2023

INNOVATION & EFFICIENCIES REPORT

UDOT
Keeping Utah Moving

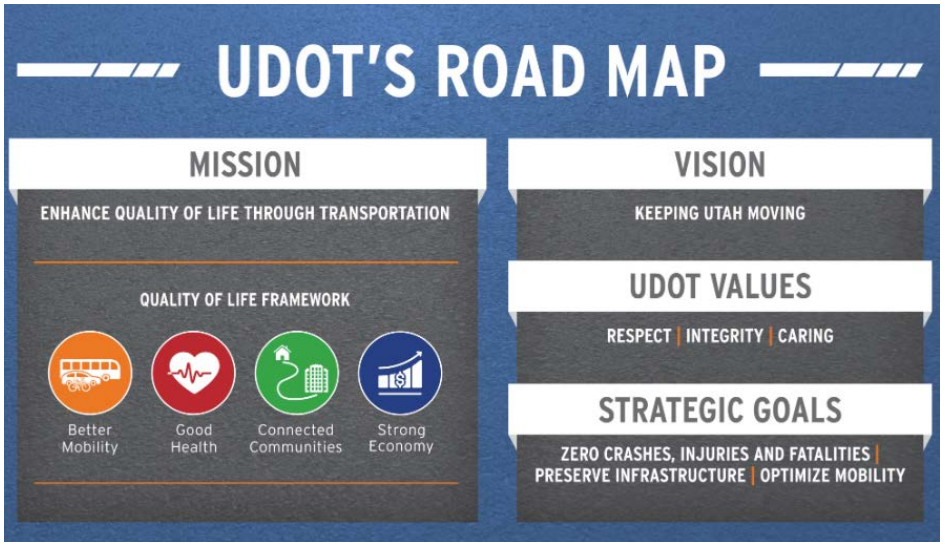
2023 Innovation and Effeciencies Report

The Utah Department of Transportation (UDOT) has a Mission to enhance quality of life through transportation. As careful stewards of taxpayer dollars, we aim to execute that goal in the most effective way – providing the greatest value with every penny we invest. Since 1997, UDOT has reported on the ways we deliver value with efficiency and innovation, and every year we continue to find new and better ways to fulfill our Mission.

The imperative for UDOT to provide a safe, reliable transportation system has perhaps never been more important or challenging. Utah's population is increasing at a tremendous rate, with our population expected to double by 2050. We cannot, and will not, double our lane miles to match the increasing population. With so much change in our state, industry, and technology, we're constantly adapting in every part of our business.

At UDOT, innovation is part of our DNA. Utah is nationally recognized for its legacy of continually seeking ways to do things better, faster and more efficiently. We've had some high-profile successes, like accelerated bridge construction (ABC) and delivering the country's first design-build transportation megaproject. And we've also had successes that were less obvious, yet still incredibly important. This report includes examples that cover the spectrum, from moving bridges to improving safety. And regardless of whether these innovations made the news or are behind the scenes, they all have one thing in common: they help us make life better and safer for everyone using Utah's transportation system.

Carlos M. Braceras, P.E.
Executive Director



IMPLEMENTED INNOVATIONS

555 INNOVATIONS

EFFICIENCIES

$31,661,191
savings to date

84,498 HOURS
saved to date

Cumulative totals since 2017

PUBLISHED OCTOBER 2023

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PROCESS IMPROVEMENT

TRAFFIC AND SAFETY

UNMANNED AERIAL SYSTEMS

Innovation Diversity Leads to Success

Diversity is good for communities. It's good for organizations, and it's good for UDOT. This year, the UDOT Innovation Program recognizes over 60 innovations and efficiencies implemented all across the state. The diversity of solutions and improvements can be seen in technology advancements, in process improvement efforts, and in the ways people make their everyday jobs easier, more efficient, and safer.

The range of work we do at UDOT is varied and diverse. It makes sense that the innovations and efficiency advancements come in all shapes and sizes that reflect that work. Some innovations are novel and creative such as the Region Two Saddle Lift Tool for Sign Repair that was born from a need to make a maintenance task safer and easier. Other innovations rely on the adaptation of existing resources such as the use of Google and LucidSpark applications substituded by the UDOT Annual Conference planning committee in place of expensive contracted services. The diversity of these solutions are as varied as the work they address.

We've expanded the annual Innovation of the Year Award by adding three subcategories to recognize and honor the wide range of innovations. In addition to the current **Innovation of the Year Award** that recognizes the innovation that advances safety, saves time or cost, and/or improves public service the most, we've added the following awards:

Spark Award - Inventive Innovation
In recognition of the creativity required to develop novel processes, tools, or technologies to solve problems and make improvements.

Enhance Award - Adaptive Innovation
Honors ingenuity, adoption, adaptation, or resourceful problem solving using available resources.

Flow Award - Process Innovation
Recognizes the implementation of a new or redesigned process that achieves excellence.

We are excited to promote these new award categories that honor diverse problem-solving skills and implementation efforts. Look for the "Winner" and "Finalists" badges throughout this report that highlight these remarkable innovations.

Innovation success stories came from every group and division at UDOT. With contributions from a greater diversity of people, the range of ideas is broader and more creative. From efficiency benefits realized through process improvements in Comptrollers to technological improvements at the Motor Carrier Monticello Port of Entry, this report documents innovative thinking across the whole organization. Innovation is alive and well at UDOT.

We are a stronger and more effective organization as we continue to push the boundaries of our thinking. A willingness to try new things and share outcomes, whether successful or not, is at the core of our culture of innovation. Celebrate and learn from the diverse work exhibited in this report and keep innovating. It's good for UDOT and it's good for the people we serve.

INNOVATION OF THE YEAR
AWARD FINALIST
2022

Mobile Application Streamlines Emergency Bridge Inspection Process

Problem

In March 2020, a 5.7 magnitude earthquake struck the Salt Lake Valley. Maintenance crews were given a very short amount of time to inspect 750 bridges to ensure their safety.

This flood of emergency inspections overwhelmed the system. Inspectors were supposed to return to a central location to input their written reports, but to speed up the process, they resorted to texting in reports. This created issues with data consistency and made it harder to produce damage reports for senior leadership.

While the overall emergency response effort was a success, there was room for improvement for future events.

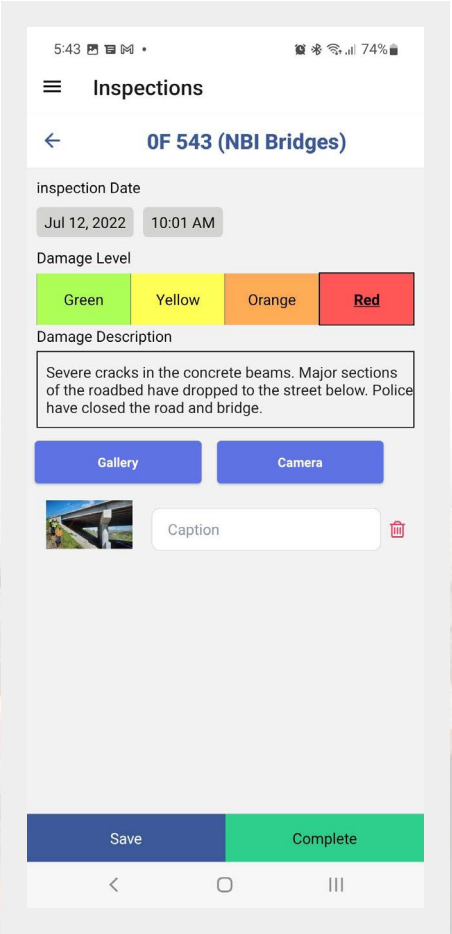
Change

The Structures Bridge Management Group took what they learned and overhauled their emergency response process. With funding from a Federal Highway Administration STIC grant, and by partnering with their bridge inspection software developer, the Structures Division was able to develop and implement a phone-based emergency inspection application called EmergencyX.

Result

During an emergency event, management can use the EmergencyX backend system to easily assign field teams based on their proximity to inspection sites. Inspectors input condition data and photographic records directly into the phone app. The app compiles all of the data in a web-based dashboard that helps with real-time decision-making. Because emergency response teams can access and record data while in the field, information is gathered more quickly and with greater detail.

Based on small-scale testing, UDOT estimates the new app and processes would have reduced inspection time by over 90 hours had the system been in place for the 2020 earthquake response. With EmergencyX, UDOT can more quickly and effectively act to safeguard the public after an emergency.



For more information contact, *Structures Division*

Paint Crew Applications Track Progress and Inventory

UDOT Keeping Utah Moving
INNOVATION OF THE YEAR
FLOW AWARD
FINALIST
2022

Problem

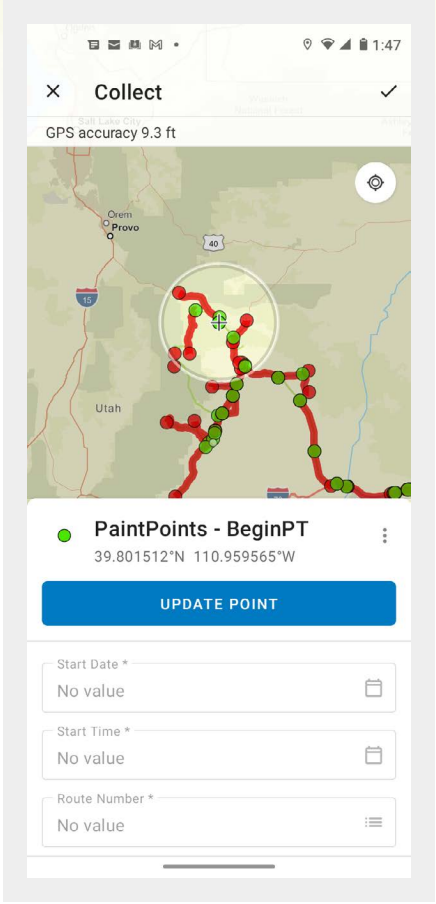
The Region Four paint crew in Price needed a better way to plan their projects and track inventory. Because they work far from their home base, they needed a mobile solution.

Change

UDOT GIS analysts developed two apps. The first GIS map tracks the condition of pavement markings along routes to help crews know what lines need to be repainted. The second app uses ESRI Field Maps and FME (feature manipulation engine) to enable crews in the field to easily track their beginning and end points for the day and the inventory used. The app automatically emails daily reports to supervisors.

Result

These apps improved planning, management, and budgeting for the Price paint team. The maps and reports help them to see where they have painted each season and where to plan future projects. The automated reports minimize the time and money spent on compiling and calculating inventory needs, and they increase transparency and accountability for the paint crew as well. Development costs of these applications were minimal because UDOT already owns the necessary software licenses.



For more information contact, *Region Four GIS*

Advanced Linear Referencing System Converts Mileposts to Linear Measurements

Problem

Mileposts, the physical reference posts along the side of UDOT-maintained roadways, can be misleading to design engineers and maintenance personnel.

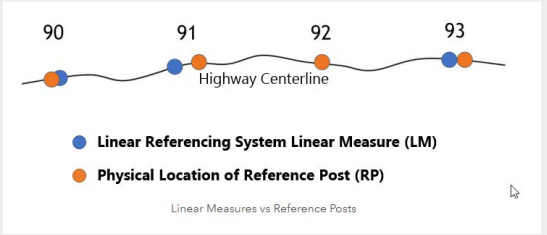
In July 2021, UDOT began using linear measures (LM) to track the location of features on UDOT roadways. These "digital mileposts" do not often correspond with physical mileposts, because over time roadways are altered. The mismatch happens as linear measures are updated based on the new length of the route, but physical reference posts are not moved.

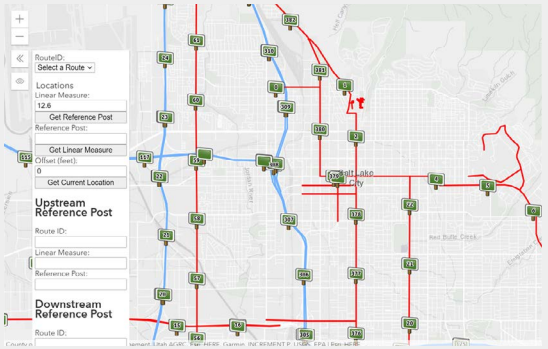
Change

The Advanced Linear Referencing System (ALRS) Conversion Application was developed to convert the location of physical reference posts to accurate linear measurements, and vice versa.

Result

The application enables design engineers and maintenance personnel to accurately communicate physical locations and linear measurements.





LINK: More Information

LINK: ALRS Conversion App

For more information contact, *Data, Technology, and Analytics Division*

New Sign Base Mobile Inspection Application Increases Safety

Problem

After a crash fatality due to roadside safety hardware (sign base) not functioning as designed, the Traffic and Safety Division committed to inspecting all 72,000 sign bases. Inspectors needed a way to track, locate, and record inspection data on all affected sign bases.

Change

The division created a mobile inspection app using Mandli sign base data and Esri's Field Maps app. The app supports field crews inspecting each of the sign bases statewide.

Result

As of June 2022, UDOT has completed inspections of approximately 40% of the statewide inventory. Non-compliant sign bases were identified and repaired increasing the safety of the traveling public. Inspections continue.

For more information contact, *Data, Technology, and Analytics Division*

Employee Quick Help Directory Makes Region Three Contact Easier

Problem

Finding the right person to contact, whether it's for a quick answer to a question or in an emergency, is difficult because the State Employee Directory and Google Contacts are not organized by helpful topics. Moreover, radio numbers and office/shed numbers are not included in these directories. This problem has been exacerbated as more employees work remotely and job functions have been decentralized.

Change

A shareable spreadsheet was created that contains two directories. One sheet is a directory of Region Three emergency contacts including mobile phone number, office/shed telephone, and radio number. The other sheet has a quick help list of contacts organized by topic.

Result

Region Three now has easy access to a regularly updated directory of all essential contacts. The information is maintained by the region executive assistant/communication specialist.

This tool saves time and effort, as employees have all the information they need in one place. In case of an emergency, multiple methods of contact are available for each person, including radio information.

The Quick Help directory is especially useful when an employee has a question about a topic but doesn't know exactly whom to contact.

UDOT Region 3
Employee Quick Help Directory

UDOT Keeping Utah Moving

Help Desk
General Questions/Directory Assistance

Chriss Anderson	801-227-8042 801-815-3686 (text)	cmanderson@utah.gov

IT Help Desk
If you have a computer question

Bobby Case	801-227-8080	rcase@utah.gov
Dylan Wolkins	801-227-8010	dwolkins@utah.gov

Safety
If you have a question regarding safety procedures

Seth Buhler - People	801-227-8015	sethbuhler@utah.gov
Mete Siafausa - Construction Projects	801-222-3450	msiafausa@utah.gov

Payroll/Accounts Payable
If you have questions about your timecard or reimbursement

Nena Woodmansee	801-227-8009	nfrischknecht@utah.gov
Britni Worthington	801-227-8018	bworthington@utah.gov

Nena and Britni are in the office Mondays and Wednesdays

Radio/Communications
If you have questions regarding truck radios

R3 Maintenance Shop - North/South Areas	801-222-3415	Email your shed's assigned mechanic or the shop if not in a shed
Buck Taylor and Daniel Taylor - Basin	385-799-2333 435-738-5731	buckteylor@utah.gov danieltaylor@utah.gov

If you have questions regarding hand radios

Scott Lott	801-222-3415	scottlott@utah.gov

Human Resources
If you have questions regarding any state provided benefits or employment rules

AskHR	801-957-9390	https://dhrm.utah.gov/contact/

Contracts/Procurement
If you have questions regarding the hiring of contractors or purchasing of materials

Lester John	801-222-3477	ljohn@utah.gov
Teresa Johnson	801-244-1966	teresajohnson@utah.gov

Teresa also assists with emergency purchase forms, salt exceptions, etc.

