

Future of the GIS Professional

Lebogang Mashishi – Product Lead



THE SOUTHERN AFRICA ESRI USER CONFERENCE 2023



Meet The Team



Claudio Duarte
Industry Lead: Utilities



Liezel Botha
Geospatial Technology
Leader



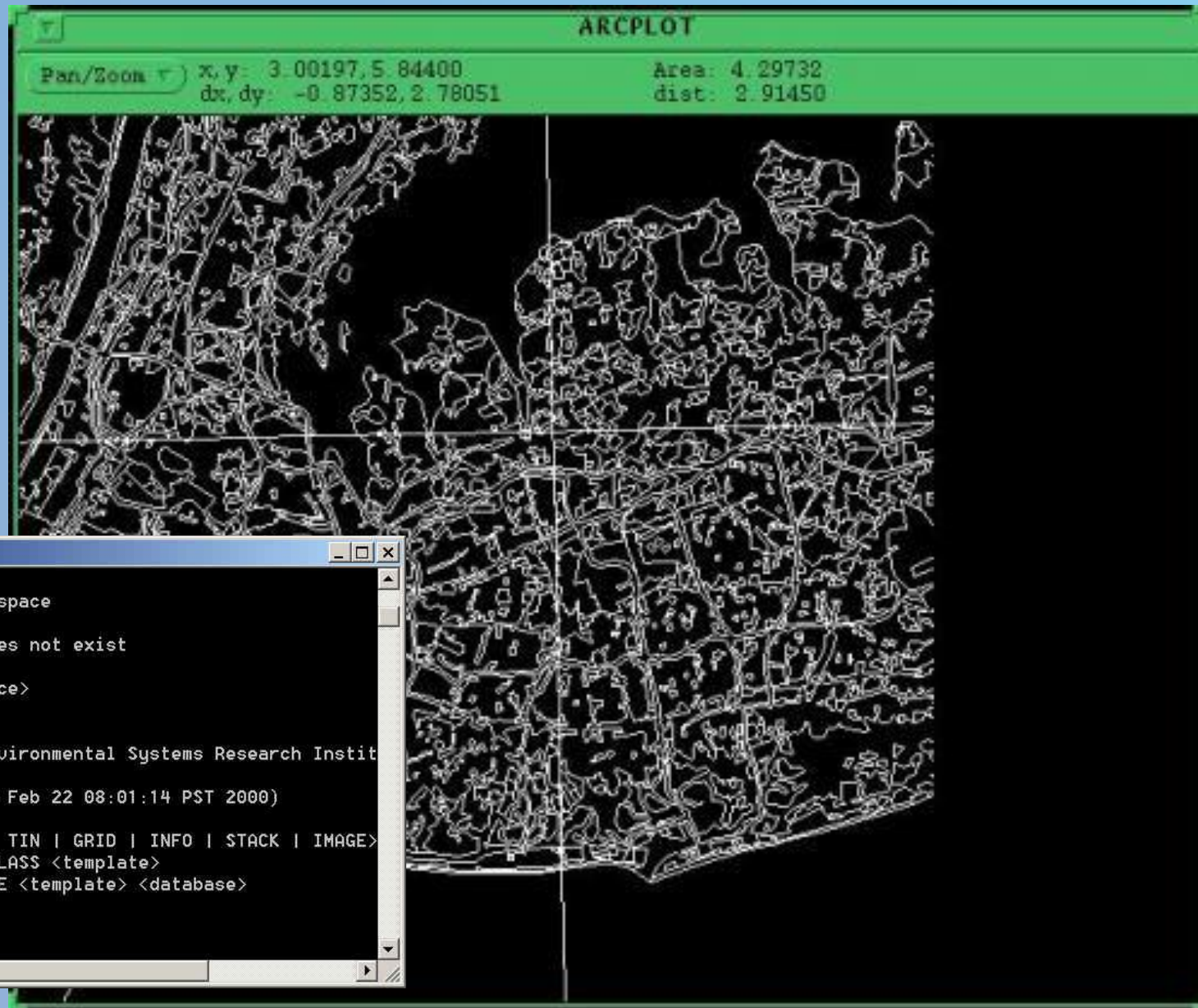
Adam Carnow
Industry Specialist: Public
Work

