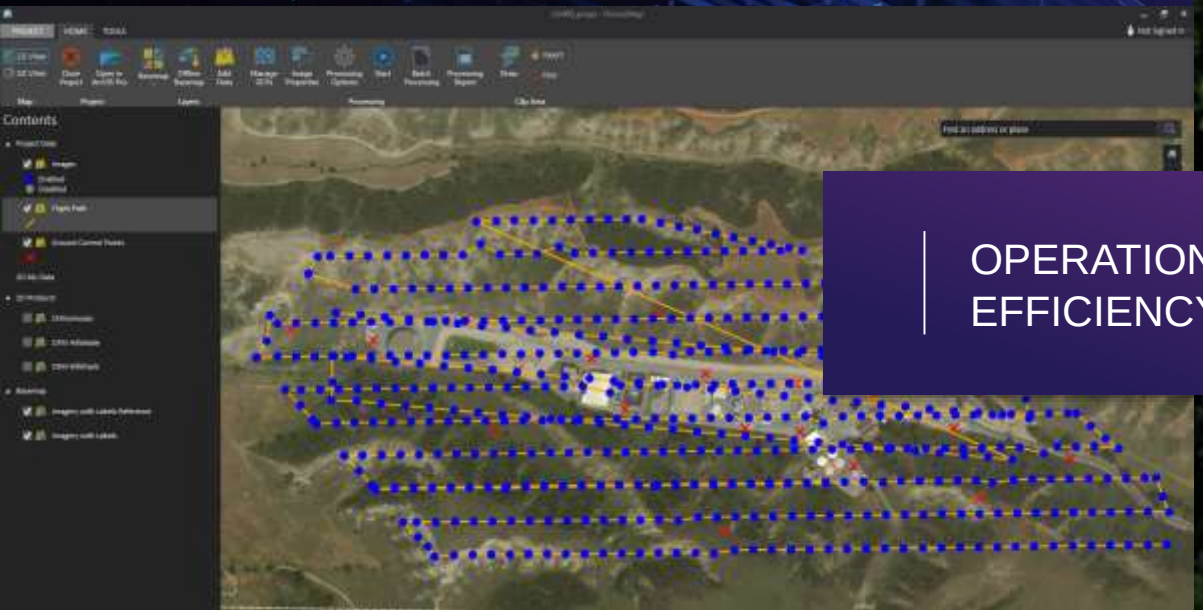

smart
Operational Efficiency
Asset Management
Fleet Management
Field Mobility
Streamlined Workflows
Inspections
Data Collection
Facilities
Service Delivery
Navigation

Saving Money with Drones

Onondaga County Water Authority, NY

Onondaga County Water Authority (OCWA) Saves $6,500 per tank inspection.

- Drone-based solution provided quick turn around
- Largest tanks captured in 20 minutes
- Captured every square inch of the assets
- Data used for risk assessment



OPERATIONAL EFFICIENCY

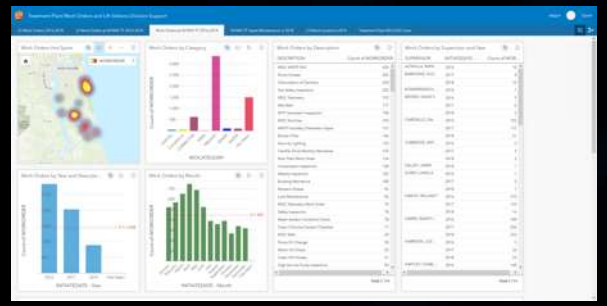
Operational Efficiency

Smart Communities Happen When Location is Used to Improve Efficiency

Palm Beach County, FL – Mosquito Inspection

Iowa DOT – Bridge Conditions

Johns Creek, GA – Alexa Skill Connects the City's Open Data



St. Johns County, FL – Asset Maintenance

Facilities Management

Seminole Tribe of Florida – Inspections with Drone Imagery


Data-Driven
Performance
Dashboards
Performance
Management
IoT
Autonomous
Vehicles
Real-Time
Analytics
Situational
Awareness
Sensors
Artificial
Intelligence
Environmental
Monitoring
Machine-Learning

Pioneering Future-Ready Mobility

Cobb County, GA

The county is consuming vehicle and pedestrian data, along with real-time road closure and traffic accident information, to modify traffic patterns in real time.

