AWARE

Platform for Autonomous self-deploying and operation of Wireless sensor-actuator networks cooperating with AeRial objEcts.

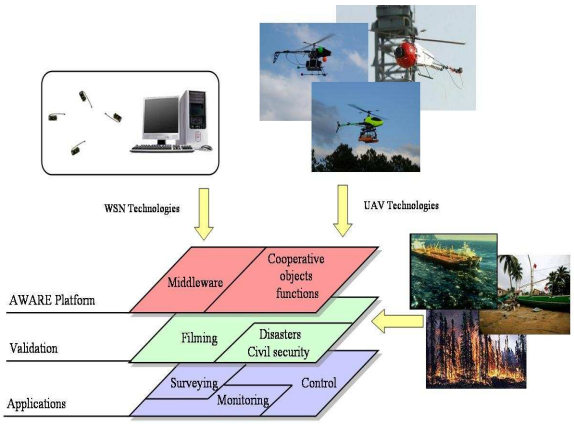
KEYWORDS: wireless sensor-actuator networks, middleware, embedded systems, co-operative robotics.

Introduction

The AWARE project is committed to the development of a platform that will enable the cooperation of autonomous aerial vehicles with ground wireless sensor-actuator networks comprising static and mobile nodes.

The platform will offer self-deployment, self-configuration and self-repairing features by means of cooperating autonomous helicopters. These features are highly relevant in natural and urban environments without pre-existing infrastructure or in situations where the infrastructure has been damaged or destroyed.

Two validation scenarios are being considered: Disaster Management/Civil Security and Filming applications. The following figure illustrates the concept:



Objectives

The general objective of the project is the design of, development of, and experimentation with a platform providing a middleware and functionalities required for the cooperation of aerial flying objects (i.e. autonomous helicopters) with a ground sensor-actuator wireless network, including ground mobile nodes carried by persons and vehicles. The platform will permit operation in sites with difficult access and without a communication infrastructure. Additionally, the project also considers the self-deployment of the network using autonomous helicopters that have the ability to transport and deploy loads (communication equipment and nodes of the ground network).

Expected Results

The results can be summarized as follows:

1. Development of a scalable and self-organizing ground sensor network integrating mobile nodes including not only low energy and light sensors (motes) but also cameras and other sensors with higher energy requirements.

2. Building the architecture and middleware required for the cooperation of the heterogeneous objects including aerial vehicles, static sensor-actuator nodes, and mobile nodes carried by ground vehicles and personnel.

3. Incorporating network-centric functionalities for operation. The project will include the

development of perception techniques required for the operation of the network, including surveillance, localization and tracking.

4. Developing novel cooperation techniques for tasks requiring strong interactions both among vehicles and between vehicles and the environment, for example, the lifting and transportation of shared loads through cooperation of several UAVs.

Partners and their roles

The consortium, coordinated by AICIA, consists of seven partners, with four institutions that are currently playing an important role in several EU initiatives in the field and three companies with significant industrial capabilities that will exploit the results in different sectors, such as Disaster Management, Civil Security and Filming.

The company SELEX Sensors and Airborne Systems will lead the specifications. AICIA, Technische Universität Berlin and Flying-Cam will collaborate in the cooperation of autonomous systems and UAVs. Universität Stuttgart is in charge of the middleware. The University of Twente is responsible for the ground wireless sensor networks. Iturri is in charge of the preparation of the experiments. All the partners will participate in these experiments. SELEX and Iturri will evaluate the system for Civil Security/Disaster Management applications, while Flying-Cam will be in charge of the evaluation for Filming.

This project is part of the portfolio of the

Embedded Systems Unit – G3
Directorate General Information Society

For more information please check:

http://cordis.europa.eu/ist/embedded/index.html

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CONTRACT NUMBER
IST-2006-33579

FULL NAME
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TYPE OF PROJECT
Specific Targeted Research Project

PROJECT PARTICIPANTS
AICIA (Spain)
Technische Universität Berlin (Germany)
Flying-Cam (Belgium)
University of Twente (Netherlands)
Universität Stuttgart (Germany)
SELEX sensors and airborne systems (UK)
ITURRI (Spain)

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PROJECT WEBSITE

http://aware-project.net

BUDGET
Total cost: 3.4 M€
Funding: 2.3 M€

TIMETABLE
Starting date: June 1, 2006
Duration: 36 months