Administrative Services Manager
If you have questions about purchasing or your P Card

Wade Ramsay	801-227-8002	wramsay@utah.gov
Britni Worthington	801-227-8018	bworthington@utah.gov

Britni is in the office on Mondays and Wednesdays

Damage Claims
If you have a question regarding damage claims

Kassidy Price - State Property	801-227-8005	kassidyprice@utah.gov
Seth Buhler - Worker's Comp.	801-227-8015	sethbuhler@utah.gov
Mete Siafausa - Worker's Comp.	801-222-3450	msiafausa@utah.gov

www.udot.utah.gov/connect/public/claims to file a claim against the state for damage to personal property

Permits
If you have a question about the Permit Process

Marshall Terry	801-222-3438	mjterry@utah.gov
Jim Winn	801-227-8017	jjwinn@utah.gov

Right of Way
If you have a question about UDOT Surplus Property or ROW

Dan Avila	801-227-8021	davila@utah.gov
Jason Henley	801-800-9634	jasonhenley@utah.gov

Public Involvement
If you receive a question from the public or wonder what UDOT's Position Is

Geoff Dupuis	Office: 801-227-8012 Cell: 385-375-1620	gdupuis@utah.gov
Chriss Anderson	801-227-8042	cmanderson@utah.gov

Planning and Program Management
If you have a question regarding long term plans (Eric) or current projects (Matt)

Eric Rasband	801-608-8870	rasband@utah.gov
Matt Parker	801-227-8025	mattparker@utah.gov

EMERGENCY
DIAL
911

Region 3 Director
Director of Operations R3

Rob Clayton	robertclayton@utah.gov	Please schedule meetings with Rob through Chriss cmanderson@utah.gov
Office 801-227-8001	Cell 801-514-9780	

For more information contact, *Region Three Communications*

Making Mondays Better with Humor

Problem

Returning to work after a great weekend can be tough. Mondays are often stressful, busy, and overwhelming, which makes it even harder to pull out of weekend mode.

Change

Humor helps to lighten the mood and put things in perspective. Each Monday morning, short, appropriate-for-the-workplace jokes are sent out through Gmail Chat to colleagues and friends to help make Mondays better and start everyone's week off on a positive note.

Result

A laugh, or at least a smile, is great for mental health and is a free stress reliever. Starting the week with fun and humor has been well received and an easy way to build comrarderie and support between coworkers.

"I gave up my seat to a blind person on the bus. And that's how I lost my job as a bus driver."

— Happy Monday! —

"The boss told me to have a good day. So I went home."

— Happy Monday! —

"The first five days after the weekend are the hardest."

— Happy Monday! —

"A bus station is where a bus stops. A train station is where a train stops. On my desk, I have a work station."

— Happy Monday! —

For more information contact, *Abdul Wakil*

New Website Directs Focus on Employee Resources

Problem

Employees, contractors, consultants, legislators, federal partners, and the traveling public all make use of UDOT's public facing website, udot.utah.gov. With the site addressing so many different groups, it was difficult for UDOT employees to find applications and other internal information. In addition, there was some confusion about the YoUDOT.utah.gov site used for news and announcements.

Change

The UDOT Employee Resources website launched on May 11, 2022. The new website focuses on one audience: UDOT employees.

Result

Employees now have one convenient place to access all of their web applications, resources, and work information, which has eliminated a lot of confusion and wasted time.

Employee-specific information has been removed from the department's main site as well, which has made it easier for UDOT partners and the public to navigate it.

For more information contact, *Communications*

Interactive Department-Wide Organizational Charts Now Available

Problem

Knowing who fills each role within the different divisions of the department is important. However, because employees move around so much, the previous UDOT Organizational Chart was difficult to keep updated. Furthermore, the old organizational chart was not searchable.

Change

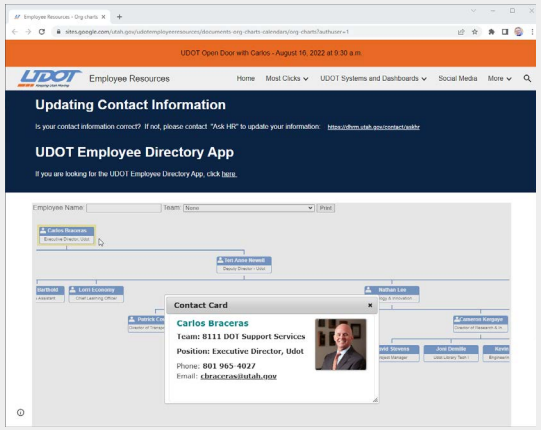
There are now two department-wide organizational charts available.

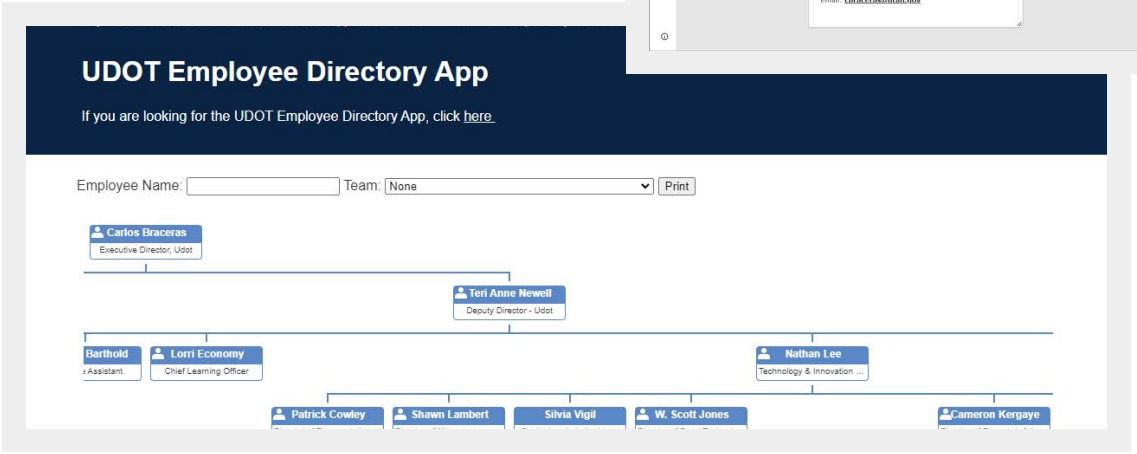
An interactive, matrix-style org chart is available on UDOT's public website. It is well organized for people who want to drill down through each level of the organization to see who is on specific teams. The chart gets updated every two or three weeks with source data from the UDOT Learning Portal.

An interactive, searchable org chart is available on UDOT's Employee Resources website. This org chart is searchable by first and last name and displays employee photos. This org chart makes it easy to find where a person fits within UDOT. Information is automatically updated regularly from the Division of Human Resource Management records.

Result

Employees and the public can quickly and easily explore UDOT's organizational structure and identify the employees who fill each role.





For more information contact, *Communications*

Quality of Life Framework Leads to More Inclusive I-15 Planning

Problem

In addition to replacing aging infrastructure, the I-15 corridor from Farmington to Salt Lake City also required attention to needs related to safety, mobility, and connectivity issues for all users.

Change

In preparing the Environmental Impact Statement (EIS) for the I-15 Farmington to SLC study, UDOT made use of Utah's Transportation Vision Quality of Life Framework to define the purpose and need for the EIS consistent with the Quality of Life Project outcome areas of Good Health, Connected Communities, Strong Economy, and Better Mobility. Using the Quality of Life Framework allowed UDOT to better define the multifaceted needs for the I-15 corridor and better develop and evaluate alternatives that would improve all four of these outcome areas. This approach allows UDOT to provide more planning and emphasis on items, such as pedestrian and bicyclist facilities, that have historically not been developed or considered until much later in the planning and project development processes.

Result

AThe Quality of Life Framework provided planners a way to identify and prioritize project objectives and remain consistent with our mission. The process helped them develop these objectives:

Improve Mobility for All Users
Improve mobility and operations on the I-15 mainline, I-15 interchanges, connected roadway network, transit, bicyclist and pedestrian facilities.

Improve Safety - Good Health
Improve the safety and operations of the I-15 mainline, I-15 interchanges, bicyclist and pedestrian crossings, and connected roadway network.

Better Connect Communities
Be consistent with planned land use, growth objectives, and transportation plans; support UTA FrontRunner Double Track projects and enhance access and connectivity to FrontRunner.

Strengthen the Economy
Replace aging infrastructure on I-15; enhance the economy by reducing travel delay on I-15.

For more information contact, *Region One Construction*

Recognizing All Users

Problem

Community needs are an inherently dynamic issue. As our population continues to grow and the needs of our communities evolve, transportation departments must adapt to better understand the populations they serve.

Change

The department strives to uphold our mission of enhancing quality of life through transportation for all people. Where transportation departments used to focus primarily on vehicle users on our roadways, we now consider a much broader planning view of "all users."

Result

The "All Users" approach puts people and communities at the heart of our decision-making to create a safer, more reliable and accessible transportation system. It helps UDOT intentionally design a transportation network where every user—pedestrians, transit riders, motorists, drivers and cyclists, and people of all ages, backgrounds and abilities—can travel safely and efficiently. This All Users view is integral to UDOT's approach to achieve our mission and support transportation equity.

PEOPLE FIRST

Decision-making focused on the end user's experience.

ALL MODES

Walking, biking, transit and vehicle travel are addressed in transportation decision-making.

TRANSPORTATION EQUITY

Consideration of mobility and accessibility needs of community members with attention to historically underserved groups.

For more information contact, *UDOT Communications*

Rest Areas Remain Open Through Contractor Change

Problem

With no prior notice, UDOT's rest area management contractor went out of business, leaving 42 employees and several other sub-contracted individuals suddenly unemployed. Consequently, UDOT was left without a team to clean, maintain, and manage rest stops statewide.

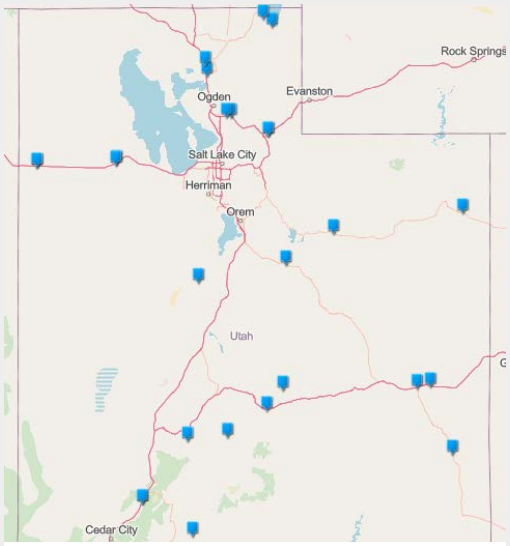
Change

The Maintenance Planning and HR teams worked tirelessly over a few weeks, including weekends to hire all of the contractor's employees as UDOT Time Limited (TL) employees.

Result

All employees kept employment with no lapse in pay. Each of UDOT's 29 rest areas and 11 view areas remained open for the traveling public. Upon award of a new contract, the majority of TL employees were retained by the new contractor.

Rest areas are a vital part of UDOT's mission to Keep Utah Moving.



Grassy Mountain West

Name: Grassy Mountain West
Location: I-80 W MILE 54
Year Built: 2000
Car Stalls: 24
Truck Stalls: 15
Nearest Communities: Salt Flast WB, West, 45 miles; Stansbury Park, East, 48 miles

UDOT Rest Area Report

Rest Area Data

For more information contact, *Maintenance and Facility Management Division*

Zero Fatalities Safety Message Offers a Carrot

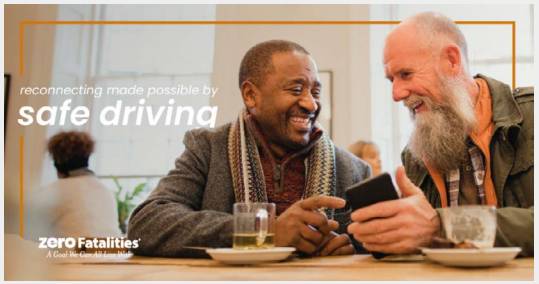
Problem

UDOT is committed to safety and we won't rest until we reach our strategic goal of zero crashes, injuries, and fatalities. Safety messaging is an important part of changing dangerous driving behaviors but if the messaging isn't refreshed continually, the public will stop responding to it.

Change

To re-engage public attention, the Traffic and Safety Division updated their safety messaging to focus on rewarding safe driving behaviors instead of using fear-based tactics.

The division's Zero Fatalities program, a joint effort between UDOT, the Department of Public Safety, and the Utah Safety Council, launched a new safety outreach effort called the Destination Campaign. It highlights seasonal activities Utahns enjoy, like skiing in winter and going to rodeos in the summer. The messaging focuses on the beauty of Utah and the many things to do around the state—as long as you arrive safely. Some messages still touched on the dangers of driving and how one individual's decisions affect others, but the "fear" detriments are balanced out by the "rewards" message of all that Utah has to offer.



Result

The updated campaign launched in January 2022 on social media, billboards, and TV ads. Like all Zero Fatalities initiatives, the impact of this campaign will be tracked.

For more information contact, *Traffic and Safety Division*

Walking Tour at Move Utah Summit Helps Attendees Experience the Impacts of Access Issues

Problem

Planners have a lot to consider as they grapple with development and community needs. While there is a great desire to address equity, diversity, inclusion, and access (EDIA) issues, it is sometimes difficult to truly understand a community's needs without walking in their shoes.

Change

At the Move Utah Summit in February 2022, an off-site walking tour was organized to help attendees learn about the planning issues in the area. The tour began at Harmony Park in a neighborhood near 3700 South and Main Street in Salt Lake City. The group saw firsthand how insufficient access to fresh food, transportation, and public space affected the quality of life for residents. The group then walked to the TRAX station, transferred to the S-Line streetcar, and finished by walking to Sugarhouse Park at 1300 East and 2100 South. Comparisons were made between the two neighborhoods across multiple indexes including income, health outcomes, and life expectancy.

