

2005 – 2025 -> Progressing Geospatial Data Interoperability, Standardization, and Availability for Emergency Response



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Agenda

- 01 Introduction
- 02 Presentation Themes
- 03 Disaster & Recovery Mapping & Tech 2005
- 04 Emergency Management Mapping & Tech 2025
- 05 Improving Data Interoperability, Standardization, and Availability
- 06 Key Takeaways
- 07 Q&A/discussion



Presentation Themes

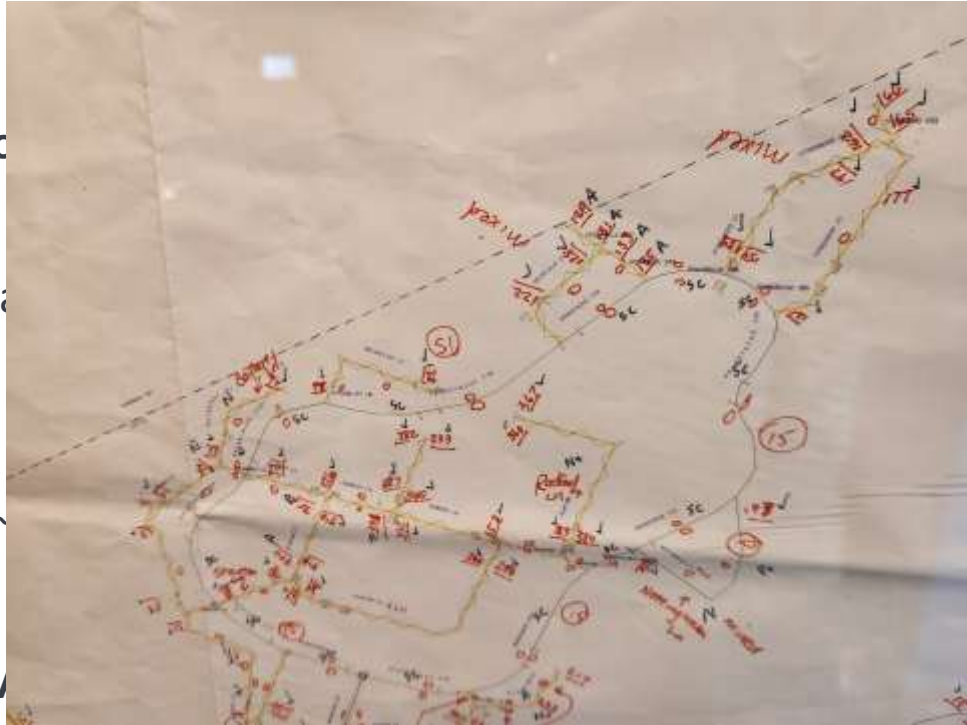
Remembrance, Emergency Tech, & Managing Big Data

Objectives: Describe mapping tech evolution and introduce more comprehensive data management solutions

