



# GIS NEWSLETTER

## OCTOBER 2023



مجموعة مايكروسنتر  
MICROCENTER GROUP

# GISday

## Virtual GIS Day 2023 (December 5)

### Inspire the world with GIS

GIS Day. Celebrating the GIS Professional.

**Save the date for December 5, 2023 to celebrate GIS Day virtually with MicroCenter.**

Geographic Information System (GIS), has revolutionized the way we analyse and understand Earth's information. It goes beyond mapping and allows us to make informed decisions that have a positive impact on our world.

The goal of this day is to provide an opportunity for GIS professionals, universities, businesses, and government to come together and celebrate their work within the GIS community. It is an occasion that allows individuals and organizations alike to showcase the benefits of GIS.

GIS professionals play a role in various industries by harnessing the power of spatial data to solve complex problems. This dedicated day serves as a platform for them to demonstrate how their work has transformed businesses, improved decision-making processes, and positively influenced communities.

[Click Here to Register](#)

# 9th SDMX Global Conference

## Empowering Data Communities

### 9th Statistical Data and Metadata eXchange (SDMX) Global Conference

We are delighted to share that MicroCenter attended the 9th Statistical Data and Metadata eXchange (SDMX) Global Conference held in Manama, Kingdom of Bahrain, under the theme 'Empowering Data Communities', the event was organized by the Information & eGovernment Authority (IGA ) from 29 to 31 October 2023. The conference attracted more than 500 participants from 107 countries, including data science experts, officials from regional and international establishments, statisticians, and data users from national, regional, and international organizations, as well as academia and the private sector.

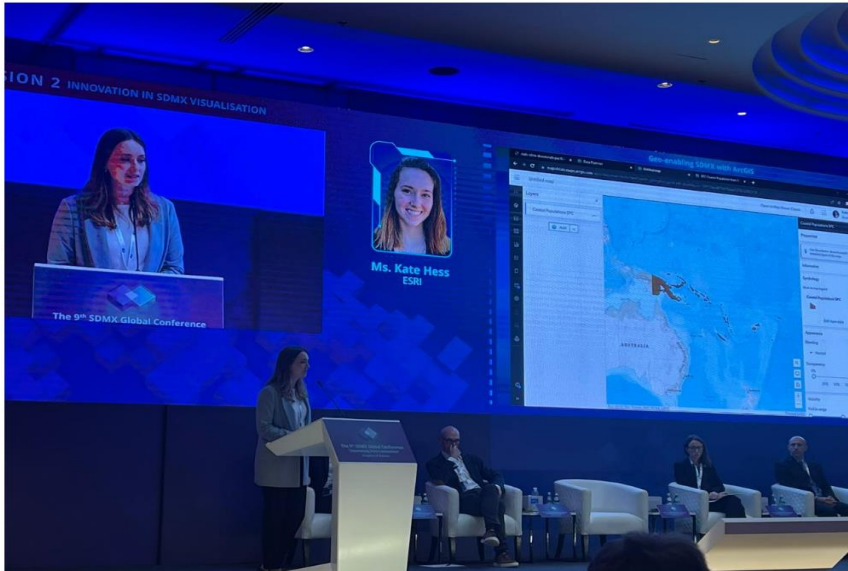


During the conference, Mr. Aduri from MicroCenter had the privilege to coordinate with Mr. Richard Estephan, Global Business Development Manager (Official Statistics), Esri. And Ms. Kate Hess Solution Engineer (Official Statistics and Census), Esri.

At this event, we had a fruitful discussion with Government Authorities on the development of Census, Statistics, and GIS. And discussed how the ArcGIS Survey 123, ArcGIS Hub, ArcGIS Pro can effectively leverage Census, Statistics data and an integration of these tools into the SDMX framework. We are excited about the prospect of further exploring these technologies and leveraging them to enhance the Census data while effectively utilizing statistical analysis through Esri/ GIS integration.



