



Modernising Land Administration Systems

Nick Land

Digital Transformation Is Just Beginning . . .

We Are Living in an Era of Exponential Technological Advancement



Building a "Digital Twin"



Addressing *All* Our World's Challenges

GIS

Nature Conservation Transparent Government
Economic Development Science & Technology
National Security Urbanization & Development
Agriculture Pollution Natural Disasters
Natural Resources Business Social Conflicts
Water Resources Climate Change Energy
Environment Infrastructure

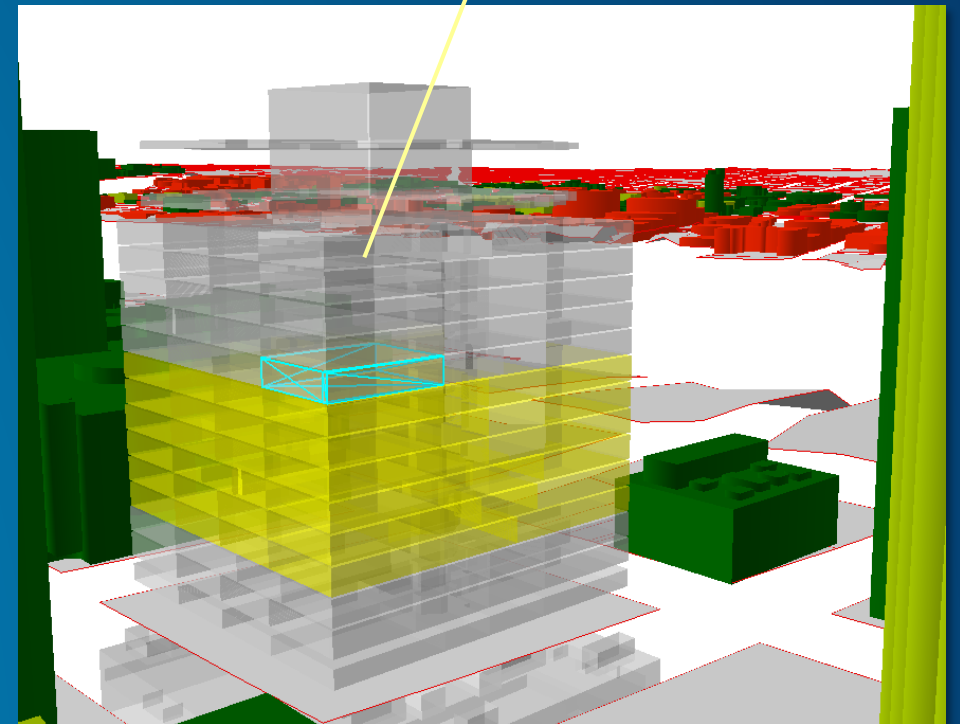
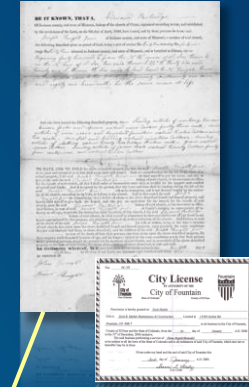
Land Administration Challenges

- Incomplete cadastre
- Moving from paper to digital
- Ensuring data are up-to-date and accurate
- Quality Improvement
- Delivering New Products & Land Information Services
- Funding & Business models



Trends in Land Administration

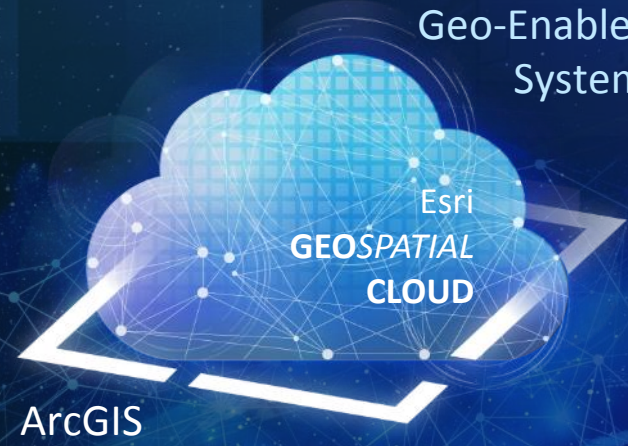
- Automated Workflows, Digital Submission, Connected Workers
- Systems Consolidation
- 3D Cadastre
- Cadastre as Basis for National SDI
 - Multipurpose Cadastre
- Standards Compliance
 - ISO; OGC
- Open Data & Transparency
- “Fit for Purpose” Cadastre





