AUTONOMOUS FUTURE, TODAY

EasyMile brings driverless vehicle solutions for people and goods to life with leading technology to provide a real service

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Lauren Isaac

Director of Business Initiatives, EasyMile

- Denver, CO based
- 15 years of transportation experience including public transportation, bike share, rideshare, and driverless vehicles
- 8+ years in transportation consulting and working with public agencies
- Passionate about reducing single-occupancy vehicles on the road and leveraging the growing sharing economy
About us
EasyMile

Since 2014

30+ PhDs

220+

7 locations

22 nationalities

32 vehicles in the US (150 worldwide)

60+ projects in the US (350+ worldwide)

Shareholders
Founders, Continental, Alstom, and Bpifrance

Denver, USA
Berlin, Germany
Toulouse, France
Dubai, UAE
Singapore
Adelaide, Australia

Leader in R&D
EZ10 autonomous shuttle

- Driverless and electric shuttle
- 6 (seated Passengers)
- 16h autonomy, 8h with Heat/Air
- Built-in automatic access ramp - ADA compliant
- Pre-mapped network of roads
- Connected
- 12 EZ10 maximum speed
- 30 Other vehicles’ maximum speed
- Sunny, Cloudy, light Rain, light snow
EasyMile’s vehicles in the world

- 150+ Shuttles worldwide
- >400,000 miles Autonomous driving
- >350 Deployments in 30+ countries
- 10 Tractors worldwide
Phoenix Motorcars and the EZ Zeus

- EasyMile is working with Phoenix Motorcars to develop the EZ Zeus
- This is an FMVSS, Buy America, and ADA compliant vehicle
- Commercially available in the next two years with the first vehicle available by 2021
- Press release [here](#)
EZ10 Deployments
Using all the available data from the different sensors in a fusion algorithm, the vehicle knows its position and the accuracy of it at all times. Any potential deviation will safely slow down or stop the vehicle.

The vehicle can be programmed to a site map, even with a network of potential trajectories, with all elements triggering specific behavior (e.g., speed areas, pedestrian crossings, etc.). The vehicle follows the path smoothly with pre-defined behavior.

If an obstacle appears, the vehicle’s sensors detect it and trigger appropriate behavior, slowing down, overtaking or stopping. When the obstacle is avoided, the vehicle proceeds.

**Teaching vehicles how to behave**

- **Localization**
  - Using all the available data from the different sensors in a fusion algorithm, the vehicle knows its position and the accuracy of it at all times. Any potential deviation will safely slow down or stop the vehicle.

- **Navigation**
  - The vehicle can be programmed to a site map, even with a network of potential trajectories, with all elements triggering specific behavior (e.g., speed areas, pedestrian crossings, etc.). The vehicle follows the path smoothly with pre-defined behavior.

- **Perception**
  - If an obstacle appears, the vehicle's sensors detect it and trigger appropriate behavior, slowing down, overtaking or stopping. When the obstacle is avoided, the vehicle proceeds.
EZ10 ODD Considerations

- Pre-mapped environment
- Well paved and maintained roads
- Lower speed vehicle traffic (<30 mph)
- Day or night operations
- Good 3g/4g coverage
- Traffic signals require CV technology
EZ10 Use Cases

Private sites

- Large industrial sites
- Universities and hospital campuses
- Business parks, theme parks especially to commute with parking areas

Public roads

- 1st and last mile in complement to mass transportation means
- Pedestrian / controlled speed districts
- Touristic areas
Sharing best practice

Various use cases including, Department of Transportations, Airports, Fortune 500 firms and University Campuses

*EasyMile has unmatched deployment experience; having operated hundreds of thousands of miles in our driverless shuttles globally. EasyMile is happy to provide references, upon request.*
10 venues over 12 months around Salt Lake City with different use cases and customer types: skiing resorts, business parks, university campus, hospital, malls.

<table>
<thead>
<tr>
<th>Place</th>
<th>Various Locations Around the State of Utah, USA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>Private and Public Roads</td>
</tr>
<tr>
<td>Description of the project scope</td>
<td>Mixed Traffic with Pedestrians, Bikes and Motorized Vehicles</td>
</tr>
<tr>
<td>Route length</td>
<td>Average 1 mile</td>
</tr>
<tr>
<td>Make, Model and Number of shuttles used</td>
<td>One EasyMile EZ10 Gen-2</td>
</tr>
<tr>
<td>Project Duration - including passengers carried</td>
<td>18 months project, has been ongoing since March 2019. 750 riders per month.</td>
</tr>
<tr>
<td>Average temperatures and weather encountered</td>
<td>The highest average temperature is 89.4° and the lowest average temperature is 17.1°F. Weather includes snow, rain, wind, fog, hail</td>
</tr>
</tbody>
</table>
Dallas Fort Worth International Airport (DFW) has contracted EasyMile to provide a driverless shuttle service transporting passengers in the Remote South Parking lot in order to provide a seamless connection with a shuttle service to the airport terminal. The service is being provided from December 2019 to June of 2020 and is operating from 7am to 3pm on weekdays. DFW is using this first pilot as an opportunity to learn about the driverless technology and understand potential additional applications throughout the airport. Future opportunities at DFW include additional passenger transport locations in addition to baggage transport airside or landside.

