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Using Big Data to Support Asset Management Decision Making

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Why conduct transportation asset management (TAM)?

- Greater accountability in the effective use of federal funds
- An increased relationship between performance and funding
- More sustainable transportation solutions

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Asset Management

- **Categories of Asset Management**
  - Bridges
  - Barriers/Delineators
  - Culverts
  - Pavements
  - Pavement Markings
  - Signs
  - Other

A. Bending Damage

B. Peeling Damage

C. Vandalism

D. Cracking Damage

E. Other Damage Types

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AASHTO's TAM Process

- **The 14 steps to TAM implementation:**
  1. Set agency goals and objectives.
  2. Conduct self-assessment and TAM gap analysis.
  3. Define the scope of TAM.
  4. Develop the change strategy.
  5. Integrate TAM into the organizational culture.
  6. Integrate TAM into business processes.
  7. Establish asset management roles.
  8. Establish performance management standards.
  9. Develop a TAM plan.
  10. **Strengthen enabling processes-service planning.**
  11. **Strengthen enabling processes-life-cycle management.**
  12. **Strengthen enabling processes-TAM integration.**
  13. **Strengthen information systems.**
  14. **Strengthen data**

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A Practical Implementation of a TAM

- The process of TAM can have the following aspects:
  - A baseline of existing assets
    - Installation Date
    - Condition
  - A process to update records that account for:
    - New infrastructure
    - Infrastructure replacement

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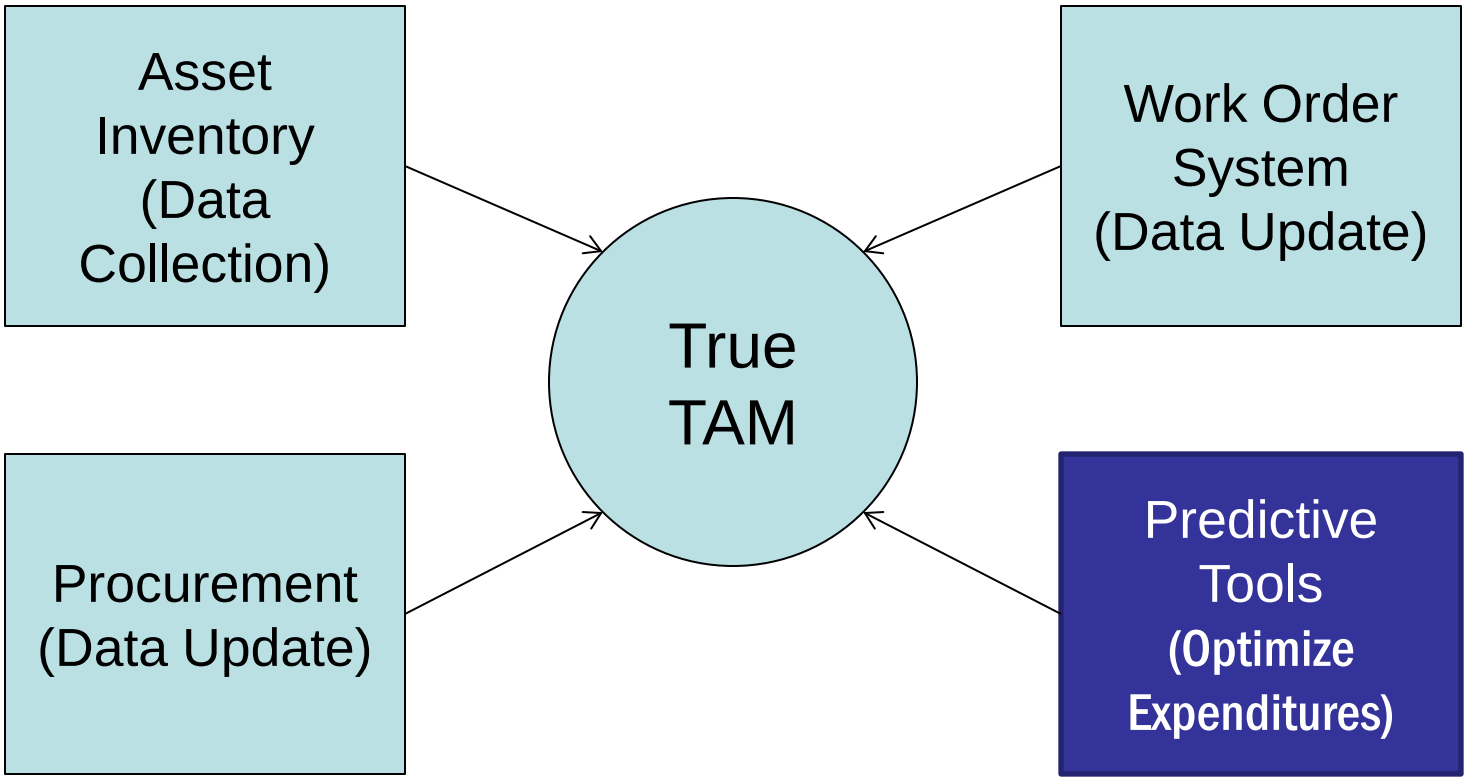
Linking Databases