2,983,107
526,180
12,265,771

Geo-Enabled
Systems



ArcGIS

OUR WORK

CREATING USEFUL TECHNOLOGY
and SUPPORTING OUR USERS

ArcGIS Product Components

An Integrated & Comprehensive System



Desktop

Enterprise & Online

Apps

APIs & SDKs

Content



GIS as a System of Systems

System of Record

Data Management
and Integration



System of Engagement

Sharing, Collaboration,
and Dissemination



System of Insight

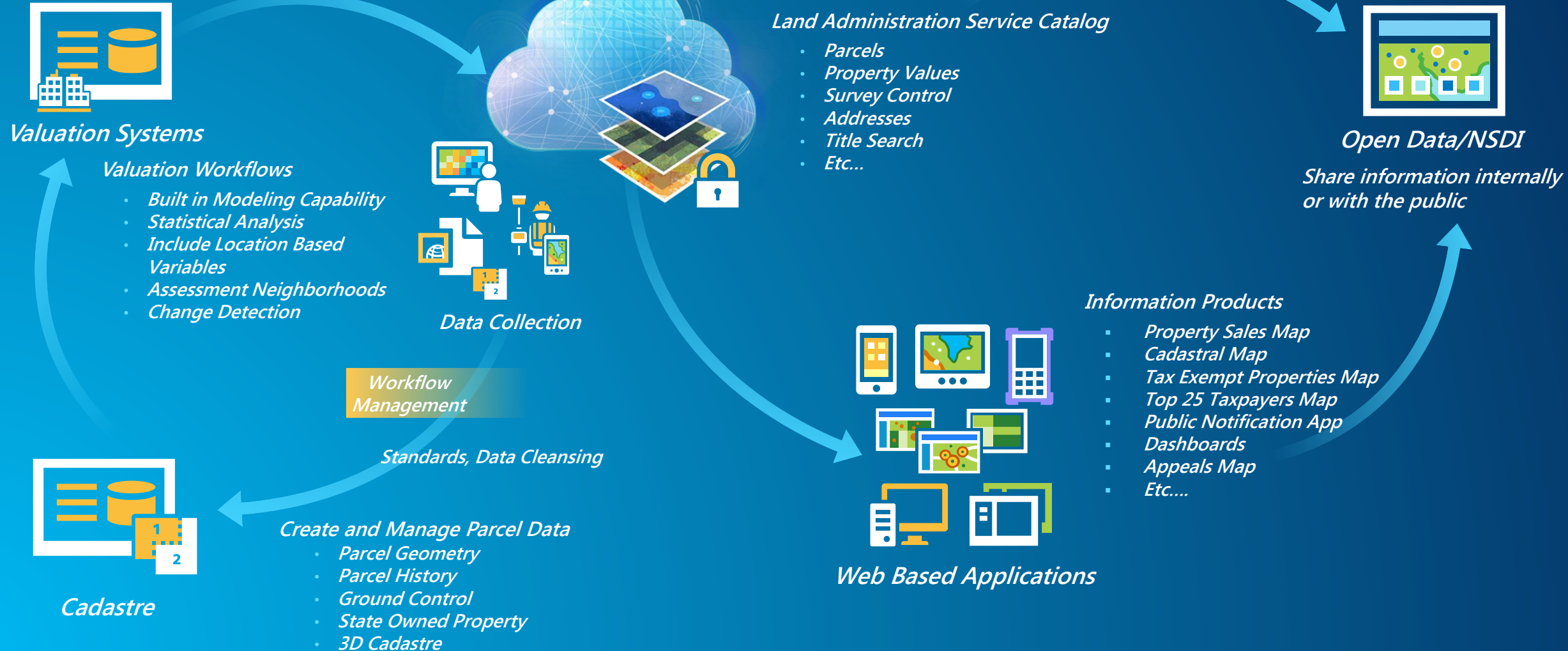
Analytics, Models, and
Data Exploration



The Technology Platform for Land Administration

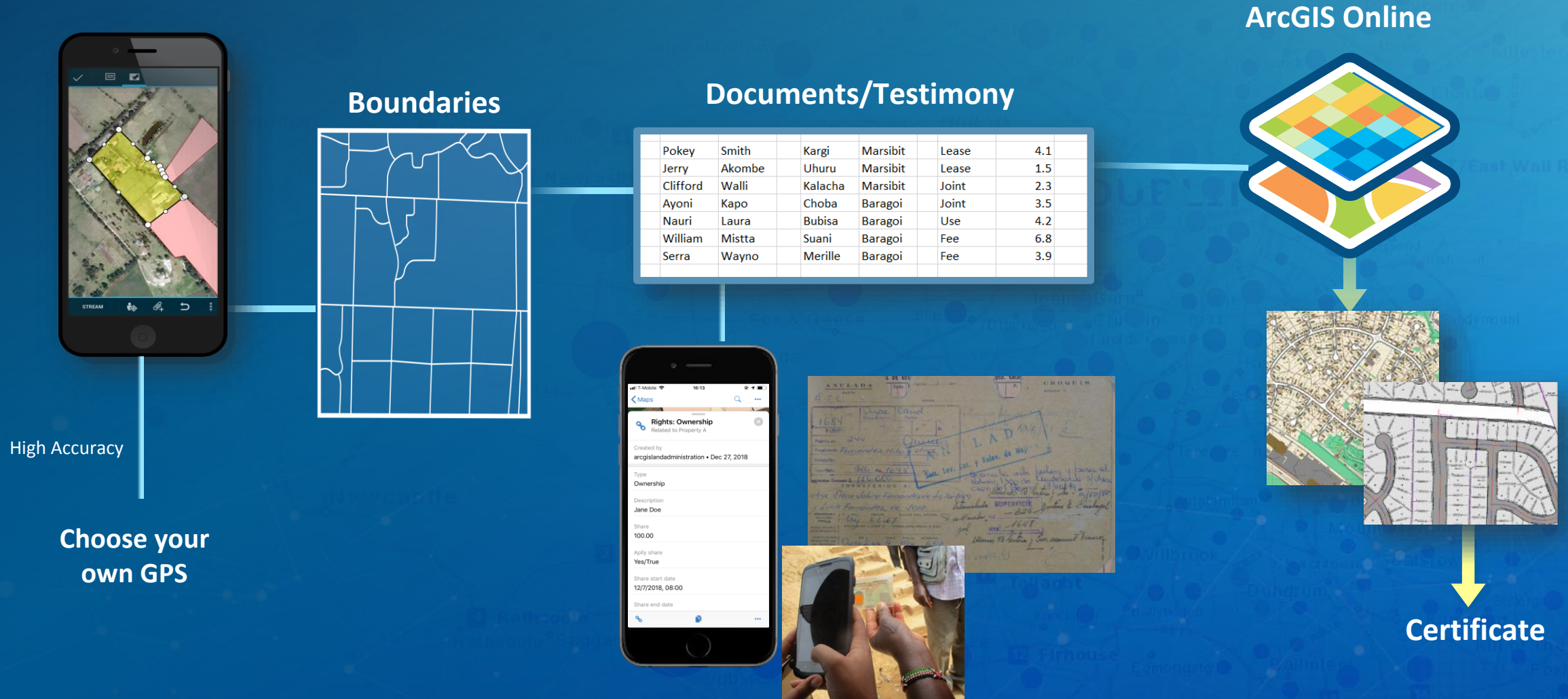
Land Administration Solution Overview

Land Administration Portal



“Fit For Purpose” Land Administration

Enabling New Workflows with High Accuracy using LADM



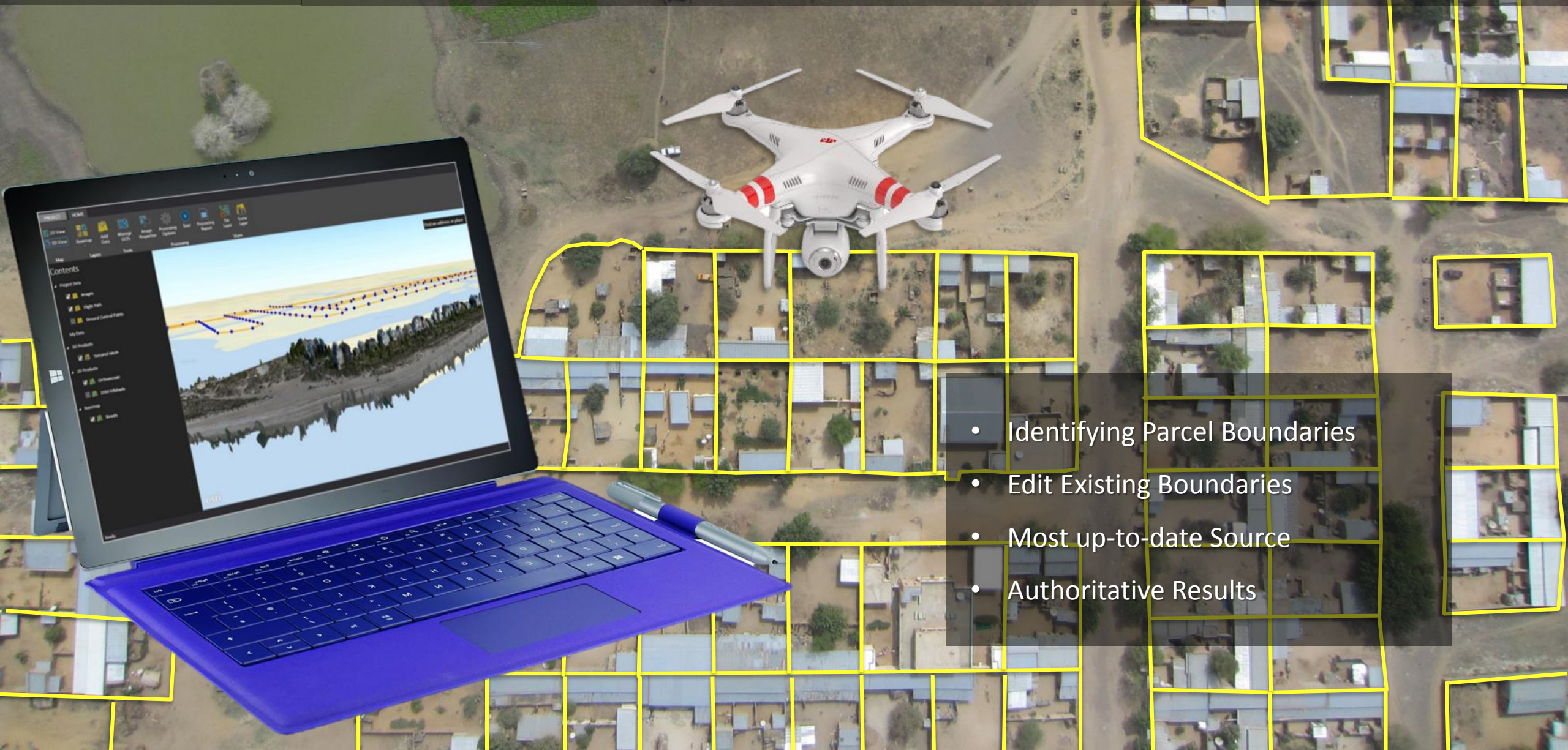
System of Record

Next Generation Parcel Management in ArcGIS

