NASCIO 2020

1. Title: Utah's Transportation Vision
2. Category: Cross Boundary Collaboration
3. Project Initiation and Completion Date: February 2018 - December 2019
4. Project Contact: Adam Radel / David Fletcher

Project Website: https://uvision.utah.gov/

Executive Summary

In the 2018 legislative session, lawmakers passed a transportation bill that addresses funding mechanisms and transportation oversight to continue integrated, long-term planning. S.B. 136 requires the Utah Department of Transportation (UDOT) to develop statewide strategic initiatives across all modes of transportation. Recognizing that Utah's transportation system is owned, maintained and operated by many different entities, UDOT uses a collaborative model to gather input that can inform policy. UDOT will convene a committee of various transportation stakeholders in order to develop a statewide vision for transportation.

The Stakeholder Committee reviews goal statements from existing plans and documents in combination with the list of considerations named in bill, with special attention to considerations identified in S.B. 136, such as air quality, return on investment, sustainability, and economy. The committee then formulates broad goals that function across modes and are scaleable to local, regional, and statewide long-range transportation planning.

The vision, goals and initiatives will guide policy decisions and state investments in transportation. The strategic initiatives may be things that partnering agencies and stakeholder committee members already do as part of their respective missions.

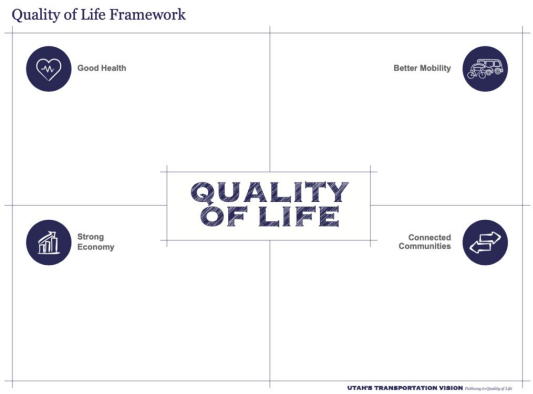
Technology and innovation are changing the transportation options available, as well as the ways we'll build, maintain, and operate the system. This evolution presents a whole host of questions as well, and possible answers are just emerging.

- Technology-based communications
- Website
- Connected Vehicles
- Improved Planning Capabilities
- GIS

Utah's Transportation Vision: https://uvision.utah.gov
Utah's Unified Transportation Plan: https://unifiedplan.org
Active Transportation: https://move.utah.gov
Unified Plan Viewer:
https://uplan.maps.arcgis.com/apps/MapSeries/index.html?appid=3539ee13f5b84dcf84252d43fe9b467f

Concept

Utah's Transportation Vision is a process to collaborate with partnering agencies in order to establish a shared vision for transportation statewide. While implementation of the Framework resides with individual agencies, the Quality of Life Framework provides guidance for statewide, regional and area-specific planning and policies for aligned transportation action at local, regional and state levels. The actual implementation of UVision, required agencies working together, in concert with a growing number of key technologies to achieve its goals.



Transportation in Utah is more than just a way to get from one place to another; in Utah, transportation is an integral part of our quality of life. Because of past investments in transportation, because of how we work together to plan and build the system, and because we are able to move freely both within and across our communities, transportation helps to deliver Utah's promise of life elevated.

Stakeholders helped identify key technologies that would contribute to the goals outlined in the Quality of Life Framework. All of these technologies contribute to the realization of UVision goals and were implemented or leveraged over the past 2-3 year to help achieve the vision outlined in the Quality of Life Framework.

Key Technologies

- Code 1 Budget Dashboard
- Automated Asset Management Transportation Plan
- Commercial Vehicle Electronic Screening
- UTAPS CDI Data Initiative
- UDOT Citizen Reports App
- Automated Vehicles
- Connected Vehicle Signal Automation
- E-Ticketing
- Local Government Management App
- Maintenance Projects GIS App
- Radar Detection Wildlife Signs
- UAS-Based Lidar Capture
- UAS for Sign Inspection
- UAS's on IMT Vehicles
- SMS and MMS Integration

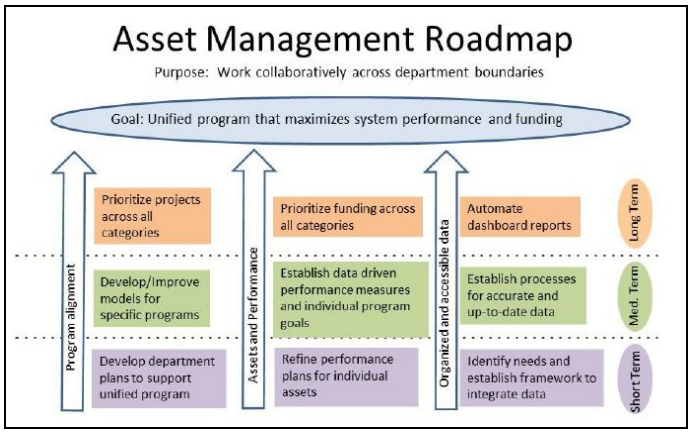
Some of these innovations that have been implemented over the past two years are outlined below.

