



VCSi

Capabilities Guide

Modular Unmanned Vehicle
Control Software

LOCKHEED MARTIN



Your Trusted Partner in Unmanned Vehicle Control

Over 25 years the Vehicle Control Station has accumulated 1.5 million flight hours of operational history across dozens of vehicles.

Lockheed Martin CDL Systems specializes in the development, integration, and application of unmanned systems for commercial, civil, and military customers. Our primary focus is developing software that helps our customers be highly effective using unmanned vehicles and the data they gather.

We leverage international standards and design our software to run on easy-to-find hardware. This provides our customers with low lifecycle costs and long-term options for growth, sustainment, and flexibility. Our software has been integrated with over 40 unmanned vehicle systems including propeller driven aircraft, jet target drones, helicopters, airships, hybrid aircraft, boats, and quadcopters. Our customer set includes the U.S. Department of Defense, the Department of National Defence (Canada), and the Ministry of Defence (United Kingdom) and a variety of commercial companies using our VCS for commercial applications. The combined flight hours on our products exceed 1.5 million.

VCSi is the next generation product in the VCS family. Built upon our extensive experience, VCSi brings modular and extensible control to your system. VCSi is made in Canada, commercially available, and ITAR free. Its modular architecture allows you to purchase only the components you need for your system. A developer-friendly API and plug-in architecture allows you to easily add or extend functionality for your unique needs. Leverage our wealth of experience and unman your future with VCSi.

VCS **i** Vehicle Control Station ...i...

international
Made in Canada commercial software, not subject to U.S. ITAR export regulations. Supports translation to different languages, including non-latin scripts.

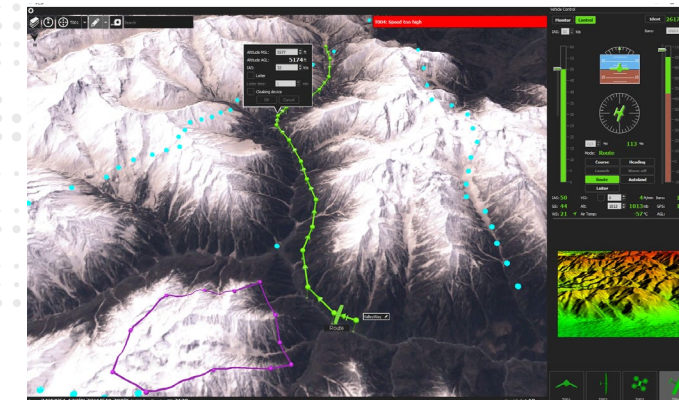
intuitive
Fly-by-mouse interface simplifies complex actions.

interoperable
Multiple disparate vehicles can be easily and effectively controlled from a single station.

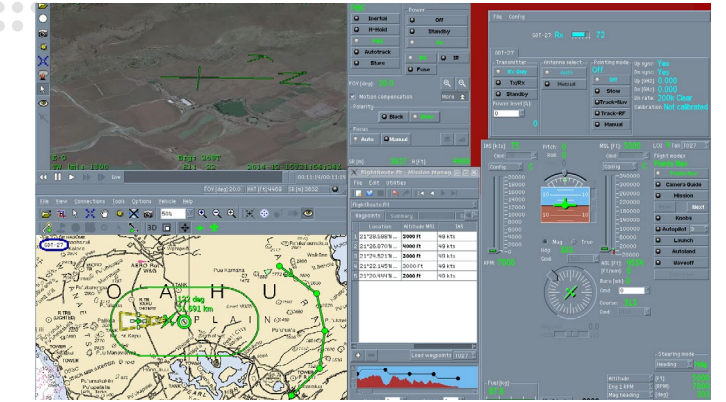
interchangeable
Modular design allows you to purchase only the components necessary for your vehicle.

indigenous
Robust plug-in architecture enables integration of local content and vehicle specific functions.