The Beginning

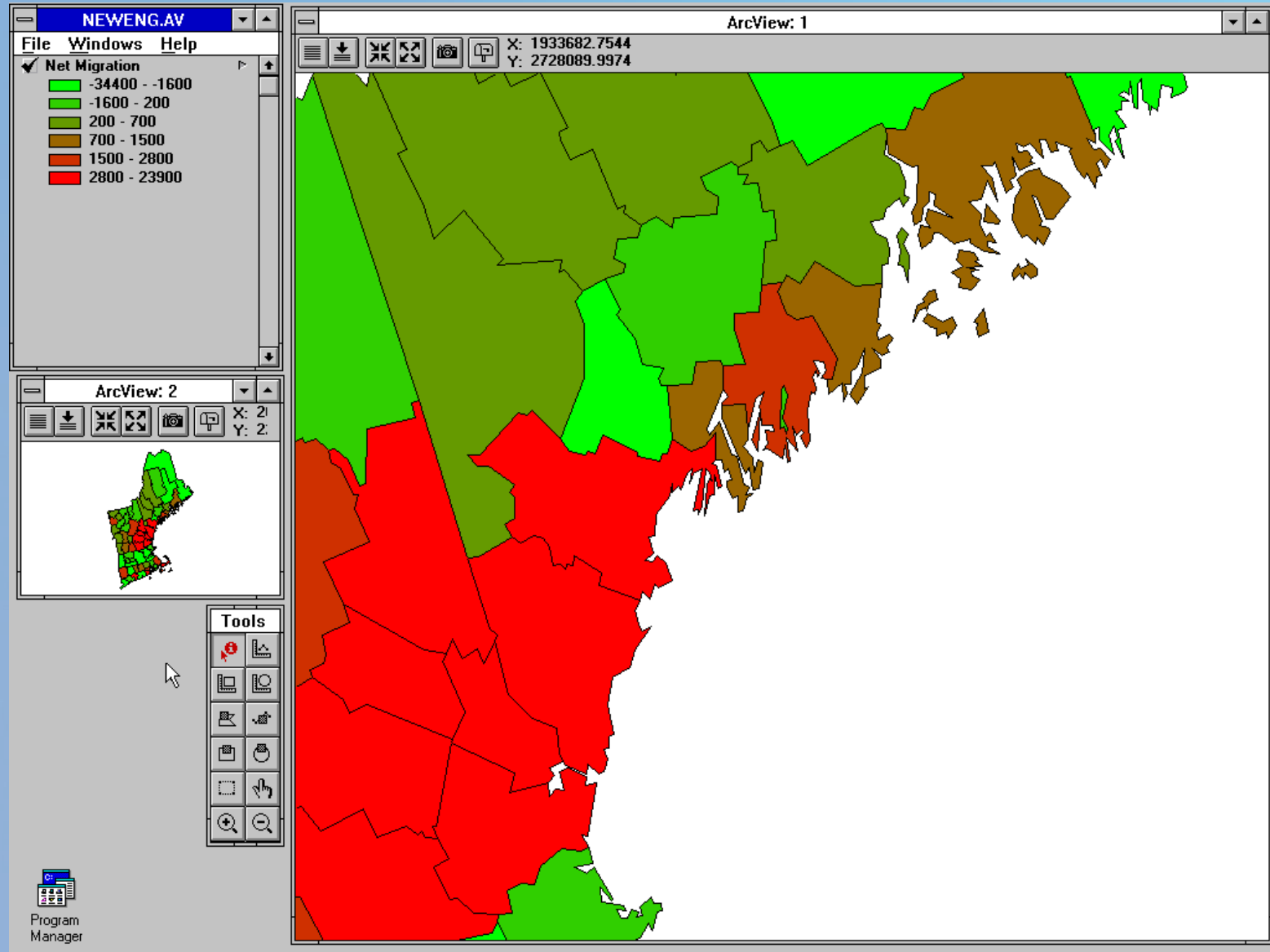
Adam Carnow





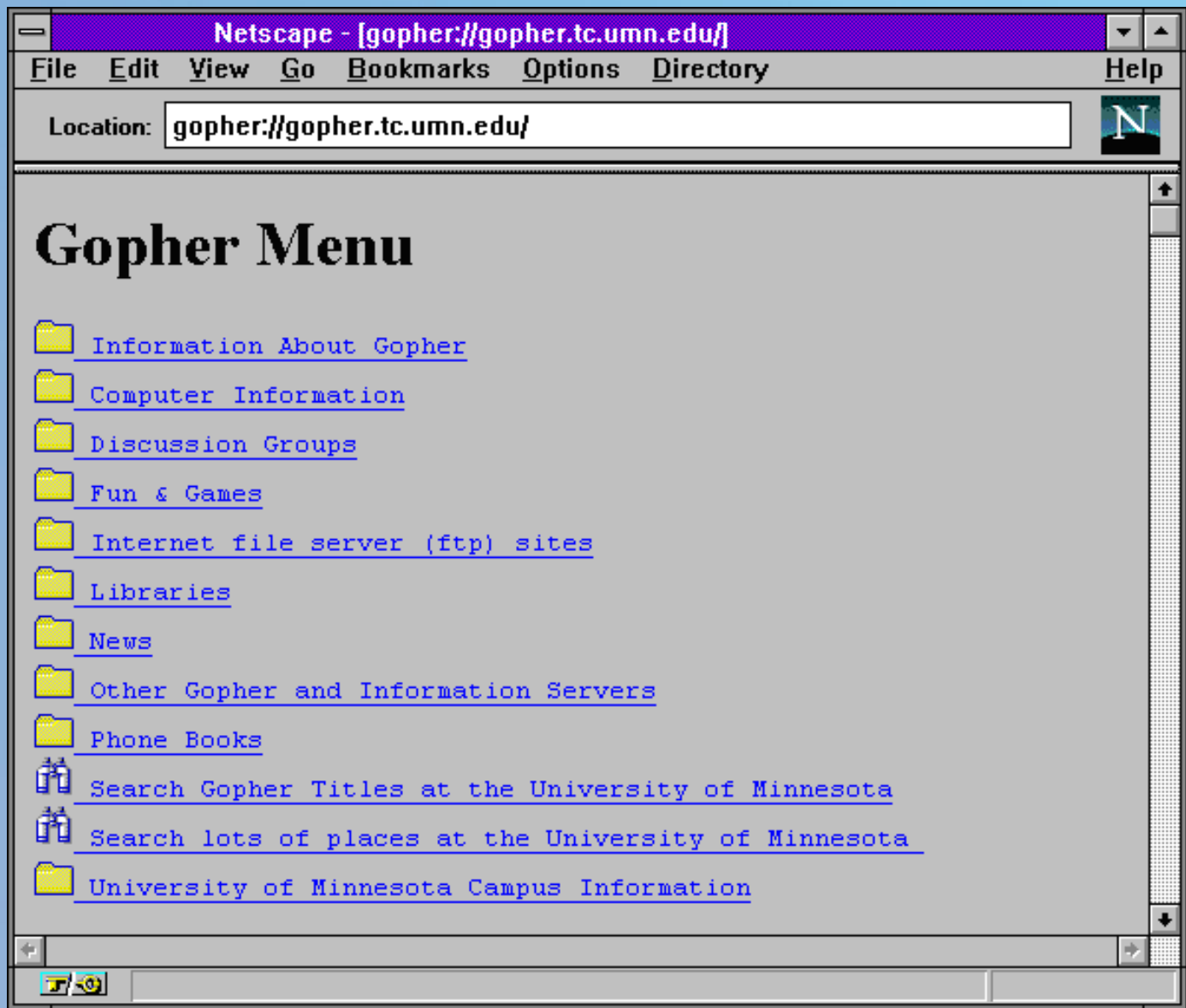


```
Arc  
Arc: workspace  
Current location: d:\workspace  
Arc: lc  
Workspace D:\WORKSPACE does not exist  
Arc: &workspace  
Usage: &WORKSPACE <workspace>  
Arc: help  
  
Copyright (C) 1982-2000 Environmental Systems Research Instit  
All Rights Reserved  
ArcDoc Version 8.0.2 (Tue Feb 22 08:01:14 PST 2000)  
Arc: dir  
Usage: DIRECTORY <COVER | TIN | GRID | INFO | STACK | IMAGE>  
Usage: DIRECTORY FEATURECLASS <template>  
Usage: DIRECTORY DBMSTABLE <template> <database>  
Arc: _
```

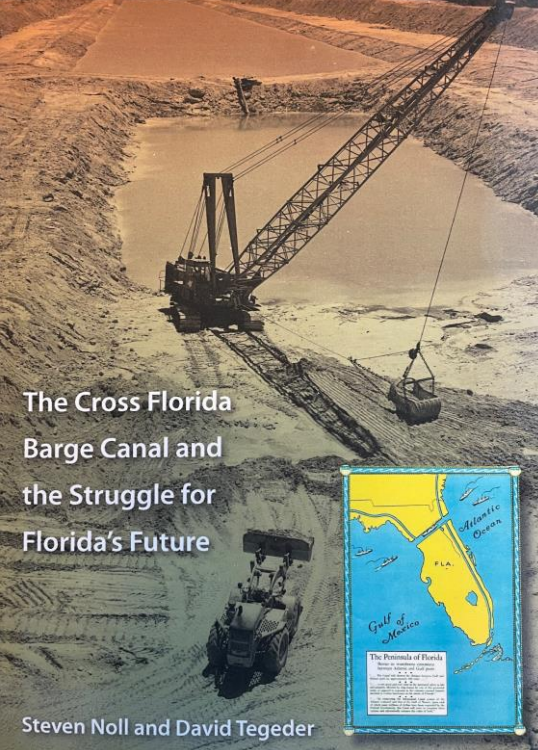








DITCH OF DREAMS



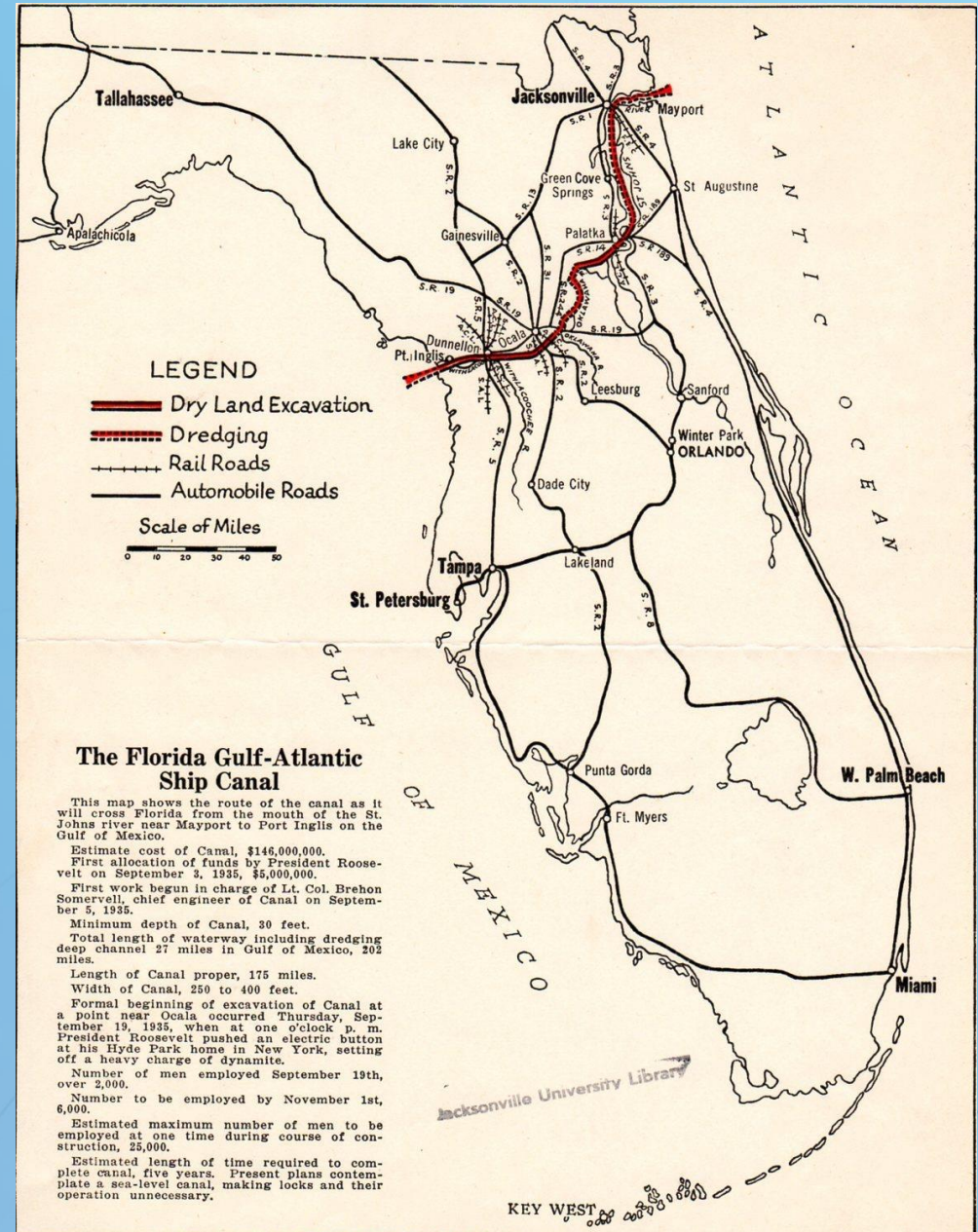
The Cross Florida Barge Canal and the Struggle for Florida's Future

Steven Noll and David Tegeder



MARJORIE HARRIS CARR CROSS FLORIDA GREENWAY

SPANNING 110 MILES FROM THE GULF OF MEXICO TO THE ST. JOHNS RIVER

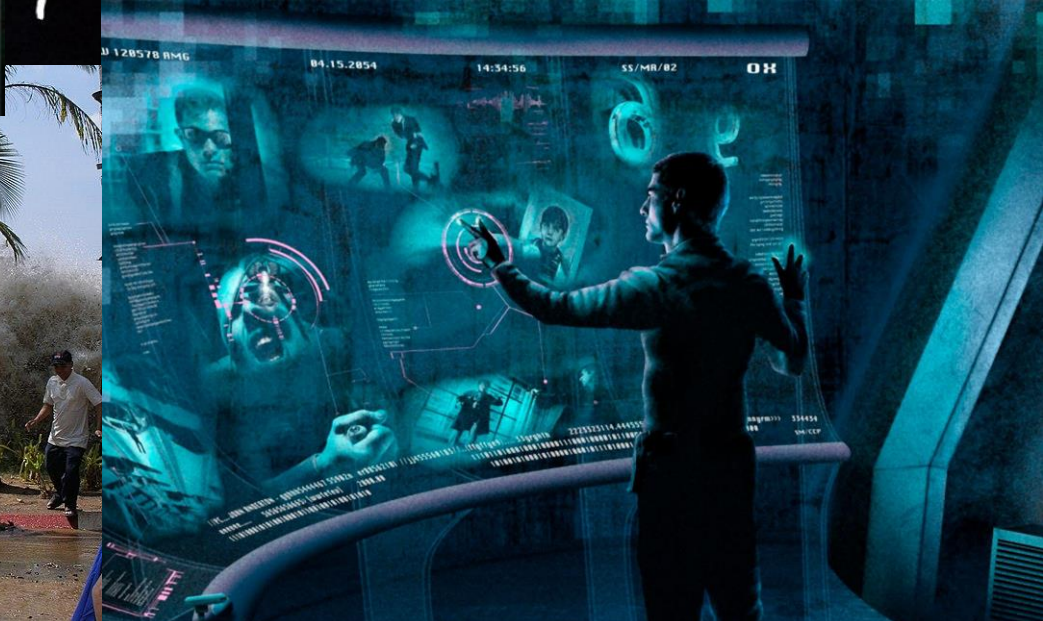
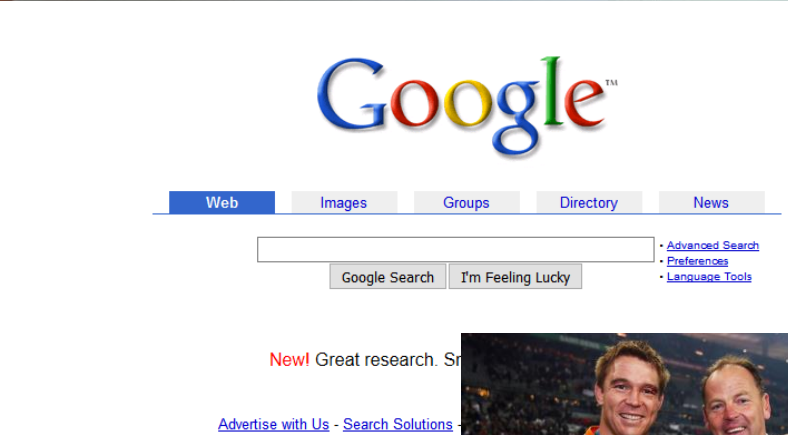
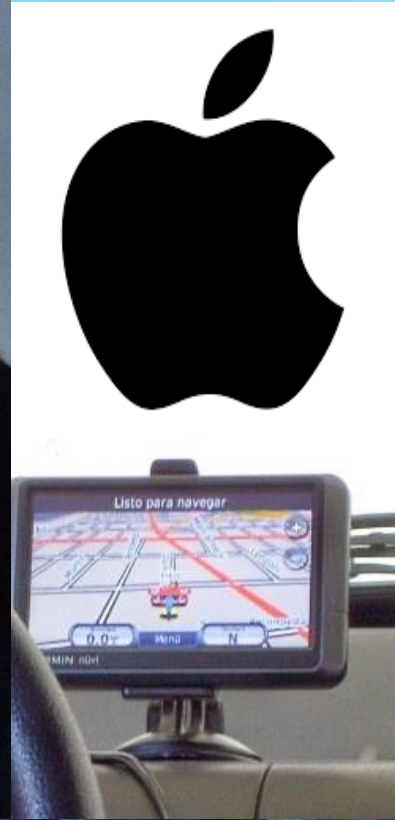