- **Service Oriented Architecture (Pro)** – parcels available across the platform
- **Migrate today, clean later** – any data, in any condition can be easily migrated
- **Configurable parcel rule engine** – prevent, detect, visualize and fix poor data
- **Integration with other business systems (REST API)** – reduce redundant data entry
- **Parcel lineage** – track and visualize parcel history
- **2D, 3D and 4D cadastre** – maintain, visualize and analyze 3D parcels
- **Digital Submission** – reduce back office work
- **Works Anywhere** – any client; any cadastral system
- **Analytics** – improved analytics for spatial accuracy and resource status

Drone2Map

Integrated with GIS Capabilities



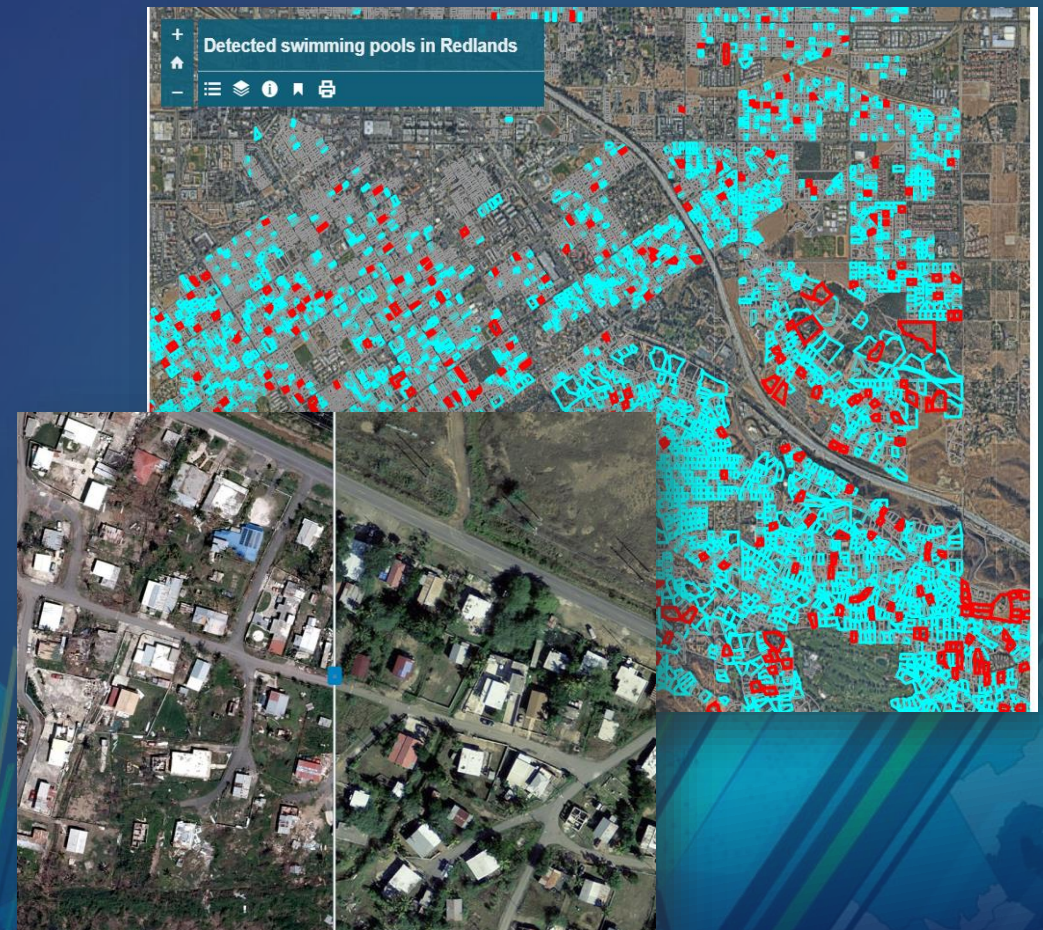
- Identifying Parcel Boundaries
- Edit Existing Boundaries
- Most up-to-date Source
- Authoritative Results

