

## **Challenge**

The Army Research Laboratory (ARL), Autonomous Systems Division performs advanced research in robotics to help and protect American warfighters. Furthering the Army's understanding of basic scientific principles and developing robotic platforms, researchers delve into a vast array of scientific problems to meet the Army's mission of Strategic Land Power Dominance for the Army of 2030 and its Visioneering goals for 2050. Robot intelligence, perception, manipulation and mobility are of utmost importance in these campaigns. Today's constantly evolving and rapidly expanding technological environment presents a serious need for talented personnel to keep America ahead of the curve.

## **Solution**

Engility employs accomplished and talented personnel to support and lead research efforts in ARL's Autonomous Systems Division. Whether it's coding new motion planning algorithms, integrating sensor suites, designing grasping mechanisms, testing aerodynamic principles for flight vehicles or analyzing basic material properties, there is a place for all engineering disciplines in ARL's robotic research efforts. Motion capture camera systems, 3D printers, computer numerical control mills, high-speed computing and various other mechanical and electrical test apparatus are only some of the tools available to researchers.

*Example:* In a recent study, Engility developed an analytic android software package that allows soldiers to determine a comrade's status based on phone data. A three-axis gimbal developed by ARL was used to spin a smart phone at varying speeds and directions. Each algorithm evaluated the accelerometer data from the cell phone separately to estimate the phone's orientation. The results of these algorithms were then compared to the phone's true orientation for selection of the most accurate and efficient algorithm. This was then paired with other phone sensor data to construct a model of the phone's movement. These patterns of movement can now be used to determine what the carrier of the phone is doing—laying down, running etc.

## **Benefit**

By tapping into the creativity, skills and expertise of talented researchers, ARL is able to provide valuable research and ultimately field robotics platforms that save lives. Integrated research efforts with top-tier academic institutions and corporate partners provide excellent opportunities to work with some of the best minds in the industry. This is an exciting prospect for many that want to work on the leading edge of technology. Lastly, it is an incredibly worthwhile outlet for those who want to continue to protect our nation's greatest assets.