DATA-DRIVEN
PERFORMACE

Sustainable Development

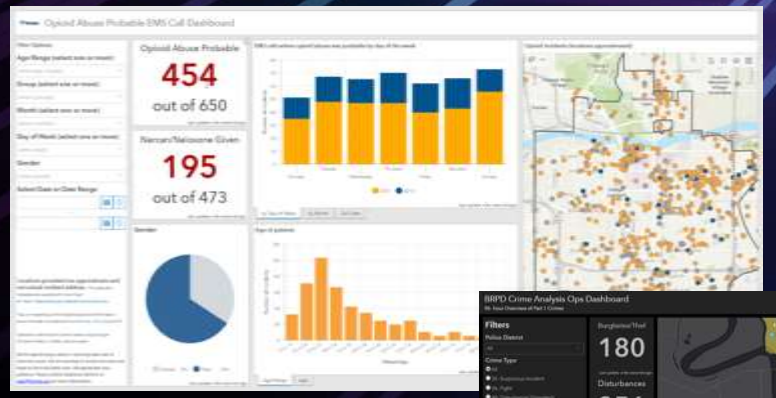
UNSD FIS4SDGs

DATA-DRIVEN
PERFORMACE

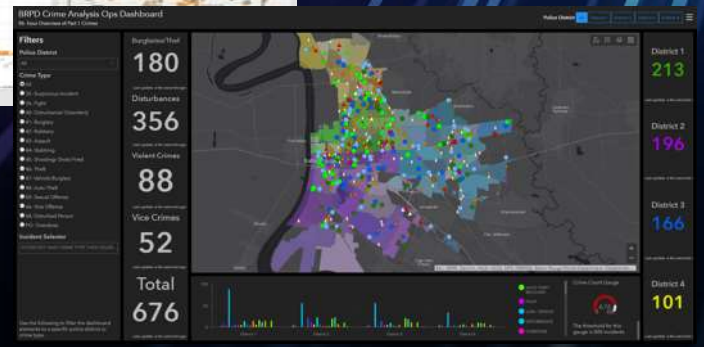
Data-Driven Performance

Smart Communities Happen When Governments Achieve Data-Driven Performance

Cobb County, GA – Traffic Management Using Artificial Intelligence

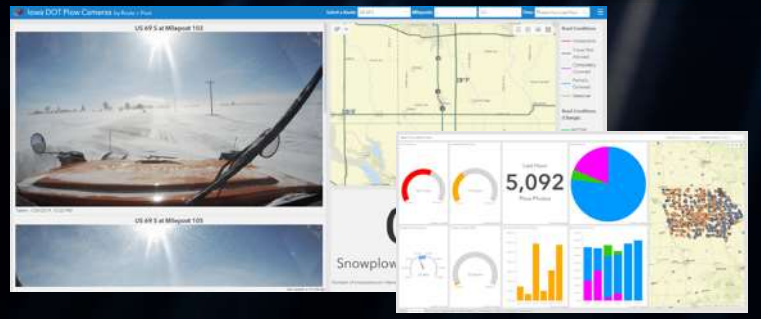


Tempe, AZ – Opioid Abuse Monitoring



Baton Rouge, LA – Crime Analysis

Coral Gables, FL – Community Intelligence Center



Iowa DOT – Real-Time Monitoring of Snow Operations

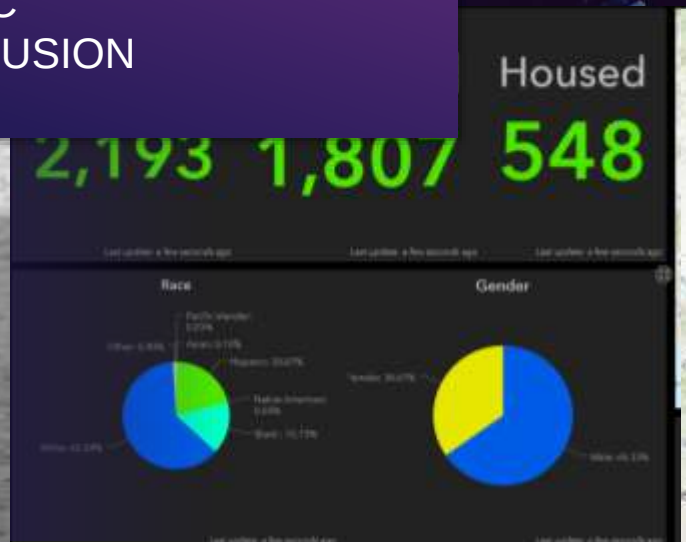

Civic
Inclusion
smart
Social Equity
Communication
Public
Participation
Humans
in Crisis
Crowdsourcing
Connected
Citizens
Citizen
Engagement
Collaboration
Demographic
and Lifestyle
At-Risk
Populations
Economic
Opportunity

Counting Homeless Population

San Bernardino County, CA

With just a few hours to act after a flooding, San Bernardino County's Homeless Outreach and Proactive Enforcement (HOPE) team had to relocate homeless populations that lived in the floodplain. Using mobile tools, they were able to make faster decisions