Result

Over 60 individuals—including residents, transportation planners, health advocates, students, and community organizers—participated in the walking tour. They gained a greater understanding of a range of planning issues and how various equity, diversity, inclusion, and access issues impact people's quality of life. Some of the realizations participants made include the following:

- Life expectancy between the two neighborhoods differs by 11 years.
- Eastside residents have five fresh food stores within five miles of Sugarhouse Park, while there are no fresh food resources within five miles of Harmony Park.
- Significant differences in noise, traffic, raised crosswalk paths, and desirable park features in each neighborhood.
- Consequences of having different tax bases.

For more information contact, *Planning Division*

INNOVATION OF THE YEAR AWARD FINALIST 2022

Transportation Equity Workshop Enhances Equity, Diversity, Inclusion, and Access Understanding

Problem

Creating opportunities for people to have positive conversations about equity, diversity, inclusion, and access (EDIA) can be difficult for many organizations. As UDOT works to build a culture based on its values of integrity, respect, and caring, the department needed to find ways to facilitate conversations that lead to greater understanding of EDIA.

Change

In June 2022, the first Transportation Equity Workshop was held. The workshop, held over two half-days at the Utah State Capitol, included UDOTand UTA employees, federal and community partners from transportation and regional planning groups, and staff from the Utah Division of Multicultural Affairs. With a wide range of presenters covering a variety of transportation topics, the workshop engaged attendees with many interactive exercises.

Result

The workshop had over 60 participants, who attended either in person or online. The workshop provided attendees with many chances to learn from one another and gain a greater understanding of transportation equity. One indicator of success is that the Division of Multicultural Affairs is interested in adapting this workshop curriculum for other state agencies to use.

For more information contact, *Planning Division*

UDOT Broadens the Definition of "High Visibility" Recruitment

Problem

Hiring is a challenge across the state and UDOT was experiencing that especially in Region Two maintenance sheds.

Change

During the summer, community parades and festivals provide an opportunity to advertise open positions. Maintenance station crews entered large snow plows and other impressive maintenance equipment in the Taylorsville, Riverton, and Kearns parades. "Now Hiring" banners were hung on the sides of the vehicles and featured QR codes to take applicants to the Utah State Jobs site.

Result

Positive exposure at community events has increased UDOT's visibility to the public and helps recruit new employees.

For more information contact, *Communications*

Fly Utah Education Program Builds Aviation Workforce

Problem

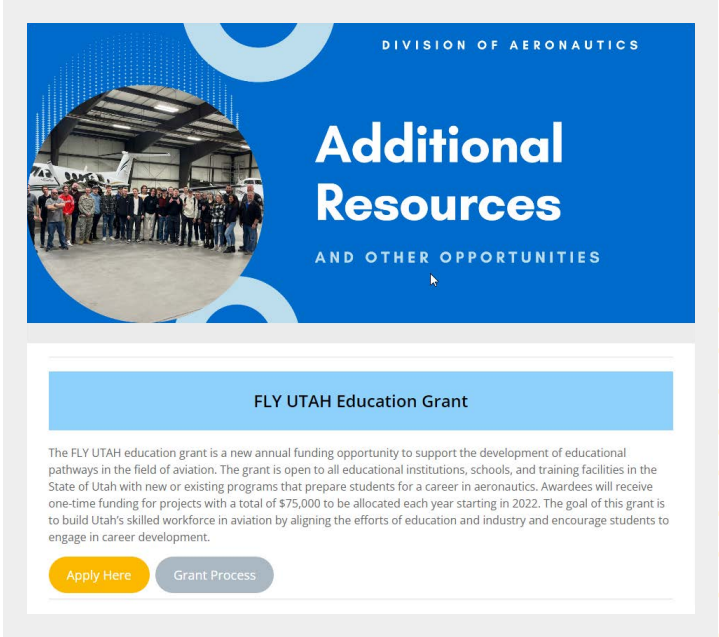
Tens of thousands of pilots, technicians, and cabin crew members will leave the workforce as they retire over the next decade.

Change

The FLY UTAH Education Grant, sponsored by the UDOT Aeronautics Division, is a new annual funding opportunity to support aviation education. The grant is open to all educational institutions, schools, and training facilities in Utah that have new or existing programs that prepare students for careers in aeronautics.

Result

This grant builds Utah's aviation workforce by aligning the efforts of education and industry to attract and prepare students for careers as pilots, mechanics, technicians, and engineers.



For more information contact, *Aeronautics Division*

State Infrastructure Bank Loan Allows Small Community to Replace Essential Bridge

Problem

In 2021, UDOT Structures Division inspected bridges in Elwood Town and determined that one bridge needed to be closed to traffic due to safety concerns. The bridge, located on a collector road that connects to a major arterial road, provides route access to schools, farms, and a manufacturing plant. The anticipated cost to repair the bridge was a significant financial challenge for the small community.

Change

Elwood Town secured an $800,000 low-interest loan from the State Infrastructure Bank (SIB)* to replace the closed bridge.

*UDOT manages applications for loans and repayment while the Utah Transportation Commission has approval authority of the State Infrastructure Bank funds. See UDOT's SIB webpage for more information.

Result

The State Infrastructure Bank is an innovative way to support projects that might otherwise struggle for funding. With a small tax base and limited borrowing capability, small communities often have difficulty affording infrastructure repair and maintenance costs. With a loan from the SIB, Elwood Town did not have to wait to replace a structure that provided essential access and mobility for residents and businesses.

For more information contact, *Strategic Investments Division*

INNOVATION OF THE YEAR
ENHANCE AWARD
FINALIST
2022

Use of Google and Lucidspark Saves the Day

Problem

The Annual Conference planning team needed a quick solution to gather, sort, review, and organize over 150 breakout submittals for the 2021 UDOT Annual Conference. Typically this is done using the event consultant's existing software package, but it was unavailable before the tight deadline.

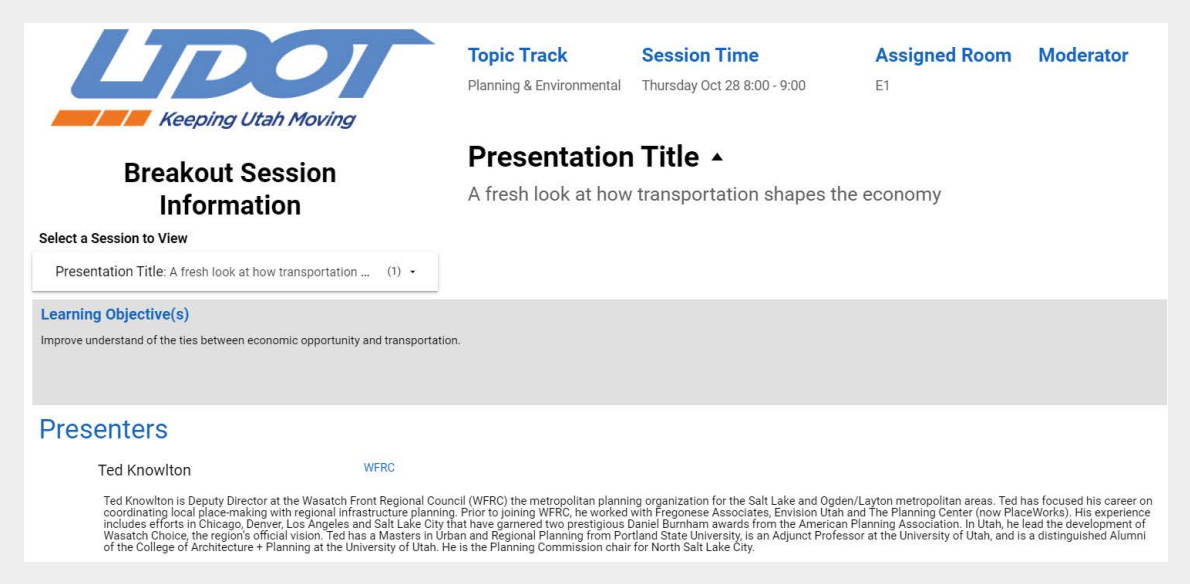
Change

The team used Google Forms, Google Sheets, Google Data Studio, and Lucidspark Whiteboard to seamlessly gather, sort, review, and organize the breakout submissions.

Result

$60,000 in consulting fees were saved by completing this and other tasks in-house with the tools UDOT already had available.

LINK: Breakout Session App



For more information contact, *Data, Technology, and Analytics Division*

UDOT ANNUAL CONFERENCE Keeping Utah Moving

UDOT Vehicle Miles Traveled Dashboard Saves Time and Improves Data Integrity

Problem

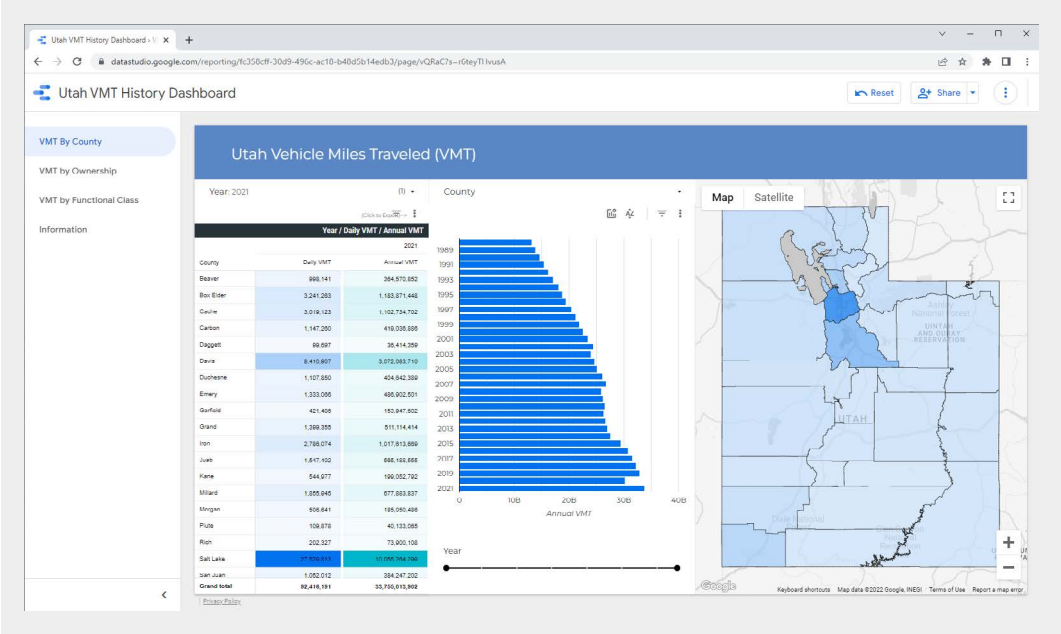
UDOT and its local and federal partners rely on Vehicles Miles Traveled (VMT) to measure the traffic volumes along a particular stretch of roadway. This data helps us to effectively manage traffic, plan future projects, and prioritize resources. VMT data previously existed only in PDFs and spreadsheets. Users had to request a custom report if they needed data categorized by attributes such as county, functional class, ownership, or years collected, which was a time-consuming process.

Change

A VMT dashboard was created in Google Data Studio to provide a single location for all past collection years. Users can now customize the data by categories and attributes themselves. Results are displayed in tables, charts, and maps, and can be exported into a Microsoft Excel format if needed.

Result

Since users can view the online dashboard and customize the data view to their unique needs, the Traffic Data Group receives less requests for custom reports. Backend data is also easy for administrators to manage and update. Furthermore, data is more consistent and accurate because it's all pulled from the same data set.



LINK: UDOT Traffic Website

LINK: VMT Dashboard

For more information contact, *Data, Technology, and Analytics Division*

Internal Audit Builds an Interactive Enterprise Risk Assessment Tool

Problem

Many government audits are a lengthy linear read that require a good memory and a lot of back-and-forth review to digest. Consequently, it is often difficult to understand the relationships between risk elements and takes considerable effort to identify trends and targeted mitigation efforts.

Change

UDOT's Internal Audit Division, with assistance from the Technology and Innovations Division, developed a smart approach to transforming UDOT's annual enterprise risk assessment report into a highly interactive experience using Google Data Studio.

Result

This new enterprise risk assessment tool brings the underlying report to life. By categorizing each risk element into an interactive 3x3 table, the reviewer can easily visualize each risk element, from the lowest impact to the highest and from the lowest likelihood to the highest. The cube's color-coding also serves as a visual heat map.

This interactive approach allows the reviewer to display other essential attributes so they can see how risk elements relate back to specific UDOT groups and risk classifications (e.g., type 1 or type 2 risks).

In addition, a third screen breaks out risk elements based on funding proposals, UDOT-wide reviews, and proposals for an internal audit review.

For more information contact, *Internal Audit*

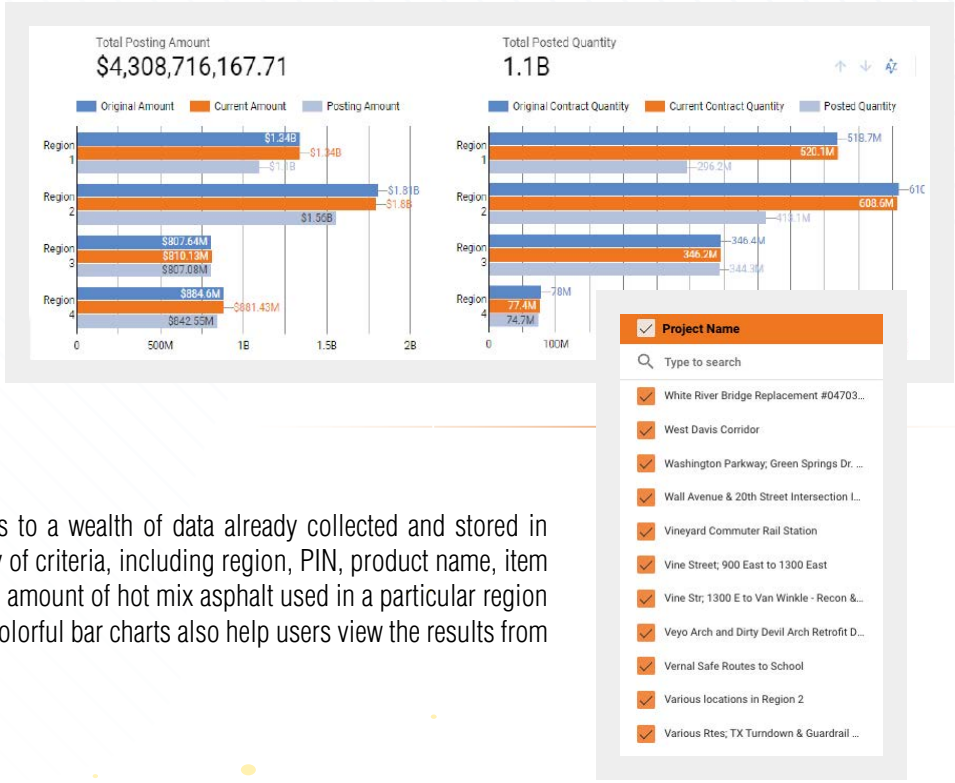
Dashboard Taps the Gold Mine of Masterworks Item Placement Data

Problem

UDOT records all standard items purchased—hot mix asphalt, pavement-marking paint, sign post etc.—and where these items are placed or used. Accessing this information directly from the Masterworks database is a time-consuming process.