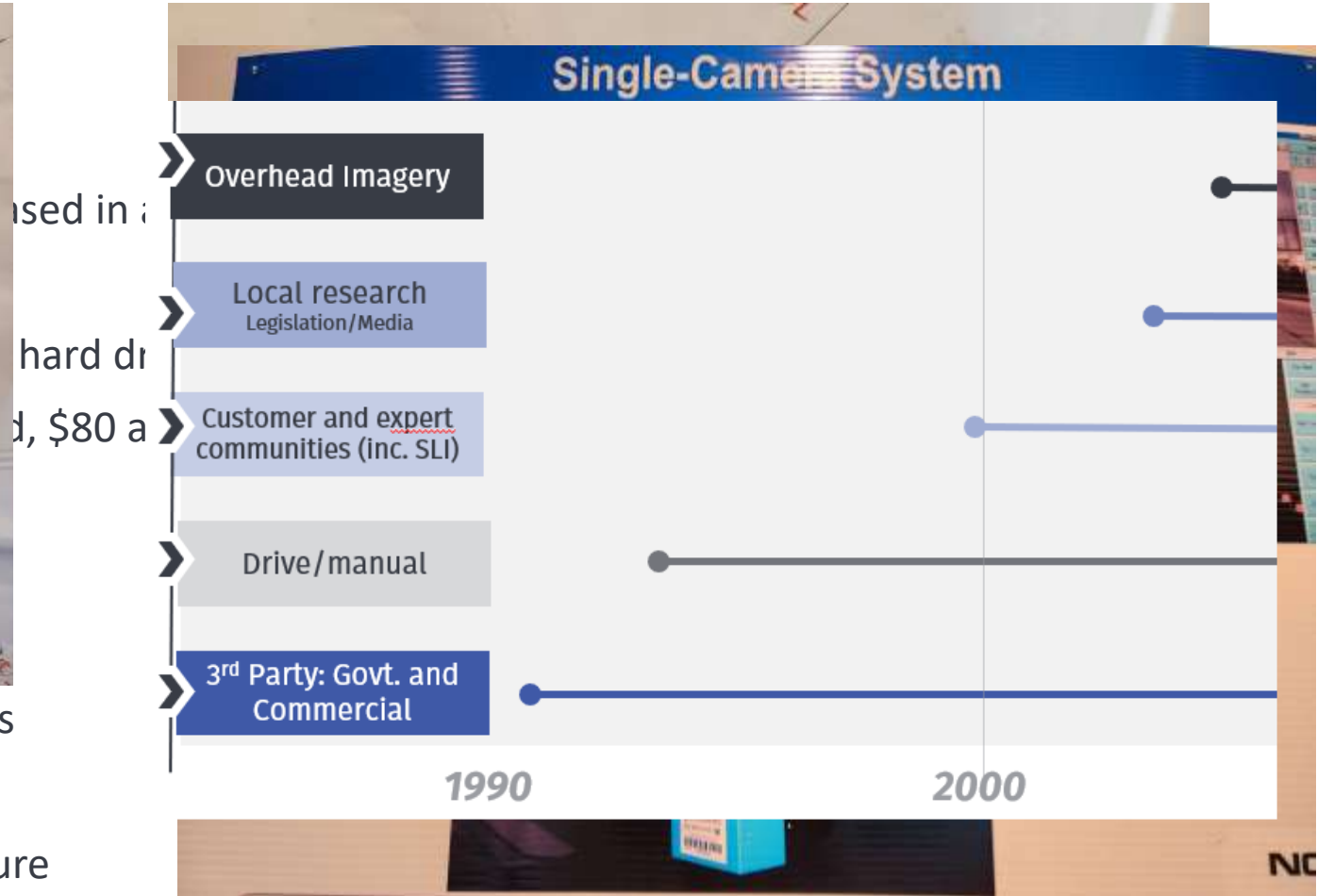


Disaster Recovery Mapping & Tech 2005

Entering the Mapping Digital Age



- 1985 → early 2000s – collection on printed plots
- 2005 collection – vehicle-based, no internet laptop, GPS equipment, point and click image capture
- 2006 – dash mounted cameras debuted



Limited Data Access

Consider:

- Commercial navigation/GIS use cases
- Quarterly releases
- Customer data compilation
- No live, dynamic content releases
- Primary capture sources – field analysts and government agencies

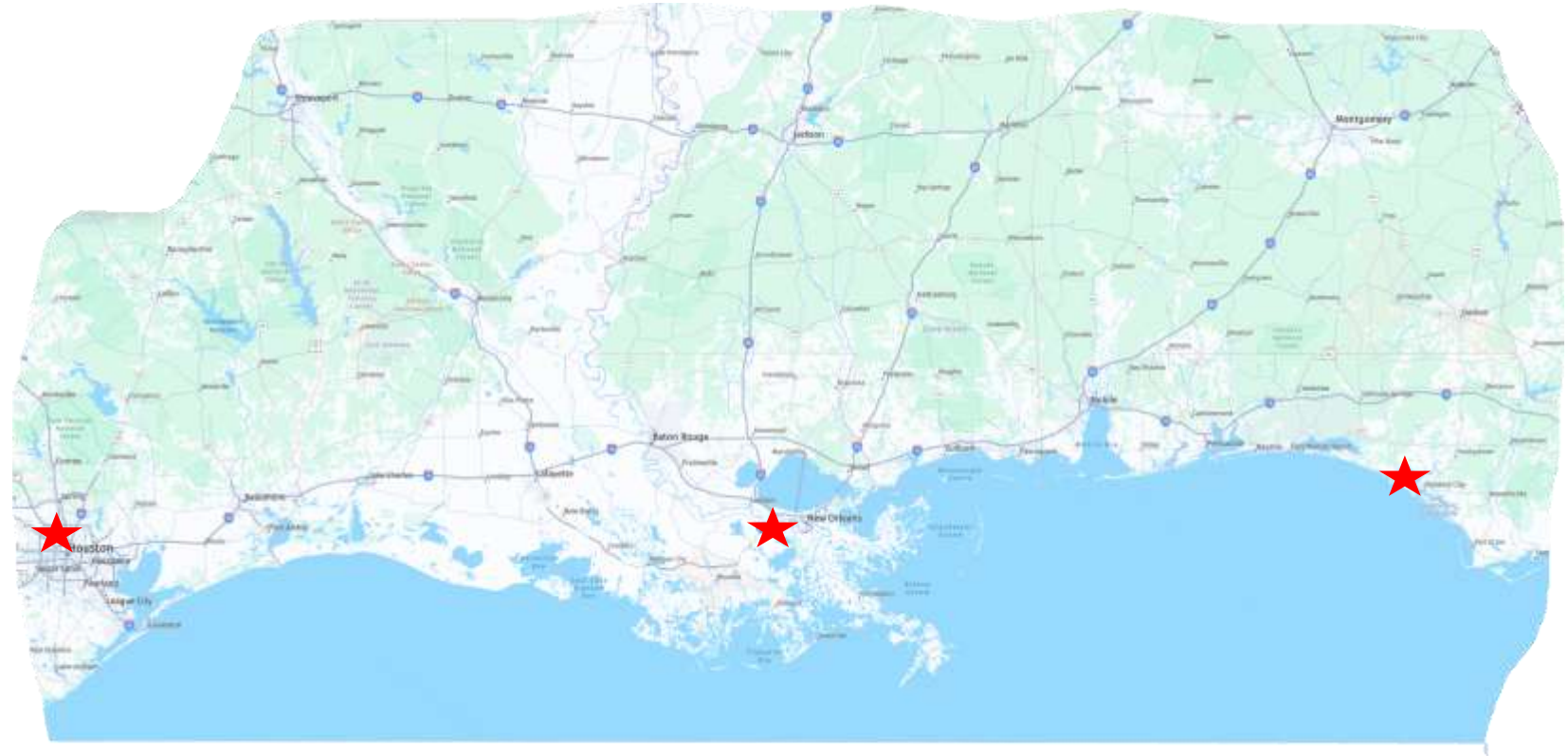


NAVTEQ Support Post Katrina & Rita

Highly Manual Collection During Recovery Phases

- **Collection**

- Methodology
- Map attributes
 - POIs
 - Evacuation Routes
 - Traffic
 - Bridge Closures

