WAV ON DEMAND PILOT
Project ID: CEEn_2018CPST_015

by

ENGINUITY
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A Capstone Statement of Work

Submitted to

Jaron Robertson
Utah Transit Authority

Department of Civil and Environmental Engineering
Brigham Young University

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Introduction

PROJECT TITLE: WAV ON DEMAND PILOT
PROJECT ID: CEEn_2018CPST_015
PROJECT SPONSOR: UTA
TEAM NAME: Enginuity

Utah Transit Authority (UTA) is exploring a partnership which would test the introduction of wheel chair accessible vehicles (WAVs) into a ride hailing platform, such as Uber or Lyft. UTA has partnered with the Utah Developmental Disabilities Council (UDDC) to provide funding towards operational costs. Per the UDDC funding, the pilot must provide transportation to passengers with developmental disabilities in Salt Lake County. Per the Federal Transportation Administration (FTA), the pilot must provide "equivalent service" for customers with disabilities. There are currently no reliable providers in the form of WAVs on demand in UTA's service area. UTA believes that this pilot would expand transportation options for people with disabilities by providing:

- On-demand service.
- Flexible, same day trips
- Affordable pricing
- Priority for WAV requests

Proposed Work Plan

This pilot is the first of two planned phases. The intended goal for phase one of the project is to prove that WAV vehicles can be available on demand and to gain operational experience.

Phase two will focus primarily on capturing the actual market of those who would benefit from the use of this service but cannot afford it. Being able to measure an affordability gap would provide data for future funding requests.

UTA will be working with Lyft and Uber companies in providing a driver for each vehicle, as well as all vehicles need. They will also provide the necessary maintenance and changes that need to be adapted for each vehicle for WAV transportation as well as vehicle insurance.

The Brigham Young University Capstone members will be working on analyzing data for optimal zone of transportation of pilot and practicality of location for highest use.

The team will analyze cost per mile. This encompasses the driver, maintenance, vehicle insurance cost, as well as affordability for customers. Following a service plan report after the launch of pilot in January. The service plan will outline how the pilot is operating under original proposal and make necessary adjustments accordingly.

Schedule

1. Service zone map & hours – Map and GPS coordinates for a geofenced service zone within Salt Lake County. Analyze data to estimate customer demand, determine optimal service zone, and days and hours of operation. Target date: October 15, 2018.

2. Cost estimate spreadsheet – These are the costs to be paid by the Partner to UTA. Costs should be estimated as per vehicle per mile and total estimated cost per month. Target date: November 1, 2018.

3. Service plan report – Report outlining how the pilot could launch, operate, and be measured. UTA plans to incorporate elements of the service plan report into the Partner procurement process. Propose a timeline to launch and prerequisites to launch. Recommend key performance metrics and how they could be tracked. Recommend optimal configuration for the vehicle's wheelchair area and passenger seats. Identify marketing and communication needs, strategies to meet those needs, planned stakeholder outreach, and estimated marketing budget. Describe potential risks and mitigation options. Describe driver training plan, vehicle maintenance plan and insurance needs. Target date: November 15, 2018.

4. Service plan presentation – PowerPoint or other presentation format for UTA executives. Target date: November 30, 2018.

5. Cost audit spreadsheet – Measure and report on actual costs. Target date: March 1, 2019 or two months after pilot launch. If costs are higher than estimated, suggest cost reduction options.

6. Service audit report – Monitor and report on actual performance to key performance metrics. Target date: March 1, 2019 or two months after pilot launch. Where performance is lower than expected, suggest options to improve. Are there enough vehicles? Are these the right vehicles? Recommend continuous improvements based on lessons learned.

Facilities, Tools, Data and Equipment

For phase one of the project, data will be collected from various resources to help in considering the most effective site for the pilot program. Data collected will include, but not be limited to: census data, paratransit trip data, data showing locations of important public buildings, and any ride-share data that may be available. Once data is gathered, the ArcGIS program will be used to help analyze and organize the data to show the most desirable site locations.

For phase two of the project, once the pilot program has started, more data will be collected to estimate the cost to run and maintain the vehicles for the pilot program. Using Microsoft Excel this data will be analyzed and a cost-analysis produced.
Other necessary items to complete the project include: Vehicles capable of providing transit for customers who use a wheelchair (provided by UTA), funding (collected by UTA and allowed for use in Salt Lake County), and drivers for the vehicles (to be provided by the rideshare company that UTA decides to partner with).