Change

The Electronic Business team in the Technology and Innovation group has developed a new Item Placement dashboard. This online dashboard sorts information into useful categories like placement of items, quantity, and unit price stored in Masterworks.



Result

The Item Placement dashboard provides decision makers with better access to a wealth of data already collected and stored in Masterworks. The dashboard interface allows users to filter data with a variety of criteria, including region, PIN, product name, item number, item description, and date. For example, if a user wanted to know the amount of hot mix asphalt used in a particular region during a specific date range, this can easily be filtered using the dashboard. Colorful bar charts also help users view the results from a high level, with the ability to drill down as desired.

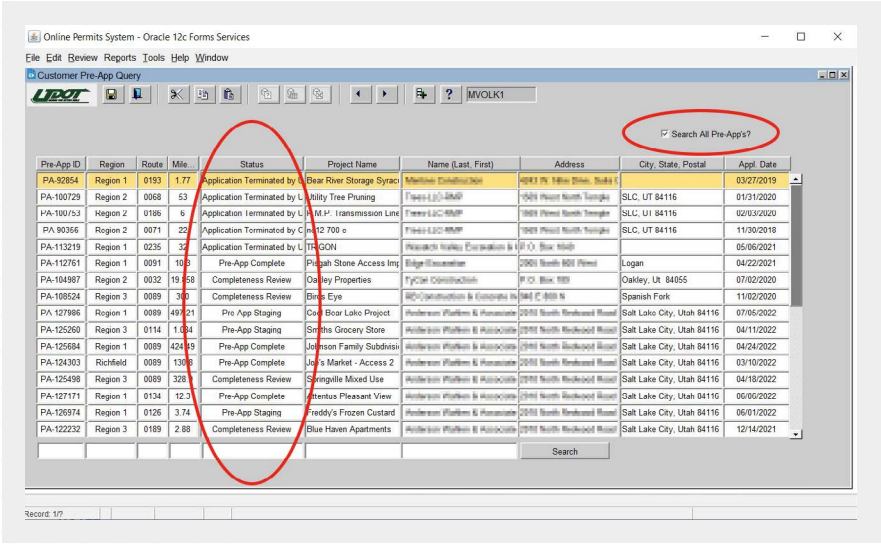
For more information contact, *Data, Technology, and Analytics Division*

Online Permit System Enhancement Improves Administrative Processes

Problem

Before a customer can apply for a Conditional Access Permit, they must participate in a pre-application meeting with regional permitting personnel. Once the meeting is completed, a record is created in the Online Permit System (OLP) that contains all the information related to the proposed project, including who attended the meeting and a discussion summary.

However, the OLP's search tool did not show pre-application meeting records that had advanced beyond the pre-application stage of the digital workflow. Permitting personnel needed a way to review this pre-application information regardless of the application's workflow status.



Change

UDOT's Statewide Permitting Office worked with the Division of Technology Services to enable the OLP system to search for all pre-application meetings regardless of workflow status.

Result

OLP searches now include all pre-application meetings across the state for any workflow status. Searches can be narrowed by region, pre-application status, and date so information can be found quickly. Region personnel can find older, incomplete pre-applications and terminate them if they are inactive, and they can also view pre-application notes easily, which helps to inform new access-related project interests. These incremental advancements improve administrative processes, aid with program efficiencies, and enhance UDOT's record-management practices.

For more information contact, *Right of Way Division*

Outdoor Advertising Control Moves Annual Permit Renewal Billing to the Digital Age

Problem

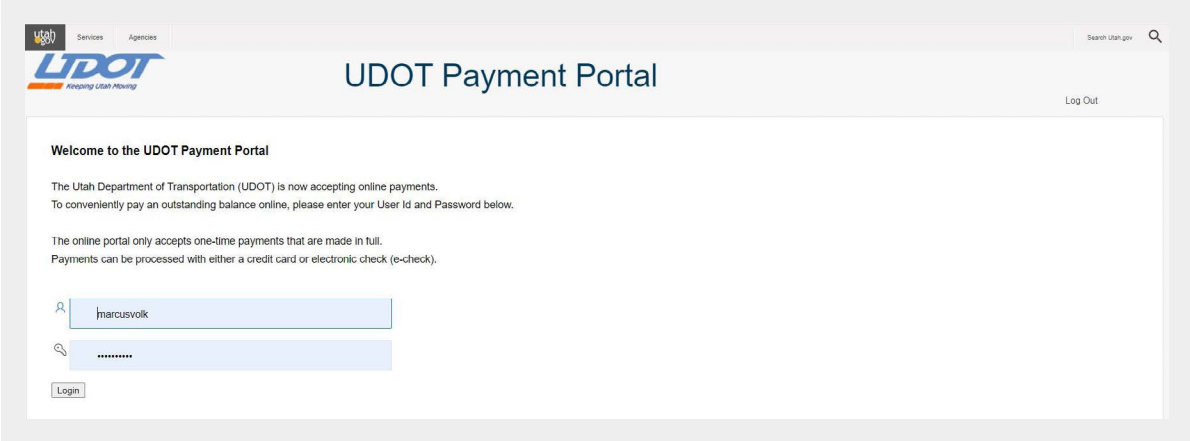
Toward the end of each fiscal year, UDOT Outdoor Advertising Control sends out around 400 invoices for annual sign permit fees, which have to be manually printed, folded, stuffed, and mailed. Along with the invoice, a separate letter explaining the payment process is also sent. This annual permit renewal process takes a lot of time to complete and consumes a lot of resources.

Change

With the help of the Data, Technology, and Analytics Division, UDOT created an electronic workflow for sending invoices. Invoice and payment letters are generated as a PDF file and then attached to the applicable email address in the billboard permit database. When these drafts are completed, invoicing can be sent out all at once.

Result

The new electronic process means no more printing hundreds of pages, stuffing envelopes, and paper cuts. The whole task can be completed more or less at one time, instead of scheduling envelope-stuffing sessions over several days. The new process saves approximately 15 work hours and $300 in postage and materials each year.



For more information contact, *Right of Way Division*

Dash Cam Imaging Improves Outdoor Advertising Enforcement

Problem

UDOT enforces state and federal standards for the sizing, lighting, spacing, and zoning of advertising signs along state roads. The Outdoor Advertising Control (OAC) team gathers photographic evidence of potential advertising violations. They usually do this by pulling to the side of the road, sometimes in heavy traffic with a narrow shoulder, to take photos, which is unsafe.

Change

In order to better communicate violations to sign and property owners, the OAC team purchased a GPS-equipped dash cam to record video as they drive through enforcement areas. Still images are later extracted from the video and oriented on Google Maps.

Result

Data collection for advertising enforcement takes less time now and is a safer process since team members do not need to pull over or exit their vehicles.

For more information contact, *Right of Way Division*

INNOVATION OF THE YEAR
ENHANCE AWARD
FINALIST
2022

Monticello Port of Entry Improvements Save Truckers Time and Fuel

Problem

Some commercial traffic is required to stop at Utah ports of entry to make sure they are in compliance with laws and rules governing safe and lawful operation. Drivers traveling on US-191 near Monticello were required to divert a few miles out of their way on US-491 to cross the scales at the Monticello Port of Entry before returning to US-191 to continue their trip. This diversion cost them time and fuel, and manning a second port of entry so close to an existing one was not cost effective for UDOT.

Change

Recently, UDOT installed additional technology to make traveling through the Monticello area more efficient for truck drivers. Devices along US-191 read the license plate and USDOT number on the side of each passing truck, and weigh-in motion sensors capture weight measurements. In a split second, all of this data is sent to the port of entry, where it is compared with state and federal databases to ensure the vehicle is in compliance. If everything is found to be in order, the driver is notified that they may continue on US-191. If any anomalies are found, the vehicle is automatically directed by variable message signs to change their route and proceed to the Monticello Port of Entry.

Result

This automated system is similar to other Utah ports of entry, except that it is located on a different highway, several miles from the port of entry station. The dual monitoring system has the added benefit of saving most drivers along US-191 the hassle and expense of leaving their route to travel to the Monticello Point of Entry. Every minute a truck is stopped or off-route costs the operator money, which is ultimately passed on to the consumer.

For more information contact, *Motor Carrier Division*

Inventory Barcodes Reduce Warehouse Downtime

Problem

UDOT maintains a vast inventory of supplies and equipment in central and regional warehouses. Manual inventory processes resulted in lengthy downtime, high count variances, and data quality errors.

Change

The Comptroller's office and Warehouse developed a mobile app to scan inventory barcodes and a scheme in the state's centralized accounting system (FINET) to track incoming and outgoing inventory. The physical space of the six primary UDOT warehouses was also reorganized to complement the new process.

Result

The new inventory process expedites order fulfillment and reduces human error. Outcomes from the April 2022 pilot show great promise. Count variance at the six primary UDOT warehouses was reduced to .4% from .6% (FY2021) and .96% (FY2020). Warehouse downtime for inventory was reduced from eight days to one or two days depending on the site, which has improved customer satisfaction.

For more information contact, *Procurement Division*

Adding Crash Narratives to AASHTOWare Safety Improves Access to Data

Problem

Vehicle crash data is used by many parties. However, obtaining redacted information from police crash reports is time consuming and resource intensive.

Change

The American Association of State Highway and Transportation Officials (AASHTO) maintains a nationwide repository of safety-related data called the AASHTOWare Safety application. This web-based data platform is often referred to as the Numetric system.

To make it easier to access crash narrative descriptions, the UDOT Traffic & Safety Division worked closely with the Department of Public Safety, the University of Utah (where UDOT's crash database is housed), and the engineers at Numetric Inc. to incorporate redacted crash narratives into the Numetric system.

Result

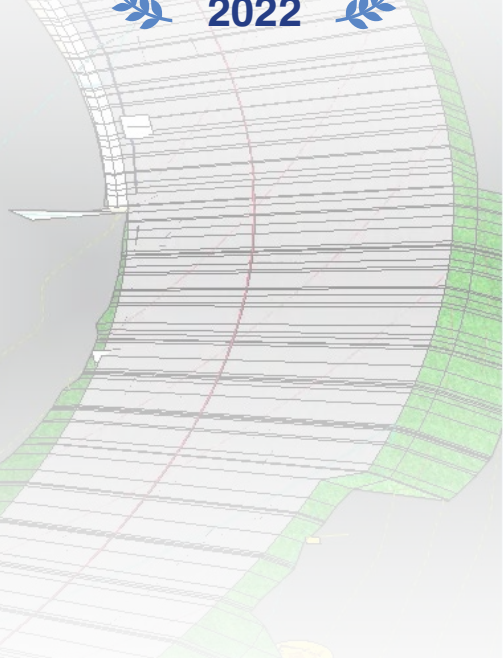
Adding crash narratives to the Numetric system improves workflow efficiency for crash data users. Anyone with an account to AASHTOWare Safety (Numetric) can, easily see crash narratives for specified fatal and suspected serious injury crashes on the web data platform. This conserves UDOT's resources by eliminating separate crash report requests.

Over time, UDOT will expand the amount of records shared on the Numetric platform. Right now, crash narratives are limited to certain severity levels and cover a limited number of years.

For more information contact, *Traffic and Safety Division*

New Digital Delivery Workspace Makes It Easier to Produce Digital Designs

INNOVATION OF THE YEAR
ENHANCE AWARD
FINALIST
2022



Problem

UDOT's digital delivery workspace is an environment managed by the departmentthat controls the resources and tools CADD users have access to when they're working on projects. For projects that are not delivered digitally, designers produce paper plan sets that have information for project features printed on the plan sheets. The digital delivery process requires information about project features to be contained within the lines and cells of the digital CADD files. Without a standardized, digitally focused workspace, this information is inconsistent between projects and is time consuming for designers to produce.

Change

A UDOT team developed a new workspace for delivering projects in a digital space, concentrating on expanding a set of design elements: signing, striping, barrier, pavement, drainage, utilities, and some structure elements.

The new workspace expands the digital metadata required for these elements, which makes it easier for designers to assign and manage the data.

Extra information, like attributes, has also been added to the graphic information. In the past, this extra information was conveyed in text on a paper plan set. Now, contractors using the digital plans can click a line and get the extra information they need. For example, a curb and gutter line would contain the type of curb, station location, and pay item information.

Result

The new, expanded workspace makes it easier and more efficient to design using all of the digital information needed to bid out a project. The new workspace also creates consistency between different digital delivery projects.

The information conveyed about project features will not just go to the contractor, but will stay with the project through construction and eventually be returned to UDOT as digital as-built files for asset management, including keeping digital files for legal records.

For more information contact, *Preconstruction Division*

Saddle Lift Tool Makes Sign Repairs Safer and Faster

UDOT Keeping Utah Moving
INNOVATION OF THE YEAR
SPARK AWARD
WINNER
2022

Problem

Barrier mounted signs (Median Concrete Barrier Pivot Sign Base—SN14) are designed with a safety feature so that, when broken, the sign post stays attached to the sign base, but swings down into a resting position.

To repair the sign, someone must raise the post to the correct upright position and insert a new pin into the sign base. This means having a couple of workers stand on the concrete barrier to lift the sign themselves. Or, in regions that have a crane truck, they can close a lane (often the HOV lane) and use the crane to lift the sign. Either way, it is dangerous, resource-intensive, and time-consuming work.

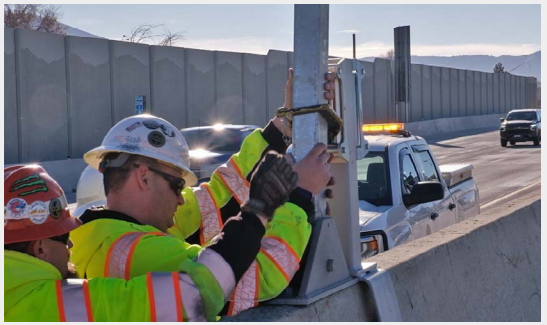
Change

The Region Two Sign and Guardrail Shop designed a new tool that easily raises the sign post using a truck-mounted winch. First the saddle lift is secured to the sign mount using the sign base bolt. The saddle lift can be mounted to pull the sign in either direction as needed. Once secured, a cable connects a square bracket to the sign post; the other end of the cable is connected to a vehicle winch cable. The winch provides the mechanical force to lift the sign post while the built-in rollers maintain correct cable alignment, regardless of the position of the winch. The sign is held in the correct position while the replacement pin is inserted in the base and, if needed, the ARGO safety bumper can be installed. Once the sign is repaired, the winch cable is released and the bracket is removed from the post. The saddle lift is disconnected from the base and the base bolt is again secured to the barrier.

Result

The saddle lift is a low-cost tool that allows UDOT crews to quickly and safely repair SN14 signs, without the need for a crane or the closure of a lane of traffic.

