Active Tag Based Pedestrian Localization Emulation System

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***Abstract*—We develop an emulation system for performing experiments related to active tag based pedestrian localization. We use emulation as an integral part of our development approach so as to be able to carry out large-scale experiments with ease, and in a repeatable manner. Our demonstration will show how to perform live emulation experiments on a remote network testbed located in Ishikawa, Japan. The experimental results will be visualized using a graphical interface.**

Keywords-active tag; wireless network emulation; processor emulation; pedestrian localization

I. INTRODUCTION

Active tags are a promising solution for identifying the position of persons in various environments, such as schools, museums, etc. During the evacuation procedure in a disaster situation, for instance evacuation of a school following an earthquake, rescue workers should be able to determine the status of the evacuation, whether some persons are still within the disaster perimeter, and to identify automatically the present location of the potential victims. We use active tags so as to provide to a central pedestrian localization engine the information needed to automatically calculate the trajectory to date and the current position of the active tag wearer. A prototype of the pedestrian localization system is being developed by Panasonic System Solutions Company, and our emulation system is used to support their development.

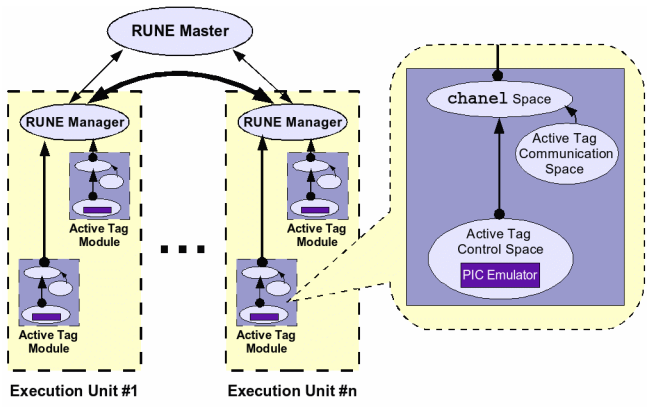

Figure 1. Active tag emulation system overview.

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II. DEMONSTRATION DESCRIPTION

Our demonstration will show how to carry out a live emulation experiment on StarBED, the large-scale network experiments environment of the Hokuriku Research Center, National Institute of Information and Communications Technology, in Ishikawa, Japan. For this purpose we create a virtual environment in which the movement of pedestrians, the communication, and the behavior of active tags are reproduced live. The key elements in our approach are the wireless communication emulation tool, QOMET, and the experiment-support software RUNE.

An overview of the system that we designed for active tag emulation experiments and the development of the pedestrian localization prototype is given in Fig. 1. The virtual environment created, the position of the fixed c-tags and gateway c-tags, the motion of the pedestrians are all visualized using a graphical interface, as depicted in Fig. 2. The conditions recreated in this example follow those of a real experiment carried out in March 2007 by Panasonic System Solutions Company. The experiment consisted in the orchestrated movement, both in indoor and outdoor environments, of 16 pedestrians wearing localization system active tag based prototypes nicknamed communication tag, or c-tag. The real-world experiment also included a number of tags with known position: fixed c-tags and gateway c-tags. Our experiments reproduced the real results, and also allowed to extend the investigation to virtual realistic environments with hundreds of pedestrians.

Figure 2. Experiment visualization interface.