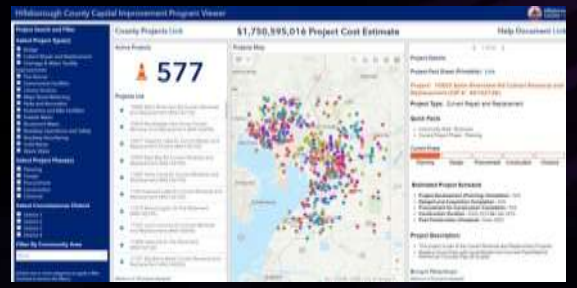
CIVIC INCLUSION



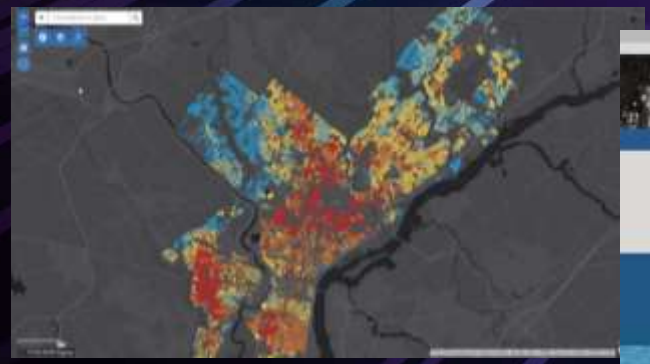
Civic Inclusion

Smart Communities Happen When Governments Focus on Civic Inclusion

Sonoma County, CA – Fire Debris Clean-Up Status

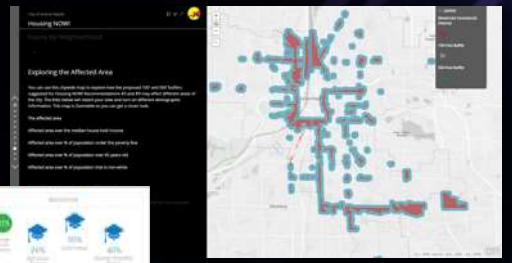


Hillsborough County, FL – Capital Improvement Projects & Expenditures



Philadelphia, PA – Stress Index

Santa Clara Valley Transportation Authority, CA - Hub



Grand Rapids, MI – Housing Choices for All

Cobb County, GA – Enhancing the Lives of Senior Citizens

San Bernardino County, CA – Addressing Homelessness

Smart Communities

Planning & Engineering

Operational Efficiency

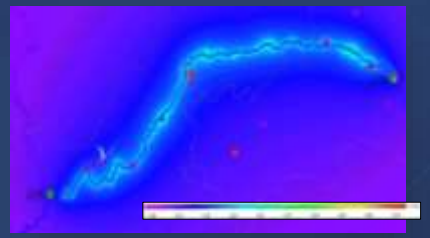
Civic Inclusion

Data-Driven Performance

Start with Location

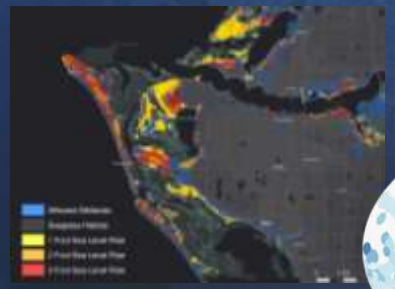
Environmental Modeling and Assessment

Water Quality



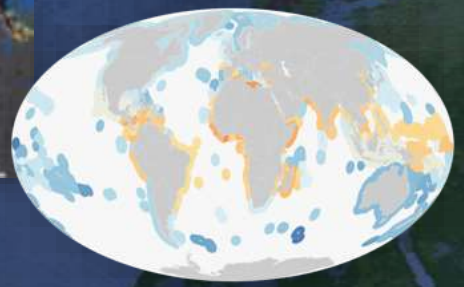
China
Three Gorges Corporation

Sea Level Rise



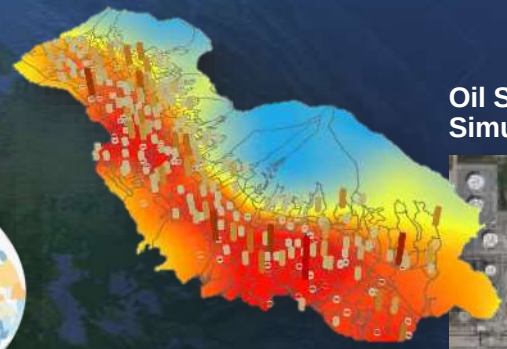
Florida
Manatee County Government

Ocean Health Index



Global
Conservation International

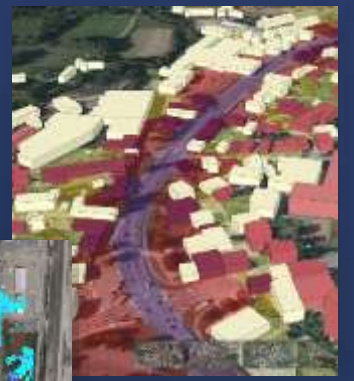
Urban Heat Island



Quito, Ecuador

Oil Spill Simulation

Noise Mapping



Czech Republic
ARCDATA PRAHA

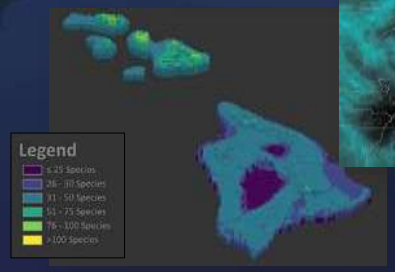
Deforestation

Brazil
MAG

Conservation Priorities

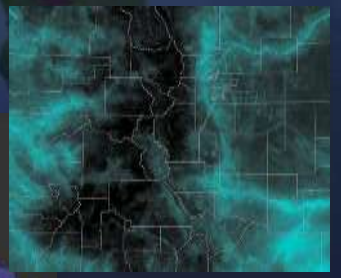
Global
Blue Raster

Endangered Species Density



Hawaii
US Fish and Wildlife

High Species Diversity

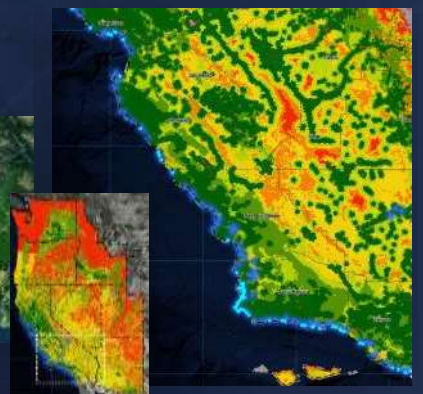


Colorado
Colorado Parks and Wildlife

Species Mapping

Russia
Sochi National Park

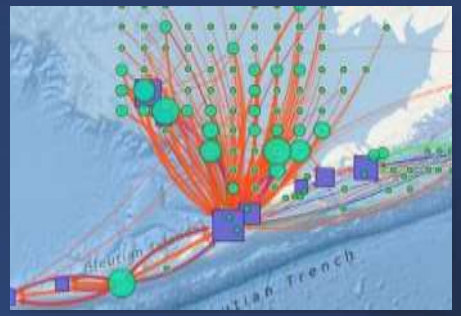
Monarch Habitat Modeling



