



Heterogeneous Teams of UGVs and UAVs for Multipurpose Operations

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Abstract. The development of heterogeneous teams of unmanned ground vehicles (UGVs) and unmanned aerial vehicles (UAVs) for different mission types has deserved increasing attention of researchers in recent years, as the technology enables building more complex and resilient robot systems. In this talk I will describe some of the work done by my group on developing a multipurpose, autonomous, mobile manipulator for building outdoor structures and for firefighting, developed to participate in the Mohamed Bin Zayed International Robotics Challenge (MBZIRC) 2020, but also as a first step towards a team of UAVs and UGVs designed to inspect and regularly monitor solar farms.

I will present with some detail the hardware and software architectures of the developed mobile manipulator, and the developed methods for building outdoor structures consisting of heterogeneous brick patterns, and entering buildings to locate and extinguish fires. Solutions were successfully deployed in the near-realistic arenas of the MBZIRC 2020 competition and resulted in the first-place award for the firefighting scenario. Then I will provide some insight on ongoing work concerning the use of this UGV and an UAV fleet to search for solar panel defects in large-area solar farms, where autonomy is an important step for future operation.

Keywords: Unmanned ground vehicles (UGVs) · Unmanned aerial vehicles (UAVs) · Mobile manipulator