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Data Collection

- **Mobile LiDAR**
  - 1.4 million points of data per second
  - State of Utah had 27 TB of points for its roadway system
  - 5,860 centerline miles

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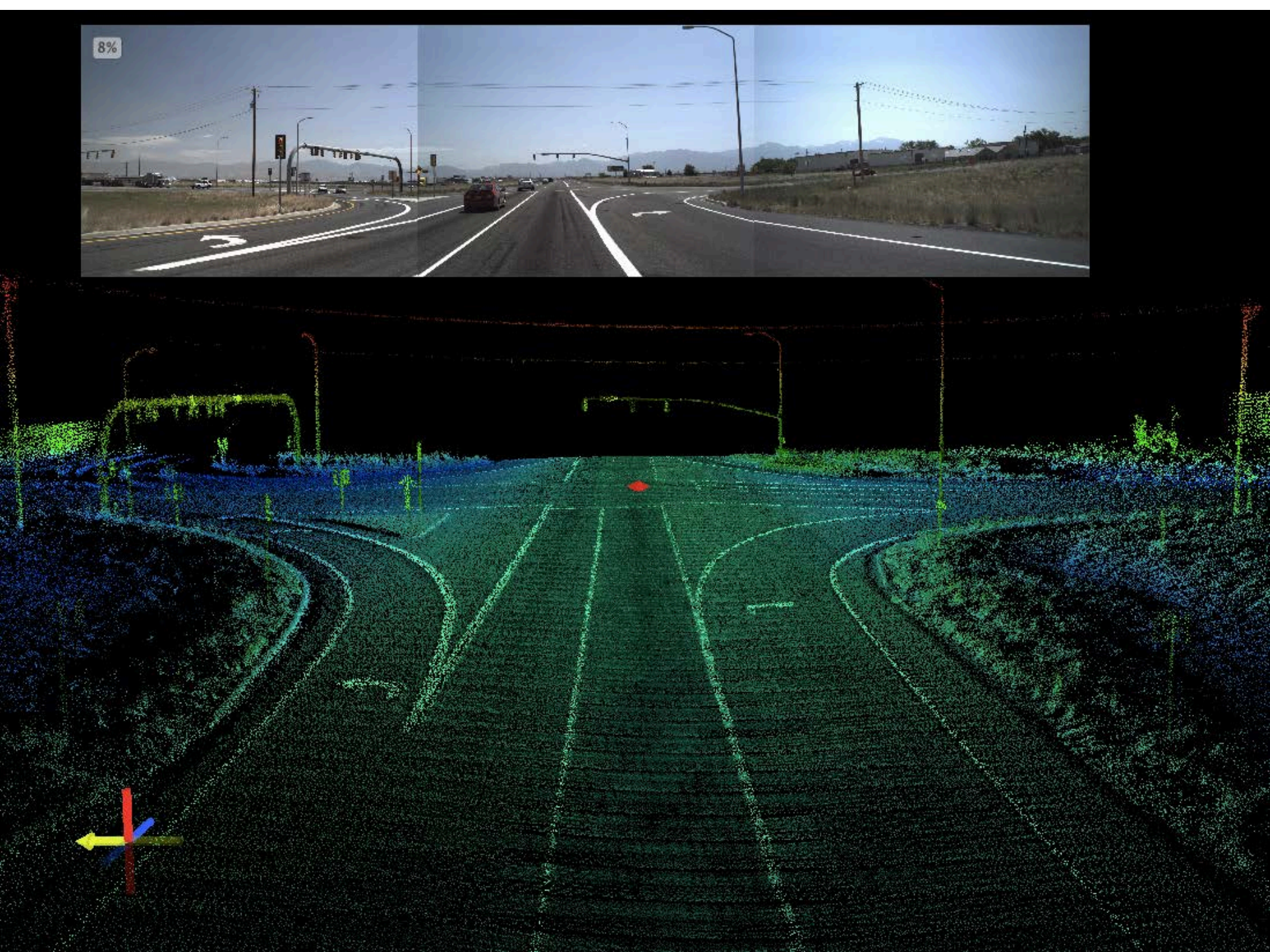
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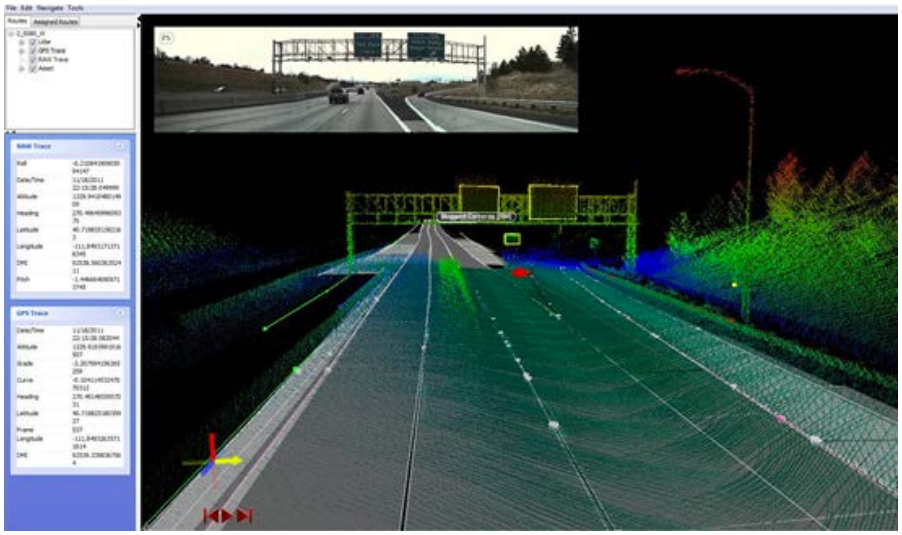
Output Data