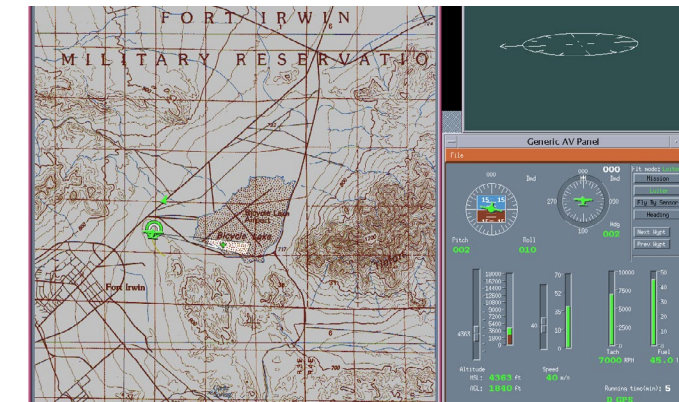
VCSi in 2018



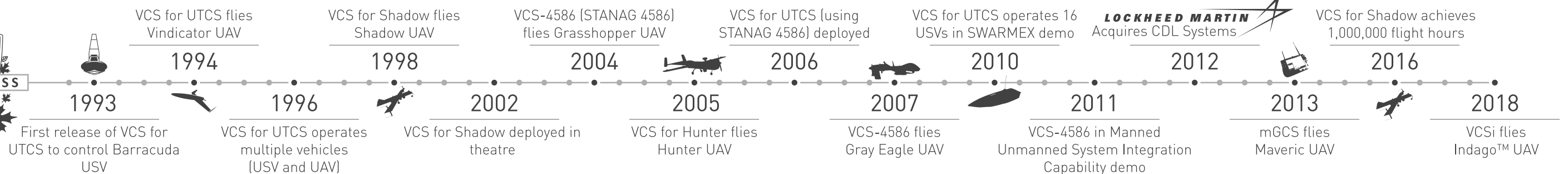
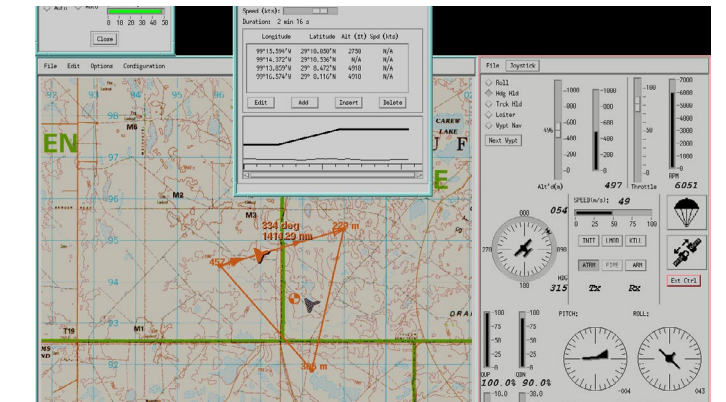
VCS-4586 circa 2010



VCS for Shadow circa 2000



VCS for the Universal Target Control Station circa 1994



Features at a Glance



Immersive 3D Mapping
Experience true context through our Panterra Mapping Engine™ for immersive 3D mapping with level of detail support.

Local Language Support
VCSi's architecture supports the translation of the user interface into other languages, including non-latin scripts.

Online Map Database
Access a worldwide map database of both street and satellite layers from Mapbox™

Map-centric Route Planning
Plan flight routes directly on the 3D map, in full context of surroundings. Flight routes are validated as they are edited.

Contingency Planning
Plan and update contingency routes for emergency situations such as unintentional loss of link or propulsion.

Notification Center
Monitor a unified location for alarms and notifications so operators can stay focused on the mission instead of scanning panels.

Customizable Notifications
Design interactive controls to allow operators to easily respond to alarms or to display the appropriate emergency procedure.

Easy Map Import
Import from hundreds of supported mapping formats including GeoTiff and CADRG maps.

Map Layering
Control transparency and layering of your maps to display the most pertinent information at any time.

Area Awareness
Annotate the map view with points, lines, and polygons to designate areas and features of interest.

Restriction Zones
Define keep-in and keep-out zones to ensure the operator is aware of areas that are safe for flight.

User Layouts
Optimize the user interface across one or more monitors for each user, role or individual and then easily switch between layouts.

Multiple Coordinate Systems
Choose from over 30 datums in MGRS, UTM, DMS and DMM coordinate display formats.