For more information contact, *Region Two Maintenace*



LINK: Spark Award - Inventive Innovation of 2022: Saddle Lift Tool

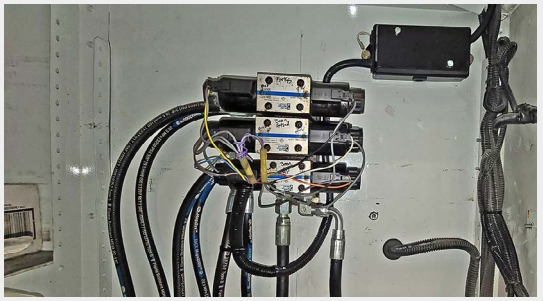
YouTube

New Valve Body Location on IMT Trucks Improves Safety and Saves Money

UDOT Keeping Utah Moving
INNOVATION OF THE YEAR
ENHANCE AWARD
WINNER
2022

Problem

Incident Management Team (IMT) trucks are outfitted with a rear-mounted stinger, a vehicle-towing device, so they can move disabled vehicles off the roadway. The hydraulic connectors for the stinger are typically housed in a valve body located under the truck behind the driver's side rear tires. However, the tires flip sand, salt, and other chemicals from the road onto the valve body, causing it to corrode and malfunction. On average, the valve bodies have to be replaced three times over a truck's service life. At $1,500 each, it costs the department over $135,000 in parts every five years for its fleet of 30 trucks. The cost of labor and downtime is also significant.



Change

To protect the valve body, it was moved inside the truck. This was accomplished by mounting the valve body inside one of the compartments and running the wires and hydraulic lines under the truck to the compartment.

Result

Moving the valve assembly to a sealed compartment keeps it free of contaminants and helps it last longer. IMT personnel no longer have to troubleshoot mechanical problems on the side of the freeway and can quickly tow disabled vehicles out of traffic, which improves safety for IMT crews and the traveling public. This innovation also provides substantial cost savings, as the valve does not need to be replaced as often.

YouTube

LINK: Enhance Award - Adaptive Innovation of 2022: IMT Truck Valve Body

For more information contact, *Equipment Division*

Region Four Rescues SR-211 and Saves $1.8 Million

Problem

On Aug. 14, 2022, a severe thunderstorm sent massive amounts of raging stormwater toward he westbound shoulder of SR-211, a popular route designated as the Indian Creek Scenic Byway. The roadway was closed due to several sections of erosion 12 to 15 feet deep, 20 to 40 feet wide and stretching cumulatively over one-mile long.

Change

Region Four personnel used aerial imagery and UPLAN maps to measure erosion and calculated that as much as 38,000 cubic yards of material had washed away. Scope, schedule and budget estimates were prepared to assess whether in-house maintenance personnel could tackle the repairs, or if emergency contractors should be hired for an estimated $2.1 million. Maintenance personnel felt confident that repairs could be completed in-house for much less cost.

Result

UDOT maintenance personnel restored and improved drainage facilities, filled the erosion and rebuilt the road base. On Sept. 12, less than one month after the incident occurred, the site was ready to be repaved. Actual pavement was completed on September 26. Estimates indicate that keeping the project in-house safely re-opened the road faster and saved taxpayers approximately $1,800,000.

For more information contact, *Region Four Maintenance*

Design Improvement to Sign Base SN14

Problem

UDOT mounts signs on the top of concrete median barriers using a pivot sign base (SN14), which meets the Manual for Assessing Safety Hardware (MASH) safety criteria outlined by AASHTO and FHWA. When a sign held by this type of base is struck, it is designed to pivot to the ground while keeping the sign and post attached to the base and out of traffic. However, maintenance crews were finding toppled signs with broken sacrificial pins that had no obvious sign of impact or damage.

Change

The Region Two Sign and Guardrail shop identified a design flaw that caused the full weight of the sign to rest on the sacrificial pin rather than the larger pivot bolt. This was causing the sacrificial pin to break prematurely. By reshaping the round pin hole to a vertically aligned slot, the primary weight of the sign now rests on the pivot bolt, as intended.

Result

This change in the base keeps signs in proper position on our roadways, saves the department time and effort, and reduces risk to our maintenance crews and travelers.

For more information contact, *Region Two Maintenace*

End of Barrier Netting Collects Garbage

Problem

On windy days, garbage can collect at the end of concrete barriers and potentially blow onto busy roadways making it hazardous for drivers.

Change

Crews installed a netting material that can trap garbage and be easily removed for a safe and efficient cleanup.

Result

Garbage collects within the netting instead of blowing across the roadway. In addition, cleanup of the garbage is much easier—all that is needed is to fold the netting over itself and then remove both from the site to dispose of the trash.

For as little as $135 parts/labor per site, garbage collection is reduced from 30 minutes to about 10 minutes. But more importantly, the traveling public is kept safe from trash blown into the roadway.

Region Two has installed end barrier netting in two locations. To improve effectiveness, they will continue to install nets on the I-215 west belt at various angles using a variety of netting materials.

For more information contact, *Region Two Maintenace*

Metal Storage Bins for Paint Beads Increase Productivity and Safety

Problem

Lane lines and other pavement markings are visible at night because reflective beads are layered on top of freshly painted surfaces. Once dry, the paint holds these reflective beads in place.

Traditionally, paint crews transported beads to the field in large fabric bags. Fork lifts were used to load these huge bags onto trucks. However, transferring beads from the bags into the bead application machines was wasteful, messy, inefficient, and time consuming. Beads would also clump together if they were transported in open bags exposed to wet weather.

Change

The Price paint crew worked with their weld shop to fabricate metal storage hoppers and mount them to paint trucks. Before leaving the shop, paint crews empty bags of beads into the metal hoppers and dispose of the bags. In the field, paint beads are easily transferred from the hopper to the application machine.

Result

With the new paint bead hoppers, it only takes 15–20 minutes to load the applicator machines, and it requires one less crew member. The new process is safer, especially in wet weather, because crew members do not need to climb on the truck to reload applicator machines. The metal bins protect the paint beads from the elements, which ensures wet beads do not clog the applicator. And because paint bags never leave the shop, they are no longer a nuisance when crew members are out in the field.

For more information contact, *Region Four Maintenance*

New Loader Multi-Tool Increases Efficiency and Safety

Problem

Moving trailers around maintenance yards was inconvenient, time consuming, and sometimes difficult. If a one-tonner was not available, a larger 10-wheeler truck was needed. The job usually required two people—a driver and a spotter.

Change

The Riverside shed crew from Region One fabricated a custom two-inch receiver hitch that can be mounted on the end of a loader fork blade. The hitch allows multiple types of tools to be attached, such as a pintle hitch or ball hitch. It includes hooks so chains may also be attached.

A cotter pin is used to securely attach the mount to the fork blade. The tool is light enough for one person to easily install or remove it in less than a minute.

Result

This multi-tool has increased efficiency and safety in a variety of situations. Mounted on a loader fork, the tool allows the driver to see exactly where the pintle hitch is positioned in relation to the trailer hitch. No spotter is needed to connect to the trailer.

In conjunction with a wing mount assister tool, the multi-tool is also being used to install and remove snow-plow wing mounts on trucks. Crews are able to safely and efficiently move these heavy wing mounts around the yard during fall installation and spring removal.

The standard two-inch receiver hitch provides a common fitting platform so other tools can be attached as needed.

YouTube

LINK: Innovation Station Video

For more information contact, *Region One Maintenance*

Improved Tool Rack on Trucks Makes It Easier to Access Tools

Problem

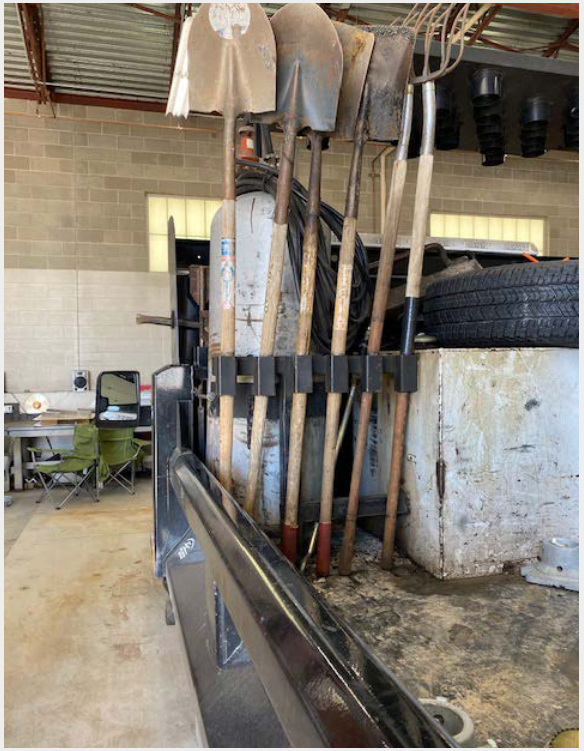
New trucks come with a couple shovel racks mounted behind the cab, making it difficult and potentially dangerous to access tools while parked on the side of the road. To make the problem worse, propane tanks often block access to the tools.

Change

Tool racks were relocated behind the propane tank and bolted to the bed of the truck. Additional tool pockets were added for more tools.

Result

The new rack configuration secures propane tanks and makes it easier to access tools.



For more information contact, *Region One Maintenance*

Truck Mounted Concrete Sample and Cylinder Wash Out Station

UDOT Keeping Utah Moving
INNOVATION OF THE YEAR
SPARK AWARD
FINALIST
2022

Problem

After construction inspection crews test concrete samples, they need to clean the testing equipment, and sometimes water is not readily available. Typically, they bring their own buckets of water or fill buckets from the mixer truck. This approach requires multiple water refill runs throughout the day and is especially challenging for washing out wheelbarrows.

Change

An inspector from Region One came up with an inexpensive truck-mounted pressure-washing system. The wash station is built out of salvaged wood signs and is placed in the back corner of the truck so it's easy to fill. The wash station supports a 25-gallon motorized weed sprayer—which is powered by the truck's battery—and provides a storage place for testing equipment; the tailgate shuts tight against the test equipment so it won't slide around the bed of the truck.

The sprayer has plenty of pressure for cleaning the slump plate, air meter bowl, and wheelbarrow. The tank provides enough capacity for a whole day of cleaning.

Result

The pressure sprayer makes it easier to clean concrete testing equipment, and in less time. Having enough water to last the whole day saves time and effort, especially in remote areas where it may require a lengthy trip to refill water buckets.

The washing station took about two hours to assemble. There was no cost for the wood box since it was made from salvaged wood from damaged signs, and the sprayer tank cost $125. Total costs came to around $225.

For more information contact, *Region One Construction*

Variable Messaging Signs Mounting Modifications Save Time and Money

Problem

Variable Message Signs (VMS) are located throughout the state and are often mounted on overhead monotube sign masts. Currently, these VMS boards are attached to a unique mounting bracket that is welded directly onto the monotube. However, when these signs are damaged or need to be adjusted, the associated mounting brackets must be removed and re-welded to the monotube. This process significantly increases costs, work time, and exposure to traffic. When future modifications are required, the whole process begins again.

Change

VMS mounting brackets were redesigned to mimic the way static signs are mounted to the same masts. Instead of permanent welded mounts, VMS signs were retrofitted with a continuous keyway on the back side of the sign that fits into brackets that are bolted onto the mast.

Result

Using static sign-mounting techniques for VMS boards significantly improves installation time, reduces costs, and allows for more flexibility when replacing or moving signs in the future. It also eliminates the need for time-consuming operations each time alterations are required and decreases the time workers are exposed to traffic.

Feedback from installation teams was so overwhelmingly positive that this new mounting and installation process will become part of the new specifications and drawings for all future installations (release date September 2023).

For more information contact, *Structures Division*

Access Ramp Added to Box Culvert Allows for Easier Regular Maintenance

Problem

Concrete box culverts are susceptible to buildup of debris and silt, especially after storms, high-water events, and wildfires. UDOT relies on the local maintenance sheds to periodically remove these blockages. However, certain culverts can be difficult to access, especially when large equipment is required to perform the work.

One box culvert near Parowan was particularly difficult to clean out after the Brian Head fire and subsequent high-water event, which sent a lot of debris through the culvert.

Change

As part of the new box culvert design (structure 0E 2715), a concrete "boat ramp" was added to the structure to allow for direct access to the streambed. This ramp was constructed at low cost, incorporated into the wingwall, and made wide enough for equipment to access.

Result

The access ramp at the Parowan box culvert allows for more regular maintenance, which improves its functionality and service life. This design detail was very well received. When applicable, access ramps will be added to new and existing culverts, especially in areas prone to flooding below burn scars.

For more information contact, *Region Four Maintenance*

Thermal Evaporators Save Money and Protect the Environment

Problem

Retention ponds at UDOT maintenance stations contain water generated from washing equipment and vehicles. This water carries contaminants such as salt, sediment, grease, oils, and other pollutants. Water levels must be properly maintained to prevent overflow during washing activities or storm events. If the pond overflows, the contaminated water is deposited into the environment or storm drain system, causing an illicit discharge. Not only does this directly violate UDOT's stormwater regulatory permit, it also negatively affects the surrounding environment and pollutes downstream waterways.

Traditionally, station pond water levels have been managed by transporting the water between full and empty ponds to keep the water levels as low as possible while the water naturally evaporates. This process is expensive and can be ineffective during the winter, as there may not be another pond with enough room to accept more water. Additionally, personnel and equipment are not always available to transport pond water before it overflows into the environment.

Change

In order to prevent ponds from overflowing, UDOT purchased five thermal evaporators that use natural gas to heat up and quickly evaporate pond water. These evaporators were strategically placed in central locations to allow multiple stations to use them.

Result

The evaporators significantly reduce costs associated with pumping and transporting water between stations or to an approved off-site waste facility. Depending on the location and the year, stations could transport several hundred thousand gallons of water per year.

Another cost savings is that the residual water, which is a byproduct of the thermal evaporator process, can be used to produce brine for Utah's roads so it doesn't need to be purchased.

Lastly, these evaporators preserve the environment by preventing ponds from overflowing and discharging water into the environment or storm drain system, where it ends up in the groundwater or local waterway.

For more information contact, *Maintenance and Facility Management Division*

UDOT's Decant Facilities Protect the Environment

Problem

UDOT is required to inspect and maintain its stormwater infrastructure to protect water quality and prevent roadways from flooding. To keep roadway debris from clogging the storm drain system, powerful vacuum trucks known as vactor trucks, extract both solid debris and liquid wastewater.

Wastewater creates a unique challenge because it cannot be hauled directly to a landfill. Instead, debris must first be dried out, or solidified.

Some maintenance crews process vactor waste to meet landfill acceptance standards by placing it in small, uncovered, concrete areas that are sloped to contain the wastewater until it evaporates. Other maintenance sheds have lined or asphalt ponds to pour out vactor waste or sweepings, but this can pose a risk to the environment if the pond overflows.

Change

As part of a larger stormwater retrofit project, the South Valley Maintenance Station installed a large regional decant facility. Liquid waste is decanted, or drawn off, as it flows through a series of weep holes and vault-like areas where the solid waste settles out, separating the remaining liquid. Prior to being released into the sanitary sewer system, the wastewater passes through an oil water separator to capture any oil or grease products that are lighter than water. The solid waste that remains is transported to an approved waste facility. The decant facility is covered so rain and snow do not saturate the solid waste again.

