



Imaging Technology Pathways

INNOVATIONS IN DATA COLLECTION AND OPPORTUNITIES

Let's Talk About ...

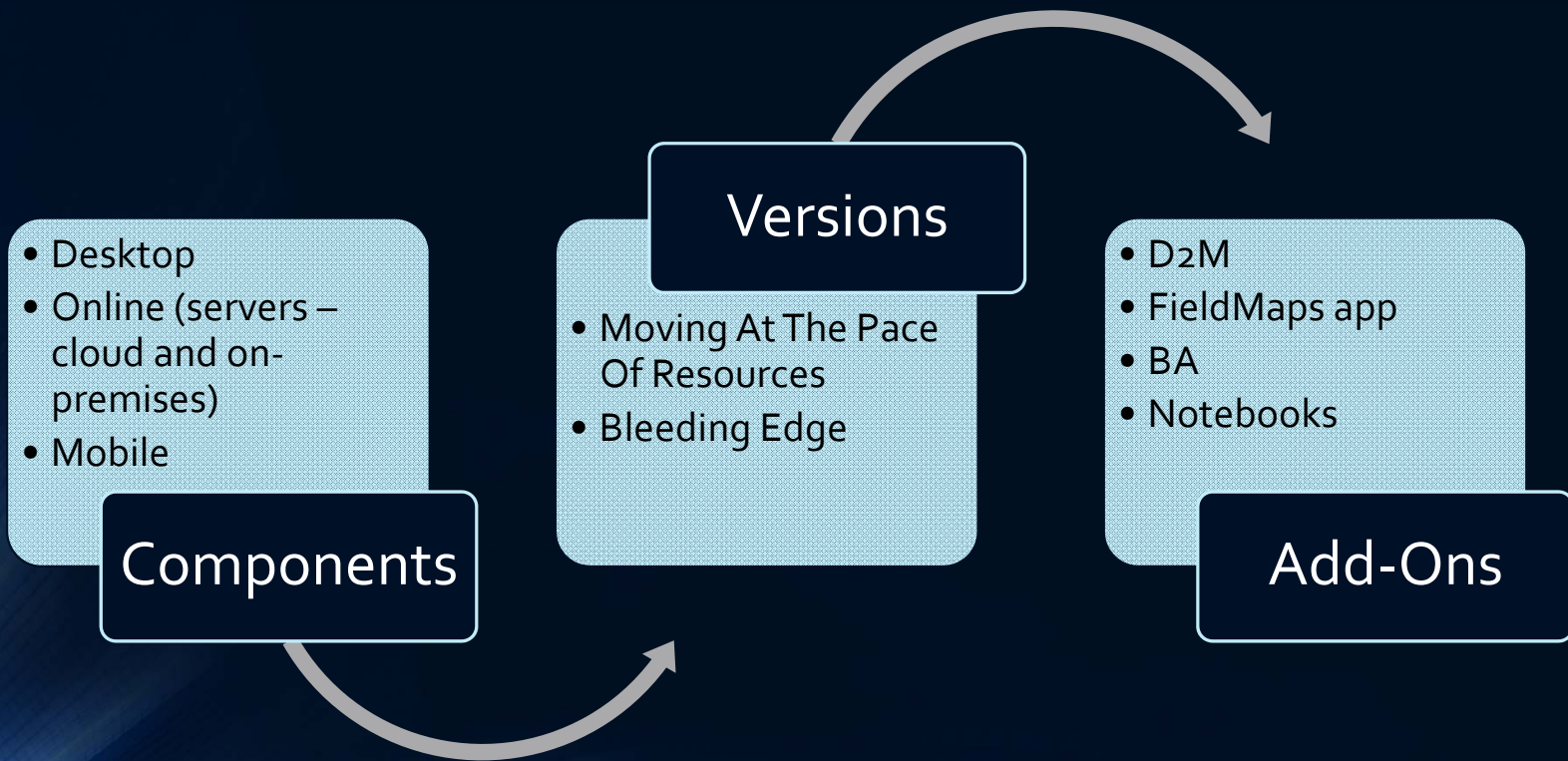
- **IMAGING TECHNOLOGIES**
- **HIGHSCHOOL DRONE PATHWAYS INTO WORKKFORCE AND COLLEGE**
- **PATTERNS OF FIELD COLLECTION**
- **PROCESSING INTO DATA PRODUCTS THAT SERVE SOLUTIONS**
- **FEATURE CREATION, DATA CONSUMPTION & THE GeoAI ASPECT**
- **THE WORKFLOW FROM FIELD SYSTEM ENGAGEMENT TO AI FEATURE CREATION**
- **RESOURCES & ESSENTIAL VOCABULARY**