Discover Change in Imagery

Rapidly identify change in property boundaries and value

- Leverage imagery from different points in time ([Wayback Imagery](#))
- Compare two images to identify and mask areas that have changed ([Image Mask App](#))
- Visualize and explore imagery through time and space ([Imagery Viewer App](#))
- Utilize ML/AI to automatically detect and extract features (i.e. [pools](#)) from imagery that may influence value

Change Detection

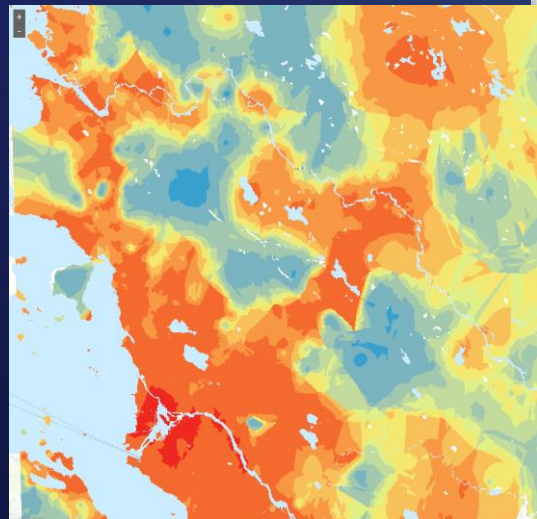


System of Insight

Valuation Modelling

- Geographically weighted regression
- Forest-based classification and regression
- Kriging
- Spatial Interpolation
- Leverage external spatial data

Spatial Analytics



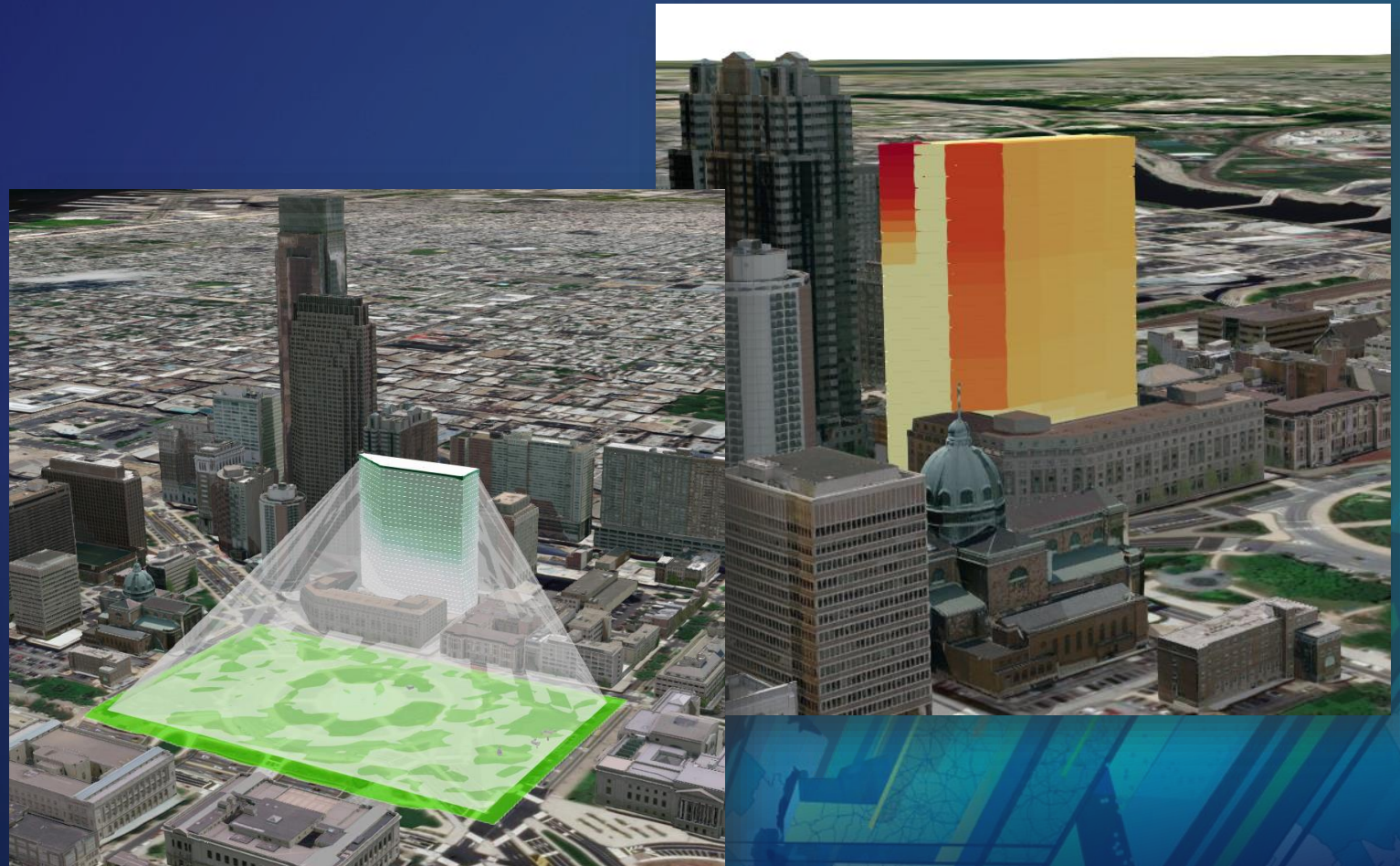
The screenshot displays the ArcGIS Pro interface for a 'Sales Ratio Analysis'. The main map shows a residential neighborhood with various colored parcels (green, yellow, orange, red) and numerical values (e.g., 52, 35, 1669, 839, 840, 821, 835, 838, 837, 817). Several parcels are highlighted with red markers and numerical values (e.g., 0.26, 0.29, 0.31, 0.28). The interface includes a ribbon with tabs for Project, Map, Insert, Analysis, View, Edit, Imagery, and Share. The Analysis tab is active, showing a workflow for 'Calculate Sales Ratio Statistics Sales in Assessment Neighborhood'. The workflow includes steps like 'Select Layer By Attribute', 'Get Count', 'Copy Features', and 'Row Count'. The map also shows a scale bar and a coordinate system (316,201,90E 563,877.71N m).