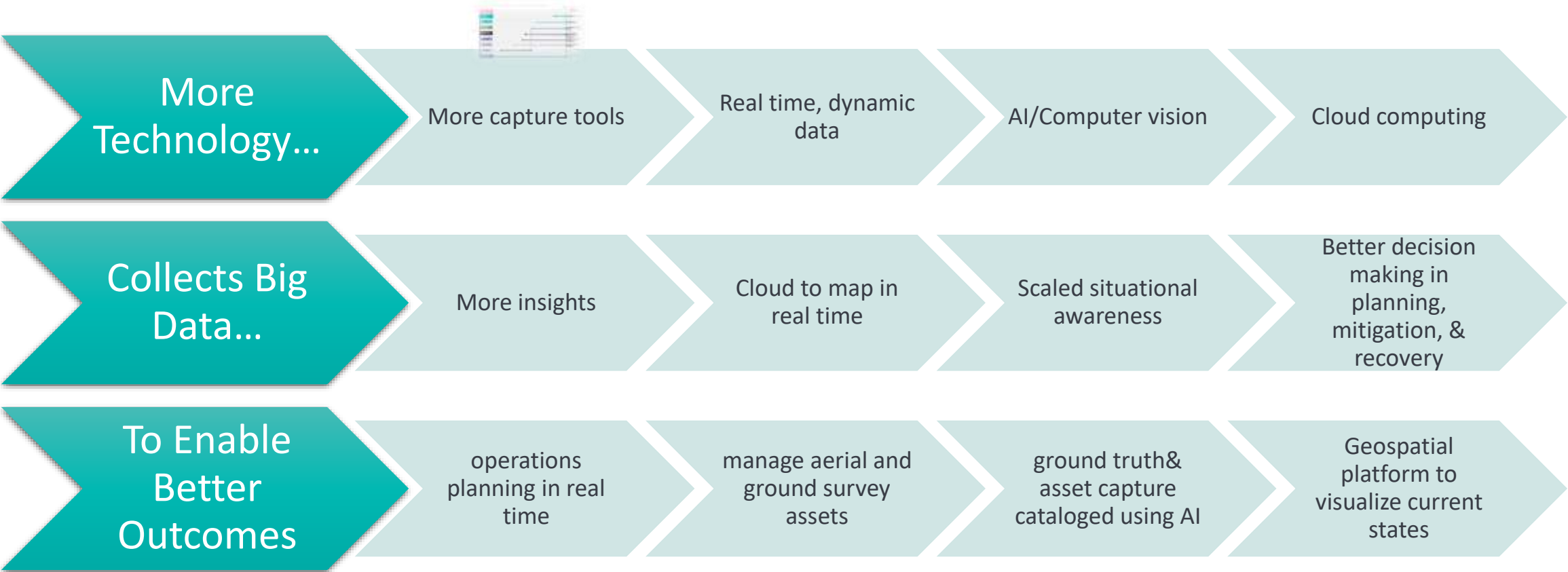


- **Giving Back**

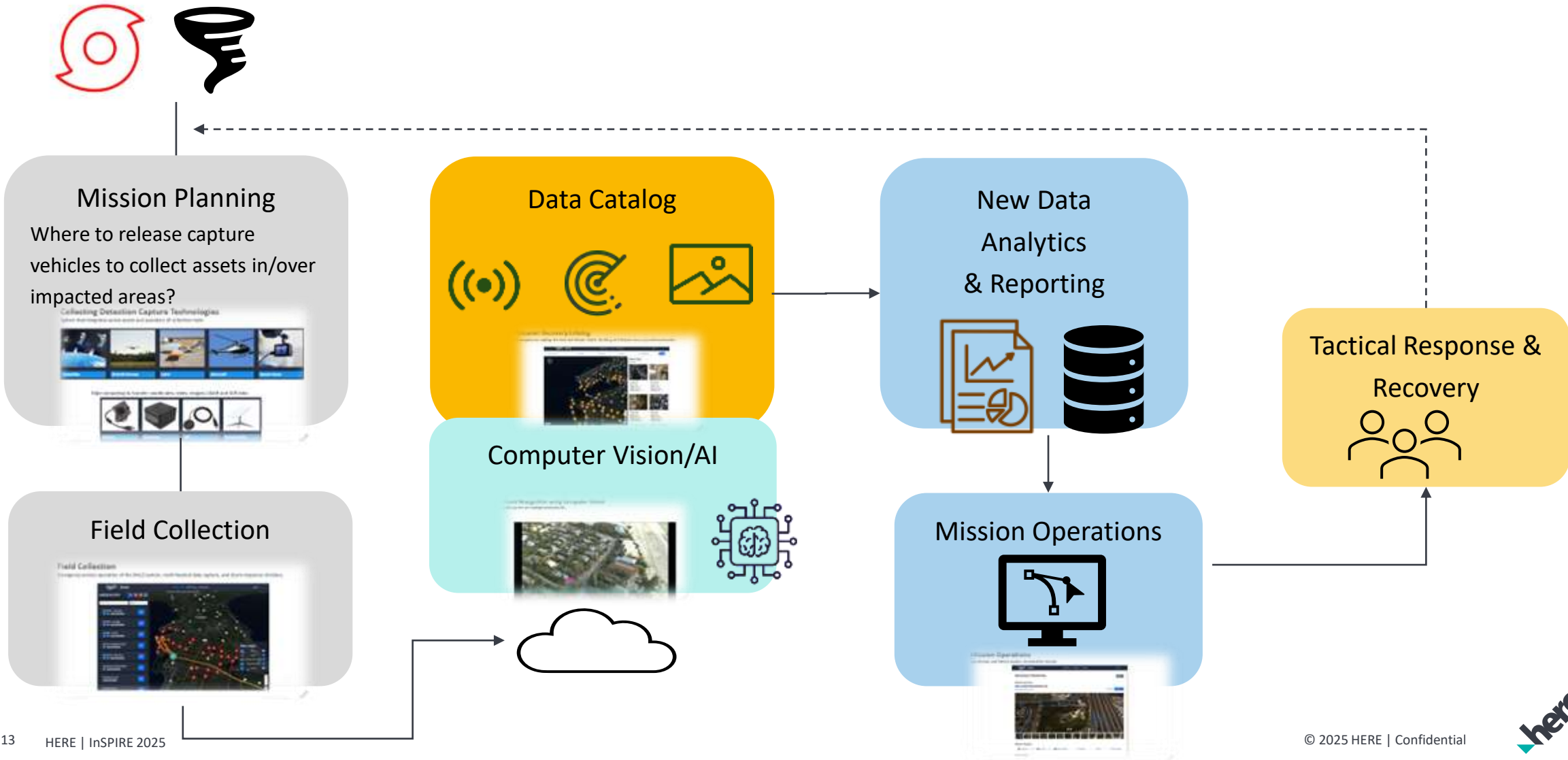
- NAVTEQ Field Analysts volunteering

Emergency Management Mapping & Tech 2025

2025 Tech Landscape Leads to Better Outcomes



Disaster Recovery Platform for DOTs & OEMs



Collecting Detection Capture Technologies

System that integrates across assets and operators of collection tools

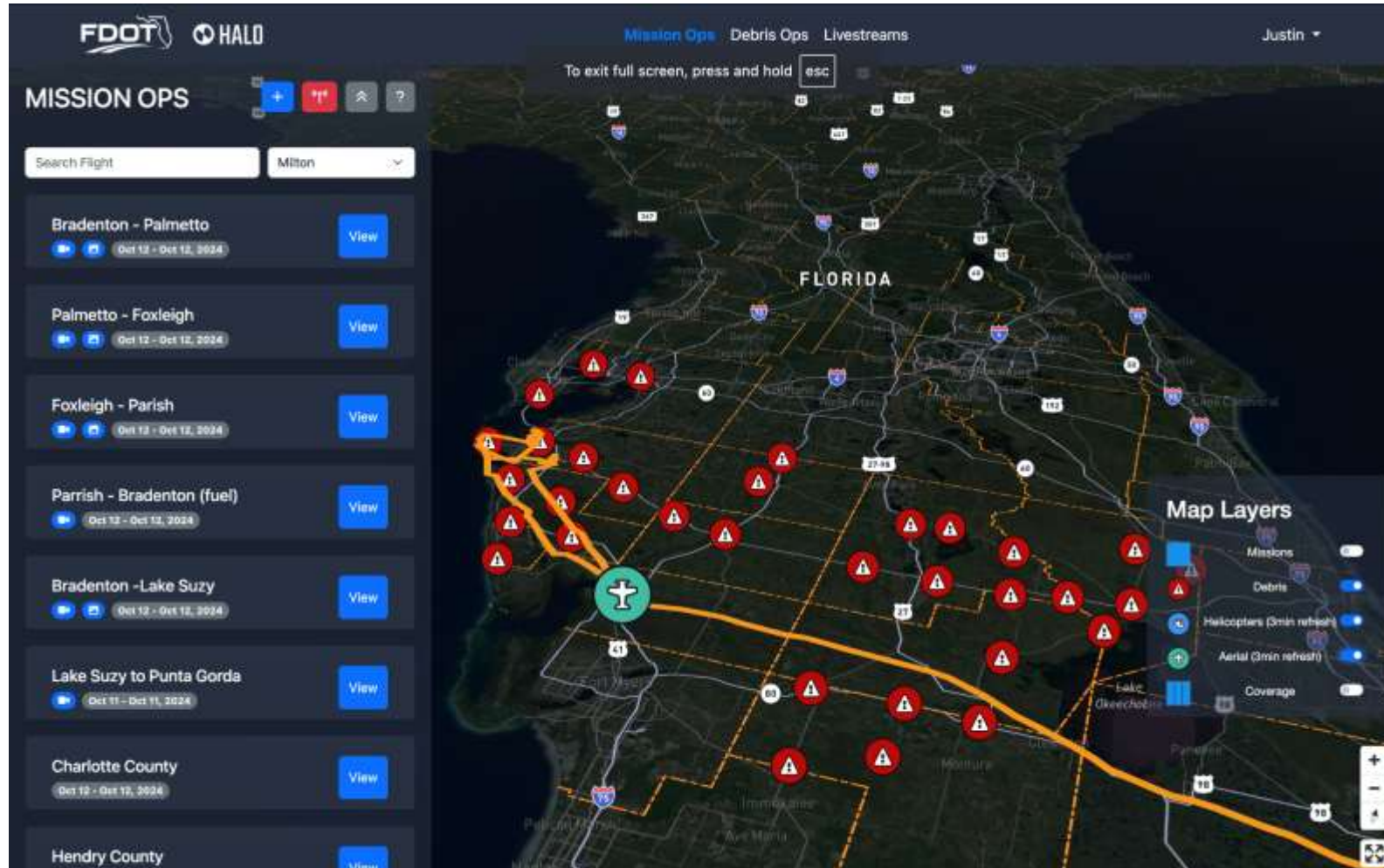


Edge computing to transfer coordinates, video, images, LiDAR and SAR data



Field Collection

Emergency service operation of the HALO system, multi-faceted data capture, and storm response missions.



Disaster Recovery Catalog

Data platform catalogs the detected threats, debris, flooding, and disaster recovery needs by location.

The screenshot displays the FDOT HALO Debris Ops interface. At the top, there are navigation tabs for Mission Ops, Debris Ops (selected), and Livestreams, along with a user profile for Justin. Below the navigation is a search bar labeled 'Search by Debris ID' and filter buttons for 'All Districts', 'All Counties', 'All Storms', and 'All Road Classes'. The main area is split into two panels. The left panel is a map of