

**Preamble:**

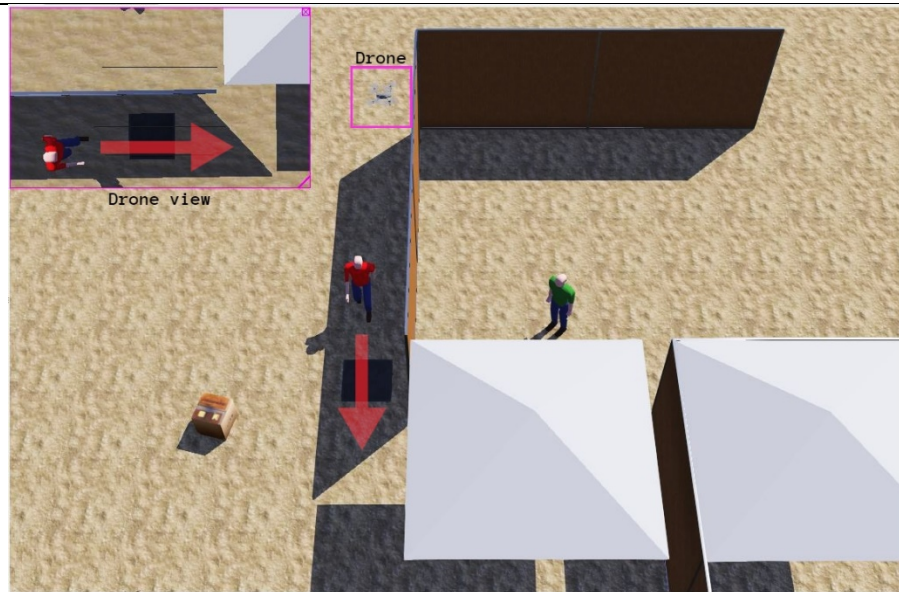
We present 6 different scenarios using a simplification of the hide-and-seek scenario proposed in the Scoping Plan to simulate a combat-like situation. In these scenarios, the drone and the human wearing the green t-shirt are a team, namely, the aerial and ground team-member respectively. Both team-members work collaboratively aiming to target the enemy, i.e., the human wearing the red t-shirt. Each scenario presents 2 figures depicting an initial situation, for instance at time-step  $t$ , and a final situation, for instance at time-step  $t+1$ , although it might be a future time-step as well.

The figures show the general aerial view of the situation, the drone view camera (see pink boxes for the drone and the drone view) and a prediction of the team-mate and/or enemy behaviour (see red arrows for the predicted movement). As stated in the Scoping Plan: “The drone can only see small areas and must determine, based on what the human is doing, the best location for it to search. It must provide details of where it is going, why, and what it sees as a dialog to the human team members.”

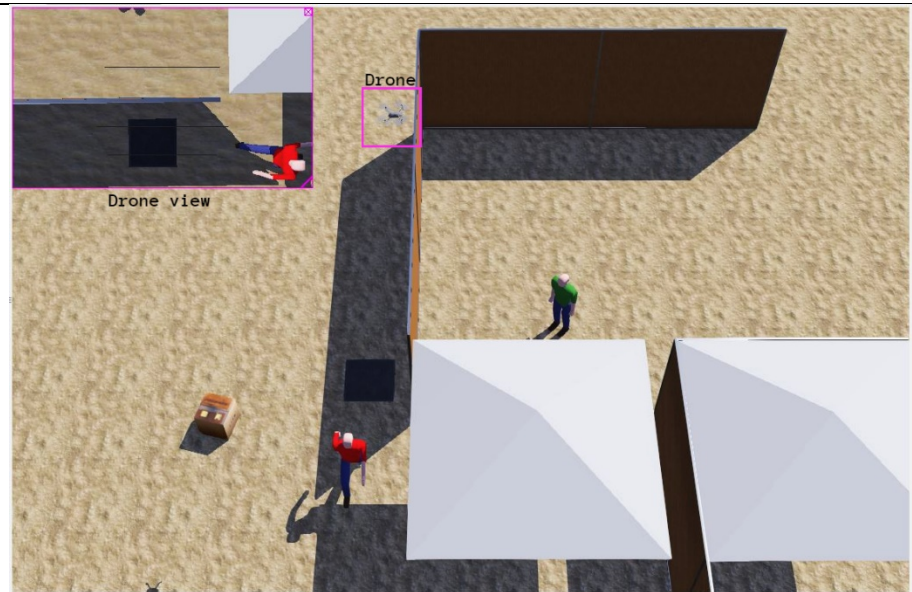
Currently, the scenarios are mock-ups built in the Webots robot simulator and it is expected to integrate them with the MO-MADDPG algorithm. At this first stage, and especially considering Charlotte’s experiments, the explanations are created manually considering future algorithm responses.