Three Dimensions – 3D

Improve values with 3D analysis

- Create and publish 3D maps
- Visibility assessment
- Viewshed analysis
- Line of sight

Urban Valuation

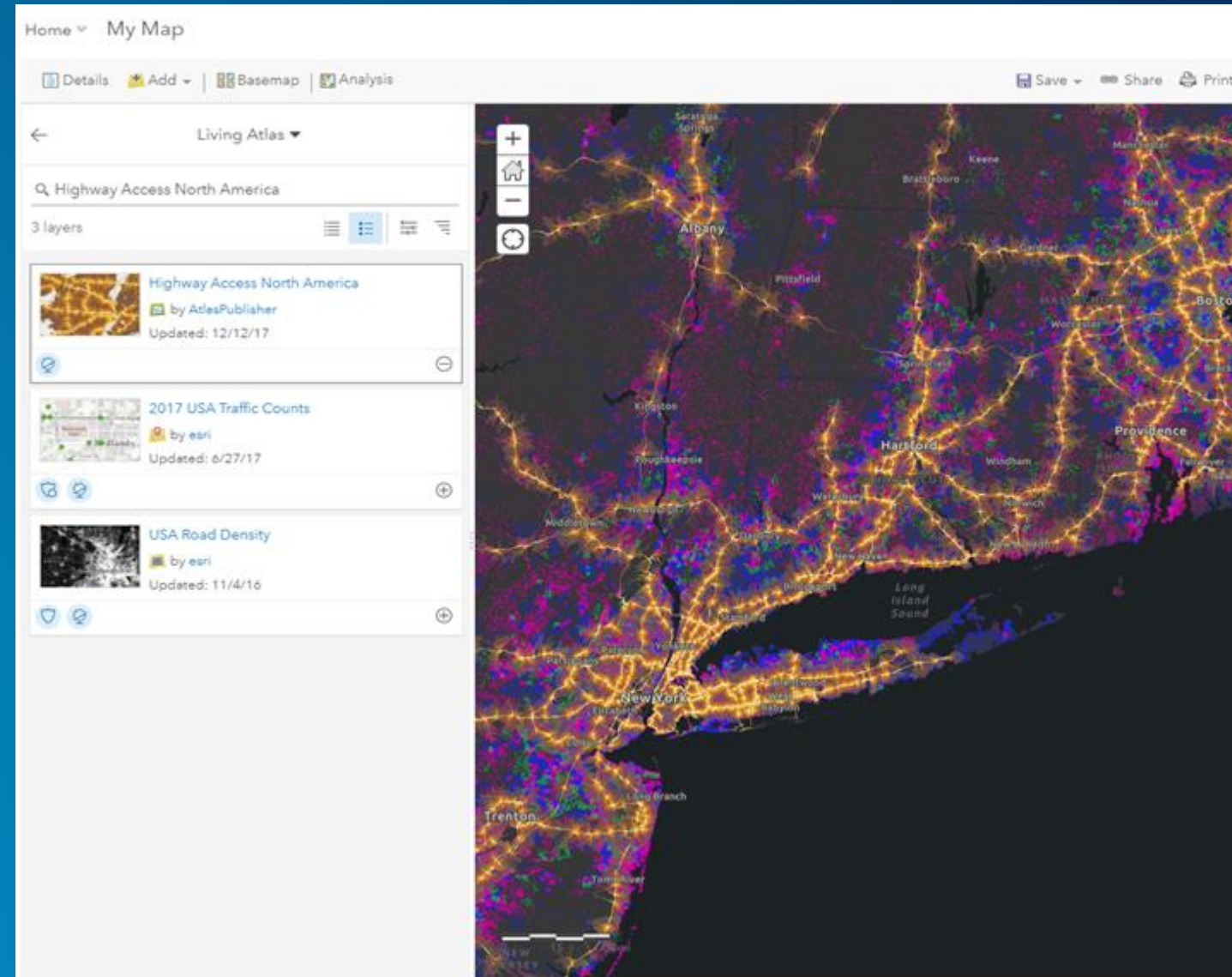


Geoenrichment

- Living Atlas
- Authoritative population dataset
- Can be used online or on desktop