Florida with numerous orange circular markers indicating debris locations. The right panel, titled 'Debris Ops', shows '985 Results' and displays four debris entries with satellite imagery and metadata:

Debris ID	Storm	District	County	Debris Present
Debris #21	Milton	District 1	Sarasota	Yes
Debris #277	Milton	District 1	Sarasota	Yes
Debris #312	Milton	District 1	Manatee	Yes
Debris #8	Milton	District 1	Sarasota	Yes



Asset Recognition using Computer Vision

Debris spotted and cataloged simultaneously.



Mission Operations

Live stream and detect assets, recorded by mission.

The screenshot shows the HALO mission operations interface. At the top, there is a navigation bar with the FDOT logo, the HALO logo, and menu items for Mission Ops, Livestreams, Reporting, and a user profile for Evan. The main heading is 'Sarasota to Siesta Key' with an 'Actions' dropdown menu. Below this is the 'Mission Summary' section, which includes a status indicator 'In Flight' with a time range from 2024-10-10 22:30:00 to 2024-10-11 02:30:00 and a 'Low' priority tag. There are also 'Map View' and 'Gallery View' buttons. The central part of the interface is a large aerial video feed showing a road interchange with several blue bounding boxes highlighting specific areas of interest. Below the video feed is a horizontal strip of 12 small thumbnail images. At the bottom, there is a 'Mission Progress' section with a progress bar showing six stages: SCHEDULED, IN FLIGHT, FLIGHT COMPLETE, PROCESS, VIEW, and REPORT READY. The 'FLIGHT COMPLETE' stage is currently active. Below the progress bar is the 'Mission Data' section.



Data Management:

Improving Interoperability, Standardization, and Availability

Transportation Network Digital Infrastructure Hub

Create a real time, predictive operational system of systems as part of a roadway network digital infrastructure (DI).

Improve performance of road networks in terms of:

- **Public Safety**
→ Vision Zero, emergency response
- **Traffic operations**
→ traveler/commuter safety and efficiency
- **Commercial freight mobility**
→ supply chain efficiency
- **Asset management** -> systematic maintenance efficiency
- **Establish accountability**
@ Federal, State levels for safety, reliability, and security across IHS



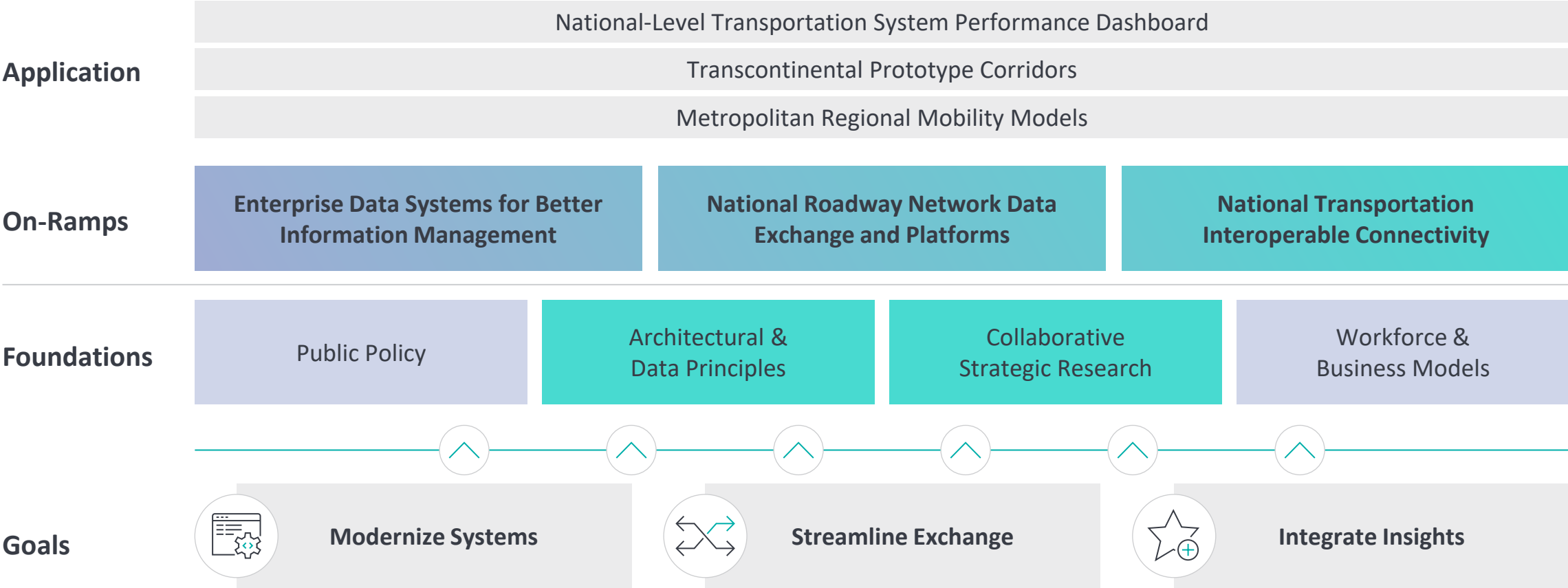
Create a real scalable DI technical solution for USDOT & State DOTs