<table>
<thead>
<tr>
<th>Customers and Client URL</th>
<th>DFW - <a href="http://www.dfwairport.com">www.dfwairport.com</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>Private parking lot - landside</td>
</tr>
<tr>
<td>Description of the project scope</td>
<td>Mixed Traffic with Pedestrians and Motorized Vehicles</td>
</tr>
<tr>
<td>Route length / Number of stops</td>
<td>0.75 mile with 6 stops</td>
</tr>
<tr>
<td>Make, Model and Number of shuttles used</td>
<td>One EasyMile EZ10 Gen-2</td>
</tr>
<tr>
<td>Project Duration, hours of service - including passengers carried</td>
<td>6 month first phase completed 7am to 3pm. Approx. 50-100 passengers per week</td>
</tr>
<tr>
<td>Average temperatures and weather encountered</td>
<td>The highest average temperature is 96°F and the lowest average temperature is 30°F. Weather includes rain, wind, fog, hail.</td>
</tr>
</tbody>
</table>
Houston Metro, TSU, Texas

Texas Southern University, METRO, First Transit, Houston-Galveston Area Council and EasyMile started the region’s first Shared Autonomous Shuttle in June 2019.

The University District Circulator in which a driverless EasyMile SAV shuttle travels on the Tiger Walk is a one-mile pedestrian walking loop, providing connections to multiple points and buildings on campus for students and faculty.

<table>
<thead>
<tr>
<th>Customers and Client URL</th>
<th>Houston METRO - <a href="https://www.ridemetro.org/">https://www.ridemetro.org/</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>University campus</td>
</tr>
<tr>
<td>Description of the project scope</td>
<td>Mixed Traffic with Pedestrians, Bikes and Motorized Vehicles</td>
</tr>
<tr>
<td>Route length / Number of stops</td>
<td>1 mile with 6 stops</td>
</tr>
<tr>
<td>Make, Model and Number of shuttles used</td>
<td>One EasyMile EZ10 Gen-2</td>
</tr>
</tbody>
</table>
| Project Duration, hours of service, ridership | Phase 1 - 1 year completed  
Phase 2 is in preparation  
1,000 Passengers per month |
| Average temperatures and weather encountered | The highest average temperature is 93° and the lowest  
average temperature is 44°F. Weather includes rain, wind,  
fog, hail. |
Reflections on AV Shuttle Deployments

- AV shuttles are not just sexy toys! Projects should solve a mobility challenge.
- Route complexity needs to match the state of the automated technology.... And can scale from there
- Stakeholders should each identify their goals upfront
- We will share data, but we need to know what is useful to you!
- Key factors for a successful AV project:
  - Aligned stakeholders
  - Feasible route
  - Funding
Introducing EZ Street...
What is required to prepare for commercial autonomous deployments?

- What type of Infrastructure changes will be required?
- Determine the advantages/disadvantages in public transit
- What level of stakeholder engagement will be required?
- How real is the threat from cybersecurity?
- What outreach will be needed to gain acceptance from the community?
- What type of weather conditions can the AV operate in? How many overall days will they not operate?
- What is the job transition plan?
- Who owns the data? How will it be shared?
- Are all AV companies the same? What type of safety testing is available?
- Will there really be a cost benefit provided by autonomous vehicles?
- Who is liable in an accident? City, AV technology, operator, infrastructure?
- Are state and local laws ready to allow for autonomous vehicles on the roads? Licensing and permitting?
PROJECT VISION

Deploy Meaningful, Autonomous Service
Provide the nation’s largest autonomous micro transit first-and last-mile/circulator service today

Educate the Industry
Capture and communicate all of the lessons learned in order to create the world’s first roadmap to prepare the city, and the industry, for robust autonomous transit in the next few years

Create a Living Lab
Incorporate a range of novel technologies that can leverage the autonomous vehicle micro transit service
The Colorado Smart Cities Alliance is in discussions with multiple Colorado cities about deployments of up to 10 autonomous shuttles at each site. The shuttles will provide first/last mile connections to transit stops and/or circulation around a downtown. Estimated deployment timeline is Q2 2021. Commitments are expected by the end of Q4 2020.
PROJECT ECOSYSTEM

**PARTNERS**

- **EasyMile** (Vehicles/Maint/Deployment)
- **RTD** (Transit Partner)
- **Panasonic** (Connected Infrastructure)
- **Transdev** (Operations)
- **Host City** (Site owner, Storage/Charging)
- **NHTSA** (Federal approval)
- **Insurance Partner** (Risk Analysis)
- **CO AV Mobility Taskforce** (State approval)

**FUNDING**

- **Partner** Contribution
- **University Data Sharing**
- **EZ Street Playbook**
- **Private Sector Sponsorship**
- **Grants**

**Colorado Smart Cities Alliance** (Partner and Funding Coordination)

- **Sponsors**
- **Local Employers**
- **University/Research Centers** (Grant Applications/Data Analysis)
- **AV Vendors** (Supporting Technology)
- **Consulting Firm** (Sponsorship Generation/Playbook)
- **MaaS Platform**
Thank you!

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Connect with us:

#EasyMile