Result

Since its inception, the South Valley facility has processed over 100 tons of debris for delivery to the landfill. The facility can accommodate two vactor trucks at a time and has a capacity of eight full vactor loads. It is large enough to provide regional decant services for UDOT maintenance stations and non-UDOT agencies that do not have their own decant facilities.

Because of the success of the program, UDOT's Salt Lake East Maintenance Station recently added a decant facility to serve the north half of the valley, including Salt Lake City. UDOT and Summit County are also in the process of designing a joint decant facility.

For more information contact, *Maintenance and Facility Management Division*

INNOVATION OF THE YEAR
SPARK AWARD
FINALIST
2022

Highly Modified Asphalt Pavement Offers Multiple Benefits

Problem

Constructing asphalt pavement in multiple lifts (layers) complicates construction and creates weak planes within the pavement. To obtain the compaction needed for long-term durability, traditional mixes must be constructed in lifts. For construction phasing and traffic maintenance, having the ability to place a thick, 6–8" lift of durable asphalt in one lift while obtaining full-depth compaction would have many applications.

Change

Using a highly modified asphalt binder in a mix designed for low air voids, a mix design was created that can do two things at once: compact in thick lifts and provide long-term durability and rut resistance.

Result

A pilot project at the Wendover Port of Entry was successful. The mix with high binder content placed in a thick lift proved to be stable in the harshest of conditions. This mix has the potential to be used in situations where the cure time for a higher early strength concrete pavement can be reduced by a week, thus opening critical infrastructure to traffic within a couple of days on a durable asphalt pavement.

The implications of this mix for other applications is being investigated, and has been placed as an overlay on the intersection of I-15 and future West Davis Corridor. There are plans to use this asphalt mix design and highly modified binder to replace concrete on interstate ramps so they can be reopened quickly as they are rehabilitated. There are also plans to use this in thin lift overlay applications to ensure compaction and reduce coring of the pavements to verify that compaction.

For more information contact, *Materials and Pavements Division*

System to Track Water Rights and Shares Inventory Enables Wise Water Management

UDOT Keeping Utah Moving
INNOVATION OF THE YEAR
FLOW AWARD
WINNER
2022

Problem

UDOT has been purchasing real estate for more than 100 years, which often results in the acquisition of water rights or shares. Water rights are generally tied to the underlying ground on which they are used, but they do not automatically transfer with the ground. These matters are the subject of negotiation and additional compensation, and when successfully acquired, require additional work to put the transfer into effect. If the rights are not used and properly documented, they can be lost.

There was no previous procedure to track these water assets, resulting in unknown inventory and the risk of lost ownership rights.

Change

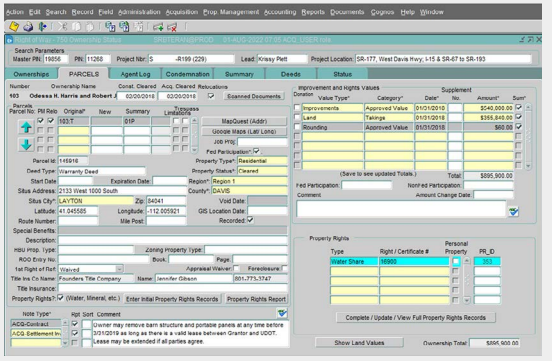
The Right-of-Way GIS team created an inventory system to track and manage existing water rights/ share ownership. This system uses EPM and GIS to manage the inventory and provide a web-based visual representation of UDOT's estimated $4 million of water rights and shares.

Click here to view the UDOT ROW Parcels Map. Enable the "UDOT Water Rights & Shares" layer.

Result

The new system currently tracks 347 water rights and ownership records. To date, the system has saved the state approximately $50,000 annually by identifying water district assessments that UDOT was paying unnecessarily. This cost savings will only increase as the analysis of unusable water rights is expanded to other water districts.

This new tool is being used to explore how best to manage unused water assets. Options include holding water for future wetland mitigation, increasing the instream flow of water to the Great Salt Lake (House Bill 33), and selling water rights and shares to restore the Transportation Fund.



LINK: Flow Award - Process Innovation of 2022: Water Asset Tracking System

YouTube

For more information contact, *Right of Way Division*

Centralization of Tasks Improves Damage Claims Process

INNOVATION OF THE YEAR
FLOW AWARD
FINALIST
2022

Problem

When a department asset such as a sign, barrier, or signal light is damaged due to a crash, UDOT seeks reimbursement for the repair cost from the driver and/or their insurance. In 2018, UDOT's damage claims collection rate had dipped into the low 80% range.

Change

After completing a process improvement project, the Comptroller's office determined the root cause of the collection gap was the lack of resources at the region level. Region personnel were overburdened with the responsibility to assess damages, issue bills, and collect claims.

The team reorganized the claims process. Regions remain responsible for the assessment and billing of infrastructure damage that occurs in their region. The collections process is now centralizing and a new UDOT damage claims collection agent is responsible for collecting each region's claims.

Result

For fiscal year 2020, UDOT collected 88% of all repair expenditures. The number for fiscal year 2021 is currently 87%, with a few outstanding accounts still being settled by the Attorney General's office. Each of these years also saw the dollar value of billable repair expenses increase by nearly 10%. So far with this new process, UDOT is collecting a higher percentage of a larger pot of money, which keeps more funding for our Maintenance efforts.

For more information contact, *Comptroller*

Multi-Disciplinary Collaboration Ensures Better Design Specifications

Problem

Over the past few years, UDOT has seen an increase of pedestrians on our roadways posing potential safety risks when crossing the road.

One solution for improving pedestrian safety is to install protected waiting areas that reduce the width of the roadway. Central Preconstruction is in the process of preparing specifications and a standard drawing for a "Curb Bulb-Out" feature that cities can use when designing crosswalks.

While such features are beneficial for pedestrians, the design creates challenges for maintenance crews who must maneuver snow plows and street sweepers around the curb bulb-out.

Change

Representatives from Traffic and Safety, Maintenance, Design, and Planning created a multi-disciplinary group to discuss design options and test different curb bulb-out configurations.

Result

Multiple stakeholders collaborated at the early design stage to allow for a more informed and holistic approach to road element design, which helps avoid unintended problems before they become expensive to fix. The "on the ground" testing of various curb tapers and angles allowed designers to see how snow plow drivers could maneuver around the curbs. The meeting also informed maintenance crews about safety issues designers seek to address.

For more information contact, *Preconstruction Division*

Mobile Simulator Training Center Hits the Road

Problem

The Employee Development team successfully employed the use of computerized simulator stations for training on heavy equipment, but trans techs located away from the Calvin Rampton Complex had to travel long distances to benefit from it. While the simulator stations could be moved, the transportation and setup/breakdown was challenging and time consuming. This resulted in limited access to the simulator stations.

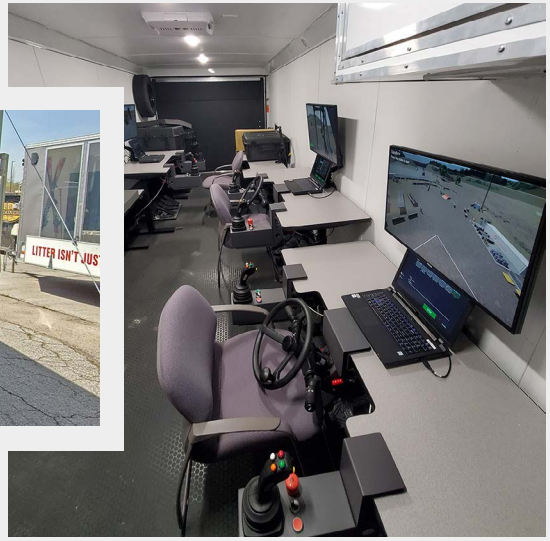
Change

A mobile work center trailer was acquired and outfitted with three simulator stations thanks to assistance from the Equipment Division. The trailer provides a comfortable, climate-controlled environment where trans techs can receive equipment training. A gas-powered generator can even power the computers in locations without utility hookups.

Result

With the ability to move the training center to any location, employee access to and interest in this training tool has greatly increased. For example, Region Two held an Equipment Rodeo, where every available training time slot was filled.

Now that trans techs do not need to schedule training time in Salt Lake City, travel expenses and time away from the job have been reduced, while at the same time heavy equipment safety and operations skills have increased.



For more information contact, *Employee Development*

Safety Packets for Shed Stations Create Peace of Mind

Problem

Employee safety is our number one priority at UDOT. When safety incidents occur, it's important to know how to report them and share lessons learned to create an environment where every employee can go home safely.

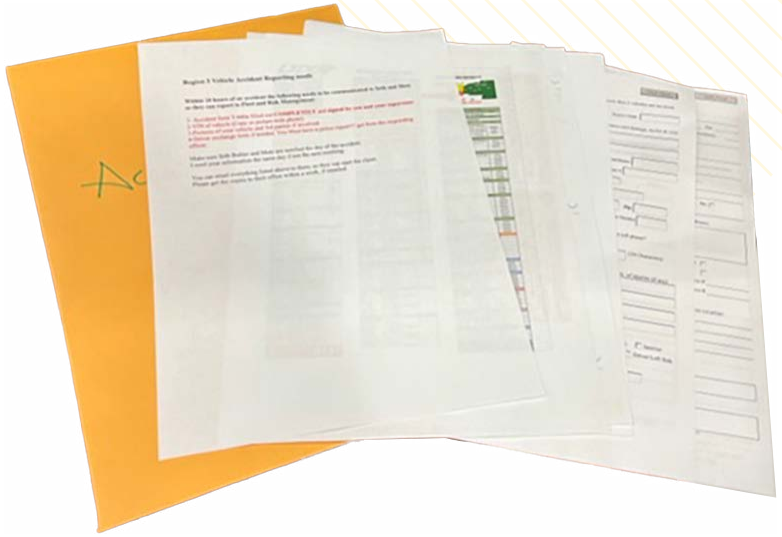
After two of his mechanics were injured on the job, shop foreman in Region Three had trouble finding the resources he needed such as required paperwork and contact information.

Change

The following resources were compiled into a packet:

- Accident forms (T840a, UDOT Serious Injury Employee Form)
- Measuring guide
- Region Three phone list
- UDOT insurance cards
- UDOT Accident Policy 06E-05
- "What to do in the first 24 hours" checklist

Copies of the packet were distributed to shed supervisors, who put them in their sheds and in the glovebox of each vehicle.



Result

A readily available safety packet gives workers peace of mind that they will know what procedures to follow and what help is available if an accident or injury occurs.

For more information contact, *Region Three Administration*

Natural Hazard Risk Management Process Created to Prioritize Risks

Problem

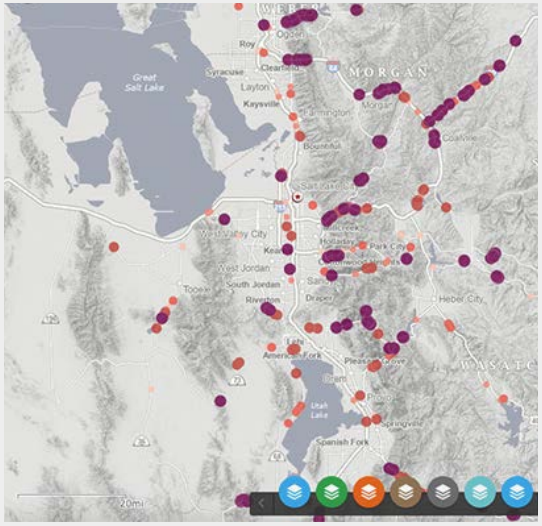
UDOT is required by the Federal Highway Administration to develop and follow a risk-management approach to prepare for the impact of natural hazards on our transportation infrastructure. Natural hazards include flood, fire, earthquake, avalanche, and rockfall risks. The mitigation of risk begins with a clear understanding of the probability and costs of these hazards on each component of our infrastructure.

Change

UDOT developed the Natural Hazard Risk Management process, which prioritizes risks in two ways. The first method calculates a criticality factor for each transportation asset. Criticality factors are a function of traffic volume and detour length.

The second method of prioritizing risk is to calculate a return on investment ratio based on an ideal scenario of eliminating all the risk for the replacement cost of an asset.

This repeatable model-based approach was used to develop a statewide GIS map of flood, fire, earthquake, avalanche, and rockfall risks. Maintenance staff helped validate the risk map by adding their institutional knowledge of risks not found in existing data.



Result

The Natural Hazard Risk Management process helps UDOT decide when to harden an asset, when to plan a rapid response, and when a response is needed.

The risk map has been used in solution development projects and concept reports. This helps to prioritize maintenance inspections and perform trade-off analysis in design.

For more information contact, *Transportation Performance Management*

New UDOT Method Keeps Track of Process Improvements

Problem

While process improvements happen all the time at UDOT, there was no standard approach for documenting these processes, measuring their outcomes and outputs, or sharing them across the department.

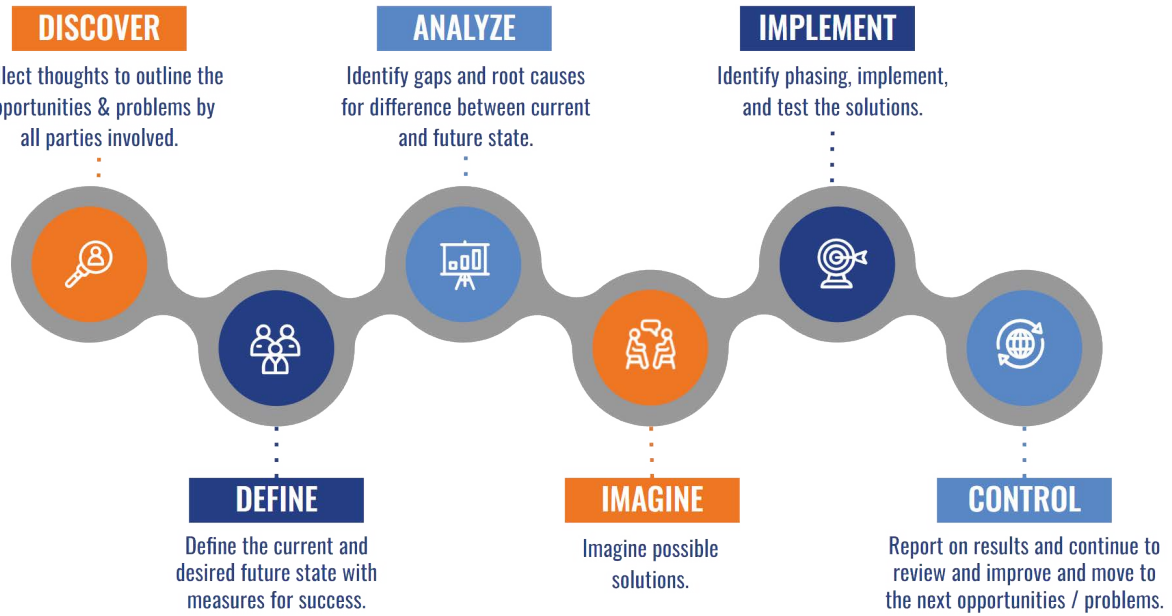
Change

The Transportation Performance Management team developed the UDOT Process Improvement Method in cooperation with leadership. This six-phase collaborative method was adapted from industry efficiency and process improvements models.