We are delighted to share the highlights of the event where Ms. Kate Hess delivered an insightful presentation on the topic **"Geo-enabling SDMX with ArcGIS."** We extend our sincere appreciation to Ms. Kate Hess for sharing her expertise at the event and inspiring attendees.



## SDMX data in ArcGIS

SDMX serving a global user community in the Statistics Industry (and beyond), SDMX is a valuable initiative that can add tremendous value to the GIS community when brought into ArcGIS.

SDMX service, and their collaborative partnership with ESRI, an opportunity arose to integrate the data drawn from SDMX API into the geospatial visualization tool. ESRI envisioned enabling users to seamlessly access and analyse SDMX data within ArcGIS, simplifying the geospatial analysis process.

Using **Data Pipelines** drag& drop UI. We can integrate data with Statistical Data and Metadata Exchange (SDMX). Statistical data as XML, JSON, CSV etc.

The SDMX REST API allows implementers to offer programmatic access to statistical data and metadata over HTTP.

Data Pipelines is a new native data integration capability of ArcGIS Online that makes it faster and easier to access, prepare, and integrate data.

Data Pipelines works with vector data (for example, points, lines, and polygons) and tabular data (for example, data represented as a table). You can connect to a variety of data sources including Amazon S3, feature layers, and more. Once connected, you can use tools to blend, build, and integrate datasets for use in your workflows.

*Attending such a prestigious global conference demonstrates MicroCenter Gulf's commitment to staying up-to-date with the latest advancements in statistical data and metadata exchange (SDMX).*

# Detecting Land-Use categories and changes with AI and Satellite Imagery

**Introduction:** Effective land-use management is essential for sustainable urban development, environmental conservation, and resource planning. To achieve these goals, it is crucial to accurately detect land-use categories and monitor changes over time. Artificial intelligence (AI) combined with satellite imagery offers an advanced solution to automate this process, providing valuable insights for various sectors, including urban planning, agriculture, and environmental monitoring.

## Use-Case Description:

**Problem Statement:** Accurate and up-to-date information on land-use categories and their changes is essential for informed decision-making. Traditional methods often involve time-consuming field surveys or remote sensing experts manually interpreting satellite imagery. AI-powered satellite image analysis can streamline this process and deliver real-time insights.

**Solution:** Leveraging AI and satellite imagery, this use-case aims to detect land-use categories and monitor changes:

### 1. Satellite Data Acquisition:

- Continuously updated satellite imagery is collected from various sources, including government agencies, commercial providers, and open-access repositories.
- High-resolution multispectral and hyperspectral images are preferred to capture detailed information about land cover.

### 2. Data Preprocessing:

- Raw satellite imagery is preprocessed to enhance clarity and remove artifacts.
- Georeferencing and calibration are applied to ensure accurate spatial analysis.
- If the satellite imagery data is available as high resolution imagery through GIS services, those can be integrated with the platform and used directly for data analysis

### 3. AI-Based Classification:

- Machine learning models, e.g. convolutional neural networks (CNNs) and deep learning algorithms, are trained on labeled datasets to classify land-use categories.
- Land-use categories may include urban areas, agricultural land, forests, water bodies, and more.
- The segmentation can even be done through a zero-shot mechanism and direct command prompts by issuing key-words such as “roads”, “swimming pools” etc

### 4. Change Detection:

- AI algorithms continuously compare recent satellite images with historical data to detect changes in land use.
- These changes can be categorized as land-use conversions, expansions, or contractions.
- The detected changes are extracted as georeferenced polygon vectors and are inserted in the back-end database for further spatial analysis

### 5. Time-Series Analysis:

- The system generates time-series data, providing a historical perspective of land-use changes, helping policymakers and researchers identify trends and potential issues.

## 6. Reporting and Visualization:

- Automatically generated reports and visualizations offer detailed insights into land-use patterns and changes.
- Decision-makers can access user-friendly dashboards for easy data interpretation.