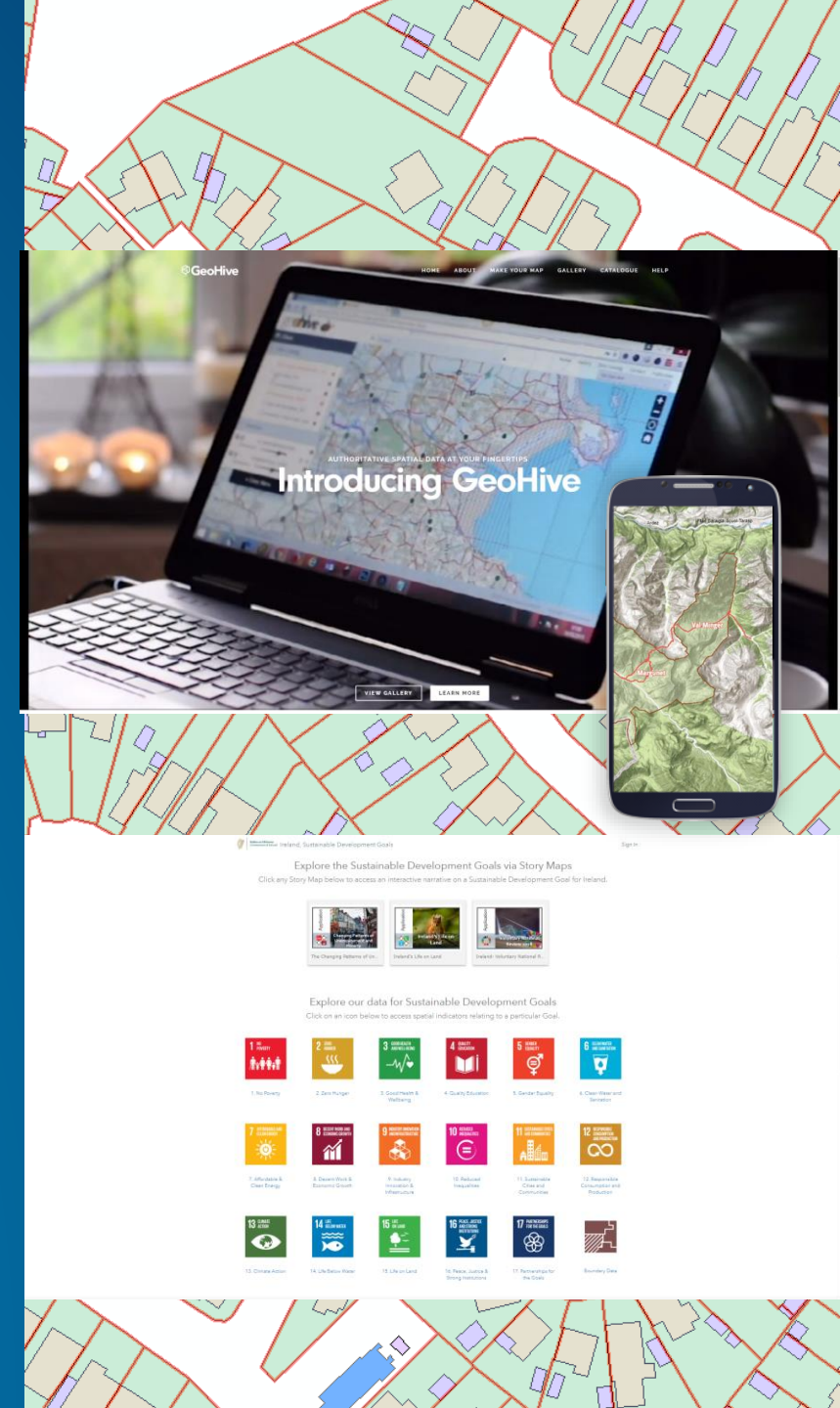
In Valuation...

- Used to augment existing attribute data with population information



System of Engagement

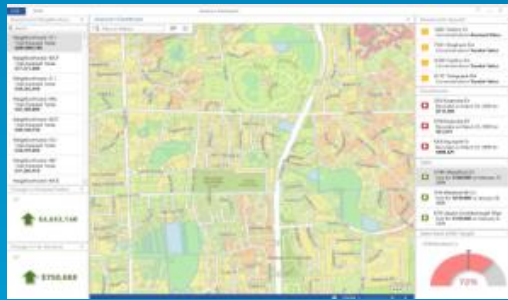
- Discoverable, Accessible, Usable
- Open
- Integral Part of a Nation's Geospatial (Data) Infrastructure
- Integral to Government Policy & Digital Transformation



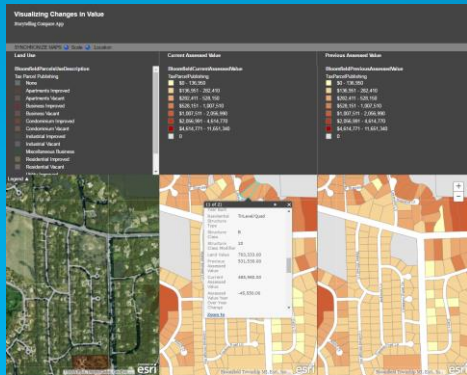
Citizen Engagement

Maps, Apps, Portals

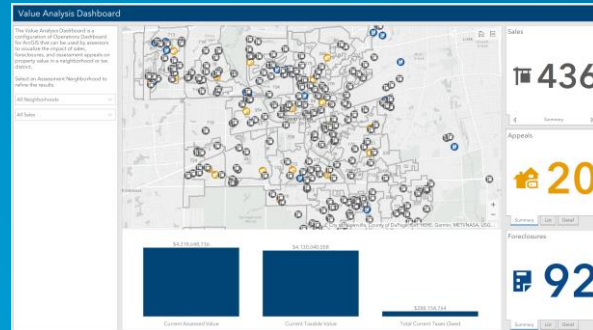
Property Value Map



Property Value Changes



Valuation Dashboard



Address Crowdsourcing

Address Crowdsourcing

The Address Crowdsourcing application allows the general public, or other stakeholders, to participate in the continuous improvement of authoritative address information by contributing missing site addresses they discover.