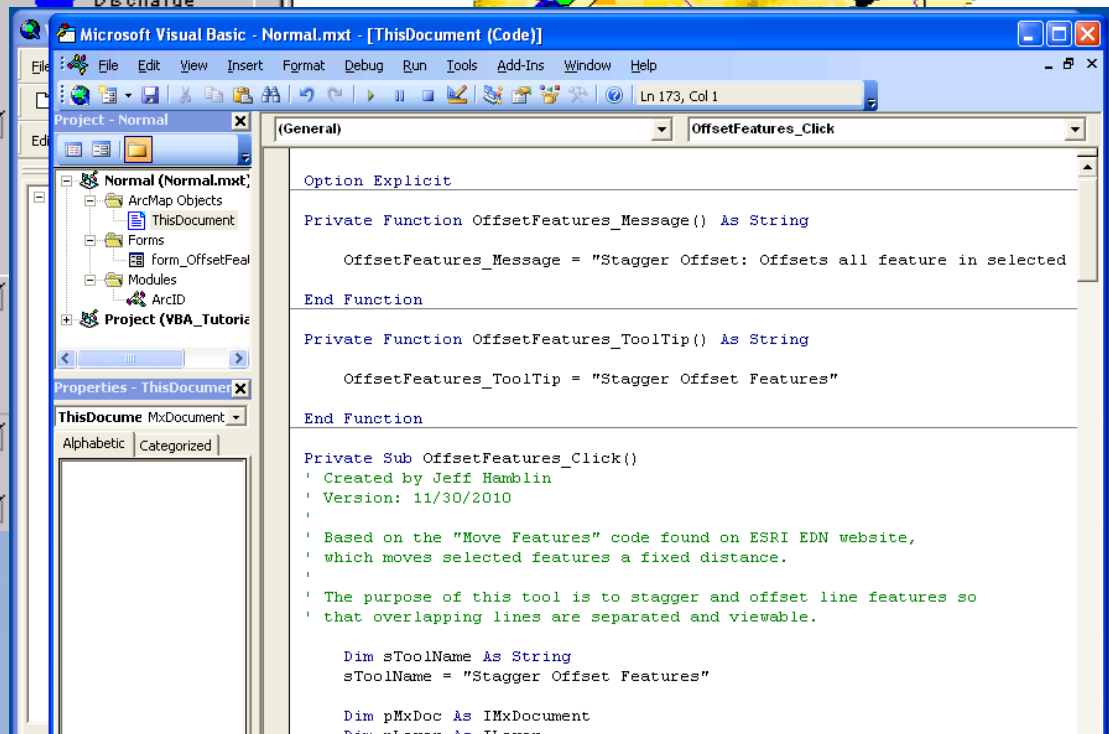
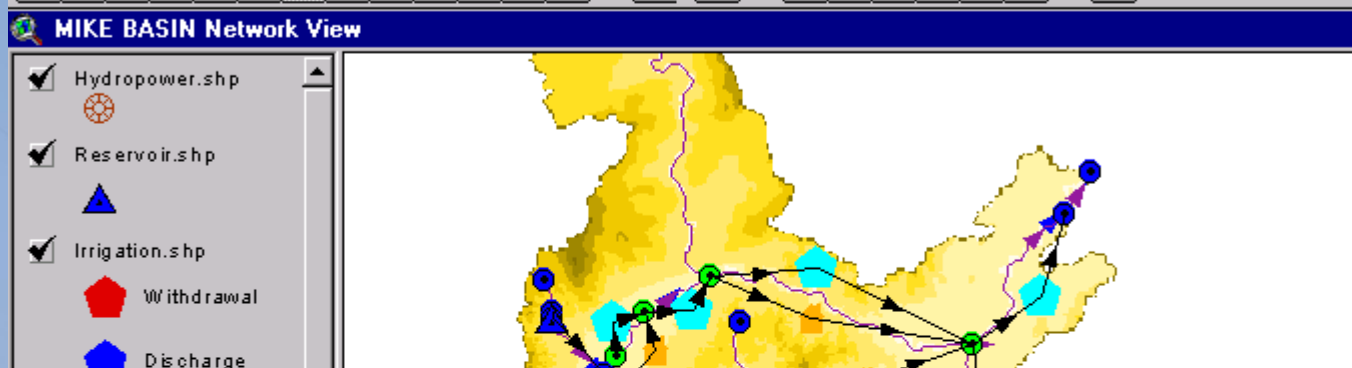
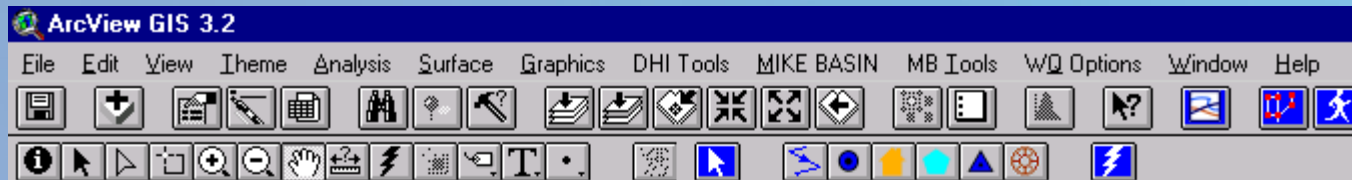
The Evolution

Liezel Botha









- ONfsa.dbf
- ONfsa.htm
- ONfsa.prj
- ONfsa.sbn
- ONfsa.sbx
- ONfsa.shp
- ONfsa.shp.xml
- ONfsa.shx

```

*****
*
* Script that creates and shows a shapefile
* that represents the minimum bounding rect
* angle (MABR) of the built-up areas input
* shapefile.
* Author: Richard Kauffholz
* Date Modified: 17-05-2004
*
*****

'set document variables
'must be the active document, with the built-up area shpfile at the top
*****

theDoc = av.GetActiveDoc
thePolyTheme = theDoc.GetThemes.Get(0)

thePolyFTab = thePolyTheme.GetFTab

'create a field to dissolve polygons
*****

thePolyFTab.SetEditable(true)

concat = Field.Make("concat", #FIELD_DECIMAL, 2, 0)

thePolyFTab.AddFields({concat})

for each i in thePolyFTab
    thePolyFTab.SetValue(concat, i, 1)
end

' summarize the shapefile based on the new concatenation field
*****

if (thePolyFTab.IsEditable = true) then
    area_field = thePolyFTab.FindField("Area")

    theNewFTab = thePolyFTab.Summarize("merger".AsFileName, Shape, concat,
  
```



The Future

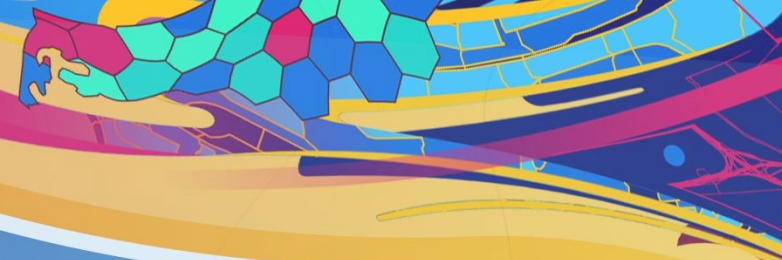
Claudio Duarte

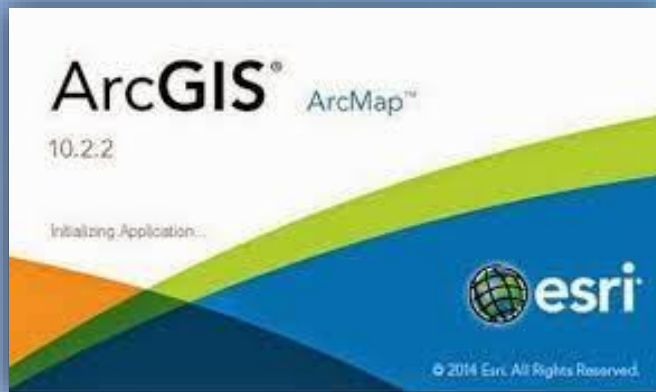




R12,86 / L







Top10.mxd - ArcMap

File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help

1:23,221,656

Table Of Contents

- Boston Hospitals
- Patient Recommendation**
 - Midwest Hospital Analysis
 - Patient Dissatisfaction
 - GI_Bin
 - Cold Spot - 99% Confidence
 - Cold Spot - 95% Confidence
 - Cold Spot - 90% Confidence
 - Not Significant
 - Hot Spot - 90% Confidence
 - Hot Spot - 95% Confidence
 - Hot Spot - 99% Confidence
- Midwest
- Northeast Hospital Analysis
- Basemap

