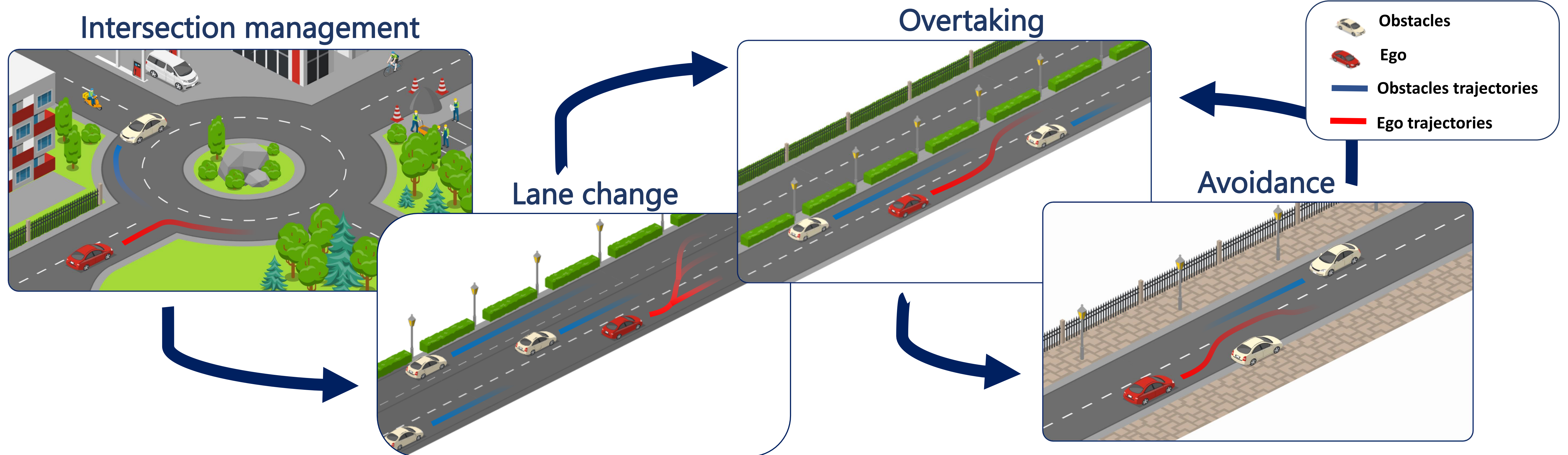


Flexible and Robust Multi-Controller Architecture for Autonomous Navigation under Risky Situations

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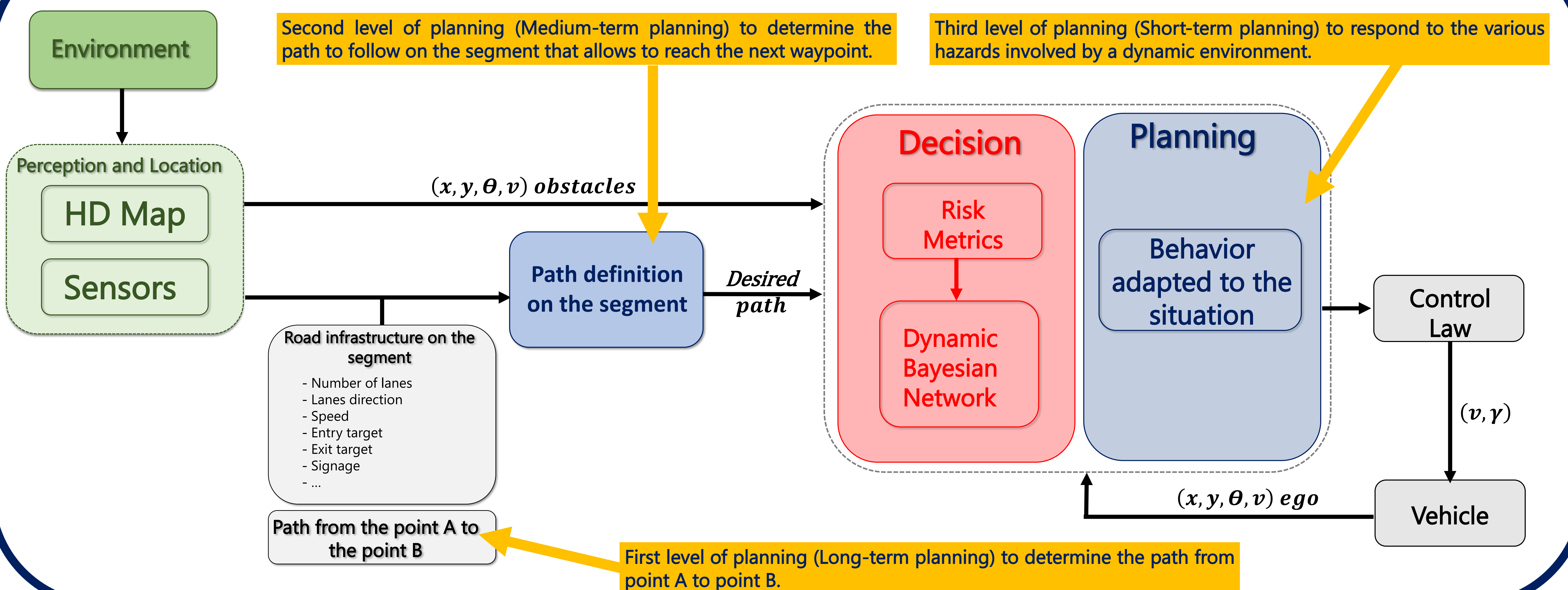
Objective