**Scenario 1:** Ground team-member does not move from their position.

**Initial situation**



**Final situation**

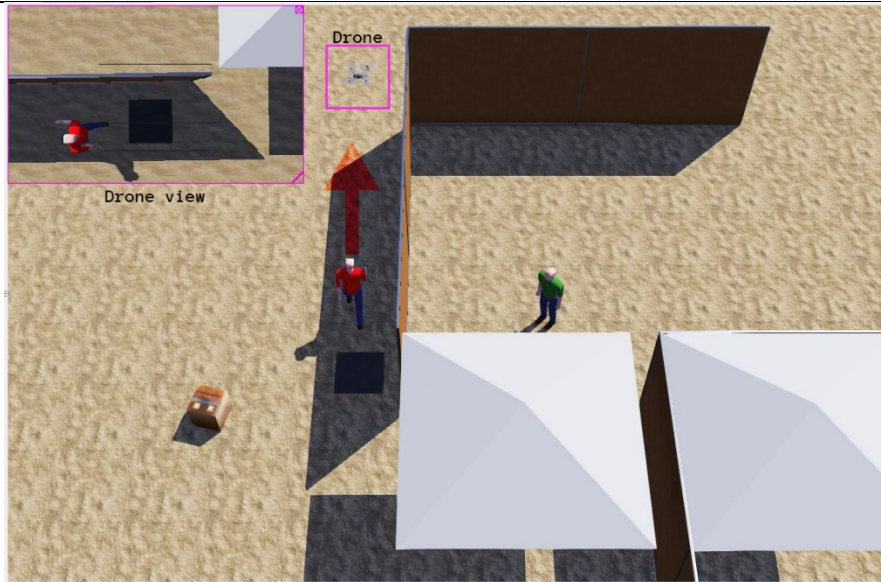


**Question (for the drone):** Why did you suggest to the ground team-member to not move from their position?

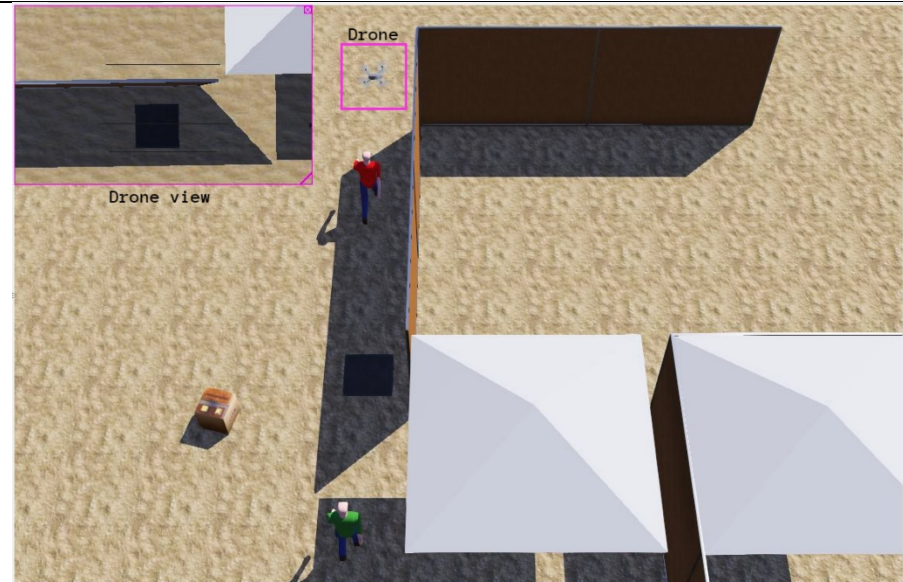
**Explanation:** I suggested to the ground team-member not actively look for an opponent because given the prediction of the opponent's behaviour, an opponent can be targeted with higher probability at a next time-step from the ground team-member's current position.