- Harborview Medical Center

Optimized Hot Spot Analysis

Input Features: Northeast Hospital Analysis\Northeast Hospitals

Output Features: C:\Demos\UC\2013\Plenary\PlenaryTop10\Hospitals\data\data.gdb\NortheastHospitals_01

Analysis Field (optional): Percent_NOT_Recommend

Incident Data Aggregation Method (optional): COUNT_INCIDENTS_WITHIN_FISHNET_POLYGONS

Bounding Polygons Defining Where Incidents Are Possible (optional):

Polygons For Aggregating Incidents Into Counts (optional):

Density Surface (optional):

OK Cancel Environments... Show Help >>

Catalog

Location: Optimized Hot Spot Analysis

- Multidimension Tools.tbx
- Network Analyst Tools.tbx
- Parcel Fabric Tools.tbx
- Schematics Tools.tbx
- Server Tools.tbx
- Spatial Analyst Tools.tbx
- Spatial Statistics Tools.tbx
 - Analyzing Patterns
 - Mapping Clusters
 - Cluster and Outlier Analysis
 - Grouping Analysis
 - Hot Spot Analysis (Geoprocessing)
 - Optimized Hot Spot Analysis
 - Measuring Geospatial

Name: Optimized Hot Spot Analysis
Type: Toolbox Tool

Optimized Hot Spot Analysis

Attributes Catalog

Python

-65.984 24.029 Decimal Degrees



The screenshot displays the ArcGIS Pro desktop environment. At the top, the ribbon includes tabs for Project, Map, Insert, Analysis, View, Edit, Imagery, Share, and Help. Below the ribbon are icons for Ribbon, Quick Access Toolbar, Help, Learning Resources, Diagnostic Monitor, Esri Community, and Technical Support. The main workspace is divided into three panes: Contents, Map, and Catalog. The Contents pane on the left shows a tree view with 'community_registry_map_7.dxf' selected under the 'Map' layer. The Map pane in the center shows a topographic map of a residential area with street names like S Mopac Expy and Barton Creek Greenbelt. The Catalog pane on the right shows a project tree with 'community_registry_map_7.dxf' selected. The status bar at the bottom indicates a scale of 1:22,056 and coordinates 617,308.34E 3,349,082.47N m.

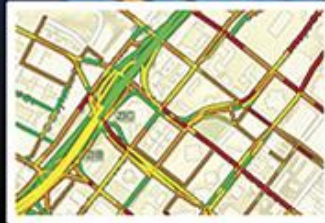


National Statistical Office

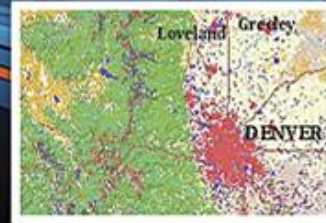
Ministry Of Information And Communication Technology



City Council Group Gallery



Development



Fire Department



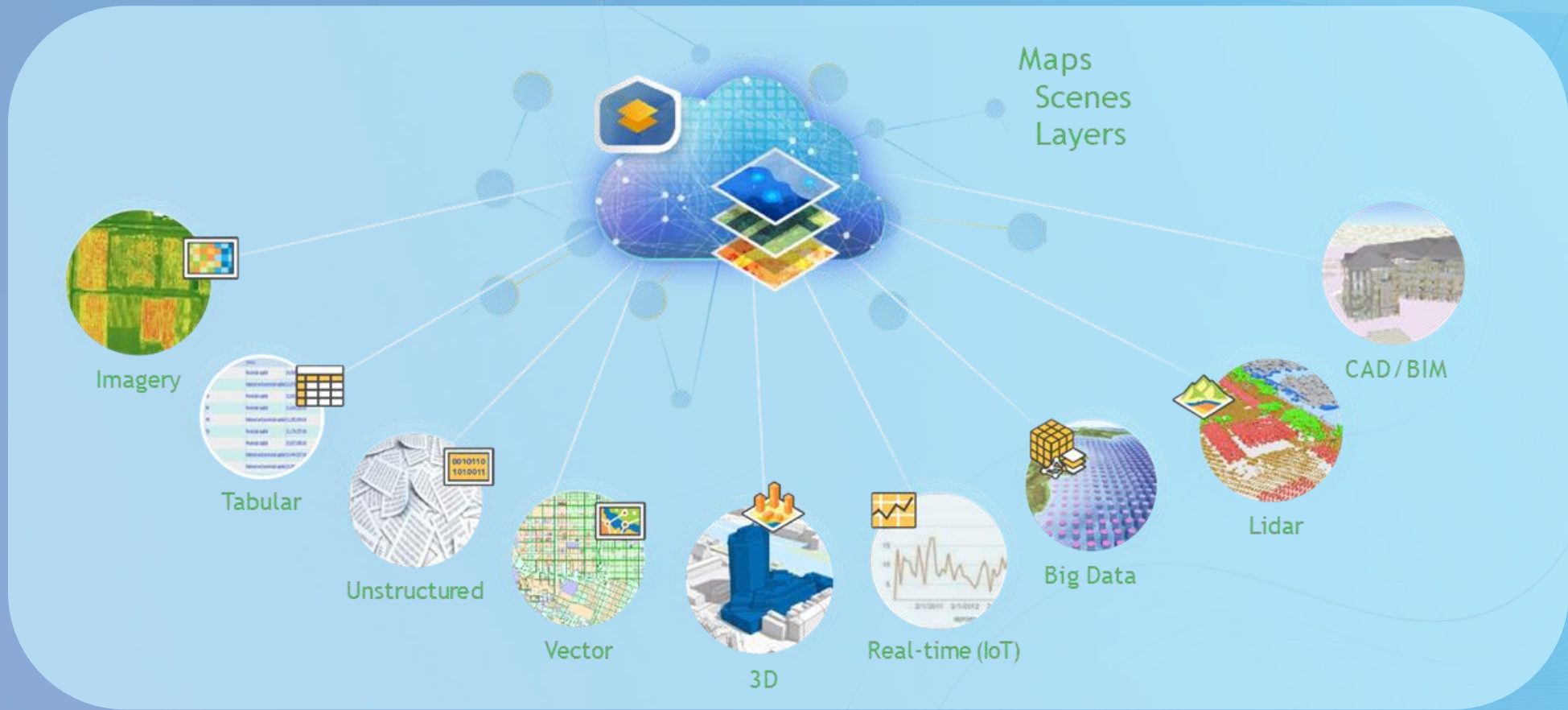
GIS Maps and Apps Gallery

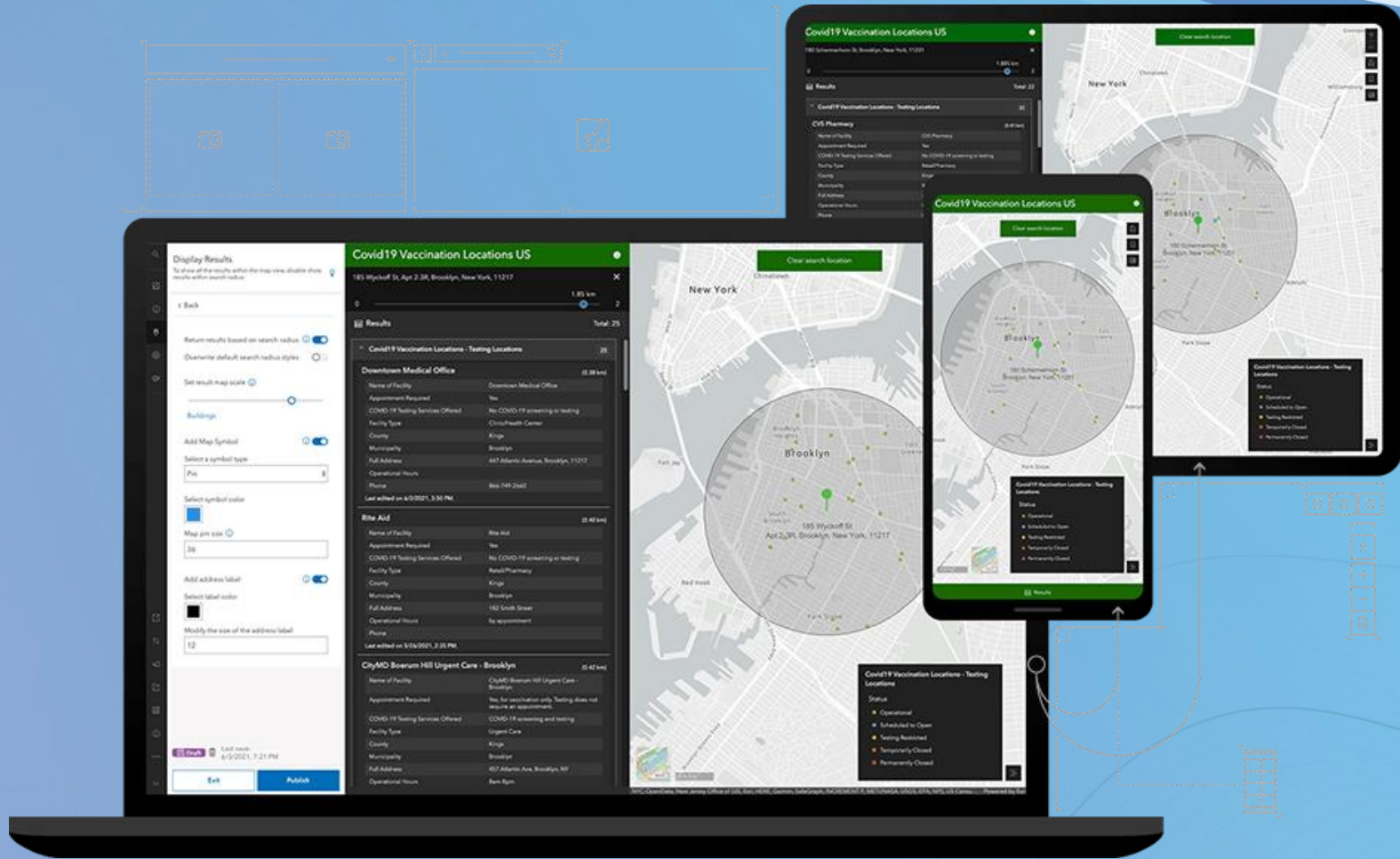
Make a Map

Create a map that can be viewed in a browser, desktop or mobile device. Share it on a blog, via email, or embed it in a website.

