

Human-Machine Interfaces



Do your autonomous platforms work with your people?

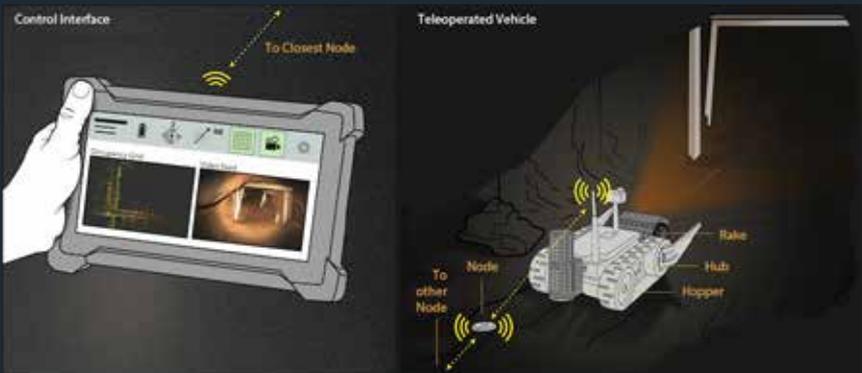
The complexity of many robotic platforms makes them inherently difficult to operate, which can jeopardize the efficiency of your operation, or worse, the safety of your personnel.

Charles River Analytics leverages cutting edge technology to develop human-machine interfaces that seamlessly integrate robots into a human operator's workflow. These natural interfaces fuse advanced speech and gesture recognition, innovative computer vision, augmented reality, and smart devices with traditional robot control technologies.



Implementing our lightweight suite of flexible controls enables human operators to respond more quickly to changing mission demands in complex operational environments, improving efficiency and decreasing downtime.

Our suite of ruggedized, modern, game-style system components supports precise performance for mission-critical unmanned applications in both military and commercial markets.



Are you looking to add HMI capabilities to your AI components? See how we've advanced these capabilities for our customers.



Seamlessly Integrating Robots with Human Teams

Unmanned ground vehicles (UGVs) that can autonomously accompany a Warfighter or vehicle during maneuvers through complex environments can solve logistical problems for the armed forces, such as transporting the equipment and supplies that individual Soldiers now carry in a rucksack.

Charles River Analytics and our teammate, 5D Robotics, developed an intuitive soldier-machine interface to control robotic leader-follower systems in small team operations. Our novel human-machine interface uses multiple robot control technologies and combines speech and gestures to manage unmanned vehicles using modern smart devices, such as smart watches.



5D Robotics' Segway RMP following a human operator through a shantytown at the Intuitive Robotic Operator Control (IROC) Challenge at the Muscatatuck Urban Training Center.

Our Multi-Modal Interface for Natural Operator Teaming with Autonomous Robots (MINOTAUR) fuses multiple proven leader-tracking and robot control technologies to provide a reliable, hands-free interface for Warfighters in challenging environments. The system integrates complementary leader-follower technologies to support operation in inclement weather, poor lighting, and non-line-of-sight scenarios. MINOTAUR draws on a novel model of operator intent that enables context-sensitive control and feedback based on multiple asynchronous sensor inputs. The system includes a lightweight, wearable operator control unit that allows a Warfighter to rapidly control and assess their robotic teammate.



View of the world from the perspective of the MINOTAUR system. Both gesture and voice-based navigation commands are supported.

With MINOTAUR, operators can use voice and hand signals to command the robot. The system's gesture recognition capability will facilitate deployment of UGVs as squad support platforms. Instead of requiring a squad member's full cognitive capacity to control a UGV, MINOTAUR will enable natural and reliable control of mule-like UGV systems, which reduces the cognitive burden on Warfighters in the field, increases trust in human-robot teams, and helps keep Warfighters safe.

This material is based upon work supported by the United States Army under Contract No. W56HZV-13-C-0286. Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the United States Army.

About Charles River Analytics

Charles River Analytics has been at the forefront of human-centered AI R&D, implementation, and deployment for decades. We transform our customer's data into mission-relevant tools and solutions to support autonomy and human decision-making. Charles River continues to grow its technology, customer base, and strategic alliances through programs for the NIH, DoD, DHS, NASA, and the Intelligence Community. We address a broad spectrum of mission areas and functional domains, including sensor and image processing, situation assessment and decision aiding, human systems integration, cyber security, human-robot interaction, and robot localization and autonomy. We take on the most challenging problems in the most difficult environments, and deliver insights that lead to action.

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