To make it easier to use the UDOT Process Improvement Method, the team also created a documentation tool in Google Forms to gather a phase-by-phase record of the process improvement and artifacts from the project.

Result

By documenting a process improvement, a record of how to execute that process is available for current and future workers. This reduces the need to reinvent the wheel every time a role changes hands or new people are hired.
In the spirit of continuous improvement, the Process Improvement Program Manager is developing resources and revising the documentation process for even greater ease of use.



For more information contact, *Transportation Performance Management*

Train-Your-Backup Protocol Increases Service Continuity

UDOT Keeping Utah Moving
INNOVATION OF THE YEAR
FLOW AWARD
FINALIST
2022

Problem

The Control group in the Comptroller's office is staffed by highly specialized subject matter experts that handle a range of work including construction payments, consultant payments, collections, and contracts. Because members of the team did not share each other's depth of subject area knowledge, they had a difficult time covering for each other when someone went on extended leave. Training replacement staff was even more problematic.

Change

The Control group put in place a two-step Train-Your-Backup Protocol. First, each person created a desk manual to document their primary tasks and responsibilities. Second, each member of the team cross-trained at least one other teammate to do their job.

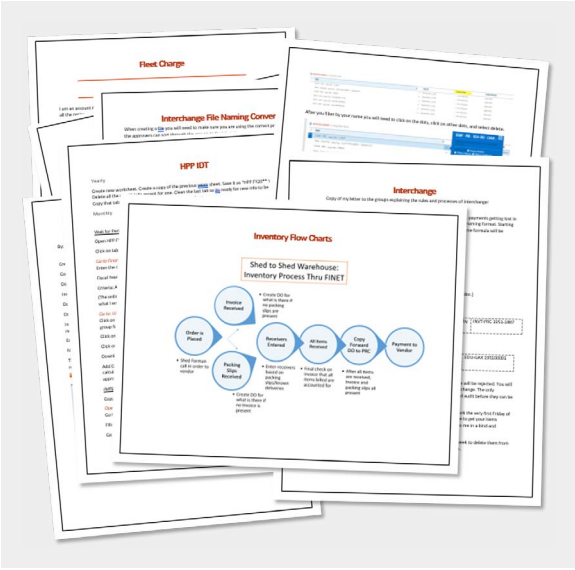
Desk manuals include text-based instructions, how-to screenshots, and videos with step-by-step descriptions on how to use specific tools and the underlying thought process behind each one.

The new protocol also requires cross-training and updates to desk manuals as new tasks or responsibilities are added.

Result

Comprehensive process and procedure documentation helps ensure continuity of service when people are absent or move on to other roles. If a backup is unavailable,the desk manual provides sufficient instruction and context for any teammate to fill in. The Train-Your-Backup Protocol also reduces time spent training new employees, thus reducing the coverage burden on the rest of the team.

Despite the initial heavy lift of developing these materials and providing cross-training, there were several unanticipated benefits. The effort required to document processes enhanced awareness and fostered process improvement. Teammates benefited from seeing things from each other's perspective and shared best practices. By co-creating this process, everyone on the team feels ownership of the protocol and is more motivated to maintain materials and training. Finally, creating the Train-Your-Backup Protocol became a professional development exercise as team members gained and improved collaboration, analytics, writing, and training skills.



For more information contact, *Comptroller*

Temporary Environmental Control with Lump Sum Pay Options Reduce Costs

Problem

UDOT designers prepare Temporary Environmental Control Plans and Stormwater Pollution Prevention Plans (SWPPP) for construction projects. These plans call for specific UDOT-approved mitigation devices. However, one problem is that designers don't always know the appropriate devices for the contractor's project phases, which leads to costly change orders when devices are improperly implemented.

Change

To reduce the number of change orders, designers and contractors now follow 01571M—Temporary Environmental Controls, Special Provision.

This new approach requires contractors to submit a Temporary Environmental Control Plan and SWPPP. These plans have the option to include a lump sum pay item, which combines all costs for labor, equipment, installation, materials, inspection, maintenance, and removal of temporary environmental controls, regardless of the phase in which these costs are incurred.

UDOT's engineers and regional stormwater coordinators worked together to approve these plans.

Result

This special provision, featuring the option to use lump sum pay items, has been used on three select test projects determined to be lower risk and did not include wetlands or multiple waters of the state. By allowing contractors the flexibility to develop Temporary Environmental Control Plans using UDOT's standard drawings and approved devices, the plans are better aligned with the contractor's anticipated phasing and resulted in fewer costly change orders.

For more information contact, *Maintenance and Facility Management Division*

New Materials Training Evaluation Form Streamlines Certification Process

Problem

Proper sampling, testing, and inspections performed by qualified technicians ensure the construction of cost-effective, higher-quality, and longer-lasting freeways. In order to achieve this, roadway construction inspectors must be certified through the Transportation Technician Qualification Program (TTQP). This program requires successful demonstration of practical Field Operating Procedures (FOPs). After a supervisor or trainer attests to their readiness, technicians send in a paper Materials Training Evaluation Form to request permission to sit for the TTQP certification exam.

Managers, trainers, and technicians found the certification request, authorization, and scheduling processes cumbersome and inefficient. Paperwork passed through multiple hands, adding time and effort. Forms were sometimes incomplete, illegible, authorized by unqualified people, or lost.

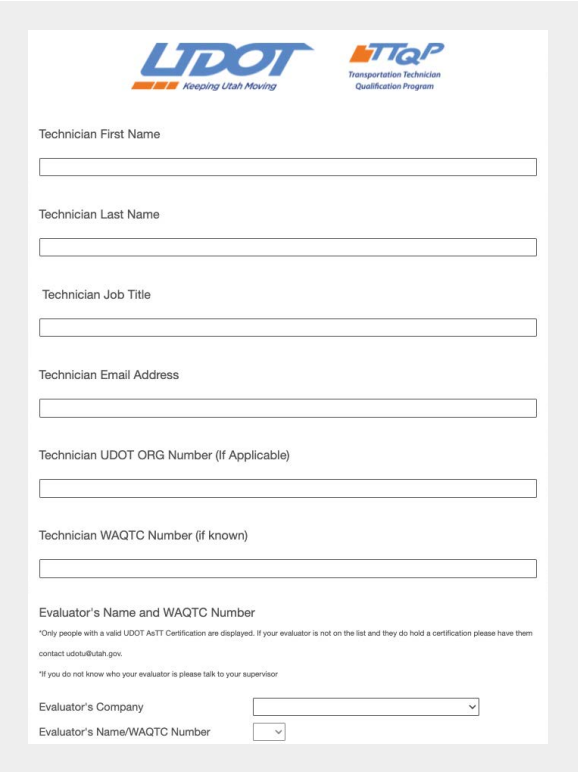
Change

To streamline workflow and enhance usability, Employee Development redesigned the Materials Training Evaluation Form using the Qualtrics survey platform. This web-based approach allows steps to be automated and requires information to be validated before submission. For example, once a completed form is submitted, it is automatically forwarded by email to a qualified evaluator to review and approve. Upon authorization, the technician is notified so they can schedule a testing date.

Result

UDOT's materials testing certification procedure now complies with Western Alliance for Quality Transportation Construction (WAQTC) certification standards. The new electronic form allows technicians, supervisors, trainers, and TTQP program staff to devote more time to certification activities rather than managing incomplete, illegible, or ineligible submissions.

For more information contact, *Materials and Pavements Division*



LINK: UDOT TTQP Program

Crushed Limestone Cement Helps Alleviate Supply Chain Shortages and Is More Environmentally Friendly

Problem

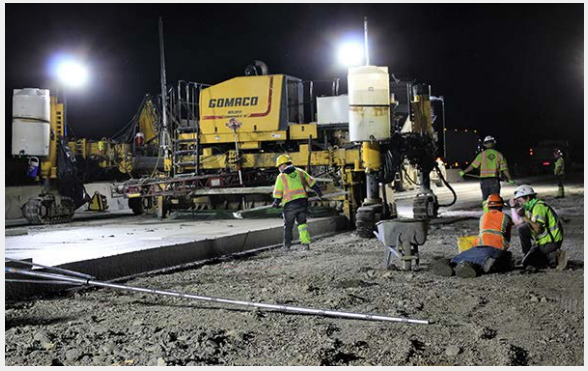
Construction projects were faced with budget issues and delays because a shortage of Portland Cement made it difficult for vendors to provide sufficient quantities of concrete at a cost-effective price.

Change

The cement industry proposed using a new cement called Portland Limestone Cement. UDOT expedited materials testing and determined its equivalence in workability, performance, and long-term durability to that of normal Portland Cement.

Result

Expedited approval of this alternative cement product allowed suppliers to switch to this more available cement and increase the production of concrete materials, helping projects meet budget and time constraints. An additional benefit is that Portland Limestone Cement production uses approximately 10% less greenhouse gasses than used in producing normal Portland Cement.



For more information contact, *Materials and Pavements Division*

INNOVATION OF THE YEAR
AWARD WINNER
2022

Incident Management Team Uses Drones to Expedite Scene Clearance After Crashes

Problem

After a crash or roadway incident, Incident Management Team (IMT) personnel document the scene as part of the incident record. The older documentation practices used handheld cameras, ground-based LiDAR systems, and manual record taking. These efforts took significant manpower, kept roads closed for extended periods, and increased the risk of secondary crashes due to traffic congestion.

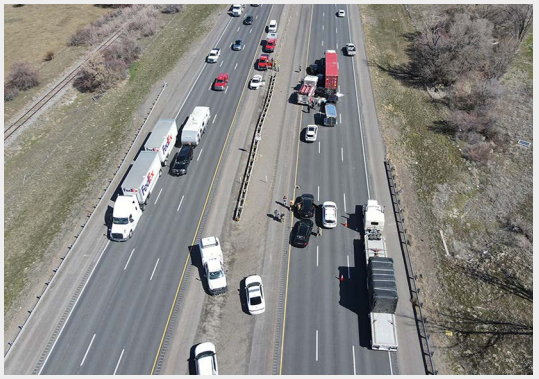
Change

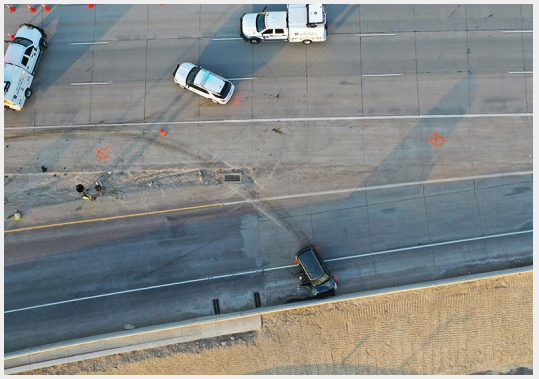
With the help of the UDOT Aeronautics Division and the Utah Highway Patrol, the IMT successfully integrated Unmanned Aerial Systems (UAS), commonly known as drones, into the incident documentation process.

Result

Using drones to collect data provides a more accurate record of the scene. GPS location data and high-detail photos and videos are used to create 2D/3D models and photogrammetry (accurate measurements based on imagery).

By using drones for data collection, road closures on a fatal scene—which used to last 5–6 hours—now only take about 4 hours. Opening the roads sooner reduces the number of secondary crashes and causes fewer delays for the traveling public.





For more information contact, *Traffic Management Division*

LINK: Innovation of the Year Award 2022 - Incident Management Team Using UAS to Expedite Scene Clearance

YouTube

Automated Traffic Signal Performance Measures Improves Safety and Mobility

INNOVATION OF THE YEAR
ENHANCE AWARD
FINALIST
2022

Problem

UDOT manages over 2200 local and state traffic signals, 96% of which are connected to UDOT's Advanced Traffic Management System (ATMS) network. A central software system was needed to monitor and coordinate this massive network of signals.

Change

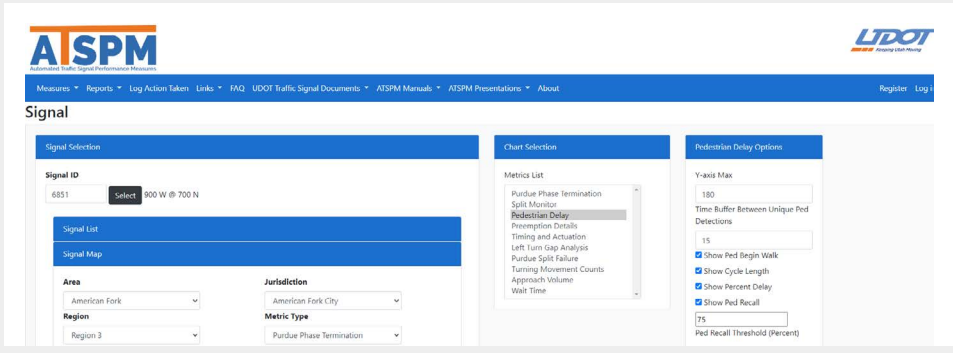
To manage performance, UDOT helped develop the Automated Traffic Signal Performance Measures (ATSPM) program*, a system that monitors signal operations, provides warnings when systems are not functioning properly, and allows UDOT engineers to improve operations in real time. *ATSPM was originally created by Purdue University and the Indiana Department of Transportation, but it was further developed, expanded, and shared nationwide by UDOT engineers.

Result

The ATSPM system keeps Utah moving by gathering detailed traffic signal data and analysis to improve mobility. This system can optimize traffic signals so more cars arrive during a green light, have enough time through a left-turn cycle, and determine whether green lights last long enough.
UDOT engineers can modify timing of these signals remotely to improve metrics in real time.

Because UDOT partners with 51 local jurisdictions on traffic signal operations, corridors that cross through multiple cities can be synchronized to help traffic move smoothly and optimize mobility.

ATSPM improves safety by encouraging good traffic flow, which helps prevent traffic incidents.



For more information contact, *Traffic Management Division*

Automated Vehicle Readiness Study Helps UDOT Prepare for Connected and Autonomous Vehicle Expansion

Problem

As UDOT prepares for the arrival of connected and autonomous vehicles (CAVs) on our roadways, people continue to wonder if we are ready for this change. In order to answer this question, we needed to put test vehicles on the road to help us gather more information and earn public trust.

Change

UDOT partnered with VSI Labs in August 2021 to conduct an Automated Vehicle Readiness Study of select Utah roads. The study team evaluated the compatibility of Utah roads with CAV technologies, specifically the Lane-Keep Assist (LKA) feature common in many Advanced Driver Assistance Systems (ADAS). LKA and other ADAS technologies rely on camera evaluations of lane markings.

The study was conducted by a team with two vehicles, each equipped with a full suite of automated driving sensors, such as advanced camera, lidar, radar, and positioning systems. The vehicles were driven on different roads throughout the state to record data from the automation sensors.

