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Introduction

The Unmanned Systems Technology XVII conference consisted of seven sessions that spanned two days and covered a variety of areas within robotics. The conference table of contents shows the various applications of unmanned systems, and the trend is predicted to increase. This year's conference also shows that, while there is still interest in the standard unmanned technologies, there is also great interest in other forms of robotics, such as micro air vehicles, which are becoming very ubiquitous in terms of commercial availability and capability.

The conference began Tuesday afternoon with a session on Perception and Human Robot Interaction, from which we have two papers that detailed research efforts into multimodal input to robotic systems, which in these cases were speech and drawing. On the Perception side, we received a paper on a method for measuring the angular orientation of a projectile using a polarized RF source, as well as a paper researching the fusion of two common robot sensing modalities (lidar and radar) to detect partially obscured objects.

The late afternoon session on Tuesday was devoted to the Army Research Laboratory's (ARL) Robotics Collaborative Technology Alliance (CTA), where papers were presented on a variety of subjects, including a novel method for performing background subtraction from moving structured light sensors, a batch streaming method for K-SVD dictionary learning, a discussion of the RCTA capstone experiment that involved semantic perception and navigation, the exploration of a multi-floor building using the legged robot RHex, and planar modeling of the bounding gait of a quadruped robot with a flexible spine.

Wednesday afternoon began with a session on Self-organizing Collaborative Unmanned ISR Teams that was joint with conference 9479, Open Architecture/Open Business Model Net-Centric Systems and Defense Transformation 2015. The first paper of the session discussed a method to control an unmanned aerial vehicle via commands sent through social media sites and the cellular phone network. Other papers discuss the generation of 3D models using structure-from-motion (SfM) software for object detection and for path planning for radiation survey aircraft, as well as the development of a cloud-based architecture for the command and control of unmanned systems.

Wednesday concluded with the Special Topics session that resulted in a potpourri of papers, including the development of an eight-rotor air vehicle with manipulation capability, a data capture system integrated into the collar of a bomb-sniffing dog, the use of a nearest neighbor trust algorithm to control the vehicles in a convoy, and the development of a crawling robot that uses magnetic wheels to maneuver around metallic surfaces.

The main conference concluded Thursday morning with a pair of joint sessions with Conference 9467, Micro- and Nanotechnology Sensors, Systems, and Applications VII, consisting of work performed under ARL's Micro-Autonomous Systems and Technology (MAST) CTA. The first session focused on control algorithms, and the papers described experimental analysis of optical flow techniques and their use for air-vehicle gust rejection, as well as a method to allow faster driving in unknown environments. The second session involved legged robot research, with papers exploring bio-inspired energy storage and redirection, experimental analysis of methods for steering legged robots, quantifying performance of a biped in terms of robustness versus agility, experiments in terrain locomotion and obstacle negotiation, and modeling efforts for legged locomotion.

The conference's poster session took place on Thursday night with papers on a communication architecture for small satellites, modeling of a quadrotor, and a discussion on building an unmanned air vehicle for gathering information from within storms and other hazardous conditions. The session was well attended and the posters sparked a considerable amount of discussion.

This year's conference once again covered a variety of unmanned systems technologies and demonstrated why robotics is such an interesting and exciting area to work in. We want to thank all those that helped make the conference a success this year, and we hope that you enjoy these proceedings and are able to attend and participate in next year's conference.

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