**Scenario 2:** Ground team-member moves towards opponent.

**Initial situation**



**Final situation**



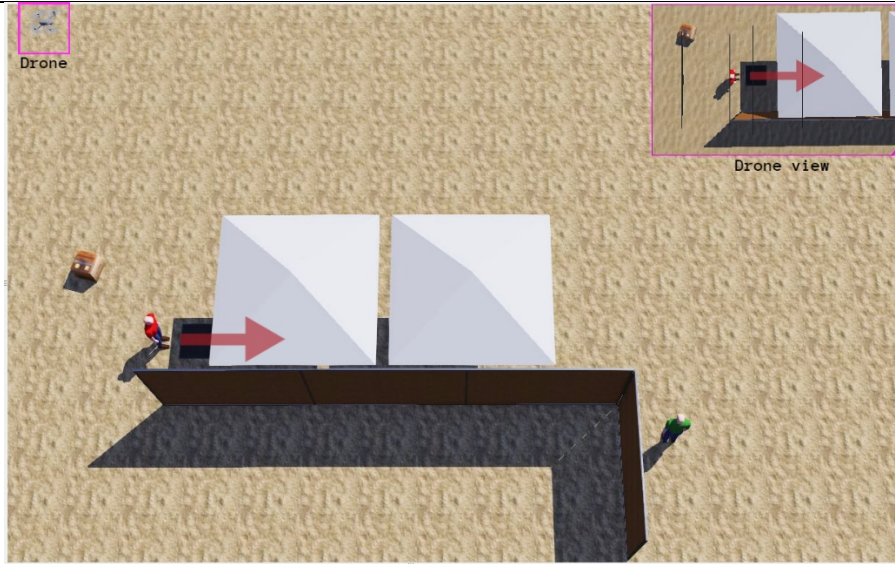
**Question (for the drone):** Why did you advise to the ground team-member to move toward the wall?

**Explanation:** I advised the ground team-member moving toward the wall because from this position there is a higher probability to target a running opponent at the next time-step, given the prediction of the opponent's behaviour.

