Ground Control Operator Software for Unmanned Vehicle Systems
Lockheed Martin
CDL Systems

In December 2012, Lockheed Martin acquired the assets of CDL Systems Ltd.

We are a software engineering firm specializing in the development of control station software for operating unmanned vehicle systems. Once a small technology start-up, we have grown into a 70 employee operation with offices in Calgary, Alberta and Huntsville, Alabama.

We have developed an open, standards-based, and commercial off-the-shelf software product that has been integrated by our customers into ground control systems for over 30 unmanned vehicle platforms. We have been instrumental in supporting the ground control systems for an international target-drone community, the U.S. Army, the UK MOD, and various defense contractors and governments around the world in fulfilling their unmanned requirements. We estimate our software has seen over 1 million hours of operational use.

With an emphasis on low-cost, interoperable, and open-system designs, we are dedicated to supporting emerging technologies, industry standards, and open architecture initiatives. We look forward to working with you in developing an unmanned future.
Our Software
Vehicle Control Station (VCS)

Our VCS software is a fully integrated command, control, and information ground control system designed for operating and monitoring unmanned vehicles. In operation around the world, VCS is used for controlling UAVs, UGVs, high-speed air and sea target-drones, and loitering munitions in a variety of roles. VCS supports the operation of multiple vehicles, sensors, payloads, data links, and other subsystems from as little as one operator workstation.

Commonly integrated as a ground control system for UAVs, VCS provides increased levels of autonomy by automatically managing basic piloting tasks. Operators enjoy real-time control and monitoring capabilities through an intuitive point-and-click user-interface requiring only a keyboard and mouse. Years of R&D have led us to design a product tailored to operators with or without piloting experience. The automation of flight tasks allows operators to focus on their main objective: the mission.

VCS is built on an open architecture framework and is hardware and operating system agnostic. It supports NATO STANAG 4586 and a multitude of other military and industry standards. A vehicle integration and development kit provides various tools necessary for our customers to integrate VCS as a ground control system component on their unique unmanned vehicle systems.

VCS-4586
Overview

Supporting STANAG 4586, VCS-4586 is the industry-leading commercial off-the-shelf operator ground control software for multiple vehicle operations ranging from civil to military, mini to large.
Real-Time Video

Real-time sensor video and telemetry is essential to virtually every ISR mission. VCS-4586 features an integrated video suite that displays real-time EO/IR video and associated metadata. VCS-4586 can interface with virtually any vehicle-mounted EO/IR sensor and geo-references the video allowing operators to command the sensor to “look” by clicking directly on desired points of interest. NTSC and PAL analog streams are supported along with MPEG-2 and H.264 digital streams with KLV metadata (MISB 601.2) in accordance with STANAG 4609.

Mission Management

To reduce operator workload, flight routes and sensor tasks in integrated systems can be automated using the mission management system. Operators can create, manage, and modify tasks in real-time in order to adjust to changing mission priorities. Flight routes can be validated against terrain violations, airspace constraints, and data link coverage outages for increased mission effectiveness and operational safety.

Vehicle Management

VCS-4586 allows for multiple vehicle control from as little as one ground control operator workstation. To make this possible, the software is engineered to assist with a high level of autonomous vehicle control. Operators simply use the point-and-click user-interface to control vehicle navigation. This allows operators to assume the role of “system managers” and focus on mission objectives while the software manages specific operational details.

Interactive Map

The interactive map displays vehicles, sensors, payloads, data links, and other vehicle systems as geo-referenced objects on a mission-specific map background. Operators can command and control integrated vehicle and sensor functions directly through the map. Maps can be imported from virtually any image and latitude/longitude, UTM, and MGRS coordinate systems, and a variety of geodetic datums are supported. NGA map formats and DTED are natively supported. Target markers, MIL-STD-2525B tactical graphics and symbols, restriction zones, flight plans, and a wide array of customized overlays can be displayed to enhance situational awareness.

Operational Safety

A number of behind-the-scenes features assist the operator in maintaining safe and optimal operations. A warning, caution, and advisory system keeps the operator informed of overall system status and abnormalities if and when they occur. VCS-4586 employs a consistent software-wide color scheme, based on human factors research, that makes distinguishing between different types of operational parameters intuitive to the operator.

