



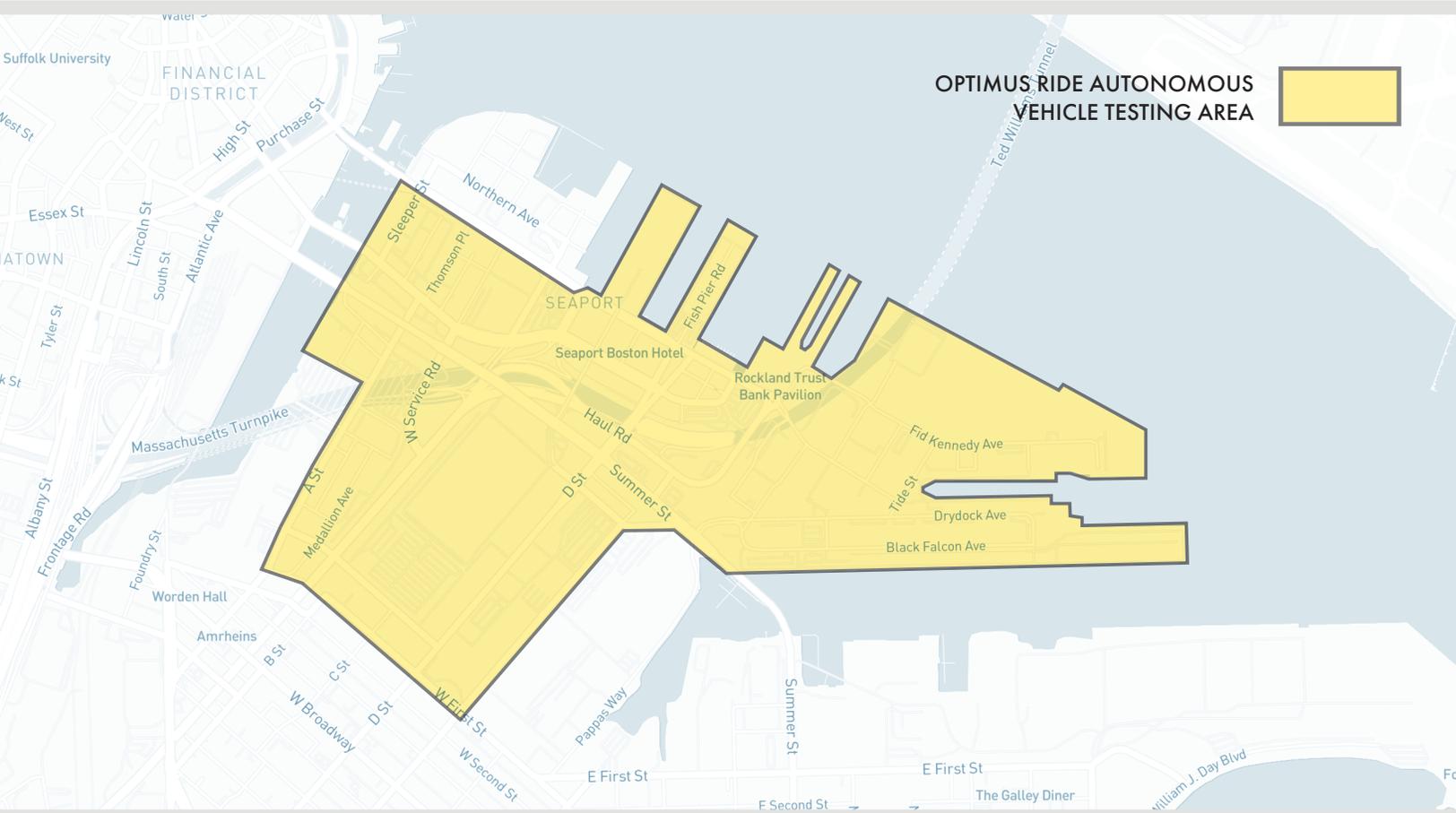
**Q1 2020**  
**PROGRESS REPORT**  
**AUTONOMOUS VEHICLE TESTING**  
**CITY OF BOSTON**

