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Introduction

The Unmanned Systems Technology XV Conference consisted of 10 sessions that spanned three days and were devoted to many areas of robotics. Although the vast majority of fielded unmanned systems are teleoperated, interest in autonomy has been especially high in recent years, perhaps because of recent advances that bring autonomous platforms from the laboratory to commercial viability. This year's conference submissions show that progress is being made along the entire autonomy spectrum, from improvements in teleoperation to teams of autonomous robots. And different levels of autonomous capability allow (or require) different methods for human/robot and robot/robot interactions. Progress is also being made in terms of alternative platform development, including robotic insects, birds, dogs, and mules. It is certainly an interesting time to be involved with unmanned systems!

The opening session on Wednesday was Open Architecture (OA)/Open Business Model (OBM) Systems, which was a joint session with Open Architecture/Open Business Model Net-Centric Systems and Defense Transformation 2013, Conference 8754. Since robotics is a relatively new industry, it currently struggles with issues of interoperability and lacks widespread open standards. This session consisted of three keynotes and a panel discussion on this issue. The Perception and Navigation I session included papers on navigation and landing of unmanned air vehicles (UAVs), object detection, and navigation and localization for micro-scale platforms. The Perception and Navigation II session continued with papers on robot mapping experiments in large indoor and outdoor environments, UAV search patterns, navigation through knowledge reasoning and machine learning, and simultaneous localization and mapping (SLAM) with planar features. Perception and intelligence continue to be some of the thornier problems facing autonomous vehicles, especially in the ground domain.

The Thursday morning session was a joint session with Conference 8725, Micro- and Nanotechnology Sensors, Systems, and Applications V, and consisted of work performed under the Army Research Laboratory's (ARL) Micro-Autonomous Systems and Technology (MAST) Collaborative Technology Alliance (CTA). The papers described locomotion, sensing, and processing for bio-inspired micro-sized flapping wing air vehicles and legged ground vehicles. These smaller-sized platforms require paradigm shifts since many unmanned technologies do not scale well with size. The afternoon's Human-Robot Interaction (HRI) and Communication Session described work in vision-based dismounted leader/follower, multi-modal communication, map presentation experiments, communication relays, and control of a multi-armed ground vehicle. HRI is a key area for tightly integrating robots into a squad or for managing a distant team of unmanned vehicles, and will require methods beyond the current laptop and joystick controlling every action. The interplay between HRI and autonomous

functionality will be increasingly important in the coming years, as the commercial automobile industry has learned. To take full advantage of a team of autonomous assets, they also need to interact effectively amongst themselves. With that in mind, the final session of the day, Intelligent Behaviors, consisted of papers discussing research involving teams of autonomous robots, including communication-aware navigation and control, consensus learning, formation control, and coalition building.

Friday began with two sessions from ARL's Robotics CTA, which is performing research to enable squad-level robot team members. The papers described current research on building common world models, cognitive architectures, semantic labeling of imagery, outdoor laser-based structured light sensor, terrain understanding for legged robots, gesture recognition and tactile displays, whole-body manipulation, and quadruped jumping. The conference concluded with the Special Topics Session, which included papers on a variety of areas, such as experiments in autonomy with small robot navigation and large vehicles in convoys, testing of mapping algorithms, alternative levels of autonomy level, and cyber security for unmanned systems.

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.

Robert E. Karlsen
Douglas W. Gage
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Grant R. Gerhart