Exploring the Power of Location in a Modern Agriculture Management System

THE SCIENCE OF WHERE

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VISION

Why is . . . THE SCIENCE OF WHERE . . . So Important to Ag?
OUR WORLD
Is Increasingly Challenged

The Evidence Is Clear…
We Need Better Understanding…
…and More Collaboration
…and Action
OUR WORLD

Is Undergoing a Massive
Digital Transformation
THE SCIENCE OF WHERE

A Fundamental Digital Language

For Understanding and Managing Our World
THE SCIENCE OF WHERE

A Framework and Process

Transforming How We Think and Act . . .
. . . Creating a More Sustainable Future
Using the Power of Where to Integrate Everything

GIS Provides the Platform For Managing, Analyzing, and Applying Geographic Information

Integrating People, Processes, Things, and Data About Them
GIS Is Advancing Rapidly
Integrating and Leveraging Many Innovations

Data
Computing
Infrastructure

GIS Innovation

Expanding the Power of GIS
Web GIS Is the Modern GIS Architecture
Helping Everyone Do Their Work Better
Growing Exponentially
Sharing Knowledge
Collaboration
Improving Productivity and Efficiency

Leveraging Web Services

Departments
Teams
Individuals
Organizations
Web GIS Simplifies Working With All Types of Data
Using Web Maps, Scenes, and Layers

Creating A Common Language
Integrating Real-Time Information
Leverages Dynamic Data About Everything
Apps Are Bringing the Power of GIS to Everyone

Extending the Reach of GIS

Across Organizations and Beyond
Smart Mapping and Exploratory Data Analysis
Simplifies the Use of Analytics and Creates Beautiful Maps
Web GIS Enables a Whole New Scale of GIS
Interconnecting Systems and Expanding Collaboration
GIS Now Provides the Means . . .

To Do Your Work Better. . .

. . . and for You to Apply
The Science of Where

. . . everywhere
ArcGIS Use Case In Agriculture

Many GIS Uses Across Multiple Disciplines

Field Mobility  
Real-Time  
Mapping  
Imagery  
Apps  
3D  
Content  
Open  
Data Exploration  
Data Management  
Big Data  
Spatial Analysis  
Community Engagement
ArcGIS | Supports Multiple Implementation Patterns

Web Services Are Interconnecting Everything
Millions of Maps and Layers
Shared by Users

Soils
Vegetation
Traffic
Landsat
Land Cover
Population
Elevation
Demographics
Boundaries
Floodplains
Hazards
Protected Areas
Protected Areas

Basemaps
Soils
Topo Maps
Addressing
Traffic
Roads
Vegetation
Scientific
Landsat
NAIP
Elevation
Protected Areas
Landsat
Species
Species

Imagery
Geology
Oceans
Climate
Water
Gauges
Stream Gauges
MODIS
Biology
Digital Globe
Landscape
Oceans
Stream Forecasts

Demographics
Hazard
Weather
Population
Sea Temperature
Wildfires

Agriculture
Ecology
Sentinel
Earthquakes
Geology

ArcGIS Content | A Fundamental Part of the Platform

Thousands of Ready-to-Use Maps and Datasets from Esri

The Foremost Collection of Global Geographic Information . . .
. . . A Living Atlas for the Planet
ArcGIS | A Complete Imagery Platform

Supporting Advanced Processing, Analysis, and Management

Dynamic Image Processing

Desktop and Web

All Major Sensors

Aerial Photos

High-Resolution Satellites

Small Sats

Landsat

Drones

Weather

Radar

Full-Motion Video

Mensuration

Image Space

Pro Imagery Tab

Drone2Map

Powerful Analytics

NDVI

Classification

Change Analysis
ArcGIS | Provides Dynamic Image Services

- Dynamic Processing Performed Next to the Data
- Enabling
  - Image Services
  - Raster Analytics

Massive Image Storage

Any Image Source

ArcGIS Image Server

Image Services

- Landsat
- Sentinel-2
- SST
- NAIP
- Airbus Global Elevation
- DigitalGlobe Imagery + Analytics
- Change Analysis

... Fully Integrated with the Platform
Spatial Analysis | Expanding and Improving Tools

- **Web-Based Analysis**
  - Join Features
  - Hot Spot Outliers
  - Aggregation

- **Science Integration**
  - ArcGIS API for Python
  - Machine Learning Tools
  - Improved R Integration

- **Charting**

- **Spatial Statistics**
  - Vector Analysis In Space-Time Cubes
  - Space-Time Pattern Mining
  - Enhanced Cube Explorer
  - Space-Time Point Aggregation
  - Geostatistical Wizard

- **Improved Processing**
  - Parallel Processing
  - Models as a Service

- **Other Enhancements**
  - Dynamic Aggregation
  - Areal Interpolation
  - Model Builder
  - Optimized VRP Clustering
  - Optimum Site Selection

- **Raster and Lidar**
  - New Raster Functions
  - Improved Slope/Aspect
  - LAS Classification
  - Improved R Integration
Insights | A New Experience for Spatial Analytics

- Visual, Intuitive, Responsive
- Exploratory Data Analysis and Visualization

New Charts

Linked and Responsive Charts and Maps

Integrated Spatial and Tabular Analysis

On-the-Fly Visual Models

Local
- Excel
- CSV

DBMSs
- SQL Server
- Oracle
- SAP HANA
- Teradata

GIS

Spatial / BI

Coming Soon In ArcGIS Online

For Analysts and Data Scientists
Big Data Spatial Analytics | Faster and Massively Scalable

Leveraging Distributed Computing and Parallel Processing

GeoAnalytics Server
Large Observation Collections

Image Server
Large Imagery Collection

Features / Vectors
- Space-Time Analytics
- Hot Spots
- Density
- Buffer
- Summarize
- Aggregation
- Construct Tracks
- Find Similar
- Spatial Join

Image Processing
- Classification
- Change Detection
- Topo
- Suitability
- Corridors
- Distance
- Proximities
- Interpolation

Lidar:
- Bare Earth
- First Return
- Imagery

Density
- Corridors
- Distance
- Proximities

Hot Spots
- Power Outages (50+ Million)
- Faster (10x+)

Space-Time Cube
- Riparian Areas

Image Server
- Accessible from ArcGIS Pro and Python API
Real-Time Analytics | Integrating Sensor Networks and the IoT

- High-Velocity Data Streams
- Monitoring and Alerting

Improvements
- Scalability
- Availability
- Cloud IoT Connectors

Situational Awareness
Analytics
Alerting
Real-Time Data
GeoEvent Server
GeoAnalytics Server

Event Management
Vehicle Tracking
Asset Monitoring
Environment Monitoring

Supporting Real-Time GIS Applications . . .
ArcGIS | An Open, Interoperable, and Standards-Compliant Platform

Any System

Open Standards and Formats

ISO

WWW

KML

WMS

GML

ICF

SQL

OPeNDAP

SLD

LS

REST

Shapefiles

GeoPackage

GeoPackage

NetCDF

OneGeology

CityGML

Open Data Access

Extensible Architecture

Embeddable Components

Open-Source Contributions (500+)

Open-Source Integration

Any System

SQL Server

Adobe Creative Cloud

SharePoint

MS Office

Azure

AutoCAD

AWS

Netezza

Teradata

IBM Cognos

SAP HANA

Oracle

Open APIs & SDKs

Many OGC Certifications

Many OGC Certifications

Successfully Integrated into Thousands of Systems
ArcGIS Platform
An Integrated System
Knowing is not enough . . .

. . . we must apply.

Being willing is not enough . . .

. . . we must do.

– Leonardo da Vinci
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