Access roadway data that is accessible, interoperable, and standardized for all eligible users

Assemble best of breed datasets from government and industry

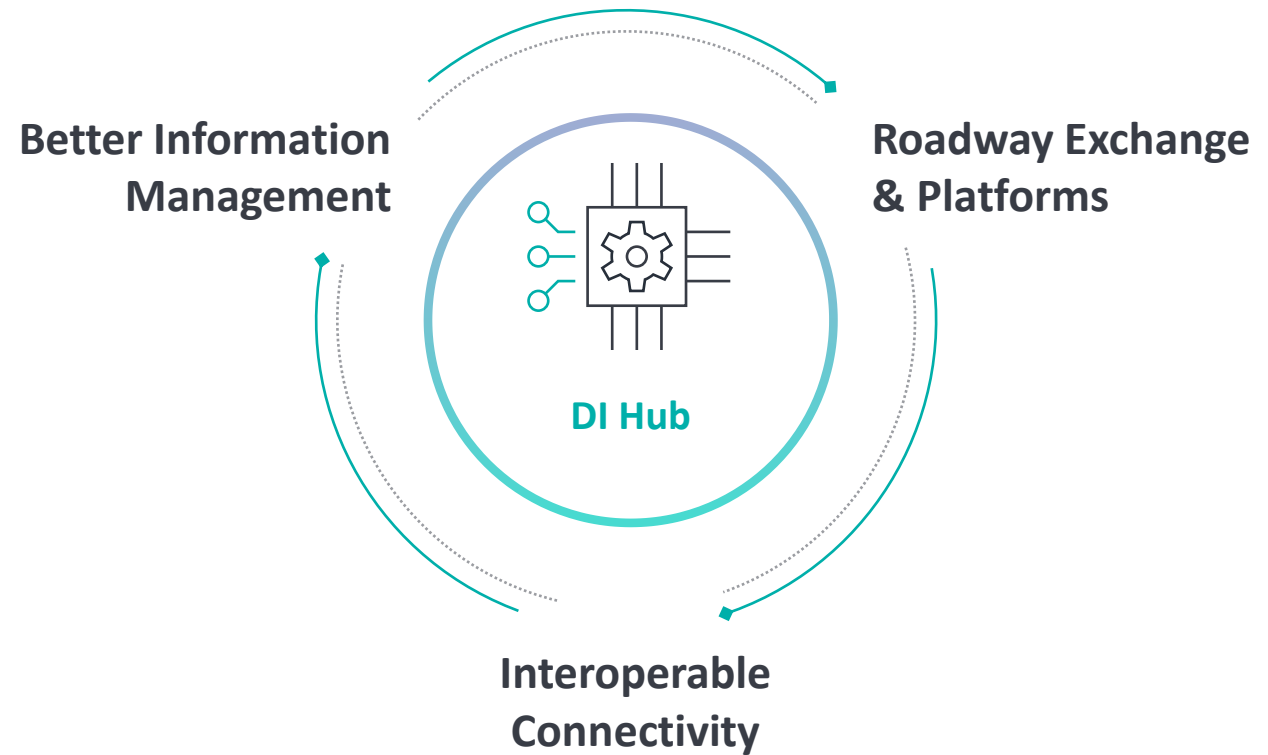
Build a data lake of training data for AI application in performance management systems

Achieving Goals, Adherence to Foundations, Building On-Ramps and Enhancing Applications.



