

Enabling codesharing in Rescue Simulation with USARSim/ROS

Zeid Kootbally¹, Stephen Balakirsky², and Arnoud Visser³

¹ Department of Mechanical Engineering, University of Maryland

² Georgia Tech Research Institute, Atlanta, Georgia

³ Intelligent Systems Laboratory Amsterdam, Universiteit van Amsterdam

Abstract. *The Robot Operating System (ROS) has been steadily gaining popularity among robotics researchers as an open source framework for robot control. The Unified System for Automation and Robot Simulation (USARSim) has been used for many years by robotics researchers and developers as a validated framework for simulation. This paper presents a new ROS node that is designed to seamlessly interface between ROS and USARSim. It provides for automatic configuration of ROS transforms and topics to allow for full utilization of the simulated hardware. The design of the new node as well as examples of its use for mobile robot inside the RoboCup Rescue Simulation League are presented.*

1 Introduction

With the development of advanced but also more complex algorithms one cannot expect that a robotic control system will be developed from scratch. With the aid of open source projects such as the Robot Operating System (ROS) [17] allow anyone with a Linux computer to download and run some of the most advanced robotic algorithms that exist. This is essential for the RoboCup mission; to accelerate the developments of intelligent and dexterous robots. With working modules that cover all basic capabilities needed for a functional robot, developers can concentrate on improving the aspects needed for their application.

Most programmers have access to a single robot or small sensor suite, but are missing access to some of the robotic hardware needed for the job. Simulators exist to fill this void and allow both experts and novices to experiment with robotic algorithms in a safe, low-cost environment. However, to truly provide valid simulation, the simulator must provide noise models for sensors and must be validated [2, 13–15, 21]. One modern robotic simulator, known as the Unified System for Automation and Robot Simulation (USARSim) [2] provides such a simulation platform. This simulator has been used by the expert robotics community for several years and has played an important role in developing robotics applications [3].

This paper examines how a new interface to the ROS control framework (introduced by [5]) can be used inside the RoboCup Rescue Simulation League [1]. The ROS framework allows for easy sharing of modules [9], allowing fast progress.