REQUEST FOR INFORMATION (RFI)

2016 Intuitive Robotic Operator Control of Autonomous Behaviors (IROC-A) Challenge
Muscatatuck Urban Training Center (MUTC)
Butlerville, Indiana
October 24-28, 2016

DISCLAIMER:

This announcement constitutes an RFI notice for planning purposes. It does not constitute a Request for Proposals (RFP) or a Request for Quote (RFQ). NO SOLICITATION DOCUMENTS EXIST AT THIS TIME. This RFI does not constitute a commitment, implied or otherwise, that the Marine Corps Warfighting Laboratory (MCWL) will take a procurement action in this matter. MCWL will not be responsible for any cost incurred in furnishing this information or participation in the challenge event.

INTRODUCTION

The Ground Combat Element (GCE) branch of MCWL is interested in gathering information to further its understanding of currently available technologies that could provide a Marine with the ability to control a ground robot comparable to the way a squad of dismounted Marines interacts in an operational context.

The 2016 Intuitive Robotic Operator Control of Autonomous Behaviors (IROC-A) Challenge will provide industry and academia an opportunity to highlight their technologies through specific challenges representative of MCWL's diverse needs.

GENERAL BACKGROUND:

MCWL has been investing in air and ground robotics for nearly two decades. In the late 1990s, MCWL began working with small tactical Unmanned Air Vehicles (UAV) and tactical throw able robots. Early on, MCWL also began working with modular wearable controllers and hand emplaced sensor suites. For the past decade, these efforts transitioned into the Tactical Network Sensor Suite (TNS2) and the Tactical Robotic Controller (TRC). As part of the TNS2 effort, MCWL continued to work hand emplaced sensor networks integrated into the tactical network with their results displayed on the TRC. The TNS2 initiative also integrated several UAV platforms and several Unmanned Ground Vehicle (UGV) platforms into the TRC as a demonstration of multiple sensors and unmanned platforms being controlled by a single controller in an integrated tactical sensor network. More recently, MCWL has also worked with voice command of ground robots. Several MCWL initiatives have focused on adding autonomous appliqué kits to existing platforms as well as weaponizing unmanned ground vehicles. MCWL has recently begun to look at Man Unmanned Teaming and autonomous behaviors in order to reduce the cognitive load on the operator so that he/she can focus on other mission tasks.

The 2014 IROC Challenge, held at Muscatatuck Urban Training Center (MUTC), focused on exploring the role of the robot as a member of a squad that utilized intuitive methods of interaction and control of the robot, without the burden of a hand-held controller. The event sought to identify technologies that facilitate interaction similar to the way Marines interact in a squad, using methods such as gestures, voice commands, and touch to gain the systems' attention. That event resulted in two companies being funded to further develop their technologies to suit MCWL's vision for future human-robot interaction in tactically relevant environments.

For the 2016 IROC-A Challenge, MCWL will continue to focus on robotic control without the burden of a hand-held controller, through use of gestures, voice, touch, or other means that do not impair the execution of weapons handling tasks, while applying autonomous intelligent behaviors to aid in lessening the attentional resources required of an operator when using the robot to complete a task. Additionally MCWL is interested in systems that have employed effective alert and status methods that would aid in improving warfighter situational awareness, reducing warfighter cognitive load and increasing their trust in autonomous systems. MCWL's aim for this event is to identify technologies capable of employing autonomous behaviors applicable to short range search and reconnaissance missions, with little to no guidance from the operator after the start of the mission. MCWL is interested in a system's ability to leverage understanding from structural and geographical features within the mission area to, subsequently, navigate and make decisions on how to achieve its objective independent from the operator. The ability of the robotic system to understand statements such as "Go to the 2nd building and enter the 3rd doorway", without requiring the operator to designate waypoints, is preferred. Object detection, classification, and identification is a desired capability that would aid the operator-robot team in completing the challenge objectives, but it is not a requirement for participation in the IROC-A Challenge.

CRITERIA:

Participation for the 2016 IROC-A Challenge would be from vendors or academia that are focused on dismount support-sized systems or systems that could be integrated with a dismount support robot. Vendors whose technology could meet the objectives of this challenge as described below are encouraged to participate.