- Move from point A to point B in a constrained and dynamic urban environment
- Take into account the road infrastructure
- Adapt to the dynamic environment
- Take into account the uncertainties of perception and location, as well as the intentions of other vehicles



The final control architecture must be **flexible** and **robust** enough to be able to carry out all identified use cases as well as controlled transitions between them.

Proposed Control Architecture



Scientific contribution

The aim of this paper [1] is to **assess and manage the risk of collision** with the surrounding obstacles (mainly the one coming from behind) during the overtaking maneuver, and this while taking into account the new dynamic of the surrounding obstacles and the actual actuation capacity of the Ego-Vehicle (its maximum velocity and acceleration). This is done by using a new metric proposed which is the **Distance Awareness for Adaptive Velocity Profile (DA-AVP)** based on Dynamic Predicted Inter-Distance Profile (D-PIDP) [2] and including a safety margin while achieving the maneuver. This velocity profile is applied on the preplanned path based on an Elliptic Limit-Cycle [3].



Vidéo Simulation

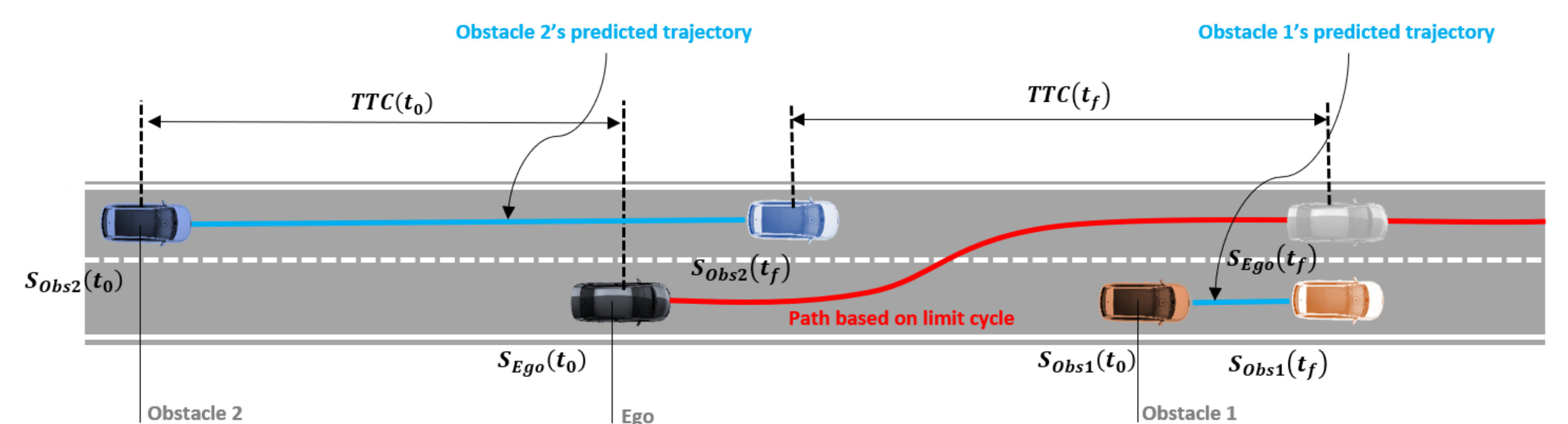


Figure. Scenario with the positioning of vehicles from t_0 which is the time of avoidance decision-making, to t_f which is the end of the maneuver time.

References

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