- **Pavement**
  - Cracks, rutting, and roughness
  - Pavement markings
- **Signs**
  - Type, condition, and size
- **Bridges**
  - Deflection and Cracking
- **Other Assets**
  - Reflectors
  - Guardrail
  - Medians
  - Rumble Strips



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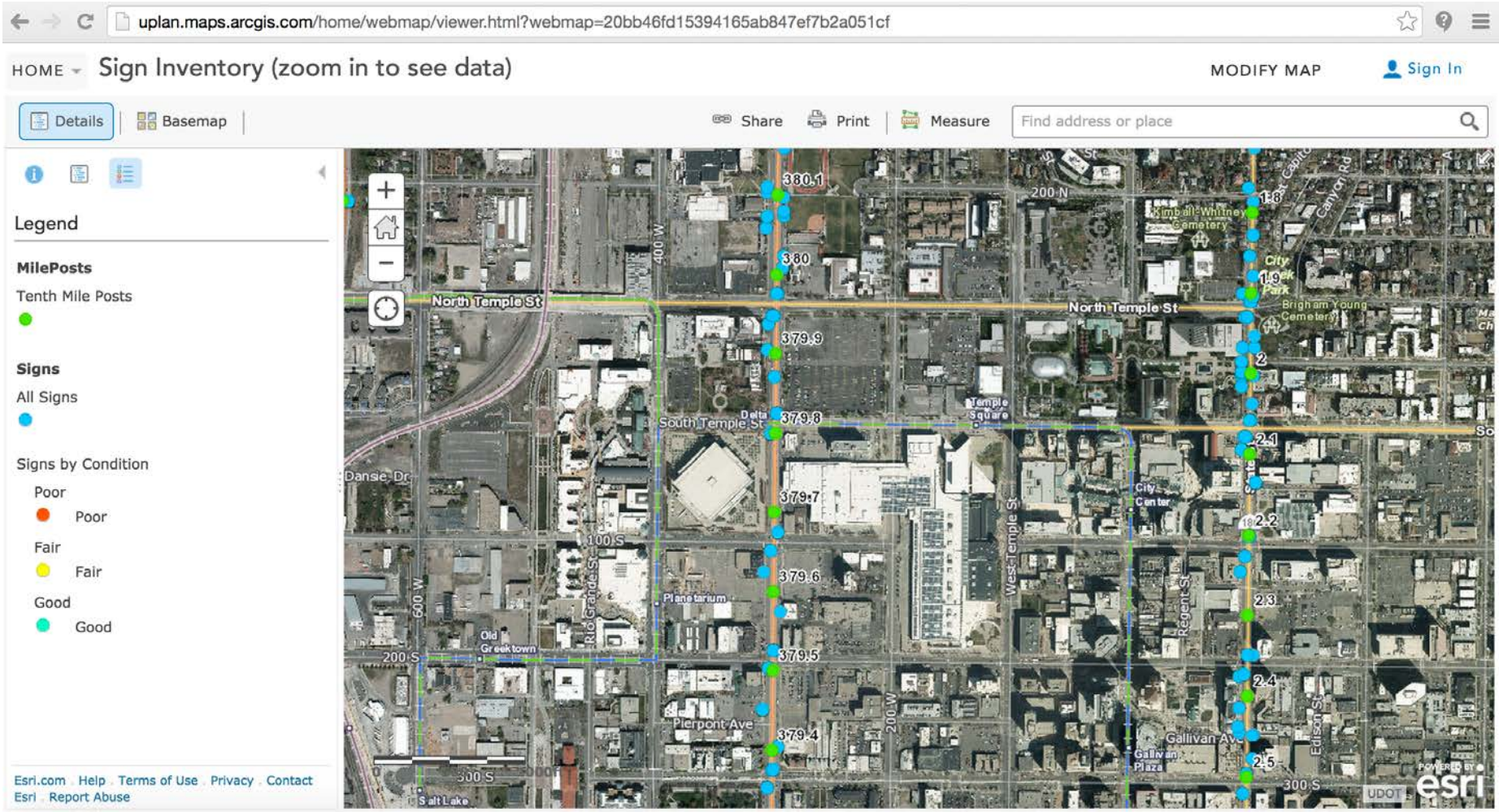
GIS Integration