CHALLENGE LOCATION AND DATE:

The 2016 IROC-A Challenge event will take place from October 24-28, 2016 at Muscatatuck Urban Training Center (MUTC) in Butlerville, Indiana. Vendors will be provided time, within reason, for individual setup and configuration. The Marine Corps Warfighting Laboratory and Muscatatuck Urban Training Center will brief all participants on safety and security requirements and expected participant compliance throughout 2016 IROC-A Challenge. Participants are expected to behave in a professional manner and will be asked to leave if they are found violating the safety and security rules or acting in an "unsafe" manner at any time.

SPECIFIC INFORMATION OF INTEREST:

Vendors are invited to participate in each of the following challenges in order to demonstrate their specific capabilities in support of MCWL's objectives:

Command Recognition Challenge: Repeatedly recognize and respond to intuitive commands to complete various tasks.

*Part 1 of this challenge is a required challenge for all participating vendors since it provides the opportunity for MCWL representatives to ask questions and learn how the system functions.

Object Search Challenge: Execute a reconnaissance mission similar to one that might be tasked in an operational setting with as little human interaction with the robotic system as possible.

Map Defined Area Challenge: Execute a search and reconnaissance mission within a specified bounding box to create a map of the area while detecting and identifying objects of interest.

MCWL is soliciting vendor or academia participation in order to identify commercial and developmental dismount support technologies that are currently integrated with a mobile robotic platform, or that could be with a limited systems engineering cycle. MCWL is interested in innovative solutions and encourages participation by vendors or academia with unique communication technologies. In all events, preference is given to systems that:

- Are or can be fully contained on a mobile robot.
- Require minimal operator control unit or other equipment carried by the operator. A form of communication, through the use of a head-mounted display and/or a pocket-carried device, however, will be needed to receive alerts and feedback from the robotic system.
- Allow the operator to maintain combat-readiness (i.e., Maintain the ability to hold a rifle while issuing commands).

*Preference is to keep the operator as burden-free as possible, in terms of carrying or holding equipment, throughout the challenges.

SUBMISSION PROCESS AND DUE DATE:

This RFI is issued for the purpose of determining market capability of sources and does not constitute an Invitation for Bid (IFB), a Request for Proposal (RFP), a Request for Quote (RFQ) or an indication that the Government will contract for any of the items and/or services contained in this notice.

The results of the 2016 IROC-A Challenge may be used to inform the development of a request for proposals (RFP) to the vendor community that may result in the acquisition of a small number of systems from one or more vendors at some future date. Systems acquired in this follow-on round may be used in targeted MCWL performance tests and experiments to derive requirements for near-future innovations, which may result in a larger acquisition of field-able systems by the Department of Defense at a date to be determined.

This notification in no way guarantees or warrants that any level of participation or performance by any vendor in the Challenge will result in any contractual obligation by MCWL, the US Marine Corps, the US Department of Defense, or the US Government for acquisitions, or any further engagement.

All information received in response to this notice that is marked Proprietary will be handled accordingly. Information provided in response to this RFI may be shared with other Department of Defense activities. Vendor or academia responses may not include classified material. Vendor or academia responses to this notice will not be returned. No reimbursement will be made for any costs to provide information or participate in the challenge event in response to this announcement or any follow-up information requests.

Vendors or academia capable of satisfying these requirements should access the 2016 IROC-A Challenge website below and submit a white paper describing their capabilities. The due date for all white paper submissions is midnight on Friday, September 16, 2016.

Firms responding to this notice should understand that the Naval Surface Warfare Center, Dahlgren Division, will be reviewing and collating all responses to this RFI.

Participants will be contacted via email with a signed letter of invitation NLT Friday, September 23, 2016. After this date, MCWL will actively engage all participants to determine operations and logistics needs.

To help maximize vendor's technologies to DOD organizations, MCWL intends to invite DARPA, the Army, and Navy unmanned systems community of interest to observe vendor performance during the events.

Additional information regarding the 2016 IROC-A Challenge with links to FAQs, white paper instructions/submissions, and further information on the Challenge Events can be accessed at: www.mcwl.marines.mil/Divisions/ScienceandTechnology/CurrentTechnologyOffice/GCE/MCWLIROCChallenge.aspx

Any questions regarding this notice should be submitted through email to the IROC-A event POC, Sean Pedrick (email: sean.pedrick@navy.mil), and/or to IROC_Challenge@usmc.mil.