Budget Dashboard

In order to achieve the goals of the UVision project, the partners needed a way to track and measure the progress. This dashboard, which began with a focus of managing the financial aspect of the project has evolved into a more comprehensive, data tool which tracks all aspects of the Utah transportation ecosystem. It is delivered at https://hub.udot.utah.gov/. Each component of the data hub contains extensive metrics that are all associated with the goals of UVision. For example, Freeway Performance Metrics includes data on freeway speeds, travel times, ramp metering, freeway reliability, occurrences, and delays all gather from Utah's extensive sensor networks that are connected to the statewide fiber network (https://www.arcgis.com/apps/webappviewer/index.html?id=096d0a7dd31a4be289b9623935308fc9). Other resources, such as road signs, traffic meters, and highway markers are all mapped geographically on UDOT's data portal (https://uplan.maps.arcgis.com/home/index.html) just like the fiber network.

Automated Asset Management Transportation Plan

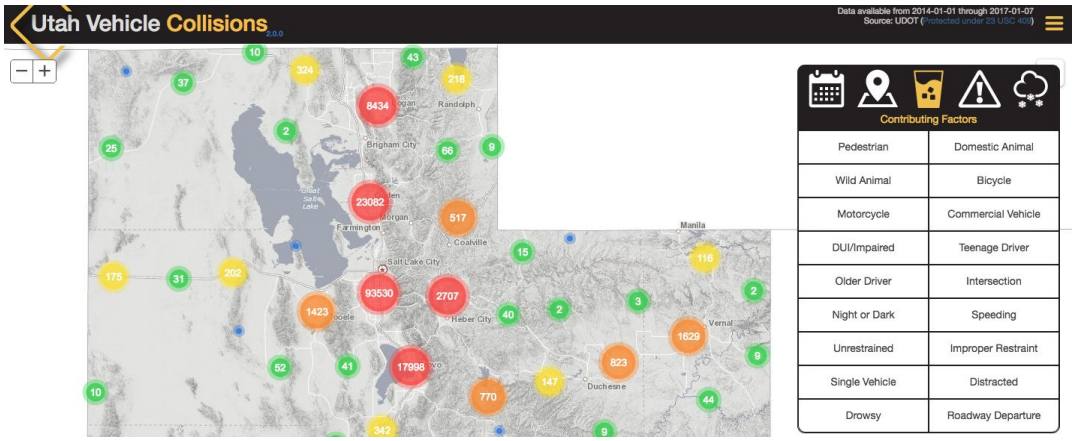
The Utah Transportation Asset Management Plan (TAMP) is the plan UDOT follows to achieve the Preserve Infrastructure strategic goal. The wealth of data now available due to a unified and automated collection process allows UDOT to evaluate conditions and develop a performance-based plan that includes all assets to the level appropriate to the value and risk associated with each. Following the roadmap, UDOT will continue to identify risks, performance measures and life cycle costs for numerous assets in a joint effort to better prioritize funding across all funding categoriesThe specific objectives of this plan which comprise the asset management roadmap are:



- Formalize a data driven performance-based approach for allocating transportation funds to manage pavements, bridges and ATMS and signal devices
- Incorporate asset management into the intermediate and long-range planning processes
- Incorporate risk management into resource allocation decisions
- Provide a valuable asset management tool with real time data

UDOT Citizen Reports App
The UDOT Citizen Report app gives volunteers direct access to report road and weather conditions to UDOT, thereby assisting thousands of other drivers who are traveling on Utah roads. Up-to-date road condition information is critical.
URL: https://play.google.com/store/apps/details?id=gov.utah.udot.citizenreport

UTAPS CDI Data Initiative
The Utah Crash Data Initiative (UTAPS-CDI) was started as a way to unify the management of crash records – improving efficiency and data access. UTAPS-CDI is a partnership between the Departments of Transportation and Public Safety with the University of Utah. The initiative developed a content management system built on open source tools, where users conduct data quality control, geo-locate crashes, generate reports, and analyze the data using SQL queries, spatial filters, and free text searches through intuitive interfaces. UTAPS-CDI now also integrates data from EMS, the commercial motor vehicle group at the DOT, and the Utah Highway Patrol, expanding the reach of the initiative with a common goal: improve traffic safety.