California
Kansas Biological Survey

Natural Resource Management

Fisheries Management



Alaska
NOAA

Forest Inventory

New Zealand
Interpine Group

Crop Management

New Zealand
GPS-it

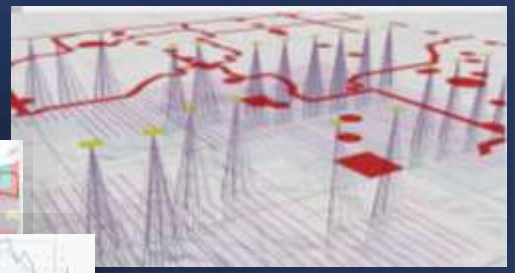
Crop Monitoring

India
Andhra University

Reserve Analysis

New Mexico
Exprodat

Well Planning



North Dakota
Exprodat

Coffee Productivity

Colombia
Alcis Holdings, Ltd

Strawberry Suitability

California
Driscoll's

Forest Management

Japan
Itoshima City

Renewable Energy Potential

State of Hawaii
Hawaii State Energy Office

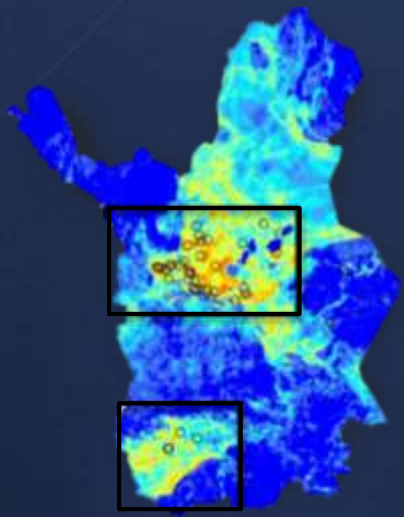
Water Harvesting

Duhok, Iraq
University of Duhok

Water Rights

State of New Mexico

Gold Prospectivity



Northern Finland
GTZ

Planning

Zoning

Fukuyama City, Japan

Growth Policy Analysis

City and County of San Francisco

Long-Range Planning

Comprehensive Plan

Delaware County, Regional Planning Commission

Regional Planning

Jihlava, Czech Republic

Community Planning

Government of Dubai

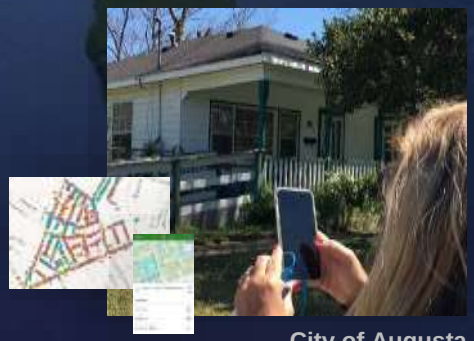
Public Space Assessment

City of Philadelphia

Housing Analysis

Los Angeles Planning Department

Blight Survey



City of Augusta

Demographic Assessment

Cleveland, OH

Trail Planning

Rails-to-Trails Conservancy

Transportation Planning and Management

Road Network Mapping

Philippines

Bike Sharing

City of Sacramento

Paratransit Services

Longview
Transit Bus Routes

Transit Planning

State of Maryland
Department of Transportation

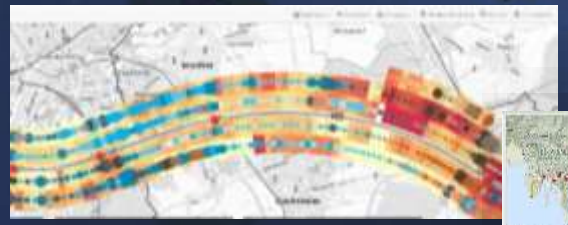
Public Transportation

Sydney Public Transportation

Night Highway Inspections

Colorado DOT

Maintenance Management (AI Based)