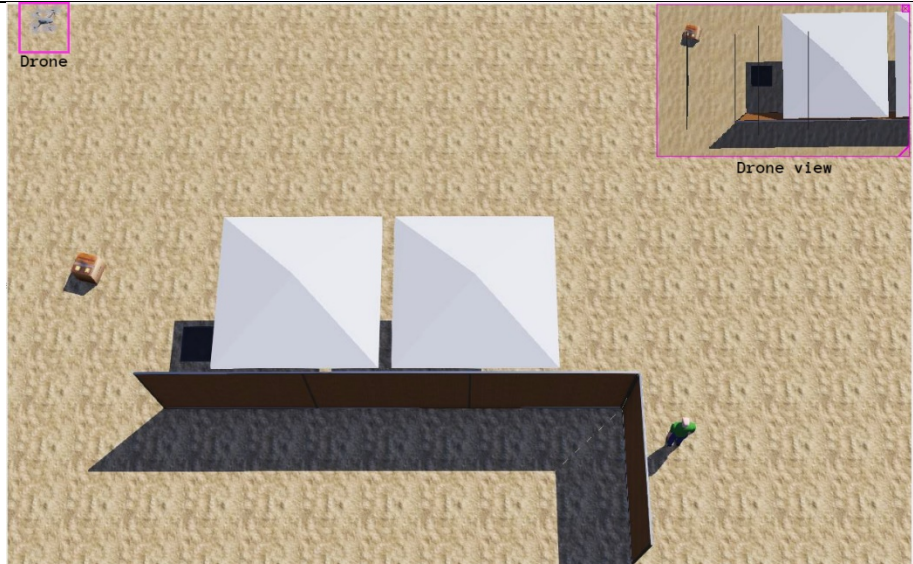


**Scenario 3:** Opponent hidden under the gazebos.

**Initial situation**



**Final situation**

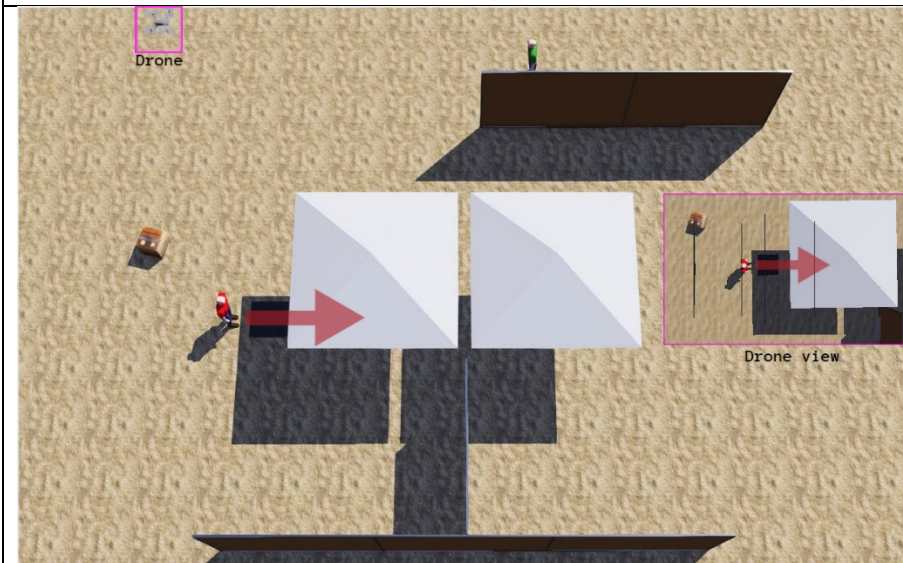


**Question (for the drone):** Why did you stay at the same position?

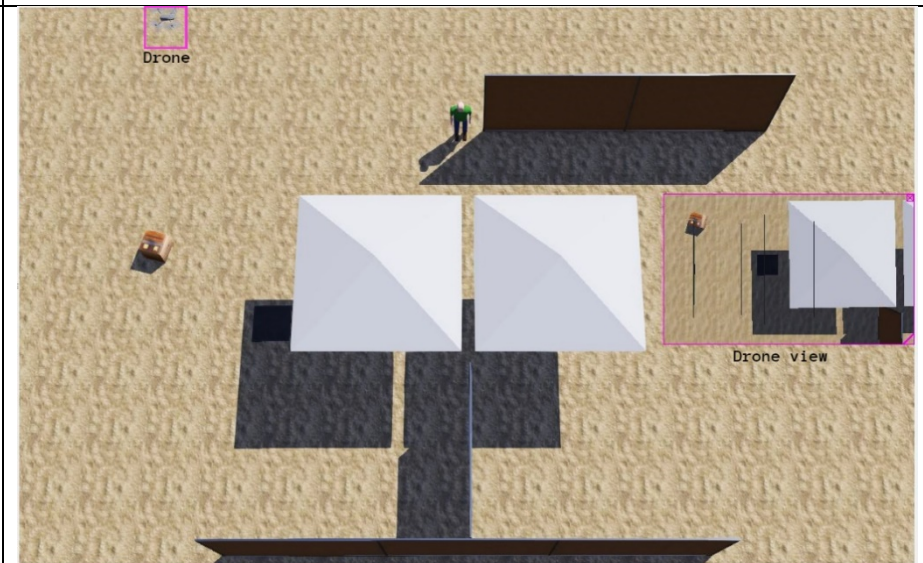
**Explanation:** I stayed at the same previous position because together with the ground team-member, we have a greater possibility of targeting the opponent at the next time-step. In case the opponent gets out to the right there is a ground team-member to target them. Otherwise, in case the opponent gets out to the left I can target this opponent.

**Scenario 4:** Opponent hidden under gazebos with unclear next behaviour.

**Initial situation**



**Final situation**



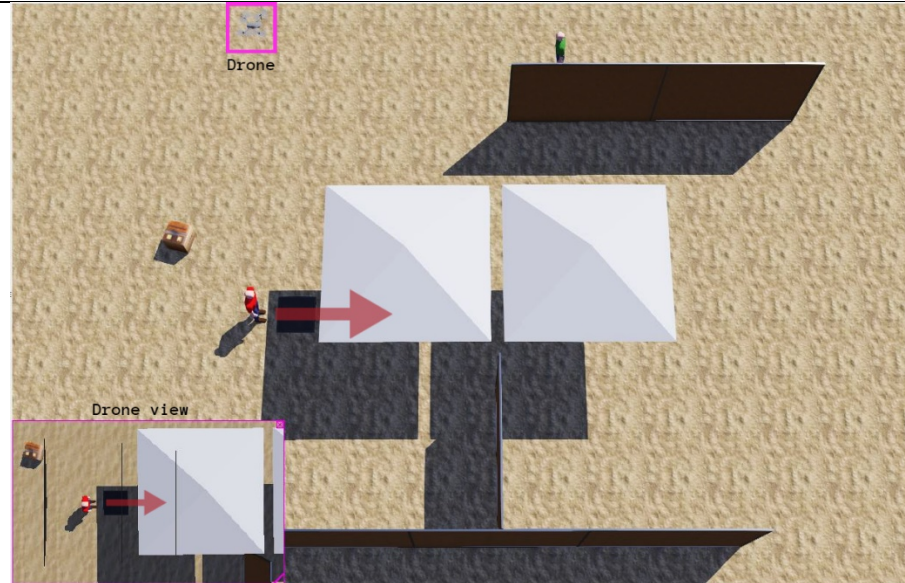
**Question (for the drone):** Why did you stay at the same position?