System Integration

VCS-4586 is designed to operate as a ground control solution with virtually any UAS. Our VSM Development Kit (VDK) allows third-party integrators to easily develop VSMs for their specific vehicle systems. Our API enables the interfacing of VCS-4586 to third-party applications and C4I infrastructures.

System Requirements

VCS-4586 is configured to operate effectively on a variety of PC-based hardware configurations. Linux, Solaris, and Windows operating systems are supported.
The One System Ground Control Station (OSGCS) is the U.S. Army’s interoperable control station for operating the RQ-7B Shadow, MQ-5B Hunter, and MQ-1C Gray Eagle UAS. Our VCS software is installed in every OSGCS shelter and is used to conduct intelligence, surveillance, reconnaissance, and other tactical UAS missions. To date, the U.S. Army and U.S. Marine Corps have collectively accumulated over 750,000 operational flight hours using VCS in theater. The OSGCS provides the U.S. Army with the ability to control their fleet of dissimilar UAV platforms from a common operator-interface.

The next generation of the OSGCS, the Universal Ground Control Station (UGCS), is designed to increase interoperability through the use of a common communication layer using the Tactical Common Data Link (TCDL), common interface protocols, and common operator-interfaces. Our VCS-4586 software is a key ground control component to unifying the UGCS objectives and enabling system-wide interoperability.
Fire Shadow is a loitering munition weapon system, designed by MBDA, for the land domain, with an operating range of approximately 60 miles (100 km). It offers precision attack capabilities against time-sensitive static and moving targets with minimal collateral damage. Once launched over a battle zone, it can loiter for several hours before being committed to engage a target.

Our ground station software, VCS-4586, provides the command, control, and monitoring capabilities for Fire Shadow. Operators control the weapon with VCS-4586 integrated into the ground control station which provides real-time situational awareness making the system particularly effective in complex scenarios.

Fire Shadow will enter service with the Royal Artillery and is part of the UK MOD evolutionary strategy for developing affordable complex weapons.
The Universal Target Control Station (UTCS) is a ground control solution developed collaboratively by Meggitt Training Systems Canada and CDL Systems to control multiple air and sea-surface target-drones for military target training against asymmetric aerial and naval threats. We provide the VCS software installed in the UTCS to operate the Barracuda and Hammerhead sea-surface targets in addition to the Vindicator and EADS Dornier air targets. The UTCS offers an interoperable architecture that uses common hardware and software interfaces and analogous communications protocols.

The UTCS has gained industry recognition for its ability to simultaneously control up to four targets from a single operator workstation. The UTCS is deployed in military target operations worldwide, notably in Canada, Greece, Japan, Norway, Saudi Arabia, Singapore, Sweden, and the United States.
Our Portfolio

We have worked alongside a diverse group of international clients on an array of unmanned vehicles and simulation platforms.

AAI Aerosonde
AAI Shadow 200 (U.S. Army RQ-7B)
AAI Shadow 400
Advanced Subsonics Grasshopper
AeroVironment Raven B
ATK Outrider
Aurora Flight Sciences Excalibur
Aurora Flight Sciences GoldenEye 80
BAE Systems Kingfisher
BAE Systems (ACR) Silverfox
Boeing A160 Hummingbird
Boeing (Insitu) ScanEagle
CAE STRIVE
CAE UAV Simulator
EADS Dornier Do-DT 25/35/45/55
E.M.I.T. Sparrow
General Atomics ASI Gray Eagle (U.S. Army MQ-1C)
General Dynamics Canada FORESIGHT
MBDA Fire Shadow
Meggitt Training Systems Canada Barracuda
Meggitt Training Systems Canada Hammerhead
Meggitt Training Systems Canada Vindicator
MetaVR VRSG
Northrop Grumman Hunter B (U.S. Army MQ-5B)
Simlat STS-Pro

We have gained recognition for our strong understanding of ground control software unmanned vehicle systems, experience in on-site integration and testing, and our personalized and long-term customer relationships. Our dedicated team of highly skilled engineers brings a wealth of expertise and innovation to the products and services we provide.