Bavaria, Germany
Bavarian State Ministry of Housing, Building and Transport

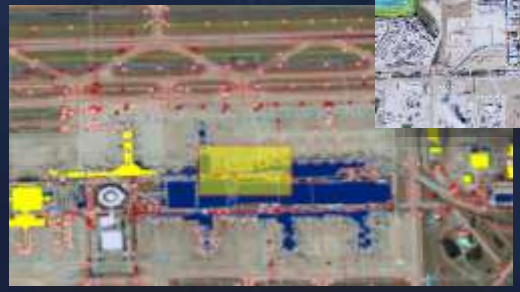
Railway Dashboard

Croatian Railway
SymGEO

Snowplow Tracking

Iowa DOT

Airport Management



Houston, TX

Port Management

Port of Houston Authority

Engineering and Public Works

Hydrant Flow Testing

Tennessee
City of Franklin

Fire Hydrant Vulnerability

Utah
Elements XS | Novotx

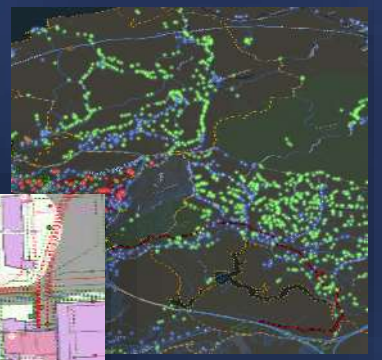
Sidewalk Ramp Status

Washington
City of Vancouver

Streetlight Maintenance

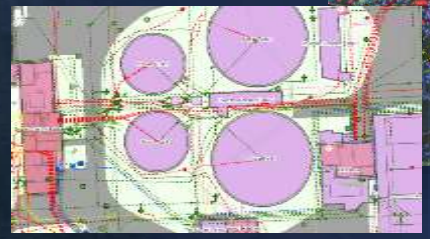
Canberra, Australia
Cityworks

Solid Waste Management Optimization



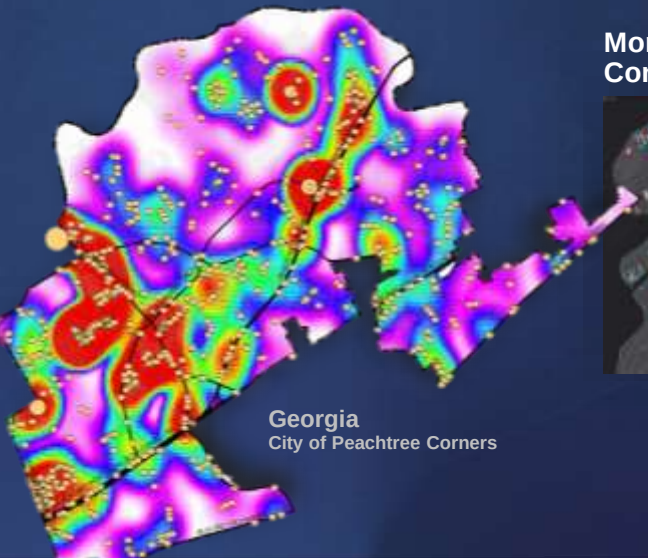
Turkey
Beykoz Municipality

Treatment Facilities



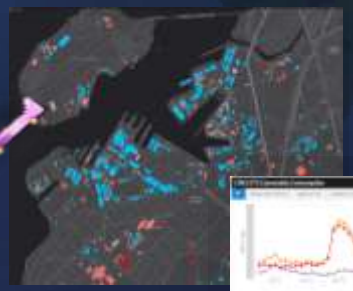
Ontario, Canada
Eos Positioning Systems

Code Enforcement

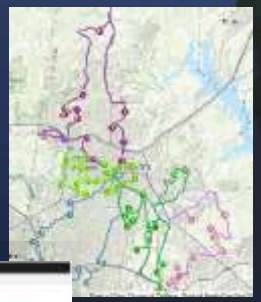


Georgia
City of Peachtree Corners

Monitoring Energy Consumption



Inspection Route Optimization



North Carolina
City of Durham

Pearl Harbor, HI
GISinc

Water Management

Holland
NV PWN

Predicting Water Network Breaks (Using AI)

Bay Area
Fracta

Potable Water Mains

Florida
Palm Beach County

Utilities and Telecommunications

Augmented Reality

Toronto
vGIS Inc.