ArcGIS for Developers

Build custom web and mobile applications that incorporate your maps and data.





Field Operations & Data Collection

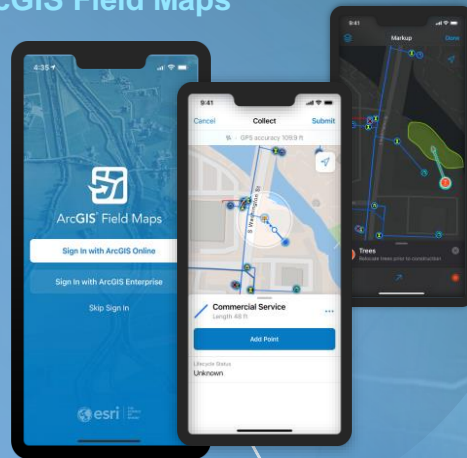
Location-Enabling All Aspects of Field Work

Comprehensive Field App

ArcGIS Field Maps

Geocentric Workflows

Collection, Updating, Tracking, Viewing & Markup



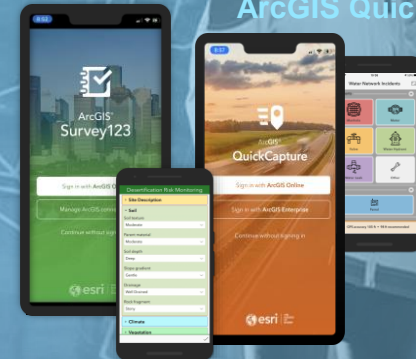
Specialized Data Collection

ArcGIS Survey123

ArcGIS QuickCapture

Form-Centric Collection

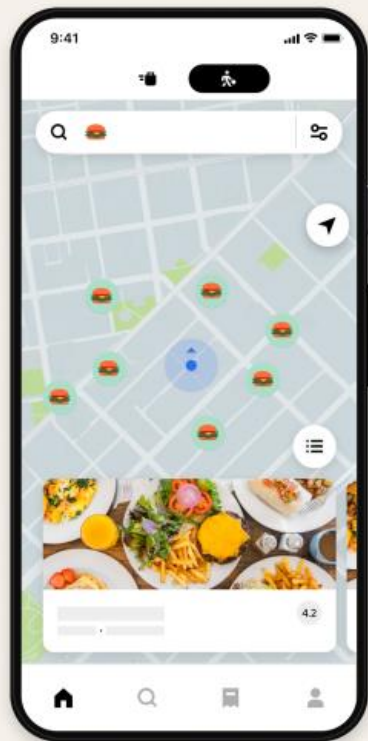
Fast Observation Location Sharing Oriented Imagery



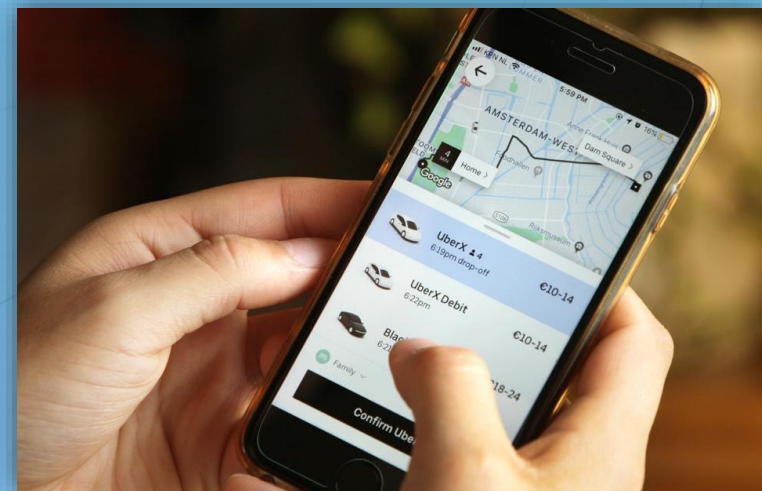
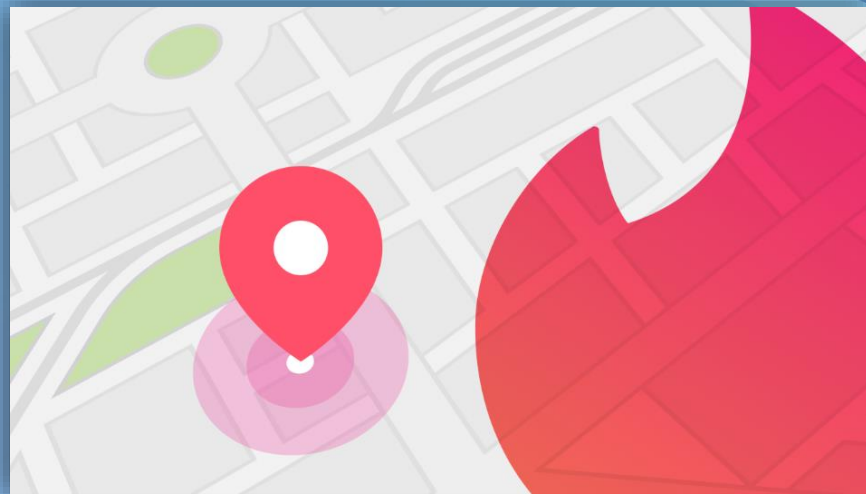
Operational Awareness