Background The Led To This Point

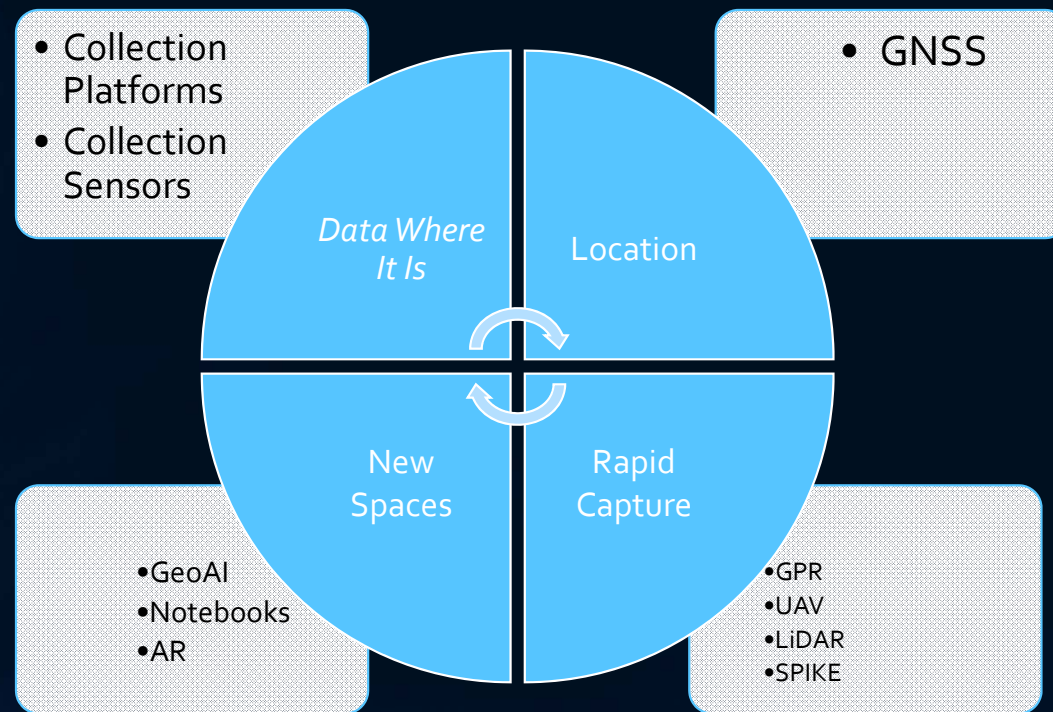
The Program – The Instruction

- Dallas College GIS Program
- Stays on the leading edge
 - Geospatial and related technologies
 - Stakeholders
 - Evolving uses
 - **National Science Foundation grant (DUE 1764427)**
- Engages the local GIS community
 - Advising about the workforce needs
 - Getting direction from the DFW Metro Workforce
- Places students in the real-world
 - *Internships*
 - *Community research activities*

The Platform – The Academic License



Augmentation (External to the ArcGIS Platform)



IMAGING TECHNOLOGIES

- Miniaturization, Simplification, Reduction on LOE
- Sensors, Platforms, Systems, and actual experience
- The patterns in ITs are common and include:
 - understanding the solution,
 - updating technology,
 - calibration,
 - testing,
 - ground truthing,
 - deployment,
 - post processing, and
 - derivative creation.

HIGH SCHOOL DRONE EXCITEMENT & PATHWAYS INTO COLLEGE AND WORKFORCE

- Drones alone go nowhere after exciting high school students.
- Leverage the patterns of drone operation to extend to other systems
- Dual Credit evolution
- **18 credit hours within a 60-hour degree upon high school completion**
- Entry level positions as field technicians with skills in ITs