# ABOUT OPTIMUS RIDE

Optimus Ride designs, builds, and operates customized electric and autonomous transportation solutions for low-speed geofenced locations, from residential communities and mixed-use developments to office/industrial parks, ports, airports, academic campuses and city zones. Our company is based out of the original Autonomous Vehicle Testing Zone in Massachusetts, the Raymond L. Flynn Marine Park within Boston's Seaport District. Here, we conduct the majority of our research and development activities which prepare our autonomous mobility system for commercial deployment. Presently, we operate commercial deployment programs in New York, Virginia, and California. Each system is tailored to meet community needs for passenger service and last-mile logistics. We are grateful for the continuous support we have received to test automated vehicles on public ways in Massachusetts. Your work makes our research, development, and commercialization efforts possible.

Thank you,

**The Optimus Ride Team**



## TESTING ACTIVITIES – Q1 2020

During the first quarter of 2020, we received official approval from the Massachusetts Department of Transportation (MassDOT), the City of Boston, and the Economic Development and Industrial Corporation of Boston (EDIC) to renew our testing permit for the Commonwealth of Massachusetts. During this process, Optimus Ride worked closely with members of the Autonomous Vehicle Working Group to expand our operational design domain (ODD) beyond the Raymond L. Flynn Marine Industrial Park Bounded Test Area and into the South Boston Seaport Bounded Test Area. We continue to be able to perform pilot service tests in the Marine Industrial Park and may apply for such permissions in the South Boston area at a later date. We also received expanded approval to test our autonomous driving system (ADS) in moderate weather conditions, which now include moderate rain, fog, and snow (greater than 10 mm/hr and less than or equal to 25 mm/hr rate of unmelted snowfall, and visibility of at least 1/2 km).

Our team continues to be able to utilize our vehicles to collect data in conventional mode (with the ADS disengaged) in extended geographies, weather conditions, and situational constraints. We refer to this as 'manual data collection'. For example, we may drive a route manually to gather data on pedestrian and cyclist behaviors around particular regions in the Seaport District. During these circumstances, we behave as conventional vehicles and move with the flow of traffic. To ensure data collection goes smoothly - and out of an abundance of caution - we conduct internal safety analyses and make the necessary plans and preparations prior to launching these efforts.

Along with many other companies and institutions, we have been closely monitoring the Covid-19 pandemic from its early days through its global spread. Beginning in February, we took steps to enforce social distancing across all of our sites. This included increasing sanitization of our vehicles and facilities as well as de-densifying our vehicle capacity and office spaces. In keeping with guidance from health and state officials, we transitioned the company from optional work-from-home to mandatory during the second week of March, pausing our on-road testing activities in Massachusetts.



# RESEARCH ACHIEVEMENTS

## GENERAL OBSERVATIONS AND LESSONS LEARNED

Despite on-road testing activities being cut short in Q1 due to our Covid-19 response, during this period, we accumulated nearly 700 autonomous miles in Massachusetts alone during testing on public roads. In anticipation of a shelter-in-place order, beginning in February we completed work that would enable us to continue many research activities during a work-from-home period with minimal disruption:

**DRIVERLESS VEHICLE:** We continue to make significant progress towards equipping a fully driverless Optimus Ride vehicle. Prior to our transition to work-from-home, we performed testing of our driverless testing vehicle on our closed test track. We also conducted user testing to better understand how users want to interact with a fully driverless vehicle, including what information users require in-vehicle and how users might seek help during a ride. Our user experience research continued into the work-from-home period to inform development efforts for the driverless vehicle.

**REMOTE MONITORING:** As part of ongoing efforts to enable a remote monitor to supervise fleets of driverless vehicles from a command center, we performed network evaluations of our operating areas to continue developing this workstream during work-from-home.

**AUTONOMOUS OVERTAKE:** We have rolled out the ability to overtake double-parked vehicles autonomously (i.e. crossing over the centerline). The overtake process is designed such that the vehicle must request and receive permission to overtake the obstacle from a human operator. We anticipate the confirmation process will progressively be transferred to a remote monitor in the command center as that capability is built out.