Dashboards





Uber Eats



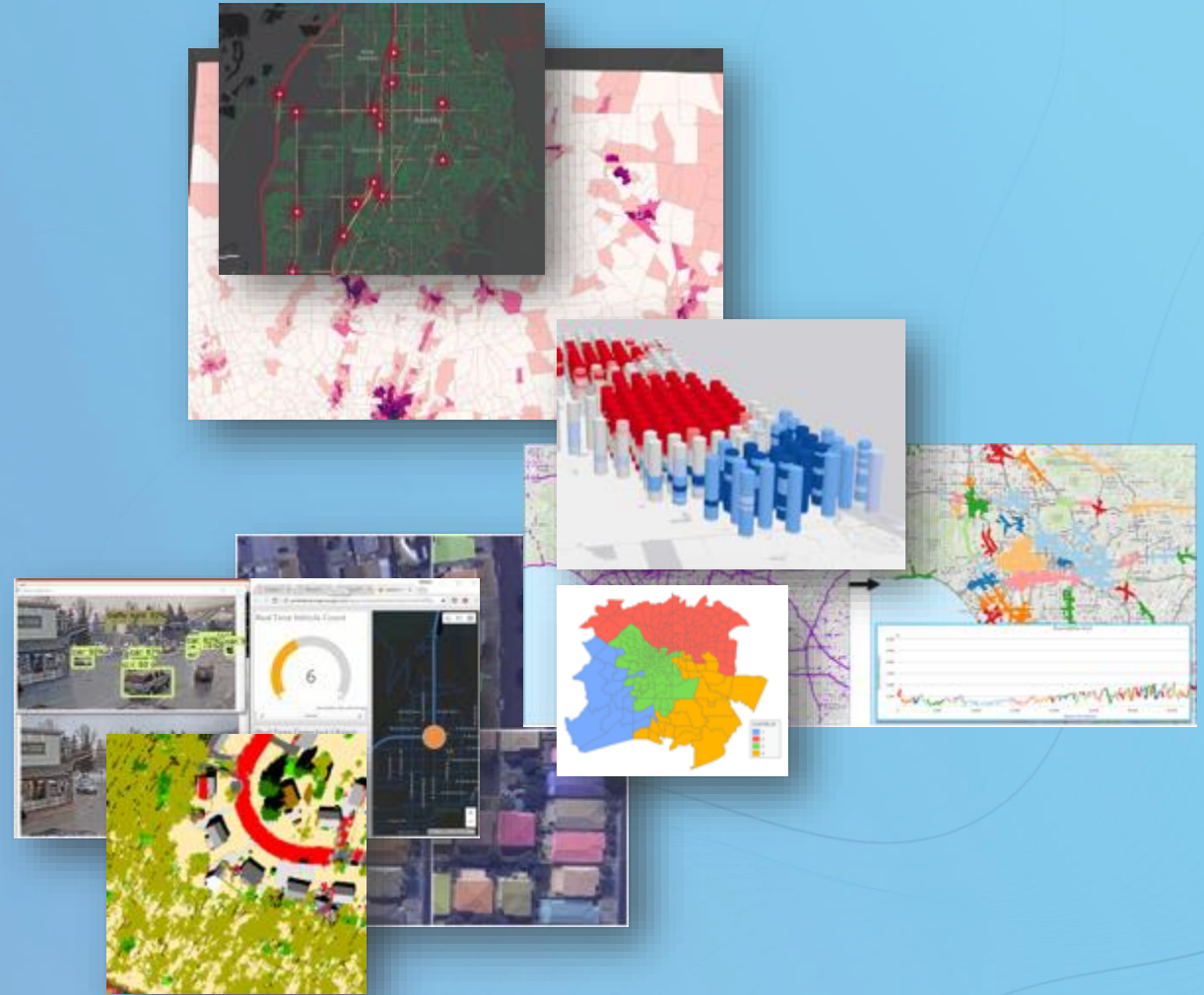
Future Trends of GIS

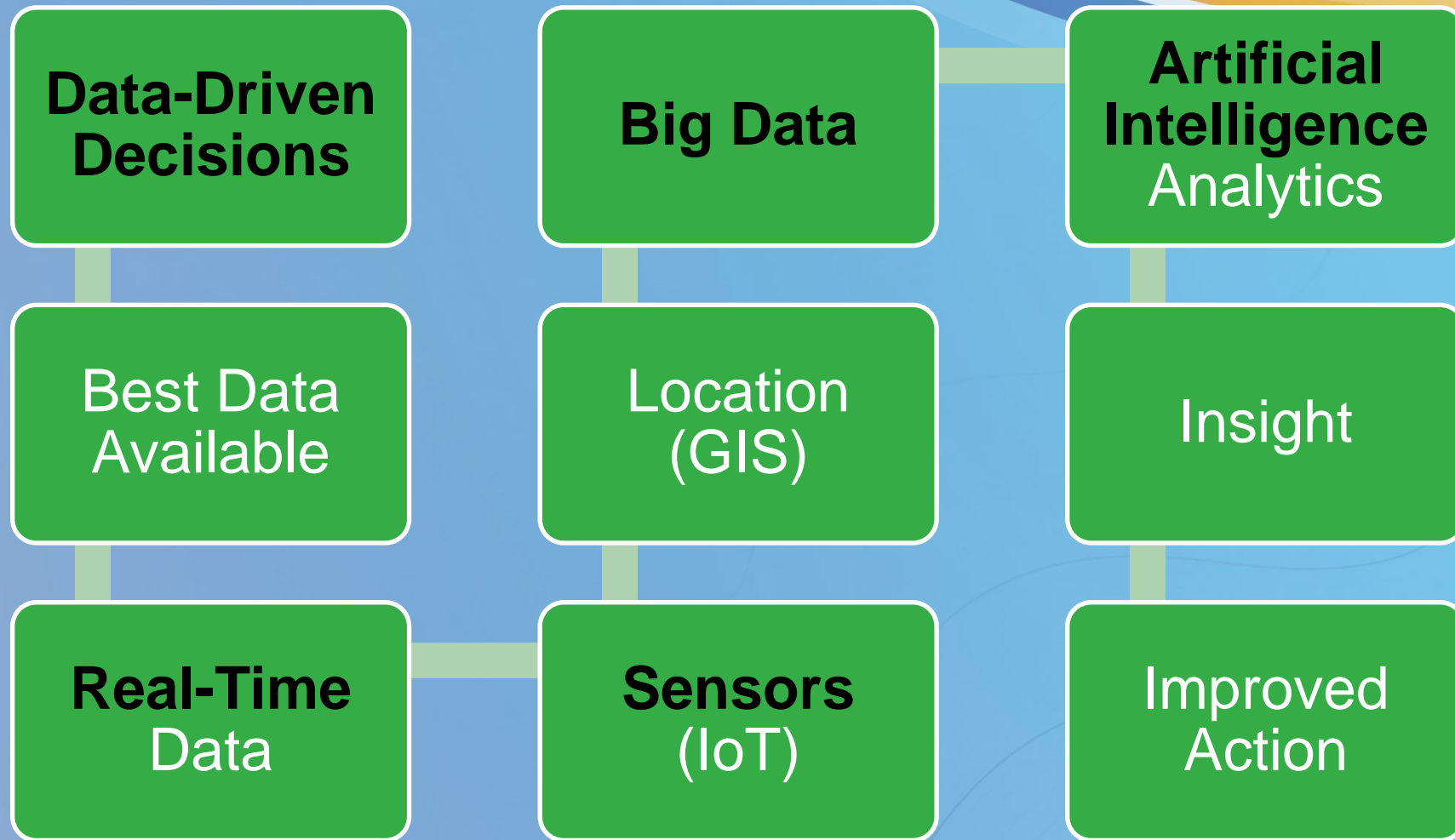


Where are we going?

Looking down the road for the next big thing...

- Connected trends
 - Data-Driven Decisions
 - Mobility
 - Real-Time
 - Big Data
 - Sensors (IoT)
 - AI
 - Imagery
 - 3D
 - Low Code/No Code

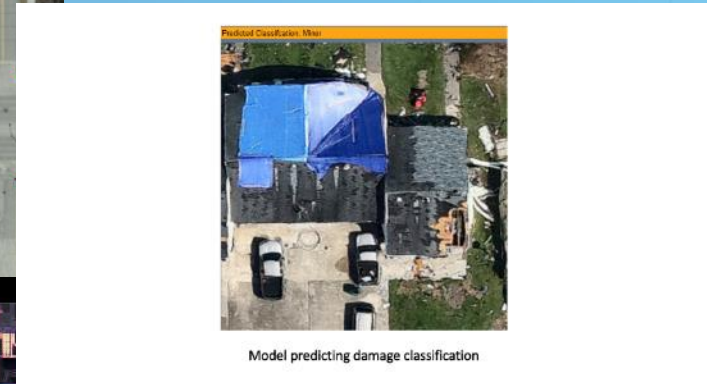
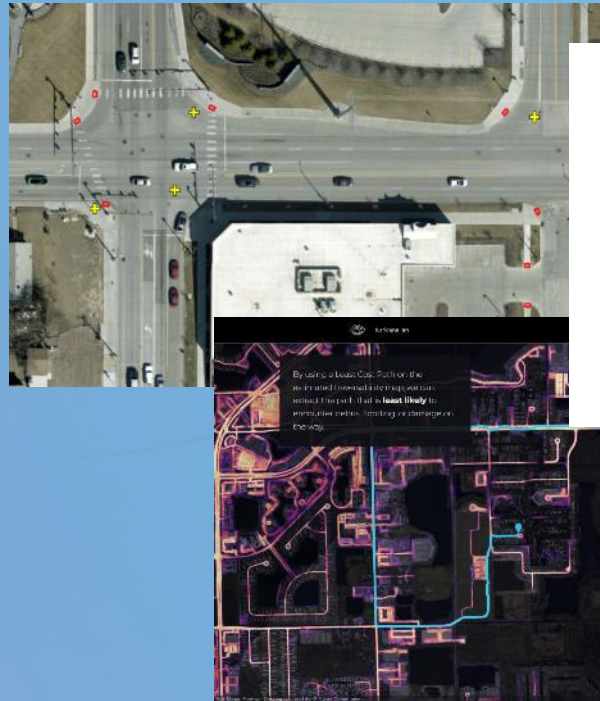




More need for GeoAI

There is so much more value hidden in our Imagery & Point Clouds...

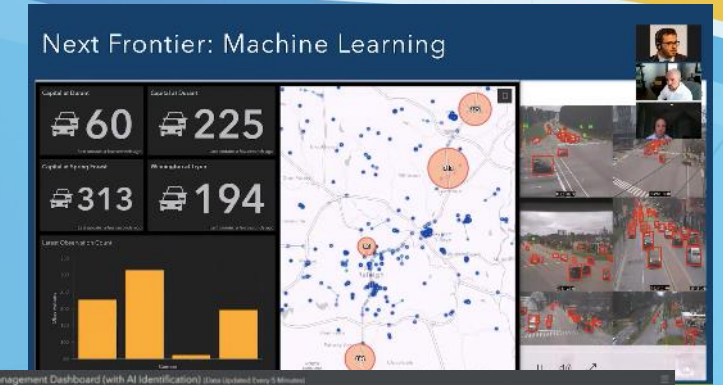
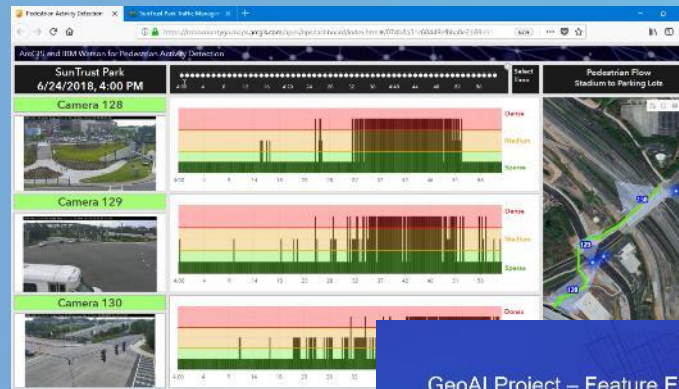
- Aerial Imagery & LiDAR – opportunity to extract features, measure change
 - Land Cover/Use
 - Vegetation
 - Impervious Surfaces
 - Sidewalks
 - Signs
 - Streetlights
 - Buildings & Building Conditions
 - Illegal Dumping
 - Impassable Roads



More need for GeoAI

Terrestrial Imagery provides new opportunities for business value...

- Stationary cameras
- Turn vehicles into image data collectors to identify & locate:
 - Blight
 - Graffiti
 - Overgrowth
 - Signs, Streetlights
 - Trees
 - Sidewalks
 - Pavement Markings & Cracks
 - Water Meters
 - Vehicles
 - Pedestrians



What else can GeoAI do?

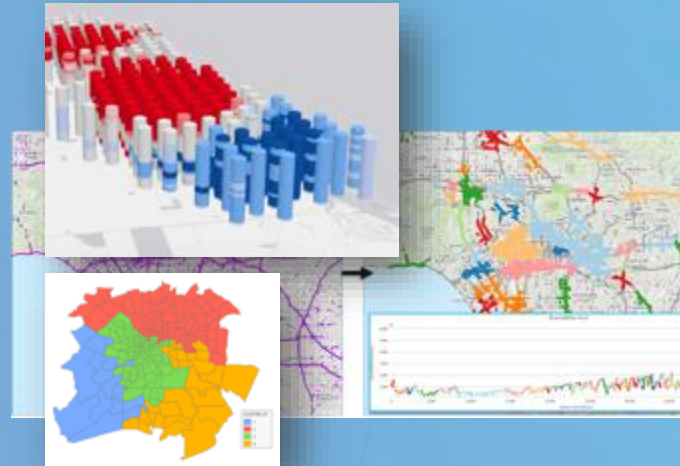
Prediction



Predicting Geospatial Events/Phenomena

Water Pipe Breaks, Road Icing,
Traffic Crashes, Floods,
Storm Debris, Solar Power Potential, etc.

