PROCEEDINGS OF SPIE

Unmanned Systems Technology XVI

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Editors

6–8 May 2014
Baltimore, Maryland, United States

Sponsored and Published by
SPIE

Volume 9084

Proceedings of SPIE 0277-786X, V. 9084

Unmanned Systems Technology XVI, edited by Robert E. Karlsen, Douglas W. Gage, Charles M. Shoemaker, Grant R. Gerhart, Proc. of SPIE Vol. 9084, 908401 · © 2014 SPIE
CCC code: 0277-786X/14/$18 · doi: 10.1117/12.2073310

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Please use the following format to cite material from this book:
Author(s), "Title of Paper," in *Unmanned Systems Technology XVI*, edited by Robert E. Karlsen, Douglas W. Gage, Charles M. Shoemaker, Grant R. Gerhart, Proceedings of SPIE Vol. 9084 (SPIE, Bellingham, WA, 2014) Article CID Number.

ISSN: 0277-786X
ISBN: 9781628410211

Published by
SPIE
P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445
SPIE.org

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

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Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

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Introduction

The Unmanned Systems Technology XVI Conference consisted of seven sessions that spanned nearly three days and covered a variety of areas within robotics. Although the vast majority of fielded unmanned systems are teleoperated, especially for ground systems, the push for autonomy is increasing due to the public perception that it is within our grasp, due to commercial endeavors at the automotive companies and at Google. This year's conference also shows that, while there is still interest in the standard unmanned technologies, there is also interest in other forms of robotics, such as micro air vehicles, which are becoming rather ubiquitous in terms of commercial availability, as well as the machine intelligence that robots will require to operate closely with humans.

The opening session on Tuesday afternoon was devoted to the always interesting Special Topics session, which this year began with a paper on neurobiomimetic cognitive architectures. This was followed by papers on communications modeling, controls for a small satellite, and power usage modeling for small unmanned ground vehicles. Manipulation was the subject of two papers, including self-righting and the use of immersive displays, followed by papers on using speech and gestures to communicate with unmanned systems. Human-Robot Interactions (HRI) is important for integrating robots into a squad or for managing a distant team of unmanned vehicles, and will require methods beyond the current laptop and joystick, especially for complex manipulation tasks.

The conference's poster session took place on Tuesday night with papers on autonomy for unmanned surface vessels, optics and solar power for unmanned air vehicles (UAV), vehicle-to-vehicle and infrastructure-to-vehicle communication, military use of UAV's, and methods for using polarization to determine vehicle orientation.

Wednesday began with a session on open architectures, which was joint with Conference 9096, Open Architecture/Open Business Model Net-Centric Systems and Defense Transformation 2014. Since robotics is a relatively new industry, it currently struggles with issues of interoperability and lacks widespread open standards. This session consisted of four keynotes and a panel discussion on this important issue that needs to be addressed before wide-spread production and utilization of unmanned systems will be feasible.

The Wednesday afternoon session had papers from the Army Research Laboratory's (ARL) Robotics Collaborative Technology Alliance (CTA), which is performing research perception, intelligence, HRI, and mobility and manipulation to enable squad-level robot team members. The papers described current research on shared mental models, trust and social cues in HRI, flexible spine

modeling for a four-legged robot and head control for snake robots, ladar development and point cloud processing, and building common world models.

Thursday morning brought a joint session with Conference 9083, Micro- and Nanotechnology Sensors, Systems, and Applications VI, and consisted of work performed under ARL's Micro-Autonomous Systems and Technology (MAST) CTA. The papers described modeling and characterization of flapping wing and quadrotor air vehicles, as well as autonomous energy charging and power management, storage, and component development and integration. The technologies for these micro-sized platforms often require paradigm shifts, since many standard unmanned technologies do not scale well with size.

Thursday afternoon led off with the Mobility and Navigation session with papers on navigation for unmanned ground, surface and air vehicles, as well as for snake robots and for tunnel exploration. This was followed by the Perception session that looked at infrared and visual stereovision calibration, infrared polarimetry, and localization and navigation through forests.

This year's conference covered a wide swath of unmanned systems technologies and demonstrates why robotics is such an exciting area. We want to especially thank those that stepped forward and assisted in making this a successful conference in spite of the issues with government funding and conference attendance regulations. We hope you enjoy these proceedings and are able to attend the conference next year.

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