URL: https://crashmapping.utah.gov/

Automated Vehicles
Automated vehicles may be autonomous (i.e., use only vehicle sensors) or may be connected (i.e., use communications systems such as connected vehicle technology, in which cars and roadside infrastructure communicate wirelessly). UDOT's first-in-the-nation deployment of CAV technology which uses Designated Short Range Communications (DSRC) radios, designed specifically for CAV applications was first demonstrated in 2018. In April 2019, UDOT launched a statewide demonstration of an autonomous vehicle (https://go.usa.gov/xfTeS). In June 2019, it kicked off a $50 million connected vehicle program to improve safety and mobility on the road by sharing data between vehicles, infrastructure, roadways and traffic operators in real time (https://go.usa.gov/xfTeu).

Connected Vehicle Signal Automation
Automated Traffic Signal Performance Measures show real-time and a history of performance at signalized intersections. The measures are used to optimize mobility and manage traffic signal

timing and maintenance to reduce congestion, save fuel costs and improve safety. The UDOT Automated Traffic Signal Measures software was developed in-house at UDOT by the Department of Technology Services. Purdue University and the Indiana Department of Transportation (INDOT) assisted in this project which has now been shared with states around the country (see https://udottraffic.utah.gov/ATSPM/Home/About for additional partners). The signal program completed in September 2018 covers over 16,000 miles of roadway and 1,250 traffic signals. The ATSPM program was developed with high return on investment in mind. Resources invested in the program provide high-value benefits including the ability to assess and improve traffic flow, detect system malfunctions, and quantify multiple measures of performance. This reduces congestion and emissions, and improves safety and operation and maintenance efficiency.
https://udottraffic.utah.gov/ATSPM

Unmanned Aerial Systems (UAS)
Utah has expanded the use of UAS's to include many new use cases, including improvements in the collection of LiDAR data, the use of UAS's for highway sign inspection, and their use in conjunction with Incident Management Team (IMT) vehicles for documenting and clearing traffic incidents. Collecting LiDAR data has been costly and difficult with traditional methods. Utah is now using unmanned aircraft systems for higher density data collection at a lower cost. Using drones for sign inspections reduces the cost of manpower and equipment while reducing the need for road closures and traffic impediments. UAS use in conjunction with IMT vehicles significantly reduces the time needed to document serious and fatal accidents, while decreasing traffic congestion and improving safety.

The use of UAS in LiDAR collection is expected to save Utah $2.9 million over five years. Using drones for bridge inspection has saved the state at least $140,000 while eliminating traffic control needs. The drone also provides the state with a digital log of all the signs which can be referenced in the future. Mapping an incident with UAS's takes about 25 minutes per incident compared to almost 2 hours using traditional alternatives. This is 344% more efficient than traditional methods.

Significance
Over twenty-five stakeholders were involved in creating Utah's Transportation Vision in 2018. This committee helped define the statewide transportation vision as a Pathway to Quality of Life. They identified technologies that would help Utah to achieve the vision.

This vision is then used by UDOT, planning organizations and UTA to develop Utah's Unified Transportation Plan (https://unifiedplan.org). This process involves these partners working together to develop common goals as well as plan time horizons, performance measures and financial assumptions. Everyone then agrees on which projects and needs to include in the Unified Plan, as well as timing, funding and how to measure their effectiveness in meeting shared objectives.

Impact

The 2019 US News Best States Report ranked Utah #2 in the nation for transportation and #3 for infrastructure. Utah has worked hard to improve its transportation systems with the goal of supporting economic growth, maintaining a high quality of life, and improving public safety. Well functioning roadways can reduce crashes and fatalities. “Utah shows that efficient departments of transportation tend to have higher rankings. The state has long been considered an innovative DOT, winning several national awards for administration and creativity,” according to Baruck Feigenbaum, the author of a national assessment of transportation systems in 2019.

UDOT leads the nation in the collaboration of a common traffic signal management system across the state with over 89% of state, county, and city signals interconnected including Automated Traffic Signal Performance Metrics (ATSPM) capabilities. This unique arrangement makes collaboration easy. UDOT worked hand in glove with the Utah Transit Authority (UTA) in the development of a Concept of Operations for an Integrated Corridor Management (ICM) system. That ConOps includes managed lanes, heavy rail, light rail, and bus modes of travel, along with the critical traveler information channels to disseminate information to those who need it. Our Connected Vehicles program is implementing the first Dedicated Short Range Communication (DSRC) corridor for operational use, providing UTA with smart transit signal priority (TSP) capabilities. No place else brings this combination of infrastructure, relationships, functionality, and innovative approaches. All of these together allows Utah to lead the nation in advanced transportation technologies.

The Utah Department of Transportation (UDOT), with its foundational statewide network of fiber and legacy advanced transportation infrastructure, an urban connected vehicle deployment currently in final testing, and robust set of traveler information systems and services, proposes to expand the principles of Smart City deployment to become the first true Smart State in the country.