# Development of Tools for Multi Vehicles Simulation with Robot Operating System and ArduPilot

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**Abstract :** One of the main difficulties in developing multi-robot systems (MRS) is related to the simulation and testing tools available. Indeed, if the differences between simulations and real robots are too significant, the transition from the simulation to the robot won&rsquo;t be possible without another long development phase and won&rsquo;t permit to validate the simulation. Moreover, the testing of different algorithmic solutions or modifications of robots requires a strong knowledge of current tools and a significant development time. Therefore, the availability of tools for MRS, mainly with flying drones, is crucial to enable the industrial emergence of these systems. This research aims to present the most commonly used tools for MRS simulations and their main shortcomings and presents complementary tools to improve the productivity of designers in the development of multi-vehicle solutions focused on a fast learning curve and rapid transition from simulations to real usage. The proposed contributions are based on existing open source tools as Gazebo simulator combined with ROS (Robot Operating System) and the open-source multi-platform autopilot ArduPilot to bring them to a broad audience.
**Keywords :** ROS, ArduPilot, MRS, simulation, drones, Gazebo
**Conference Title :** ICSEMS 2019 : International Conference on Systems Engineering, Modeling and Simulation
**Conference Location :** Berlin, Germany
**Conference Dates :** May 21-22, 2019