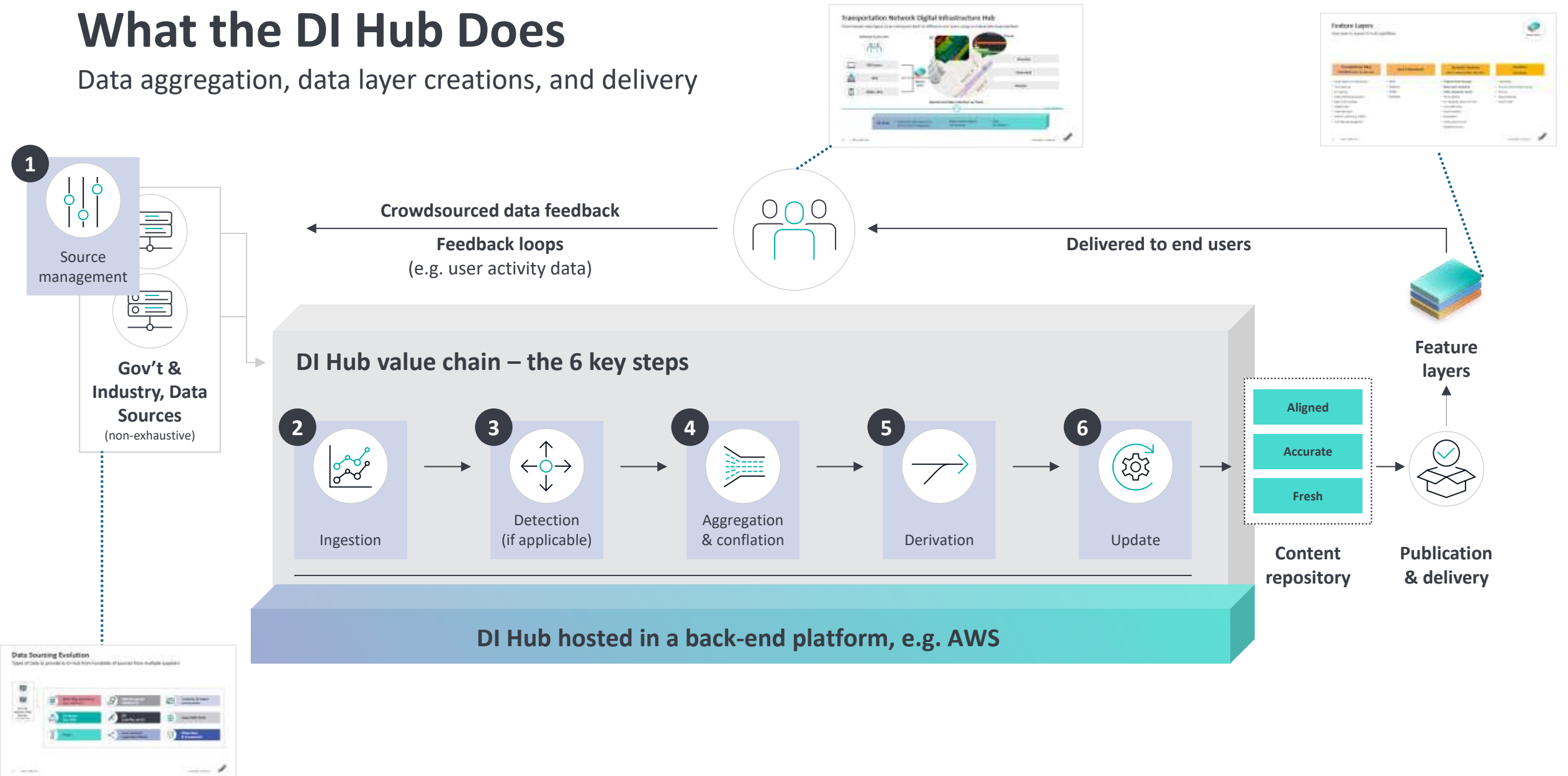
What is inside a notional Digital Infrastructure Hub (DI Hub)?

- A hub for delivering a DI strategy
- Enables digital interoperability of any transportation network of interest for collaborative decision support at a national scale
- Federated data exchanges consisting of feature layers sourced from all levels of gov't & pertinent industry
- Single architecture that integrates, processes, and shares data.
- Hosted cloud-based platform
- Interactive digital map of features
- Analytical capabilities, e.g. dashboards
- Deploy data to different user groups



What the DI Hub Does

Data aggregation, data layer creations, and delivery



Key Takeaways

This presentation supports the HIFLD mission to continually educate, InSPIRE and promote collaboration amongst the public sector GIS community to support public safety.



Mapmaking technology and data management have advanced since 2005 to improve how Public Sector responds to large scale natural disasters



Location based technologies can help breakdown the silos of excellence that Federal, State, Tribal, and Local Governments possess to make data standardized, accessible, and interoperable in GIS for all.



Thank you

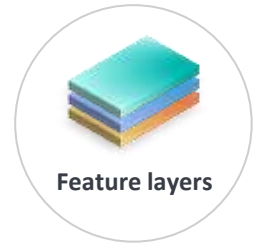
Time for discussion and Q&A

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Feature Layers

Data types to expand DI Hub capabilities



Foundational Map Content (Gov't & industry)

- Road network w/attribution
- Truck parking
- EV stations
- Heavy vehicle attribution
- Signs and warnings
- Speed limits
- Road elevation
- Historic traffic (e.g. AADT)
- Commercial regulations

Gov't Standards

- MIRE
- ARNOLD
- HPMS
- NPMRDS

Dynamic Content (Gov't, communities, industry)