Map-centric Displays
Estimated time enroute, distance to waypoint, climb rate, and other status indicators are displayed on the map for situational awareness at a glance.

Line of Sight Visibility
Operators can visualize the line of sight range of a ground data transmitter on the map to ensure the vehicle remains within communication range.

Automated Look Ahead
Receive notifications well in advance if the vehicle is on a trajectory to impact terrain or to violate a keep-in or keep-out zone.

Network-centric Control
Monitor, control and handoff a vehicle to any VCSi control station or to other STANAG 4586 stations such as mGCS.

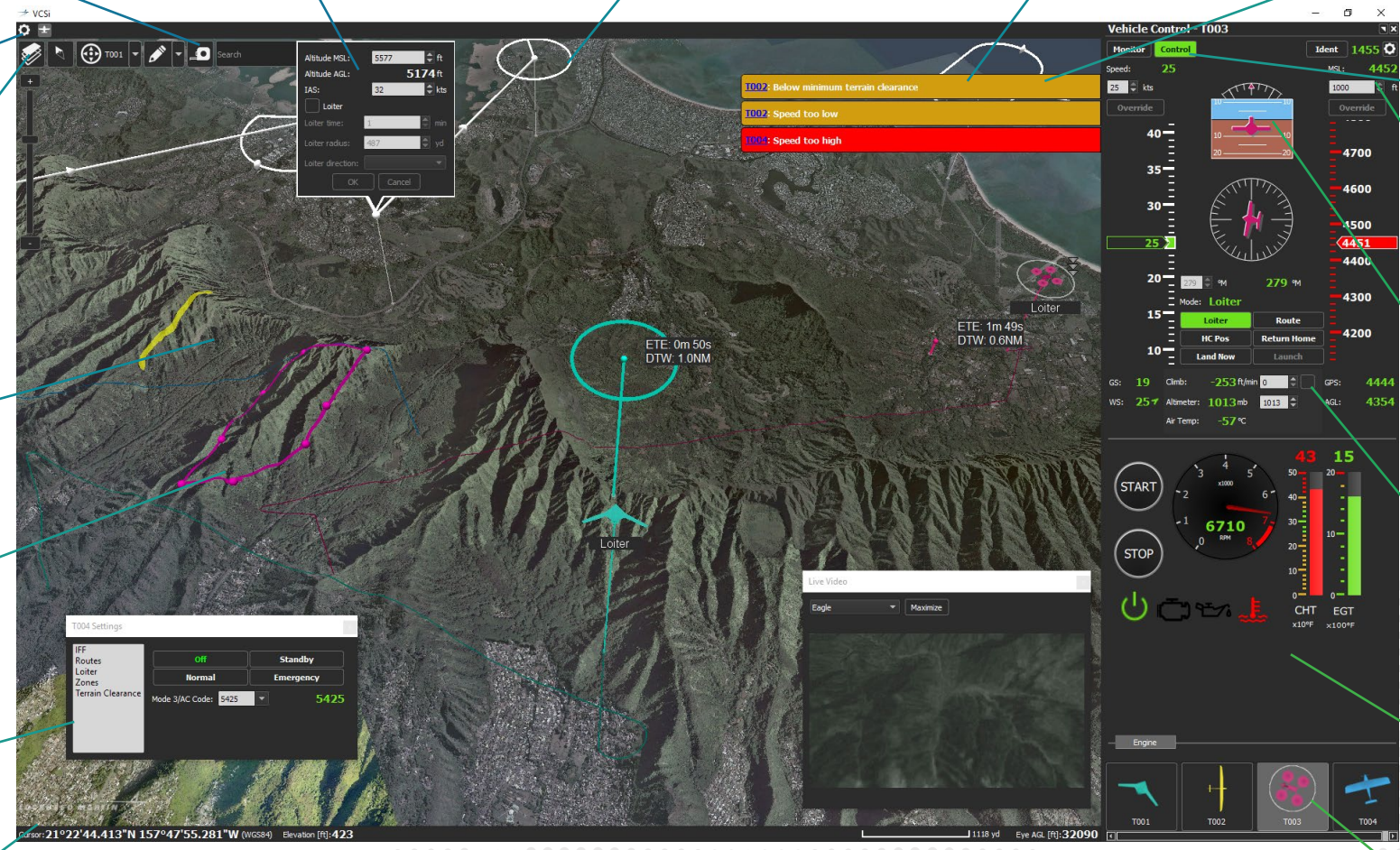
Transponder Support
VCSi supports IFF Mode 3/AC for civil airspace operations.