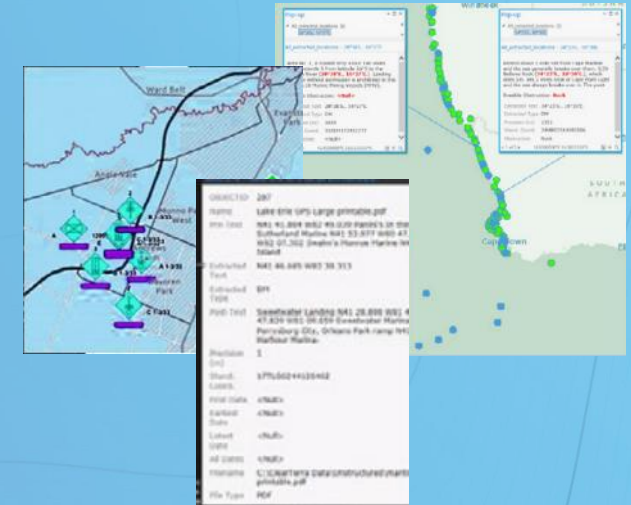
Pattern Detection



Finding Statistically Significant Clusters & Patterns

Hotspots, Anomalies, Outliers, etc.

Unstructured Data



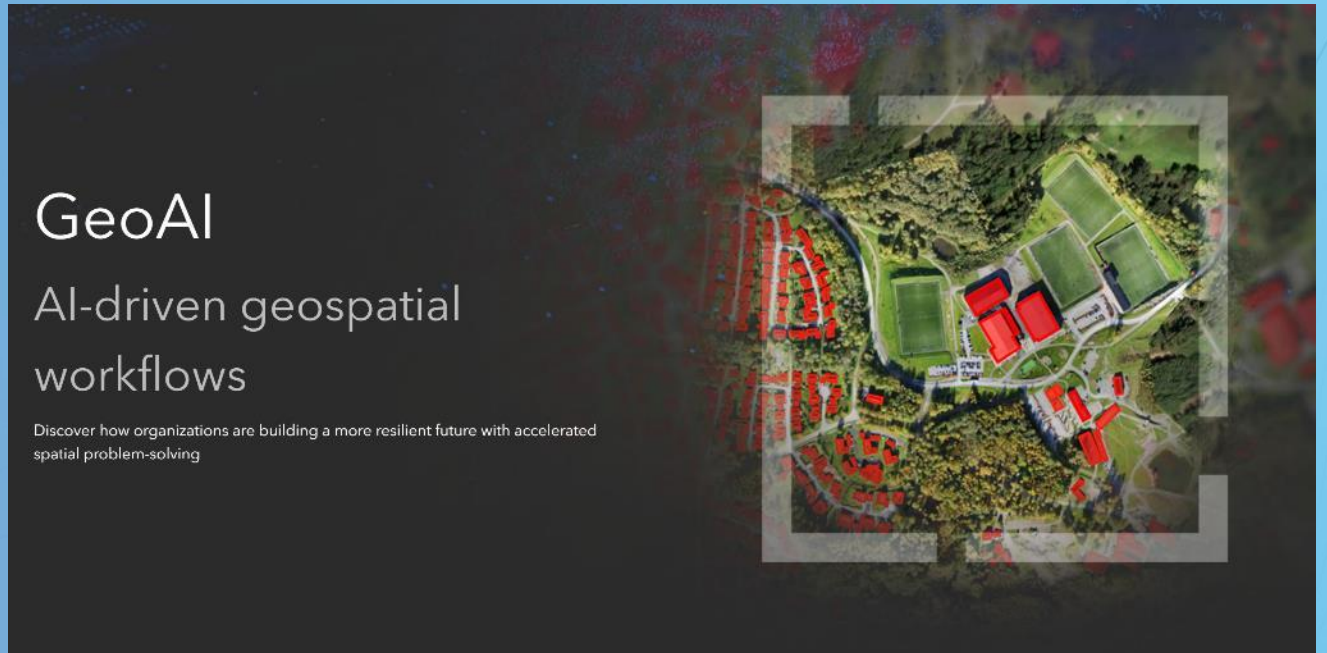
Extracting Entities & Their Locations

Documents, PDFs, Spreadsheets, Social
Media, etc.

Get started with GeoAI

Discover how you can accelerate spatial problem-solving...

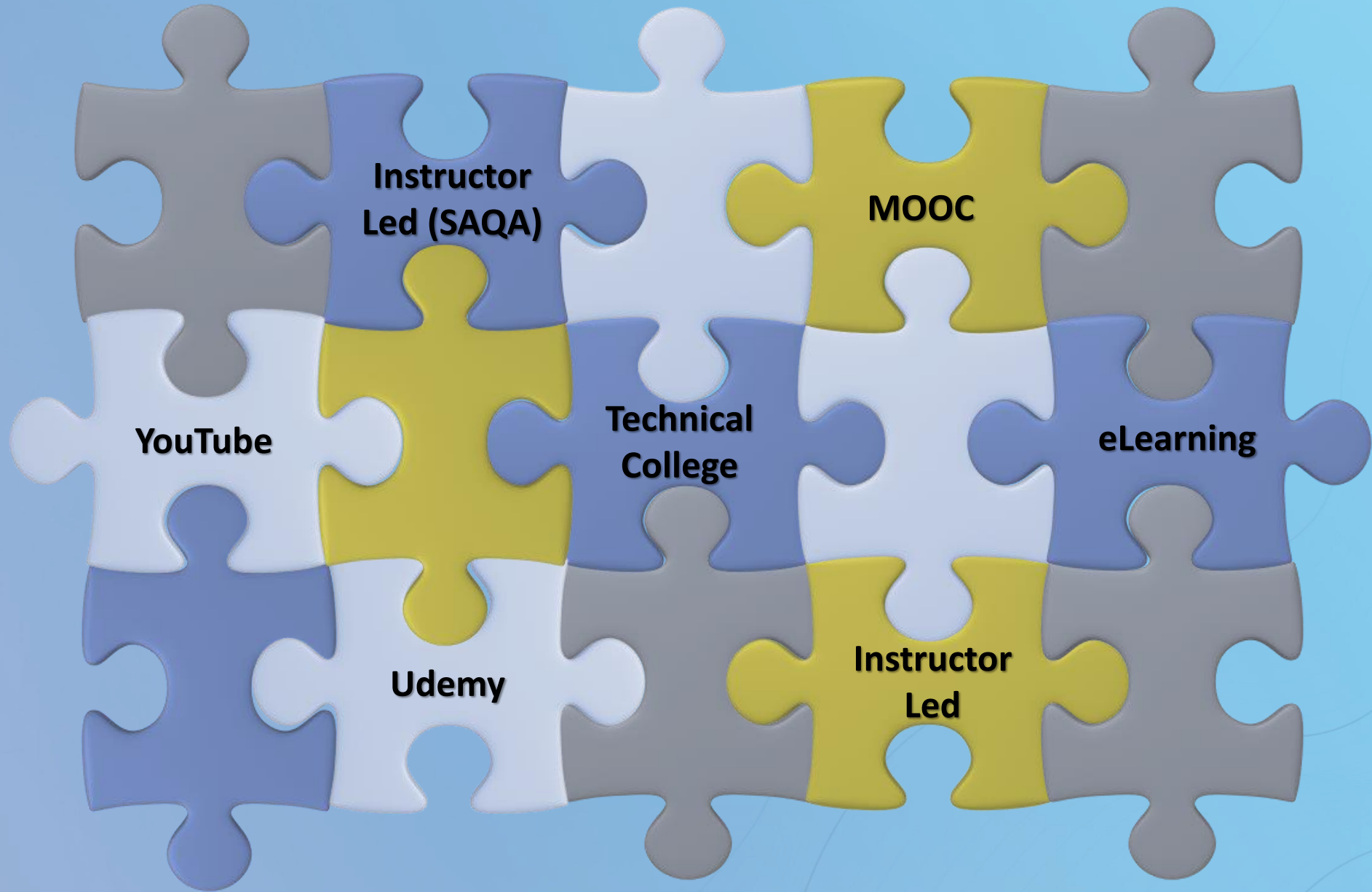
- Pre-trained models
- Fine tune models
- Build custom models
- Integrate with other models



Learn

Equipping yourself for the future





**Instructor
Led (SAQA)**

MOOC

YouTube

**Technical
College**

eLearning

Udemy

**Instructor
Led**

Plan

Creating a roadmap for your future



SFIA 8 Summary Chart

The global skills and competency framework for the digital world

Strategy and architecture										
Category	Code	1	2	3	4	5	6	7		
Strategy and planning	Strategic planning	ITSP				5	6	7		
	Information systems coordination	ISCO					6	7		
	Information management	IRMG			4	5	6	7		
	Enterprise and business architecture	STPL				5	6	7		
	Solution architecture	ARCH			4	5	6			
	Innovation	INOV				5	6	7		
	Emerging technology monitoring	EMRG				4	5	6		
	Research	RSCH	2	3	4	5	6			
	Demand management	DEMM					5	6		
	Investment appraisal	INVA				4	5	6		
	Financial management	FMIT				4	5	6		
	Measurement	MEAS			3	4	5	6		
	Sustainability	SUST				4	5	6		
	Continuity management	COPL	2	3	4	5	6			
	Security and privacy	Information security	SCTY			3	4	5	6	7
		Information assurance	INAS			3	4	5	6	7
		Personal data protection	PEDP					5	6	
Vulnerability research		VURE				3	4	5	6	
Threat intelligence		THIN	2	3	4	5	6			
Governance, risk and compliance	Governance	GOVN						6	7	
	Risk management	BURM			3	4	5	6	7	
	Audit	AUDT			3	4	5	6	7	
	Quality management	QUMG			3	4	5	6	7	
	Quality assurance	QUAS			3	4	5	6		
	Advice and guidance	Consultancy	CNSL				4	5	6	7
		Specialist advice	TECH				4	5	6	
Methods and tools		METL			3	4	5	6		

Change and transformation									
Category	Code	1	2	3	4	5	6	7	
Change implementation	Portfolio management	POMG				5	6	7	
	Programme management	PGMG					6	7	
	Project management	PRMG				4	5	6	7
	Portfolio, programme and project support	PROF	2	3	4	5	6		
Change analysis	Business situation analysis	BUSA			3	4	5	6	
	Feasibility assessment	FEAS			3	4	5	6	
	Requirements definition and management	REQM	2	3	4	5	6		
	Business modelling	BSMO	2	3	4	5	6		
	Acceptance testing	BPTS	2	3	4	5	6		
Change planning	Business process improvement	BPRI				5	6	7	
	Organisational capability development	OCDV				5	6	7	
	Organisation design and implementation	ORDI				4	5	6	7
	Organisational change management	CIPM			3	4	5	6	
	Benefits management	BENM				5	6		