1. Enter Information
2. Select Location
3. Complete Form

Full Address (required):

Blg / Unit Type (required):

Blg / Unit Number (required):

Alt. Blg / Unit Type (required):

Alt. Blg / Unit Number (required):

Municipality Name (required):

Contact Name (required):

Phone (required):

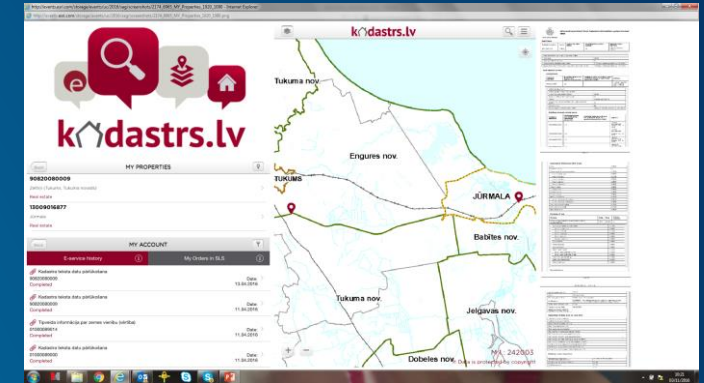
Email (required):

Search

Submit New Address

Back to Top

Latvia – Cadastral Map App



Property Tax Appeals

Property Tax Assessment Appeal

This form can be completed by the property owner or agent. Please answer the following questions about your property tax assessment and we'll follow up with next steps.

Property Information

Where is the property?*

Enter the address or locate on the map.

City of Naperville, County of DuPage, Est. HERE: Garmin US95, NOAA, EPA, USCA, NPS

Powered by Esri

Lat: 41.77742 Lon: -88.13636

Is this residence occupied by the owner?