Project Budget

Estimated hours to complete tasks:

Task 1 – Recommended service zone map and hours of service – 20 HRS

Task 2 – Cost estimate spreadsheet – 16 HRS

Task 3 – Service plan report – 28 HRS

Task 4 – Service plan presentation – 12 HRS

Task 5 – Cost audit spreadsheet – 28 HRS

Task 6 – Service audit report – 28 HRS

Apart from time spent on the project, which will not require payment, there is also a set amount of funds that have been collected and are to be used on the project. As of today, the funds collected amount to $100,000 and are available to help with any phase of the project as deemed necessary. As part of the cost estimate for the project, these funds will be allocated and recommended for use as seen most fit and beneficial.

Deliverables

- Monthly status reports including the following:
    - Progress made
    - Challenges encountered
    - Solutions to challenges
    - Goals for deadlines approaching
- Recommendations for a proposed service zone and hours of operation
    - Using data collected and a spatial data analyses, a recommendation will be made for the best area to run the pilot program
- A cost estimate spreadsheet including the estimated cost to fund the pilot program
    - This cost estimate will be estimated as cost per vehicle per mile and help to determine how many vehicles will run and for how long on the given funds
- Service plan report is to include:
    - How the pilot program will launch, operate and be measured
    - A timeline for the launch of the program and any prerequisites to launch
    - Potential risks and mitigation options
    - Vehicle maintenance plan and insurance needs
- Service plan presentation
    - This presentation will be prepared for and presented to UTA executives before pilot launch.
- Cost audit spreadsheet
    - This spreadsheet is to be used to measure and report actual costs of the pilot after it has started
- Service audit report
    - This report will be used to analyze the performance of the pilot and recommend areas where improvements can be made
    - Results of this report will assist in making recommendations on how to move forward with implementing the pilot into a regular program
- A final poster with a summary of the project and results
    - This poster will be presented to other students, faculty, and UTA in the final undergraduate seminar of the semester
- Final presentation for UTA
    - The final presentation will include a summary of work performed, goals achieved, improvements made, and recommendations for future implementation of the program

Performance Standards

Enginuity will provide work for this Capstone project "as is" using best practices and with best effort. Project results cannot be construed as work performed by licensed professionals and cannot be used as "stamped deliverables" without first being reviewed, approved and stamped by a qualified and relevant license professional engineer.

Statement of Qualification

Enginuity brings project management experience, a functional level of GIS skill, formal education in transportation engineering, and a high level of motivation to make WAV's available to residents of Salt Lake County.

Nate Lant, Team Leader, has a proven ability to organize and lead projects. His wealth of experience in the transportation technology industry, as well as his experience as a Lyft driver qualifies him to lead this project. His personal networking efforts have yielded an abundance of professional connections the team can draw upon for this project.

Matthew Strong is able to become an expert at any discipline. His strong academic and professional record support that. Matt's intellect and commitment to excellence make him a great fit for this project where the majority of it is on the cutting edge of research. Matt is also a Lyft driver.

Byron Yates has exceptional strength in bringing people together and making groups function smoothly. His leadership experiences in the US Army prove his ability to generate success. His professional experience focuses on construction efficiencies in project management and environmental sustainability. These strengths will add consistent, valuable input to the progress of this project.

Cody Irons consistently produces the most practical solutions to problems. His wide-ranging experience from ranch-hand to structural analysis intern has displayed his ability to work exceptionally hard, and also to find efficient solutions.

Work will be completed with the assistance of:

Shaina Quinn, UTA Innovative Mobility Solutions Researcher
Jaron Robertson, UTA Innovative Mobility Solutions Program Manager
Ryan Taylor, UTA Coordinated Mobility Director
Dr. Grant Shultz, BYU Faculty Advisor

For a more complete list of individual qualifications, Enginuity team member resumes are included in Appendix A.

Appendix A

Nate Lant

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EDUCATION

Brigham Young University — Provo, UT
Bachelor of Civil Engineering, Emphasis in Transportation — Jun 2019

- GPA: 3.65/4.00 – Minors in Mathematics and Portuguese
- Former member of Management Consulting Club, BYU Tech Club—Engineering Ambassador, and BYUITE
- Related courses: Statistics, Intro to Transportation, Applications of GIS, GIS Software development, Urban Transportation Planning, Geometric Highway Design, and Traffic Engineering
- National member of ASCE (3 years) and international member of ITE.