Result

The Automated Vehicle Readiness Study provided UDOT with data that will help ensure Utah's roadways are ready for current and future CAV technologies. Specific areas were identified that need lane marking maintenance and improvements. UDOT also identified strategies and standard practices to improve current lane assist technology, which can be implemented in the future. The results were shared with other states.

For more information contact, *Traffic Management Division*

Added Logic in Signal Controller Improves Pedestrian Safety and Vehicle Efficiency

Problem

Some intersections utilize left-turn Flashing Yellow Arrows (FYA) when the demand for a designated turn arrow is low. By default, this flashing yellow arrow is activated when the through lane's light turns green. However, if the pedestrian crosswalk button is pressed on either side of the street, the arrow is withheld. This can cause backups in the turn lane, with some cars not making it through the intersection before the light turns red.

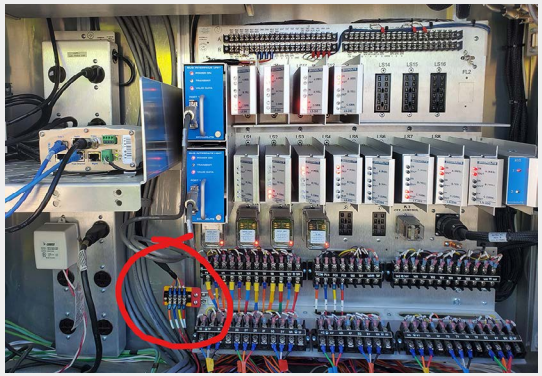
Change

The Traffic Management Division in Region Two installed signal controllers with additional input indicators in two intersections. In the new controllers, eight channels are independently identified in the signal box, which allows signal engineers to identify the side of the street and direction of travel each time a pedestrian button is activated.

Result

Now that each crosswalk button is individually identified, signal engineers can omit the FYA signal when a pedestrian presses the corresponding button. This gives the pedestrian extra time to safely cross the street before the FYA is activated. If the crosswalk button is not activated, the FYA can light as usual.

This additional pedestrian data will help traffic engineers to better manage intersections for both pedestrian safety and vehicle efficiency.



For more information contact, *Traffic Management Division*

INNOVATION OF THE YEAR
SPARK AWARD
FINALIST
2022

Aerial Images Used to Conduct Pavement Inspections

Problem

For current pavement repair projects, inspectors must drive on the shoulder of a road to document lane conditions, approximate milepost for locations, and estimate the approximate size of needed repairs. For high-speed roadways such as I-15, this collection process creates numerous safety risks for both inspectors and the traveling public. This is especially true in narrow shoulder areas adjacent to on- and off-ramps. The traditional collection process can also result in imprecise quantities and estimates because of various complexities related to working in live traffic conditions.

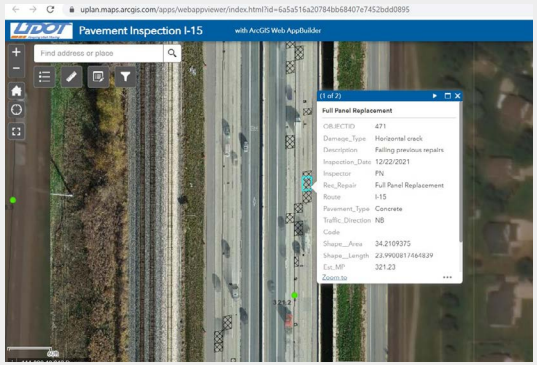
Change

Region One's GIS Division conducted a drone, or unmanned aerial system (UAS), flight mission over a four-mile segment of roadway to assist in the inspection. The aerial images were used to create a dynamic GIS map with embedded feature layers to mark the necessary repairs.

Result

This new method of conducting pavement inspections results in improved efficiency, safety, and accuracy of inspections. The UAS pilot can collect images of the area in need of repair from a safe distance, and the inspection completed on a computer in the office. The location of the repairs and damage area measurements are marked with greater accuracy, leading to better project cost estimates. This in turn decreases the number of change orders made during construction.

The Central Design and GIS teams are taking the next steps to improve this new process by developing a machine learning program that will analyze photos taken by a UAS and automatically identify cracks and potholes to create a database for further processing.



LINK: Technical Summary

LINK: UPLAN Map

For more information contact, *Region One GIS*

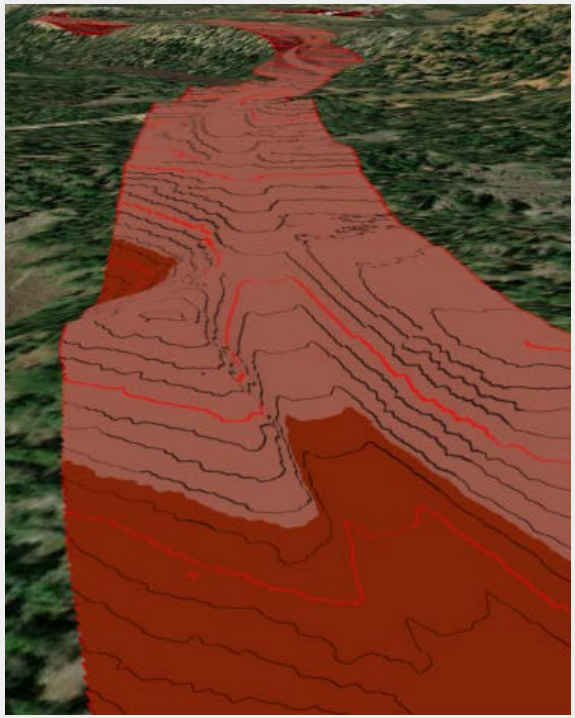
3D Surface Models Help Designers Prepare for Concept Projects

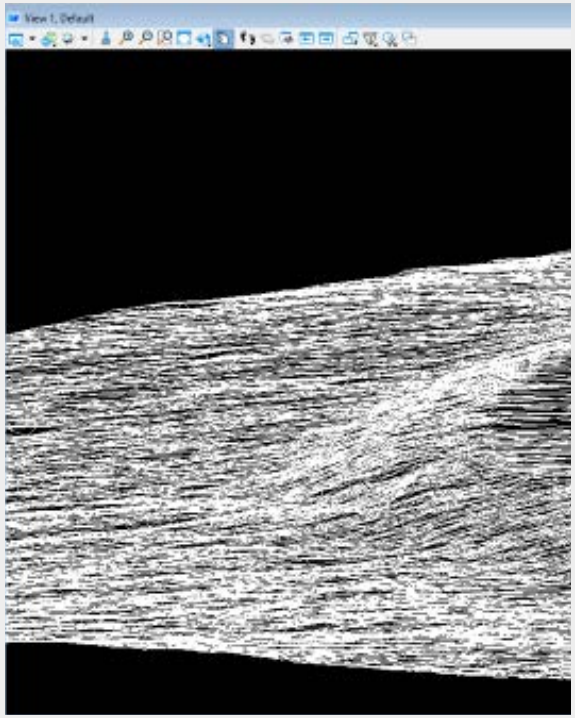
Problem

When preparing for future projects, designers would make quantity estimates, which were not always accurate and would impact evaluations. If more precise measurements were required, someone would need to walk the area with a measurement wheel or fly a drone to collect additional aerial imagery.

Change

The Region Four GIS team downloads data from the state's LiDAR dataset to create 3D surface models used by designers. Using this data in the OpenRoads Designer tool, surface areas can be calculated with greater accuracy and efficiency. This helps UDOT anticipate quantities for excavation, materials to be brought in, etc.





Result

Using 3D surface models for potential projects will increase the accuracy of feasibility, quantity and cost estimates. This process also saves time and aids in recalculating quantities if there is a change in work or scope.

For more information contact, *Region Four GIS*

Unmanned Aircraft System Used for Airport Inspections

Problem

Aeronautic Division employees are required to conduct asset reviews and inspect pavement conditions and obstructions at airports across the state. Walking the property and recording notes on paper may take 5–8 hours depending on the airport. Data collected is subjective and varies with each inspector.

Change

UDOT is now using Unmanned Aircraft System (UAS), or drones, to quickly collect and upload high-resolution images. Software and artificial intelligence is used to compile the image data for analysis and image processing. Additional types of images such a video, infrared, and ground-penetrating radar offer more information.

Result

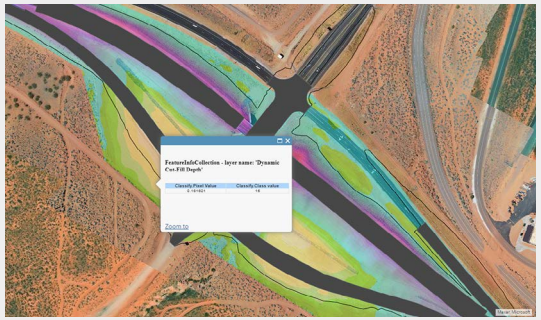
When combined with artificial intelligence, this form of image collection and analysis helps inspectors provide more consistent information in less time. Analytics give airport managers, the Federal Aviation Administration, designers, and other stakeholders additional information about pavement conditions, obstructions, vegetation, construction site data, and future connections of the system.

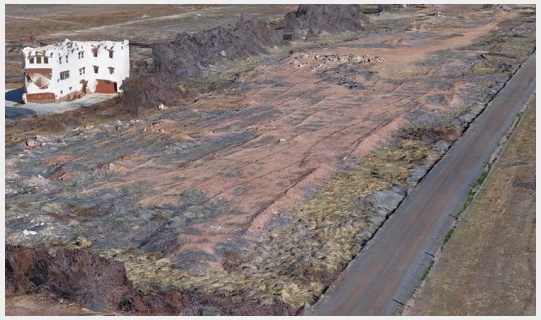
For more information contact, *Aeronautics Division*

Aerial Imagery Improves Measurements for Change Order Accuracy

Problem

Construction contracts are based on a mutual understanding of a site and the work to be done. Some construction projects require change orders due to variations in surface area or materials that need to be added or removed that differ from the original design. An accurate determination of the materials involved is important to both UDOT and contractors because it may have a significant impact on the change order cost. UDOT resident engineers needed an easy way to measure materials at a site to verify the change order volumes submitted by the contractor.





Change

UDOT uses drones and Site Scan Flight software to collect site data. ArcGIS tools are used to create 2D and 3D terrain maps that accurately measure material volume, surface area, and linear distances.

Result

Reliable and accurate data that can be agreed upon by all parties is important in managing these types of change orders. Contractors and UDOT now have a better and more accurate way to determine area and volume, and it is easy to share data with project teams and contractors using a web link. This type of site imagery data will be useful for many other purposes in design, construction, and even maintenance work.

For more information contact, *Preconstruction Division*

Aero Targets Improve Survey Accuracy and Reduce Work Time

Problem

UDOT uses Unmanned Aircraft Systems (UAS), commonly called drones, to create detailed land surveys. The process used to require a surveyor to paint reference points on the ground so aerial imagery could be aligned and calibrated after the project was flown. Obtaining "survey-grade" accurate drone data required time-consuming preparation and coordination between drone pilots and surveyors.

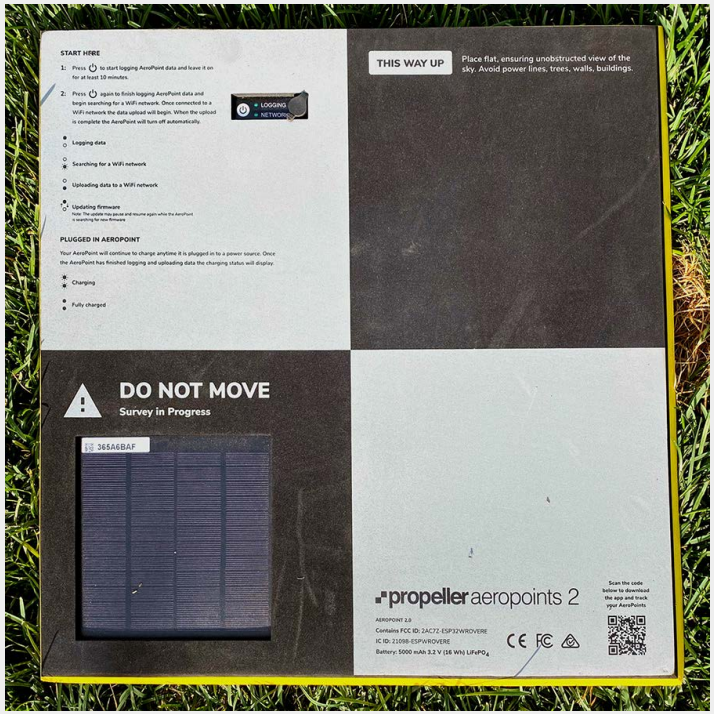
Change

Central Preconstruction purchased 20 Aeropoint targets. These targets are 21" x 21" square mats with high-visibility color blocks, a solar panel, a battery, and a GPS device that reports location data directly to an app on the surveyor's phone.

Result

Aeropoint targets allow survey work to be done more quickly, with design-grade accuracy and with fewer crew members.

This simplified tool and workflow allows even non-survey-trained drone pilots to collect survey-grade data, eliminating the need for two teams on-site. Now any drone pilot can lay target mats on the ground and log their GPS data to quickly and easily establish reference markings.



For more information contact, *Preconstruction Division*

Unmanned Aircraft Systems Provide Better Data for Better Decision-Making

Problem

Decisions are only as good as the data they are based on. Information gathered at eye level does not always tell the whole story, and sometimes areas are not safely accessible by foot. Traditional aerial photography is helpful, but cost-prohibitive and time consuming.

Change

Region Two obtained the necessary training to fly Unmanned Aircraft Systems (UAS), or drones, and licenses to obtain their own aerial imagery.

Result

Region Two explored several UAS uses and found that aerial imagery helped drive decisions and reduced data collection costs. For example, inspection of overhead freeway signs, without the use of a bucket lift and traffic control, saved a lot of money and reduced the risks involved with working in traffic.

Other examples include:

- Before and after aerial imagery of herbicide effectiveness on a pepperweed field along the I-80
- Mudslide damage imagery in the Cottonwood Canyons
- Aerial imagery for MS4 plansets
- Burn scar aerial imagery on I-80
- Pictures and videos of Midvalley Highway public involvement
- Filming of avalanche control operations
- Before and after imagery of construction sites
- Aerial imagery of I-215 flooding
- Right-of-Way (ROW) fence line inspection on I-80 at Grassy Mt. Rest Area, east bound
- Aerial imagery of ROW controlled burns of tumbleweeds along I-80 and SR-199

For more information contact, *Region Two Design*

udot.utah.gov/go/innovation

If you have implemented something new, or even stopped doing something that was no longer contributing value, we would love to hear your story. You can submit your successful implementation story here. This form is used to compile the annual collection of innovations and serves as a nomination for the Innovation of the Year Awards.

Thanks for innovating!

Special Thanks To:

UDOT Research & Innovation Division

UDOT's Innovation Council

UDOT Communications

2023 INNOVATION & EFFICIENCIES REPORT