**Explanation:** I stayed at the same previous position because I cannot determine the opponent's behaviour or from where the opponent will escape the gazebos and, based on previous ground team-member behaviour, I predict a team-member will move from the other side of the wall to target the opponent at the next time-step.

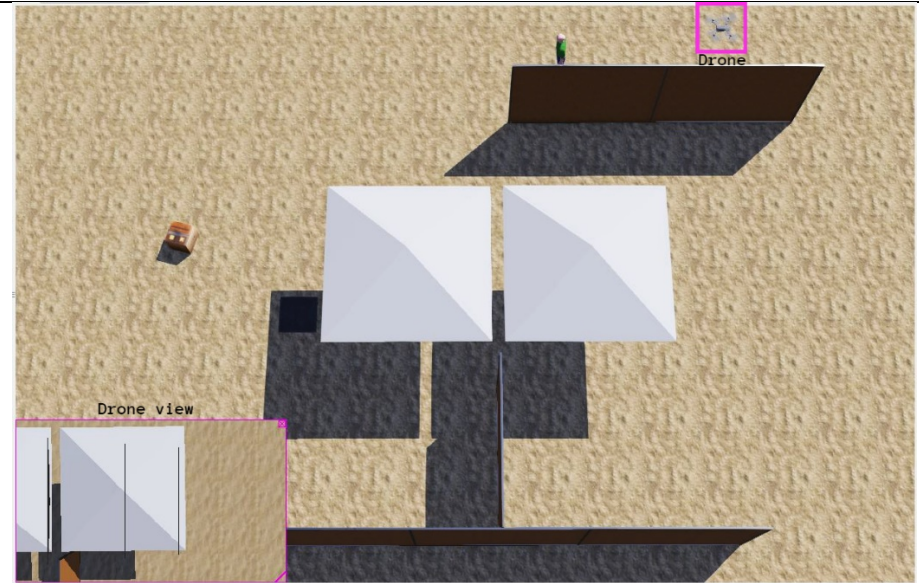


**Scenario 5:** Drone moves actively looking for opponents.

**Initial situation**



**Final situation**



**Question (for the drone):** Why did you move to the right?

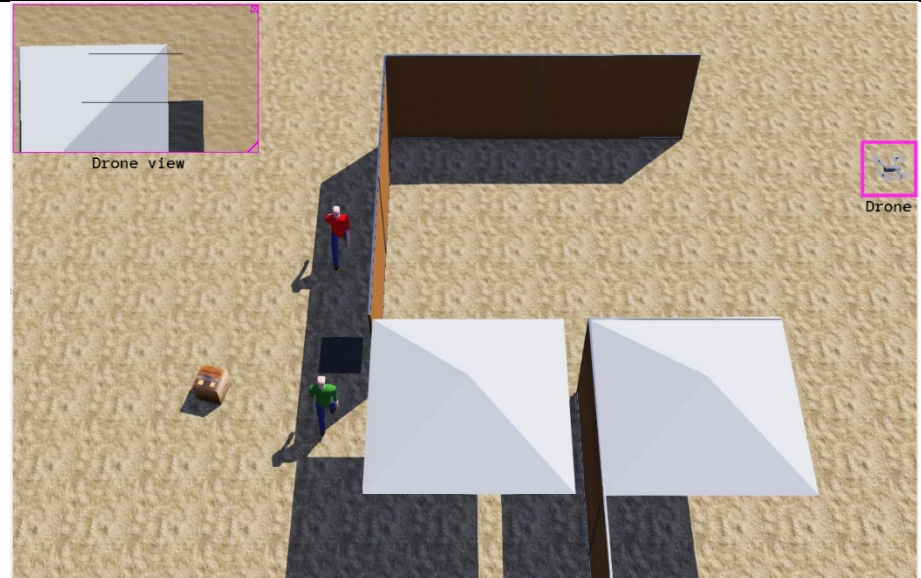
**Explanation:** I moved to the right of the gazebos because, based on the previous ground team-member's behaviour, I predict the ground team-member will not move from their position and, based on the previous opponent's behaviour, I predict the opponent will get out of the gazebos to the right. Therefore, I have a higher probability to target the opponent from that position at the next time-step.

**Scenario 6:** Drone moves actively looking for opponents after ground team-member targeted an opponent.

**Initial situation**



**Final situation**



**Question (for the drone):** Why did you move beside the gazebo?

**Explanation:** I moved beside the right gazebo because in my previous position an opponent has been already targeted by a ground team-member and, therefore, in the new position I have a higher probability to target another opponent at the next time-step hidden under the gazebo and not visible from the ground.