EXPERIENCE/LEADERSHIP

Utah Transit Authority – BYU Capstone — Salt Lake City, UT
Student Team Lead and Project Coordinator — Sept 2018 – Present

- Develop pilot program to provide on-demand rides for disabled riders; build public-private partnership with TNCs
- Assist UTA and partners in market analysis and development of project scope, cost, goal and measurement, marketing, and promotion. Assist in project implementation, monitoring, and report on findings

Esri — Redlands, CA
Market Analysis Intern – Competitive Intelligence — May 2018 – Aug 2018

- Researched patterns, investments, partnerships and strategies in the industry of autonomous vehicles and smart cities, resulting in a 9-page argument and 50-page appendix describing opportunities, challenges, and recommendations
- Conducted interviews with Waze, Nvidia, HERE, Microsoft, Berkeley PATH, UDOT, Avenue Consultants, and IBM
- Collaborated with the Senior Business Strategist, the Head of Transportation Industry, a Global Business Development Lead, and individuals with Strategic Partnerships within Esri to make research highly applicable
- Studied vendor and partner relationships among 8 mapping companies, 14 automakers, 5 TNCs, and 4 chip makers

Utah Department of Transportation — Salt Lake City, UT
Policy Intern – Autonomous Vehicle Research — Jan 2018 – May 2018

- Researched and advised on major policy changes concerning autonomous vehicle testing, operation, and deployment
- Compared state vs. federal preemptive power and compiled data to determine which states were most permissive
- Participated (once) with the ASCE Connected and Automated Vehicle Impact Committee and participated in their strategic plan development
- Worked toward bringing AV testing to Utah

IBM Portugal — Lisbon, Portugal
Marketing and Communications Summer Intern — Jun 2017 – Jul 2017

- Involved with teams and efforts to integrate Watson and AI technology into transportation systems

VOLUNTEER SERVICE

Engineers Mean Business Club — Provo, UT
VP Club Relations – Building the Network of Engineers to Leadership — Jun 2017 – Dec 2017

- Organized and managed relations with 5 clubs inside Marriott School of Business to develop engineer leaders
- Increased club membership by recruiting engineers who are business minded

The Church of Jesus Christ of Latter-day Saints — Brasilia, Brazil
Volunteer Missionary Representative — Dec 2012 – Dec 2014

- Oversaw transportation efficiencies for 160+ volunteers and managed cost efficiencies of ride share and buses
- Managed, trained, and motivated 160+ volunteer missionaries to each maintain 80+ hour work week for two years

ACCOMPLISHMENTS

- Mountain Marathon - Bad Pyrmont, Germany, 2100+ ft. elevation change
- Fluent in Portuguese, proficient in Spanish

MATTHEW J. STRONG

LinkedIn: www.linkedin.com/in/matthewstrong06 • (M) 385-335-3591 • mattj_strong@yahoo.com

EDUCATION

Brigham Young University — Apr. 2019
Bachelors of Science, Civil Engineering Major, Junior — Provo, Utah

- Concrete Canoe team member for 2+ years
- ASCE Member; National and BYU student chapter 4+ years
- Member of Tau Beta Pi Engineering Honor Society; 1 year
- Multiple scholarships from BYU and 5 other sources

EXPERIENCE

Stanley Consultants — Mar. 2018 - Pres.
Field Engineer/Inspector Intern — SLC, Utah

- Assist in managing inspection operations on a multi-million dollar highway project
- Assist in managing all documentation pertaining to the responsibilities of the IQF on the project
- Perform quality inspections on structures, reinforcing steel, soils, concrete and other materials

Acute Engineering — Nov. 2016-Dec. 2017
Engineer in Training — Orem, Utah

- Perform structural analysis for light-framed structures including homes and restaurants
- Using seismic, wind, and gravity loads, design for both vertical and lateral integrity of structure
- Design custom details fit for specific situations where there may not be a "pre-made" method

Staker Parson Companies — Apr. – Oct. 2016
Intern (Survey Crew, Field Engineer, Technology Support, ECS) — Draper, Utah

- Used Business Center to digitally model all of the drainage that was to be installed on the project
- Set grade on a multi-million dollar highway project using Trimble Technology
- Performed weekly SWPPP inspections along the job site as the Environmental Control Supervisor
- Observed and learned firsthand a variety of professional construction procedures and practices

Brigham Young University — Jan. – Oct. 2016
Teaching Assistant (CEEn 103 – Statics, CEEn 203 – Materials, CEEn 332 – Fluids & CEEn 341 - Soils) — Provo, Utah

- Responsible for organizing reviews to help students prepare for tests and review previous material
- Worked personally with hundreds of students to help solve problems and understand concepts
- Stayed current with all material for the course along with special concepts requested by the professor

Church of Jesus Christ of Latter-day Saints — 2013-2015
Volunteer Representative — Tampico, Mexico

- Managed and trained 200+ volunteers in effective teaching methods
- Maintained 80+ hour work week for the duration of my time volunteering
- Provided weekly humanitarian aid and service to members of the local community
- Taught principles of honesty, self-reliance, and treating others with respect