3D Pipelines

Argentina
Aeroterra

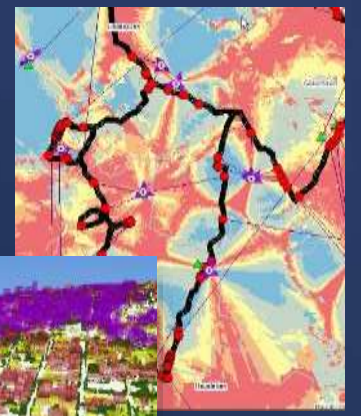
Automation Fiber Design

Nashville
3-GIS

Wi-Fi Planning

Chicago

Testing Wireless Data Speed



Austria
SynerGIS

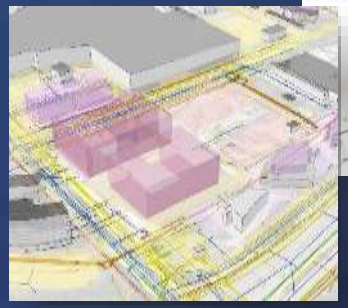
5G Modeling

Washington
Land Info Worldwide Mapping

Asset Management

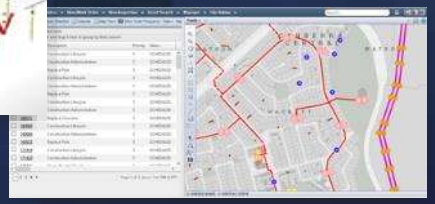
New Mexico
POWER Engineers

Underground Asset Management



Vilnius, Lithuania
Vilniaus planas

Work Management



Australia
Cityworks

Pole Inspection

Florida
Schneider Electric

Electric Transmission

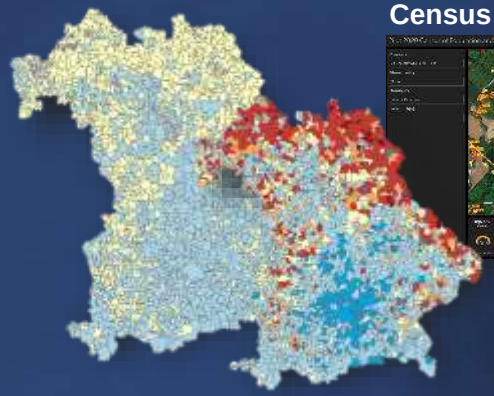
Serregal
ASER

Solar Energy Hot Spots

Texas
El Paso Electric

Demographics and Public Health

Population Change

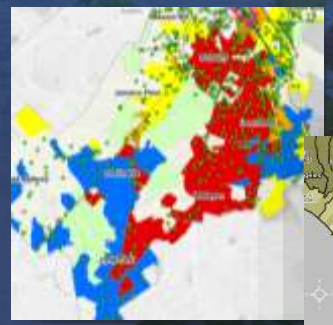


Germany
Bavarian Ministry of Housing, Building and Transport

Census Enumeration

Philippines

Opioid Epidemic by Tapestry Segments



Massachusetts
Northeastern University

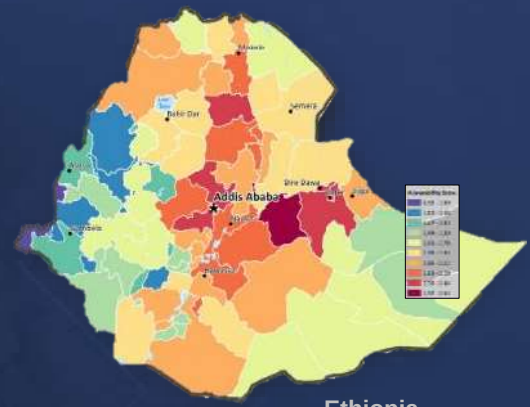
Lead Poisoning

Los Angeles
Department of Public Health

Prenatal Vitamins Distribution

Africa
Direct Relief

Youth Migration

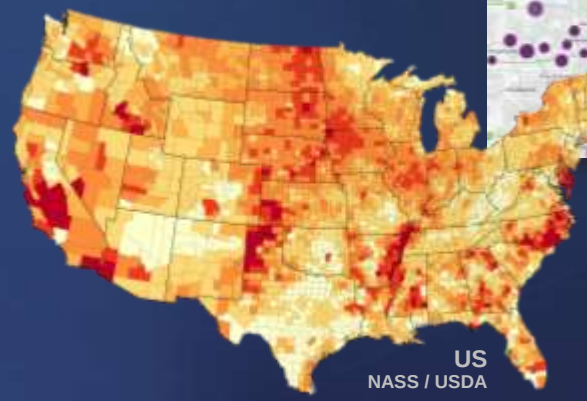


Ethiopia
Tufts University

Unemployment

Ireland

Farmer Income 2017



US
NASS / USDA

Income / Poverty Ratio

USA
Sanametrix

Homeless Point in Time Count

California
Orange County

Social Vulnerability to Climate Change

Ohio
Cuyahoga County Planning Commission

Public Safety and Security

LA Marathon Ops Center

Los Angeles, CA
SALUS—The Crisis Hub

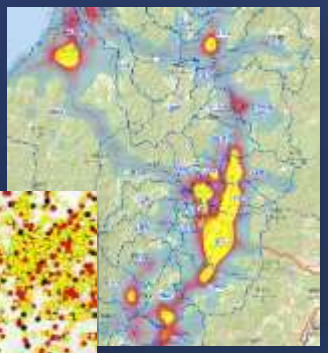
CCTV Dashboard

Jakarta

Security Camera Viewshed

University of Utah
Nearmap

Traffic Accidents

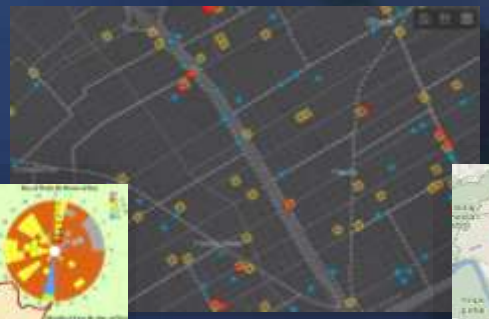


Japan
Yamagata Prefectural

Traffic Accidents

Oklahoma
Highway Safety Office

Crime Prediction (AI)



