OAK RIDGE NATIONAL LABORATORY

Autonomous System Research

Uncrewed Systems & Robotics Development

The **Oak Ridge National Laboratory** supports national security through the research, development, and engineering of innovative autonomous vehicles for federal government applications. Through innovative partnerships with industry, ORNL can leverage the benefits of commercial production while retaining control of the intellectual property associated with technology design to ensure the strategic and programmatic needs of government are met efficiently and effectively. Below are some examples of custom vehicle development projects at ORNL.

Ground Vehicles

Researchers and engineers at ORNL partnered with industry to develop a tracked vehicle that leverages modular hardware, advanced on-board computing, and open-source software. The result is a small but extremely robust ground vehicle that climbs stairs and can run Artificial Intelligence applications at the edge. Modular radio designs and an open payload interface permits maximum mission flexibility. A unique partnership with industry will make this system commercially available to government partners, ensuring a sustainable supply chain, parts availability, and a technical support program.

ORNL's "Skorpio" unmanned ground vehicle performing a stair climbing maneuver.

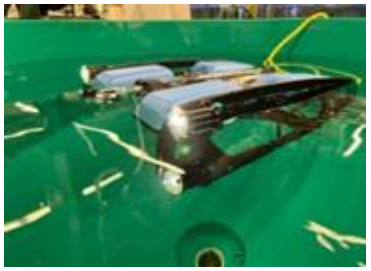
Air Vehicles

To address the need for an all-electric, long-endurance, heavy-lift VTOL aircraft capable of Beyond Visual Line of Sight flight operations for radiological sensing applications, the Autonomous Systems Group designed and built a series of custom quadcopters known as the "Strelka". These aircraft have since been used to conduct ground-breaking science in nuclear non-proliferation, novel communications, remote sensing, and environmental science. In addition to the aircraft, the group builds custom sensor payloads for a variety of applications.

ORNL's "Strelka" aircraft prepared to conduct a radiological survey flight.

Submersible Vehicles

Researchers at the Oak Ridge National Laboratory are utilizing submersible remotely operated vehicles as research and development tools for a variety of advanced technologies and applications such as underwater communications, autonomous navigation, remote sensing, and bathymetry. Future research initiatives will include operational evaluation and risk analyses for sensitive nuclear facilities.



ORNL's submersible ROV undergoes leak testing prior to field deployment.

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