SKILLS AND ACCOMPLISHMENTS

- Fluent in Written and Spoken Spanish, excellent communication ability, able to adapt to the situation
- Proficient in Microsoft Word and Excel, AutoCAD, Bluebeam, and other software
- Eagle Scout, Salem City Youth Council (Service) - 2 Years, HOA Treasurer

BYRON J. YATES
435-287-8185
byron.j.yates@gmail.com

Experience

Utah Department of Transportation | Richfield, UT

Engineering Intern | Summer, 2018

- Documented daily project progress in written reports
- Maintained regular communication with contractors to ensure highest quality bridges possible
- Conducted necessary quality assurance inspection

Brigham Young University | Provo, UT

Teaching Assistant, Sustainable Infrastructure | August 2016-Present

- Helped develop the Sustainable Infrastructure course for BYU
- Developed personal understanding of economic, environmental and social equitability concerns

Research Assistant, Center for Unmanned Aircraft Systems | January 2016-January 2017

- Worked on project developing UAV-born LiDAR change-detection application
- Independent problem solving

Maintenance Technician, Lead Student | January 2015-September 2016

- Oversaw work order completion for myself and five other students for over 700 housing units

Utah Army National Guard | Various Locations

Equipment Maintenance Specialist, Team Leader | May 2009-Present

- Enhanced critical thinking ability by troubleshooting and repairing vehicles and other equipment
- Warrior Leader Course, January 2012
- Deployed to Iraq, 2011
- Thrived in detail-oriented culture

Education

BS Civil Engineering from BYU, projected graduation December 2019

- 3.23 GPA
- Concrete Canoe Construction Manager, 2015-2018

Accomplishments and Certifications

- Passed FE Exam, March 2018
- WAQTC Concrete Testing Certificate, July 2018
- BYU ASCE Vice President 2017
- 2015 Soldier of the Year, A-Battery, 2/222 Field Artillery Battalion
- Nuclear Soil Density Certificate, May 2017
- LDS Mission, New York, New York South, April 2012-April 2014
- Eagle Scout Leadership Award, Boy Scouts of America, 2005

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CODY IRONS

EDUCATION

2013-2016 **Associates of Science / Associates of Pre-Engineering – Snow College.** Ephraim, UT
(Awarded private scholarship for college education)

2017-Current **BYU Civil & Environmental Engineering.** Provo, UT
(Currently a Jr. in the BYU CE EN Program)

EXPERIENCE

2014-2017 **Coughlin General Engineering Company:** St. George, UT
- Operated RoadTec milling machines as a groundsman and mill operator, for both State and Federal jobs.
- Consulted with Supervisors and Engineers to plan layouts and resolve problems in system operations.
- Measured project depths and layout where construction is to be performed, while performing regular preventative maintenance checks, such as cleaning and checking equipment to detect future problems.

2017 **Intermountain Power Project (IPP):** Delta, UT
- Scrubber crew for Power Plant exhaust systems that remove pollutants from gas streams.
- Recorded data for Plant Engineers and inspected slurry nozzles during annual power outage, resulting in more efficient flue-gas removal.

2012-2014 **Eco Life:** Ephraim, UT
- Helped coordinate and bring organization to employees and transportation of equipment, for jobs with various design aspects.
- Responsible for improvements and completion of diverse landscape installs for better production.
- Trouble shooting various irrigation systems for repair and annual maintenance.

2009-2010 **Clawson Construction:** Wales, UT
- Worked on 3 man boring crew, running heavy equipment, including boring drills and hydraulic rams. Drilling under Interstates and roadways for sewer line installation.
- Solved on the job problems and eliminated risks by correctly identifying potential safety hazards.

2008-2010 **Sage Electric:** Payson, UT
- Family owned company with approximately 50 employees, that performed on industrial and commercial projects .
- Worked part time by laboring in major wire pulls, to facilitate certified electricians which led to expedited completed jobs.

STRENGTHS & LEADERSHIP SKILLS

- Served fulltime mission for the Church of Jesus Christ of latter-day Saints in Brisbane Australia (2010 - 2012).
- Dog trainer at The Lazy JW Hunting Club, guiding upland bird hunts. Helping to manage public relations with clients, leading to repeat business.
- Served as team captain for various athletic teams, receiving school athletic awards and Utah All-State athletic awards.
- Raised on a large ranch in Utah, where I acquired life skills and practical hands on abilities.

PERSONAL

- Husband to a beautiful wife * Father of two sons * Little league wrestling coach * Rancher * Hunter * Innovator * Practical problem solver (using math if needed) * If it's not broke don't fix it * Red meats are essential to life * Hard work is always the answer!