Autoware Foundation:
Autonomous Valet Parking project status
**AVP2020**

**Autonomous Valet Parking**

The Autonomous Valet Parking functionality will provide the capability to automatically drive a car from a drop-off location (such as a carpark entrance) to a specified park, park the car, and then drive to a pick-up location upon request.

**Goal 1: Kick-start Autoware.Auto development**

By gathering many contributors from AWF member companies and beyond, create the kernel of a development community for the next generation of Autoware.

**Goal 2: Provide a technical foundation**

By focusing on a narrow ODD and doing a complete end-to-end application, we will produce a sound architecture that can be expanded to a variety of new ODDs with accelerating development.

**Goal 3. Increase exposure of the Autoware Foundation**

Through a complete application that can be reliably demonstrated, enable the Autoware Foundation to hold public demonstrations to show the potential of open-source self-driving software.
Project timeline

Planning workshop in Palo Alto

Milestone 1: Foundations
- Dec. w1
- Jan. w1
- Feb. w1
- Mar. w1
- Apr. w1

Milestone 2: Follow waypoints with NDT localisation
- Dec. w3
- Jan. w2
- Feb. w2
- Mar. w2
- Apr. w2

Milestone 3: Vehicle integration, motion planner
- Dec. w4
- Jan. w3
- Feb. w3
- Mar. w3
- Apr. w3

Milestone 4: HD map integration, route planner
- Jan. w4
- Feb. w4
- Mar. w4
- Apr. w4

Milestone 5: Full-vehicle testing in carpark and demonstration
- Feb. w4

Hackathon in Palo Alto
Collaborative, iterative development

Iterative development
Development divided into five milestones, with each milestone incrementally improving on the one before.

Well-designed, well-reviewed and well-tested software
All software contributions must come with design documentation explaining what was done and why. Every MR is peer-reviewed by two or more people.
A high test coverage (>85%) is required to merge new code, and integration testing is conducted using behaviour verifiers, the LGSVL simulator and (soon) a real vehicle.

19 contributors from 8 companies
Including two independent contributors, this is a true collaborative Autoware Foundation and open-source project.
Development by (growing) numbers

**Accelerating development**
Number of commits has grown significantly since the start of the AVP work

**Rapid development**
Nearly 40 merge requests merged in the past four weeks alone - while maintaining test coverage and quality of code and design

**Growing developer community**
Doubled the number of regularly-active contributors since December. Significant growth in meeting attendance.

**Strong development focus**
Typically only five branches under active development at a time.
Contributing companies

- Apex.AI
- Embotech
- LGE
- Parkopedia
- Robotec Solutions
- Streetdrone
- Streetscooter
- Tier IV
- ...
Current status: MS2

Simulated carpark environment
Copy of the real-world carpark to be used for the demonstration.

Deterministic-time implementation of a LiDAR pipeline
From Velodyne data to bounding boxes (via Euclidean clustering) in deterministic execution time. Currently being tuned and connected to the mock planner.

Mock planner
Based on trajectory recording and replaying. To be replaced by a real path planner in MS3.

Real-time-safe MPC controller implementation
Implementation of MPC that will provide motion control of the car. Currently being integrated with the simulated car.

Fail-safe implementation of NDT
NDT implementation with features to handle failure modes identified through a light failure analysis