Development and implementation									
Category	Code	1	2	3	4	5	6	7	
Systems development	Product management	PROD			3	4	5	6	
	Systems development management	DLMG				5	6	7	
	Systems and software life cycle engineering	SLEN				4	5	6	7
	Systems design	DESN			3	4	5	6	
	Software design	SWDN	2	3	4	5	6		
	Network design	NTDS			3	4	5	6	
	Hardware design	HWDE			3	4	5	6	
	Programming/software development	PROG	2	3	4	5	6		
	Systems integration and build	SINT	2	3	4	5	6		
	Testing	TEST	1	2	3	4	5	6	
	Software configuration	PORT			3	4	5	6	
	Real-time/embedded systems development	RESD	2	3	4	5	6		
	Safety engineering	SFEN			3	4	5	6	
	Safety assessment	SFAS				4	5	6	
	Radio frequency engineering	RFEN	2	3	4	5	6		
	Animation development	ADEV			3	4	5	6	
	Data and analytics	Data management	DATM			4	5	6	
Data modelling and design		DTAN	2	3	4	5			
Database design		DBDS			3	4	5		
Data engineering		DENG	2	3	4	5	6		
Database administration		DBAD	2	3	4	5			
Data science		DATS	2	3	4	5	6	7	
Machine learning		MLNG	2	3	4	5	6		
Business intelligence		BINT	2	3	4	5			
Data visualisation		VISL			3	4	5		
User experience	User research	URCH			3	4	5	6	
	User experience analysis	UNAN			3	4	5		
	User experience design	HCEV			3	4	5	6	
	User experience evaluation	USEV	2	3	4	5	6		
Content management	Content authoring	INCA	1	2	3	4	5	6	
	Content publishing	ICPM	1	2	3	4	5	6	
	Knowledge management	KNOW	2	3	4	5	6	7	
Computational science	Scientific modelling	SCMO			4	5	6	7	
	Numerical analysis	NUAN			4	5	6	7	
	High-performance computing	HPCC			4	5	6	7	

Relationships and engagement									
Category	Code	1	2	3	4	5	6	7	
Stakeholder management	Sourcing	SORC	2	3	4	5	6	7	
	Supplier management	SUPP	2	3	4	5	6	7	
	Contract management	ITCM			3	4	5	6	
	Stakeholder relationship management	RLMT				4	5	6	7
	Customer service support	CSMG	1	2	3	4	5	6	
	Business administration	ADMN	1	2	3	4	5	6	
	Sales and marketing	Marketing	MKTG	2	3	4	5	6	
Selling		SALE			3	4	5	6	
Sales support		SSUP	1	2	3	4	5	6	

Delivery and operation									
Category	Code	1	2	3	4	5	6	7	
Technology management	Technology service management	ITMG				5	6	7	
	Application support	ASUP			2	3	4	5	
	IT infrastructure	ITOP	1	2	3	4	5		
	System software	SYSP				3	4	5	
	Network support	NTAS			2	3	4	5	
	Systems installation and removal	HSIN	1	2	3	4	5		
	Configuration management	CFMG			2	3	4	5	6
	Release and deployment	RELM				3	4	5	6
	Storage management	STMG				3	4	5	6
	Facilities management	DCMA				3	4	5	6
	Service management	Service level management	SLMO	2	3	4	5	6	7
		Service catalogue management	SCMG			3	4	5	
		Availability management	AVMT				4	5	6
Capacity management		CPMG				4	5	6	
Incident management		USUP			2	3	4	5	
Problem management		PBMG				3	4	5	
Change control		CHMG			2	3	4	5	6
Asset management		ASMG			2	3	4	5	6
Service acceptance		SEAC				3	4	5	6
Security services		Security operations	SCAD	1	2	3	4	5	6
	Vulnerability assessment	VUAS			2	3	4	5	
	Digital forensics	DGFS				3	4	5	6
	Penetration testing	PENT				3	4	5	6

People and skills										
Category	Code	1	2	3	4	5	6	7		
People management	Performance management	PEMT				4	5	6		
	Employee experience	EEXP				4	5	6		
	Organisational facilitation	OFCL				4	5	6		
	Professional development	PDSV				4	5	6		
	Workforce planning	WFPL				4	5	6		
	Resourcing	RESC			3	4	5	6		
Skills management	Learning and development management	ETMG			3	4	5	6	7	
	Learning design and development	TMCR				3	4	5		
	Learning delivery	ETDL			2	3	4	5		
	Competency assessment	LEDA				3	4	5	6	
	Certification scheme operation	CSOP			2	3	4	5	6	
	Teaching	TEAC			2	3	4	5	6	7
	Subject formation	SUBF				4	5	6	7	

Levels of responsibility

The SFIA Framework describes seven levels of increasing responsibility, accountability and impact from Level 1, the lowest, to Level 7, the highest.

Each of the seven levels is labelled with a guiding phrase to summarise the level of responsibility.

Level 1 - Follow
 Level 2 - Assist
 Level 3 - Apply
 Level 4 - Enable
 Level 5 - Ensure, advise
 Level 6 - Initiate, influence
 Level 7 - Set strategy, inspire, mobilise

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Questions

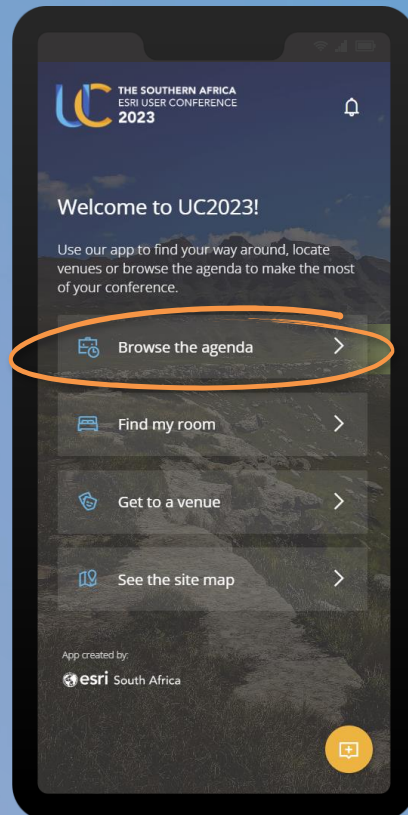
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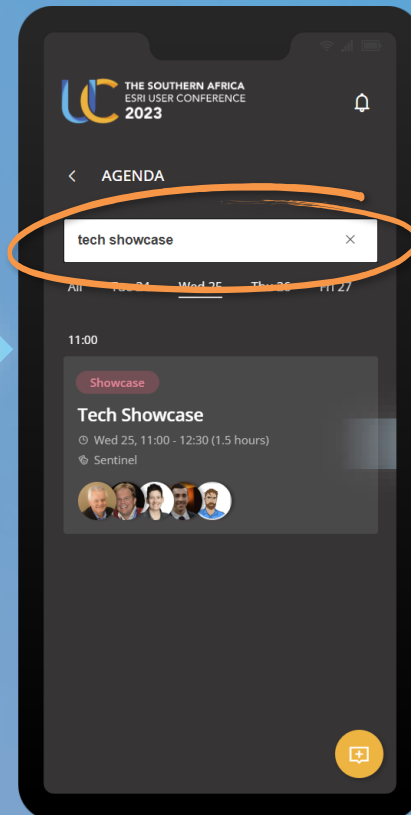
Please share your feedback in the UC2023 app



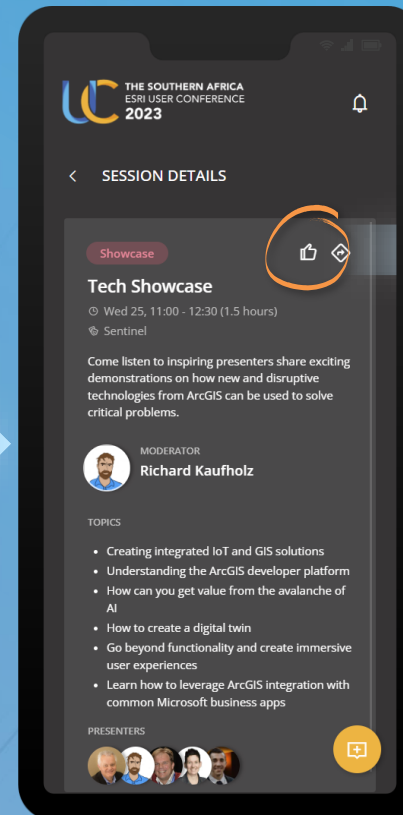
Open
uc2023.esri-southafrica.com
and browse the agenda



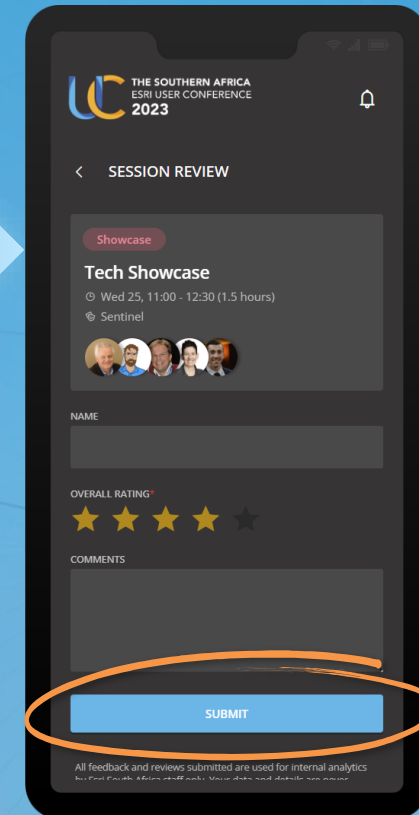
Search and select the
session you attended



Click the “thumbs up”
icon



Complete and submit
your review





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ESRI USER CONFERENCE
2023**

CONNECTING COMMUNITIES