Buenos Aires, Argentina
Aeroterra

Spatiotemporal Crime Analytics

Sri Lanka
Marta Police

Suspicious Behavior Reporting

Lithuania
Hnit-Baltic

COMPSTAT Dashboard

Sheriff's Office
Jacksonville, FL

In-Vehicle Awareness

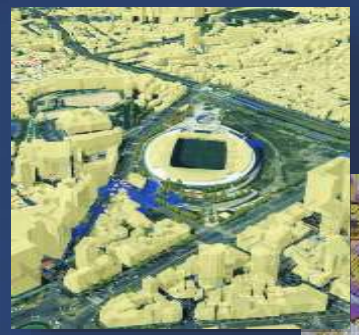
Charlotte, NC
BCS

Graffiti Activity

California
City of Escondido

Preparing for and Responding to Disasters

Flooding



Korea
KISTI

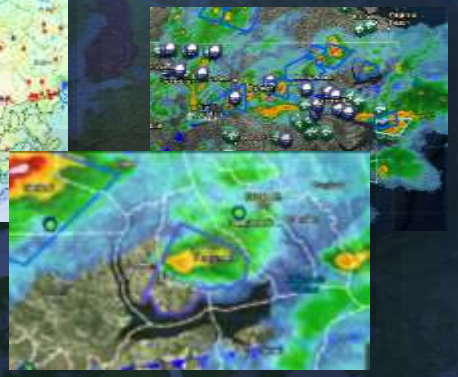
Flood Prediction

Kansas
Shawnee County

Heavy Rain Intensity

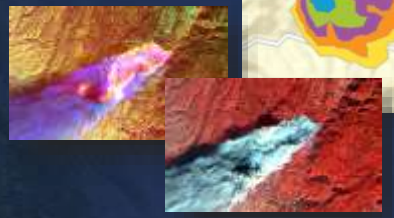
Japan
Chuden Engineering Consultants

Severe Weather



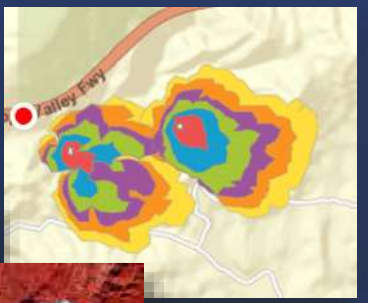
Mid-Atlantic
Bent Ear Solutions

Wildfire Imagery Analysis



California
NASA Disasters Program

Wildfire Modeling

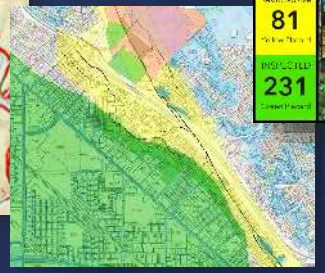


California
GIS4EMS

Landslide Susceptibility

Pennsylvania
GeoDecisions

Earthquake Zones



San Francisco
California Department of Conservation

Tornado Damage Assessment

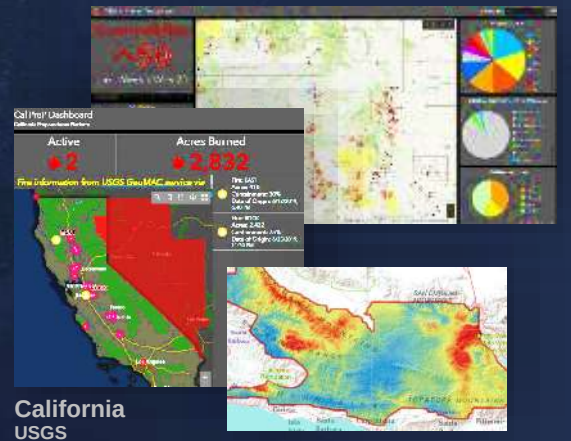
Missouri
State of Missouri

Humanitarian Response

Lebanon
Lebanese Red Cross

Venezuela

Wildfire Risk



California
USGS

California
San Francisco State University

Caribbean Examples

CGDI Survey: Overview and Q&A

Background

Main Objective

- Understand the business and technical needs of Caribbean agencies for increased use of geoinformation
- Gather the information required to put together the CGDI ToR

Review of previous surveys and assessments

- Caribbean Project coordinated by INEGI. Survey Form, 2014
- Caribbean Project coordinated by INEGI. Final Report, 2018
- UN GGIM SDI Regional Working Group Survey, 2018
- ECLAC, planning survey for 2020 census, 2017
- UWI, academic paper on readiness of geospatial systems (published in 2019)

Previous assessments: Priority areas identified

- Implement national and regional geoportals with:
  - Map services
  - Analysis and geoprocessing services
  - Metadata catalogs
  - Best practices clearinghouses
- Increase adoption of geospatial standards
- Improve policy making capabilities
- Develop Regional Geodetic Infrastructure to Support Geospatial Activities
- Develop regional and national strategies to acquire cartographic data and imagery
- Receive training on
  - Development of geoservices
  - Mapping and analysis capabilities
- Promote a culture of data sharing and dissemination

Draft Survey Instrument (Part 1)

Topics	Sample questions
Point of contact	
Organization type	• NMO • NSDO • Land • Other
Description of authoritative data generated by agency	
How many staff are engaged in authoritative data creation and/or maintenance	0 -5 6 – 10 11 – 20 More than 20
Source information	• Imagery • Topographic maps
Software	• ICT • OS • GIS • CMS
Hardware	• Number of desktops • Number of servers • LAN description • Hardware needs upgrading or improving?

Draft Survey Instrument (Part 2)

Topics	Sample questions
Internet connectivity	• Type • Bandwidth • Servers connected to internet • Quality (low, medium, high)
Web GIS Platform description	• Portal • Map services • Analysis services • Geoprocessing services • Metadata catalogs For each provide URL, #, SW, data served, standards
Geospatial standards	Select up to five standards actively used by your organization: • WMS • WFS • CSW • WTMS
GIS skill set	• Topic and number of staff
Geospatial training needs	• Provide list of topics • Option to prioritize topics

Draft Survey Instrument (Part 3)

Topics	Sample questions
Data policy	• Can data be shared with the public? • List legislation that supports / limits data sharing • Is there an Open Data Policy
Select the three top challenges for creating, hosting and sharing your data	• Multiple selection list

Select the top three activities that should be part of the CGDI	• Regional Portal (UWI-based?)
	• National Portal design
	• Map services (define up to 3 key map services)
	• Regional metadata catalog
	• Data discovery mechanism
	• Solution templates
	• Applications for:
	  • Disaster management app
	  • SDGs
	  • Economic development
	  • Flood mapping
	  • Integrated regional map
	  • Regional DSM

Next steps

Activity	When
Develop survey instrument	Early November
Post survey online and inform CGDI participating agencies	Late November
Survey completion by participating agencies	December
Analysis of survey results	January
Presentation of survey results to participating agencies	February
Final report	February

Closing Session and Next Steps

Closing discussion

- What are the key priority areas in the region for the CGDI to tackle?
- What type of communication plan should be established to keep all parties informed and actively engaged?
- What type of committees should be established to guide and coordinate the initiative?
- What role can agencies attending the workshop can play to raise awareness of and promote the CGDI in and outside the region?
- How do we engage Caribbean leaders in the CGDI?
- What steps can we all take to improve community building?
- What are key key partnerships that can nurture and sustain the CGDI?

Proposed timeline

Activity	When
Establish communications plan	Late October
Establish CGDI committees?	Early November
Complete survey	December
Compile survey results to inform ToR	January
Prepare draft CGDI ToR	February
Present draft ToR to CGDI participating agencies	Late February
Develop CGDI project proposal	March

Thanks for your participation!