**AUTONOMOUS THREE-POINT TURNS:** We are in the final stages of testing our autonomous three-point turn capability. This is especially valuable in sites where constrained roads require completing three-point turns during our standard operating routes, which we currently perform manually. The three-point turn capability ensures we can provide autonomous rides from start to finish on these routes.



## OPTIMUS RIDE'S RESPONSE TO COVID-19

On Monday, March 15th, we mutually decided with our partners to pause passenger operations at all of our sites, including the Brooklyn Navy Yard in Brooklyn, NY, Halley Rise in Reston, VA (with Brookfield Properties), and Paradise Valley Estates (PVE) in Fairfield, CA. We felt this action was the responsible choice considering the situation around the globe.

The same day we paused operations at Paradise Valley Estates, a 60+ Life Plan Community, we received an urgent request from their management to assist with evening meal delivery as residents were no longer allowed to congregate in the dining hall. Our team immediately sprang into action. After taking all possible precautions, we adapted our service for meal delivery. That evening, we delivered 46 meals. Since then, we continue to deliver 50-80 meals per day and have expanded our efforts to include doorstep delivery of goods and packages.

While we are unable to provide passenger mobility services at this time, we continue to look forward to resuming our services to all our customers. In the meantime, we remain committed to serving the Paradise Valley community during this difficult period, and will continue to work with our clients to determine how we may be of service through our delivery program in the interim.

## TAKEOVERS

The takeover methods used in Optimus Ride's vehicles are designed to ensure that the Human Machine Interface (HMI) is clear, consistent, gives context, and provides operators the necessary feedback about the system. The system is designed to disengage autonomous control and enable manual control by the safety driver when a takeover is initiated. The safety driver can immediately take control using the brakes, throttle, or steering wheel, for example.

All Optimus Ride employees who will be operating our vehicles are required to achieve the classification of Vehicle Safety Operator (VSO) and maintain good standing. To be certified, VSOs must demonstrate proficiency in operating our system during standard and stressed operating conditions, including those requiring manual takeovers. VSOs are trained to take over under two categories, required and nominal takeovers, and VSOs may take over at their discretion. Required takeovers occur to promote the safety of our drivers or other road users. For example, a VSO may take over out of an abundance of caution if a pedestrian jumps out quickly between cars in a parking lot. Environmental factors, such as construction sites, potholes, and unclear or faded lane markings may also lead to takeovers as the system and other road users adapt. In contrast, nominal takeovers occur outside of this safety case, for example, if a VSO wishes to adjust their seat or mirrors.



# GENERAL REPORT

## FEEDBACK FOR MUNICIPAL AND STATE TRANSPORTATION STAKEHOLDERS

During Q1 2020, we experienced a notable near miss caused by another road user. While preparing to leave our facility for testing conducted in early morning traffic, a Vehicle Safety Operator (VSO) manually drove down the ramp from the second floor of the 88 Black Falcon building onto Drydock Avenue. Midway down the ramp, an oncoming vehicle rapidly veered onto our lane. The VSO immediately steered away and braked, narrowly avoiding a collision. Beyond underscoring the importance of engaged safety driving, this event exemplifies the need to train VSOs on safety driving protocols under stressed conditions. After ensuring our employees were unharmed and reviewing the event internally, we ultimately decided to report this event to the administration of our building so they could remind tenants of safe driving behavior. We continue to note unsafe driving behaviors and maintain open lines of communication with members of our community to ensure the safety of all road users.

## GOALS FOR CURRENT AND FUTURE TESTING, AND/OR PROPOSALS FOR CHANGES

We do not wish to extend our operational design domain or update our testing approvals at this time. For information related to our current and future testing efforts, please refer to the Research Achievements section of our report.

## DESCRIPTION OF ALL ADS SYSTEM FAILURES, CITATIONS, OR VIOLATIONS RECEIVED DURING TESTING

After Q1 2020, Optimus Ride conducted an internal audit of ADS system failures, citations, and violations received during testing. During this period, Optimus Ride has no system failures, citations or violations to report.

## PILOT SERVICE TESTS

Optimus Ride is not providing pilot service tests at this time in the State of Massachusetts. For more information regarding the services we provide, our commercial deployment sites, or general inquiries, please refer to our website: [www.optimusride.com](http://www.optimusride.com)