Yes

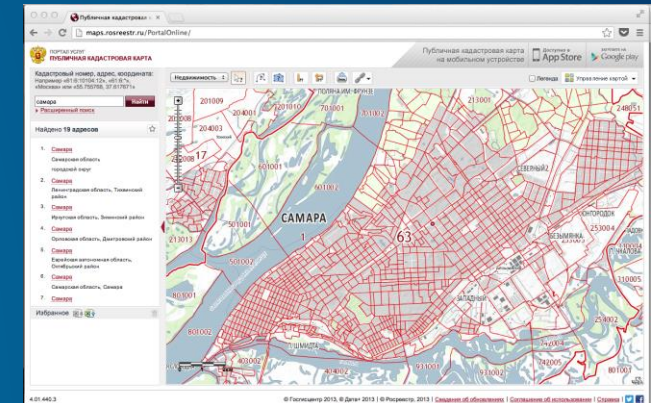
No

Do you know your parcel identification number?*

Yes

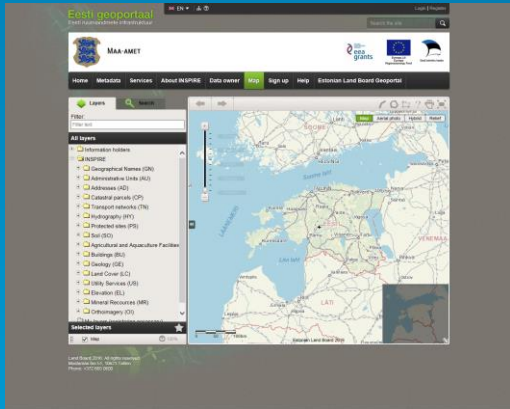
No

Russia – Public Cadastral Map

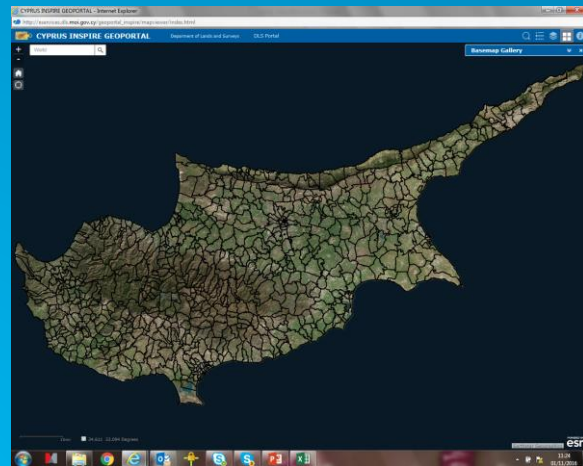


National Geospatial Infrastructure

Estonia & Cyprus – INSPIRE Compliance

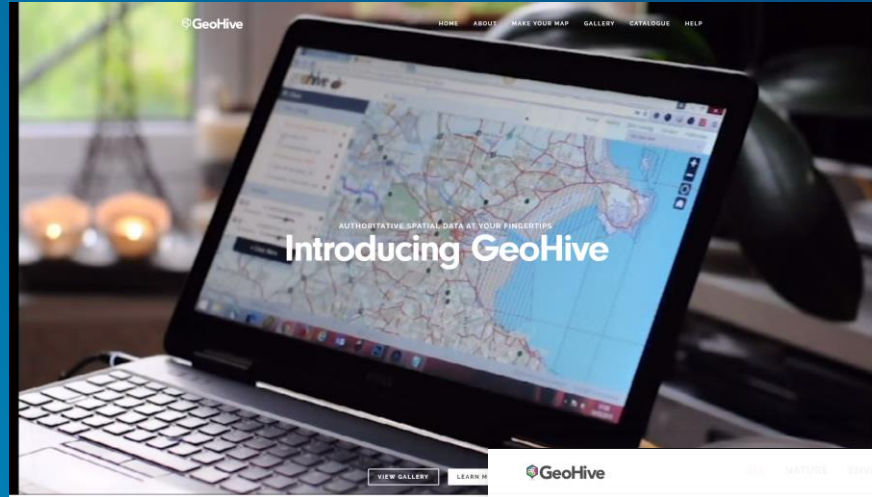


<http://inspire.maaamet.ee/>

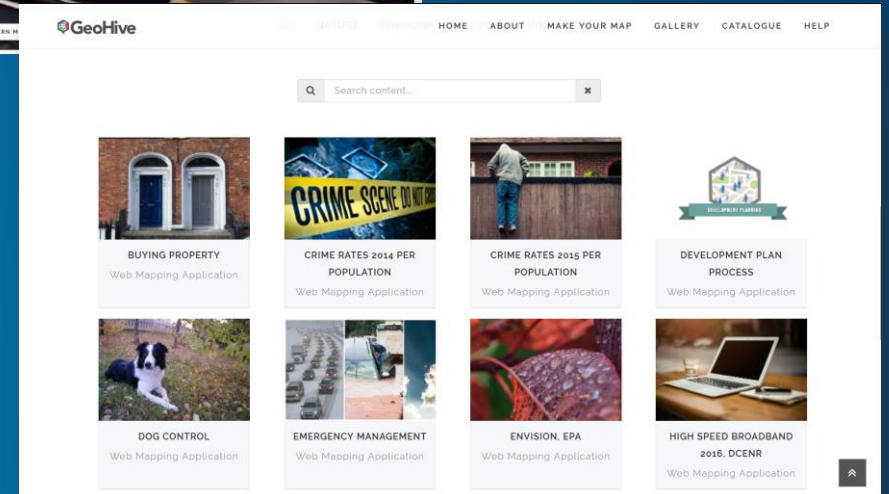


<http://portal.dls.moi.gov.cy/en-us/homepage>

Ireland – SDI “Hub”



<http://geohive.ie>





17 Goals to Transform our World

Highlighting Ireland's progress towards achieving the United Nations Sustainable Development Goals

Welcome to Ireland's Sustainable Development Goals (SDGs) data hub.

This is a collaboration platform for reporting on progress towards the goals and sharing information on related initiatives.

Ireland's progress against each goal is measured using a set of United Nations (UN) global and European Union (EU) agreed targets and indicators.

From this home page, you can access information on specific goals, view our video and sign up to receive updates.



<https://irelandsdg.geohive.ie/>



Explore the Sustainable Development Goals

Click on a card below to access progress reports and indicator data relating to a particular goal.

 <p>1 NO POVERTY</p>	 <p>2 ZERO HUNGER</p>	 <p>3 GOOD HEALTH AND WELL-BEING</p>	 <p>4 QUALITY EDUCATION</p>
<p>Sustainable Development Goal 1 Progress, Ireland</p> <p>See Ireland's progress towards ending poverty in all its forms everywhere.</p> <p>Explore</p>	<p>Sustainable Development Goal 2 Progress, Ireland</p> <p>See Ireland's progress towards ending hunger, achieving food security, improving nutrition and</p> <p>Explore</p>	<p>Sustainable Development Goal 3 Progress, Ireland</p> <p>See Ireland's progress towards ensuring healthy lives and promoting well-being for all, at all</p> <p>Explore</p>	<p>Sustainable Development Goal 4 Progress, Ireland</p> <p>See Ireland's progress towards ensuring inclusive and equitable quality education and promoting</p> <p>Explore</p>
 <p>5 GENDER EQUALITY</p>	 <p>6 CLEAN WATER AND SANITATION</p>	 <p>7 AFFORDABLE AND CLEAN ENERGY</p>	 <p>8 DECENT WORK AND ECONOMIC GROWTH</p>
<p>Sustainable Development Goal 5 Progress, Ireland</p> <p>See Ireland's progress towards achieving gender equality and empowering all women and girls.</p> <p>Explore</p>	<p>Sustainable Development Goal 6 Progress, Ireland</p> <p>See Ireland's progress towards ensuring the availability and sustainable management of water</p> <p>Explore</p>	<p>Sustainable Development Goal 7 Progress, Ireland</p> <p>See Ireland's progress towards ensuring access to affordable, reliable, sustainable and modern</p> <p>Explore</p>	<p>Sustainable Development Goal 8 Progress, Ireland</p> <p>See Ireland's progress towards promoting sustained, inclusive and sustainable economic growth, full</p> <p>Explore</p>
 <p>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE</p>	 <p>10 REDUCED INEQUALITIES</p>	 <p>11 SUSTAINABLE CITIES AND COMMUNITIES</p>	 <p>12 RESPONSIBLE CONSUMPTION AND PRODUCTION</p>
<p>Sustainable Development Goal 9 Progress, Ireland</p> <p>See Ireland's progress towards building resilient infrastructure, promoting inclusive and sustainable</p> <p>Explore</p>	<p>Sustainable Development Goal 10 Progress, Ireland</p> <p>See Ireland's progress towards reducing inequality within and among countries.</p> <p>Explore</p>	<p>Sustainable Development Goal 11 Progress, Ireland</p> <p>See Ireland's progress towards making cities and human settlements inclusive, safe, resilient</p> <p>Explore</p>	<p>Sustainable Development Goal 12 Progress, Ireland</p> <p>See Ireland's progress towards ensuring sustainable consumption and production patterns.</p> <p>Explore</p>

UN Open SDG Hub



Welcome to the Open SDG Data Hub

To fully implement and monitor progress on the Sustainable Development Goals, decision makers everywhere need data and statistics that are accurate, timely, sufficiently disaggregated, relevant, accessible and easy to use. The Open SDG Data Hub promotes the exploration, analysis, and use of authoritative SDG data sources for evidence-based decision-making and advocacy. Its goal is to enable data providers, managers and users to discover, understand, and communicate patterns and interrelationships in the wealth of SDG data and statistics that are now available.

<http://unstats-undesa.opendata.arcgis.com/>



17 Goals to Transform Our World

A Modern Land Administration System

A complete GIS for Cadastre, Valuation and NSDI

Accurately Determine Property Values

- Sales, appeals and foreclosure
- Perform advanced spatial analysis
- Geographic weighted regression
- 3D Viewshed analysis
- Imagery comparison & change detection

Respond to and Defend Property Values

- Simplify valuation appeals
- Communicate comparable sales
- Advanced spatial analysis
- Communicate with maps
- Visualize complex analysis

Improve Public Engagement and Data Sharing

- Simplified data sharing model
- Transparency through open data
- Tax parcel viewer
- Find comparable sales
- Floodplain mapping
- Public notification
- Tell your community's story

Maintain Current and Accurate Cadastre

- Efficiently manage parcels
- Automatically maintain historic parcels
- Improve data quality and accuracy
- Workflow management
- Aggregate parcel and property data

Manage Field Appraisal and Data Collection

- Efficiently schedule field data collection
- Understand status of field work
- Navigate from site-to-site
- Collect street-level photos
- Assess damage





esri

THE
SCIENCE
OF
WHERE

nland@esri.com