### Benefits:

- Real-Time Monitoring: AI and satellite imagery provide near-real-time monitoring, allowing for immediate responses to land-use changes.
- Efficiency: Automation significantly reduces the time and resources required for manual land-use analysis.
- Informed Decision-Making: Policymakers can make data-driven decisions on urban planning, agriculture, and environmental conservation.
- Early Detection: Identifying unauthorized land-use changes enables swift enforcement and mitigation.




Box threshold

0.3

Text threshold

0.25

Image




Text Prompt

swimming pool

Clear

Submit

Output Image



Flag

*Example of zero-shot detection of “swimming pool” based inputs*

**Conclusion:** The integration of AI and satellite imagery for land-use category detection and change monitoring offers a valuable tool for land management, urban planning, and environmental conservation. This technology-driven approach empowers stakeholders to make informed decisions and take proactive measures in addressing land-use issues, ultimately contributing to sustainable development and responsible resource utilization.





## Introduction to Data Pipelines

Data Pipelines provides integration of your data with ArcGIS. With Data Pipelines you can connect to and read data from where it is stored, perform data preparation operations, and write the data out to a feature layer that is readily available in ArcGIS. You can use the Data Pipelines interface to construct, run, and reproduce your data preparation workflows

Data Pipelines (beta) is a new data engineering and integration application that was released in ArcGIS Online in June 2023. The Data Pipelines development team has been listening closely to your feedback and have implemented new features based on your requests. New features include scheduled data pipeline workflows, and an easier way to configure the schema for delimited datasets.

- Support for writing big integers and date only fields
- A new option to calculate summary statistics in the Join tool
- Improved error reporting

[Click here for more details](#)



ArcGIS Online

## What's New in ArcGIS Online

ArcGIS Online lets you understand the world around you by using interactive maps to connect people, locations, and data. You get smart, data-driven styles and intuitive analysis tools that deliver location intelligence. ArcGIS Online gives you the ability to make maps and apps to share your insights with your organization or the world. You can use it as a complete, cloud-based solution or to extend and complement the capabilities of ArcGIS Pro and ArcGIS Enterprise.

[Click here for more details](#)





## Modernization of Utilities and the Supporting Role of GIS

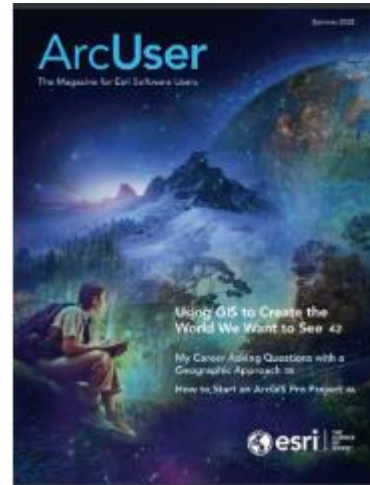
Modernization of utilities is pervasive across the globe. As a whole, the power delivery industry is transitioning to improved methods and technology due to regulatory and social pressures. This trend can be seen across all industries and in most countries. For example, hydrocarbon-based power plants are outfitted with improved systems for emission reduction or capture. There is a greater dependency on modern renewable generation such as solar, wind, and improved hydro facilities (eg. pump stations). For system operators, telemetry devices enable remote control for rapid response during service disruptions and to improve customer service. Examples of such devices include Supervisory Control and Data Acquisition (SCADA) and Advanced Metering Instrument (AMI).

[Click here for more details](#)

## ESRI Publications



ArcNews Fall 2023  
[Read This Issue](#)  
[View the PDF](#)



ArcUser Summer 2023  
[Read This Issue](#)  
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## MicroCenter Group

Founded in 1983, MicroCenter Group is a pioneer in providing information technology solutions in Bahrain. Initially it was started with the aim of providing customized IT solutions to small and medium organizations but today with over 100 customers, both in the Government and private sector it has attained a leadership position in the industry within the country. With four group companies and an office in Saudi Arabia, today it has diversified into various other businesses that include IT Business Solutions, Geographical Information Systems (GIS), Utility network GIS surveys, LiDar Technology / BIM modeling, and Digital media solutions & Specialized training.

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