PATTERNS OF FIELD COLLECTION

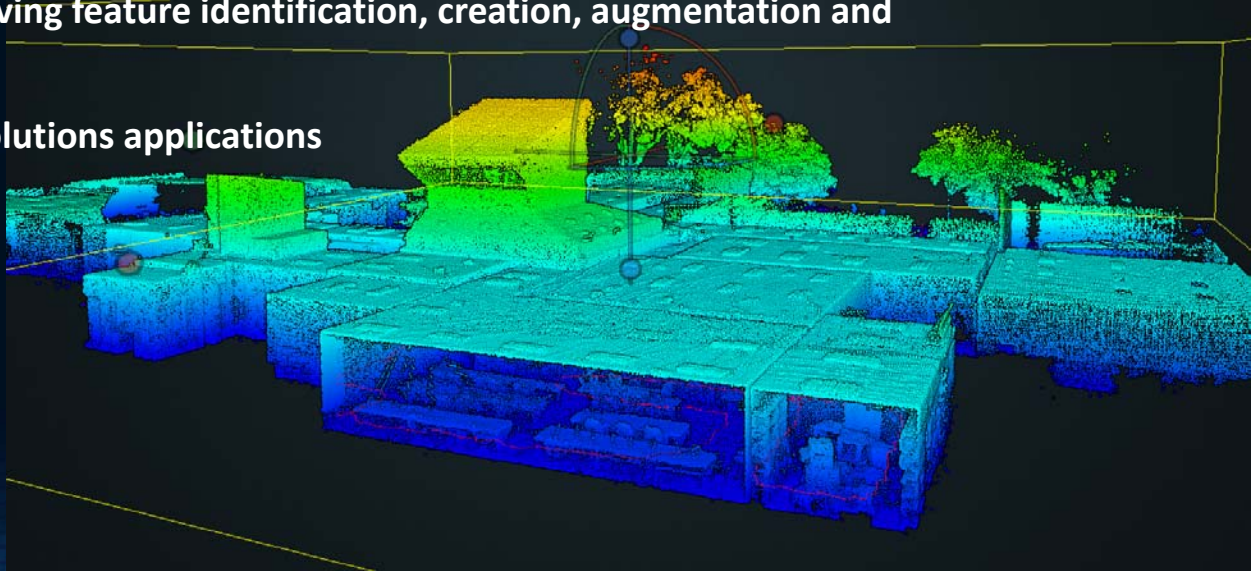
- Control and Coordinates
- Common patterns in field collection using systems
- Energy interaction with the environment

PLATFORM	SENSOR	ENERGY	ENVIRONMENT	MODALITY	GEOMETRY	PROCESSING
Rotor Drone	RGB	Visible	AGL to 400'	MicroSD	Raster	D2M or SiteScan
Marine vessel	SONAR	Acoustical signal	Water surface to -1500'	SD	Raster & Vector	Freeware Viewer
Handheld	LiDAR	UV, Visible, or NIR	AGL to 100'	Datalogger	Vector	GeoSLAM CloudCompare
Sled	GPR	High Frequency Radio wave	BGL to -30'	Insitu	Raster	??? CloudCompare

- Creation of 1st generation data
- Digital Twin creation

PROCESSING INTO DATA PRODUCTS THAT SERVE SOLUTIONS

- Incorporating GCPs and high accuracy control
- Reference Point creation in collection processes
- Processing creates 2nd generation data with improving positional accuracy,
- 3rd generation processing involving feature identification, creation, augmentation and enrichment
- Access to data or configured solutions applications



FEATURE CREATION, DATA CONSUMPTION & THE GeoAI ASPECT

- Human processing & (not vs) machine processing.
- AI and existing resources ([GeoAI Storymap](#)).
- The reality of ITs is more large data.
- Analysis can be time consuming.
- Enter artificial intelligence.
- There are AI tools already in ArcGIS Pro.
 - Does anyone know where they are?

THE WORKFLOW FROM FIELD SYSTEM ENGAGEMENT TO AI FEATURE CREATION

- Automated GIS and AI are not the same
 - All GeoAI is automated GIS but not all automated GIS is GeoAI
 - AI helps make decisions based on user definitions and trained data
- 80% of GeoAI is invested in data cleaning, preparation, labeling and training
- Match data form to AI engine/model
- Understand the question to answer
- Articulate influencing factors
- Know your data inputs and outputs
- Keep the answer binary

THE WORKFLOW FROM FIELD SYSTEM ENGAGEMENT TO AI FEATURE CREATION

- Use existing tools
- ArcGIS Notebooks to modify an AI tool
- Tools for Data Training and Exportation

RESOURCES & ESSENTIAL VOCABULARY

- Solutions/Systems = Sensor + Platform
- Field Experience Document
- Digital Twin
- GeoAI
- Deep Learning Tools (Image Analyst)

Adopting New Technology Releases

- Models
 - Data
 - Methodologies
- Templates
 - Apps
 - Samples

Consumer Solutions

Access When It Is Needed	Access Where It Is Needed	Access To What Is Needed
Now - No Training for Users	Browser-based	Solved Problems
Fast - No Licensing for Users	Findable	Enhanced Content
Intuitive – Works as Assumed	All devices, Everywhere	Visualized data/answers

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Audience Participation

REFLECTIONS, ADDITIONS OR QUESTIONS