GIS INSPIRING WHAT'S NEXT

7 – 8 October, 2019. UNAM. Mexico City


esri
THE SCIENCE OF WHERE

SOCIAL CONFLICTS

BIODIVERSITY

HOMELESSNESS

DEMOGRAPHIC SHIFTS

JOB LOSS

ECONOMIC PRESSURES

TRANSPORTATION

EPIDEMICS

DISASTERS

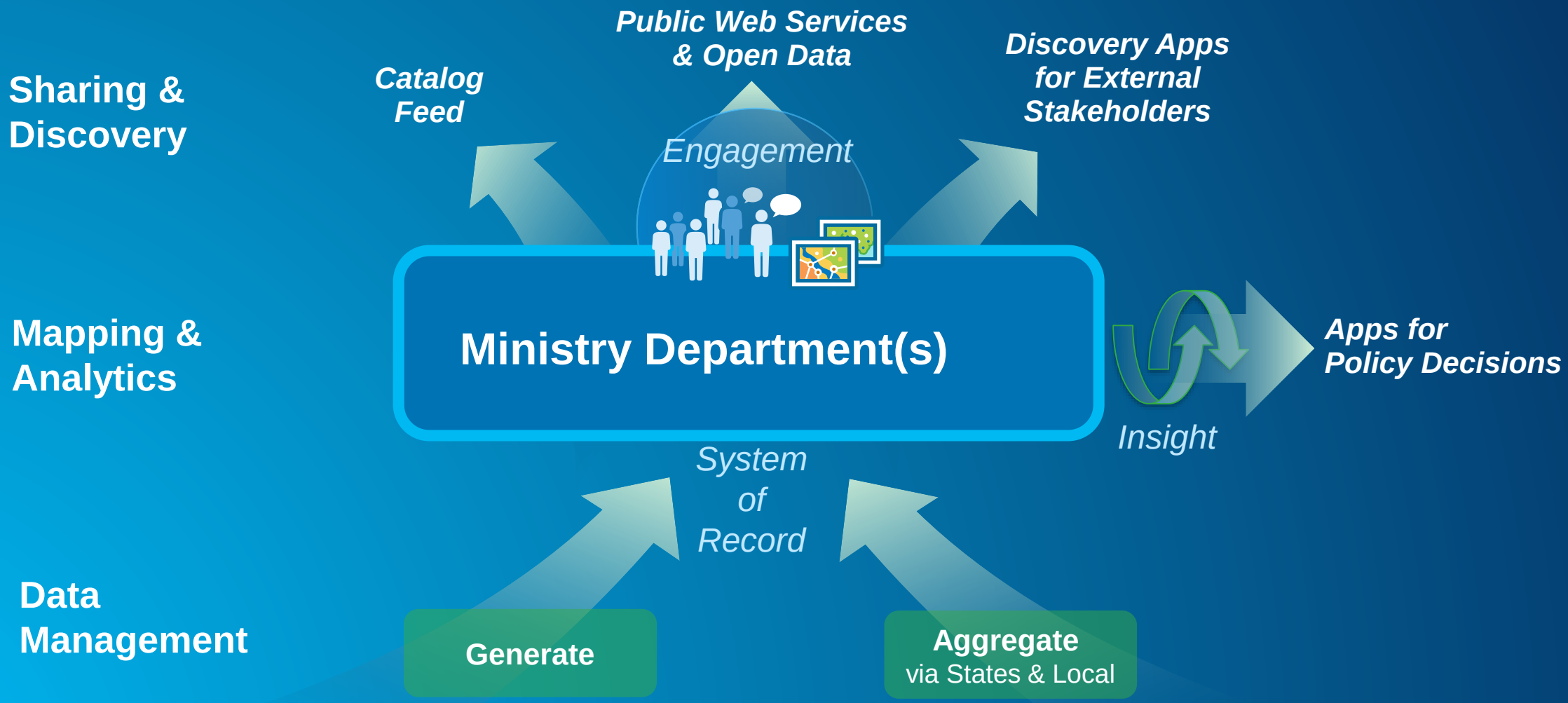
CLIMATE CHANGE

DROUGHT

FLOODING

National Agencies – Contributing to National Objectives

Each government organization manages their own geospatial data pipelines…



Managing and Analyzing Land Information

Damage Assessment

Texas
Harris

Valuation

Colorado
Douglas County Assessor

Appraisal Status

Kansas
Shawnee County

Mapping Land Legal Descriptions

Oklahoma
WhiteStar

Deed Documentation

Louisiana
WhiteStar

Land Use

Toyohashi City, Japan
Aichi University

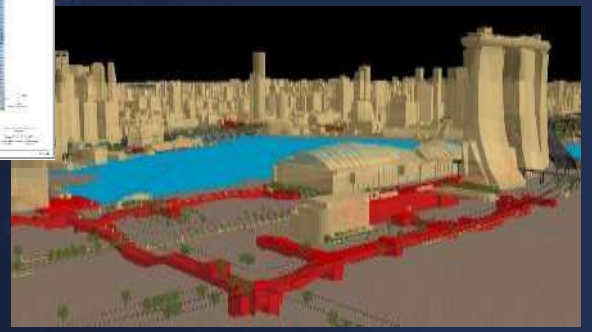
Tax Mapping

Illinois
DuPage County Assessor's Office

Marine Cadastre

Offshore Cadastre
Bureau of Ocean
Energy Management

Underground Cadastre



Singapore
Singapore Land Authority

Comparable Parcel Assessment

North Carolina
DEVNET

Parcel Citizen Viewer

Russia
Data+

Cemetery Management

Denham Springs, LA
Environmental Science Services

Planning

Zoning

Fukuyama City, Japan

Growth Policy Analysis

City and County of San Francisco

Long-Range Planning

Comprehensive Plan

Delaware County, Regional Planning Commission

Regional Planning

Jihlava, Czech Republic

Community Planning

Government of Dubai

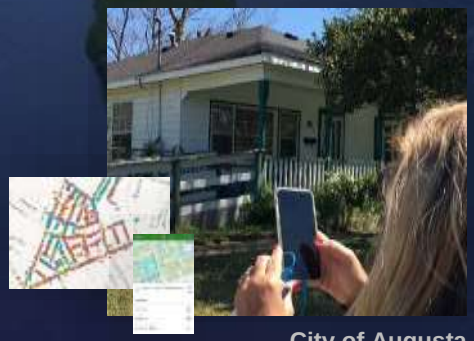
Public Space Assessment

City of Philadelphia

Housing Analysis

Los Angeles Planning Department

Blight Survey



City of Augusta

Demographic Assessment

Cleveland, OH

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