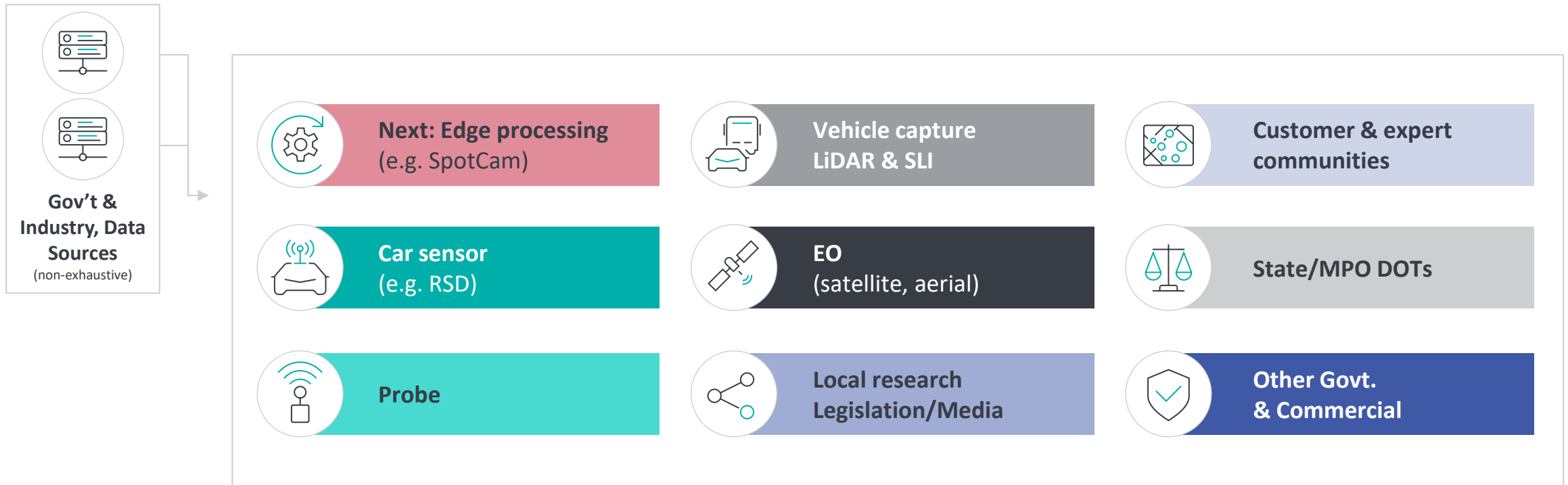
- **Property level damage**
- **Road asset conditions**
- **Other temporary assets**
- Truck parking
- EV charging station live info
- Live traffic flow
- Road incidents
- Road alerts
- Construction zones
- Weather service

Location Services

- Geocoding
- Truck & multi-modal routing
- Toll cost
- Map rendering
- Transit lines

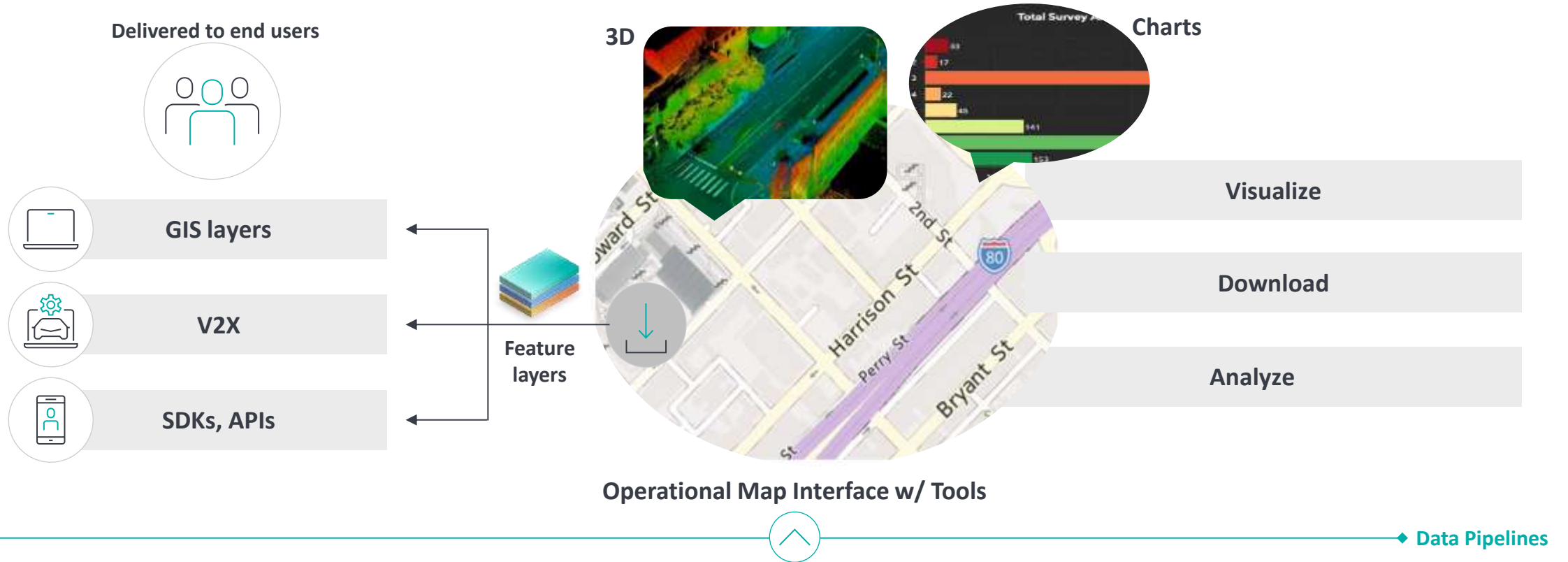
Data Sourcing Evolution

Types of Data to provide to DI Hub from hundreds of sources from multiple suppliers



Transportation Network Digital Infrastructure Hub

Disseminates data layers at an enterprise level to different user types using an interactive map interface



DI Hub

- Integrated data repository with 3d and 2d map data
- Digital map storage & maintenance
- Data distribution