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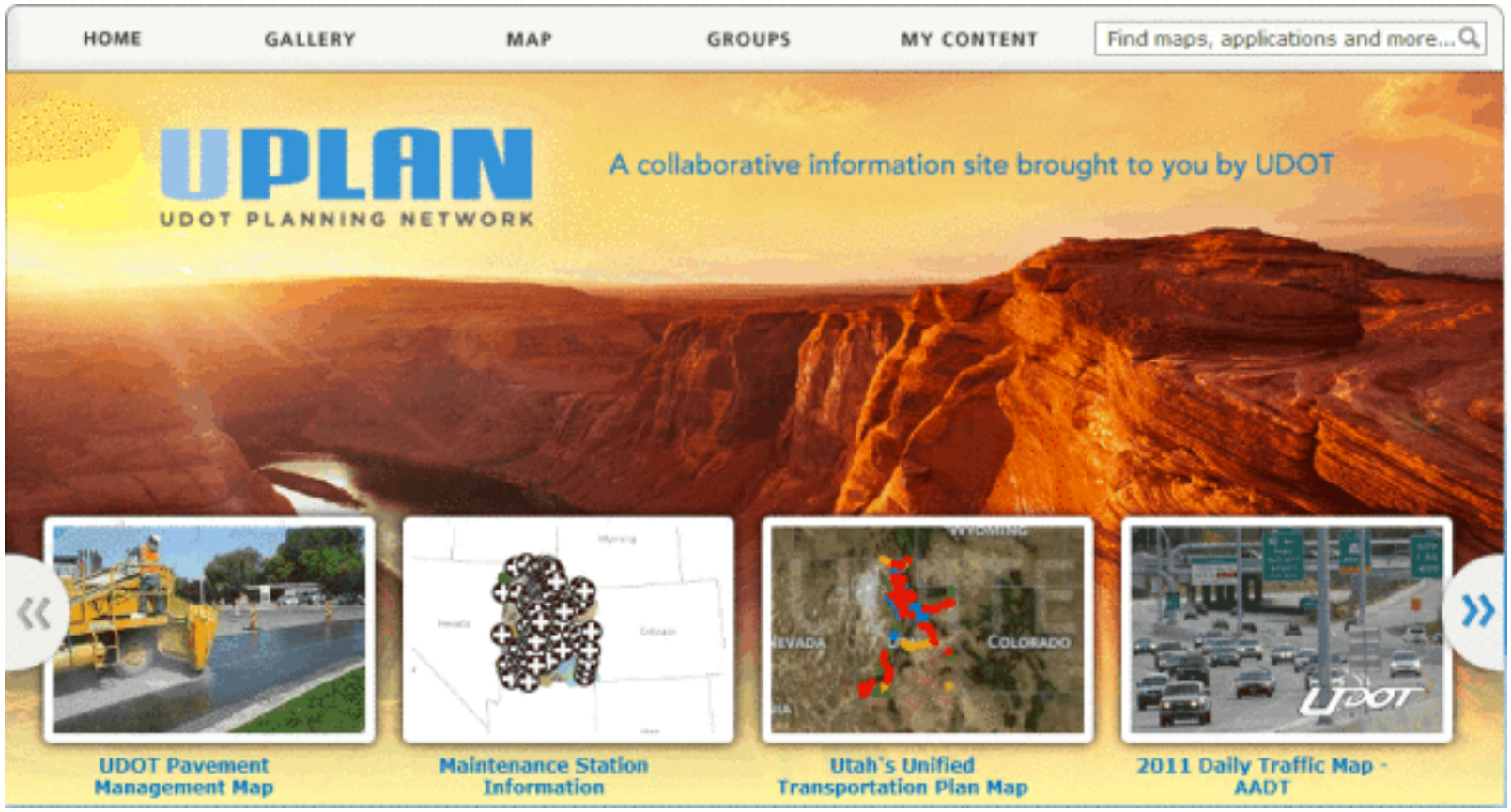
UPLAN



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UDOT Open Data

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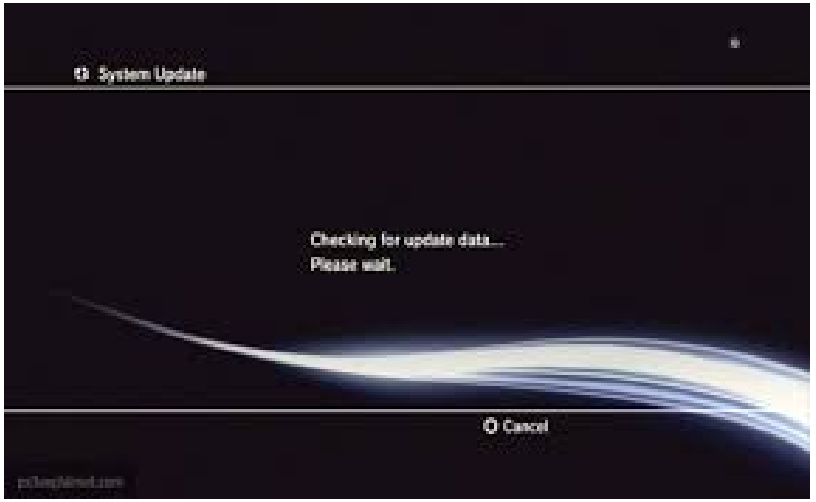
Challenges

- Post processing of data
- Keeping maps up to date
- "Snapshot in time"
- Updating data
- Predictive analysis



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Taking the Next Step

- **Optimizing asset management investment**
  - Understanding degradation of infrastructure
  - Forecasting the useful life of the infrastructure
  - Avoiding blanket replacement and replacement during large projects

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Conclusions

- Era of big data is upon us in transportation
- Data analytics can help
- Collection, maintenance, and analytics are important
- Innovation is possible
- “Real-time” analytics

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Thank you!

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