T-Scan Display
Control vehicles with a familiar aviation interface for heading, roll, speed, and altitude status. Limit the climb rate, change the altimeter setting and monitor environmental conditions near the vehicle.

Customizable Navigation Controls
Tailor VCSi for each vehicle's capabilities, including speed and altitude limits and custom autonomous flight modes.

Customizable with Plug-ins
Easily design custom controls with the Qt Quick GUI toolkit for your vehicle's unique requirements.

Multi Vehicle Control
Simultaneously control multiple dissimilar vehicles from a single, easy-to-use and understand interface. Interact with each vehicle directly in the 3D map.

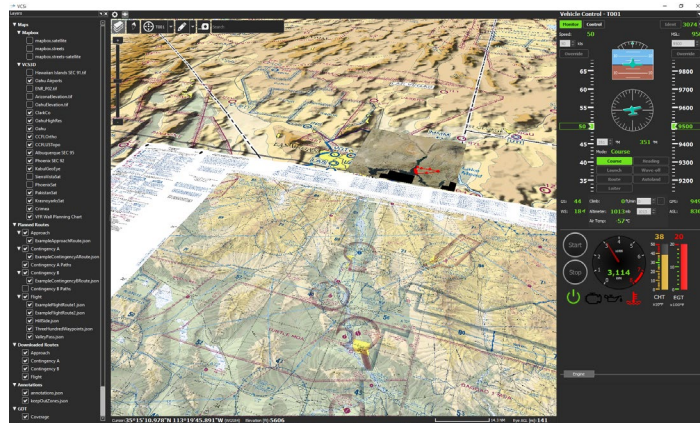




Airspace Awareness Module

The Airspace Awareness module brings real-time and immersive information into VCSi to ensure safety of flight. This module includes:

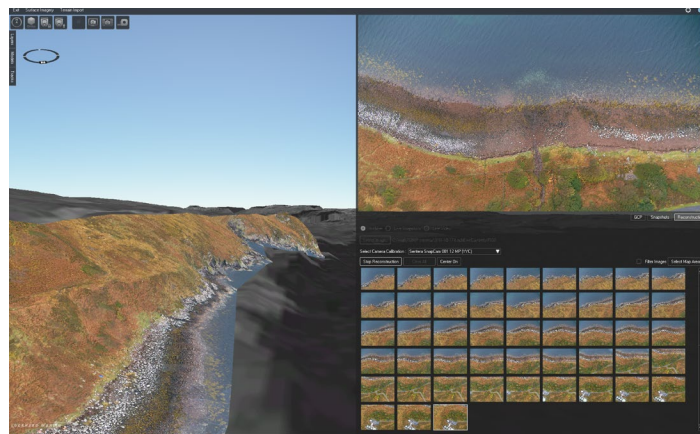
- A 3D view with terrain avoidance information, optionally overlaying video from the vehicle's nose camera.
- Display of real-time ADS-B information on the map
- Look ahead notifications for airspace and terrain collisions.



Aviation Data Modules

The following modules are currently under development:

- The Unmanned Traffic Management (UTM) module integrates airspace data (including weather, obstacles, and other information) from national sources into VCSi.
- The Digital Aeronautical Information module brings international Digital Aeronautical Flight Information Files (DAFIF) that include information on airports, airways, airspaces, and navigation into VCSi.



Camera Control Module

The Camera Control module connects VCSi to a STANAG 4586 compatible electro-optical/infrared (EO/IR) sensor. Video display, tactical marking and camera control are all part of this module.

This module brings enhanced situational awareness to the user through innovative features such as overlaid video on the 3D map and real-time 3D reconstructions. 3D maps are built in real-time, without an internet connection and present the operator with a level of instantaneous situational awareness that has not been possible before.

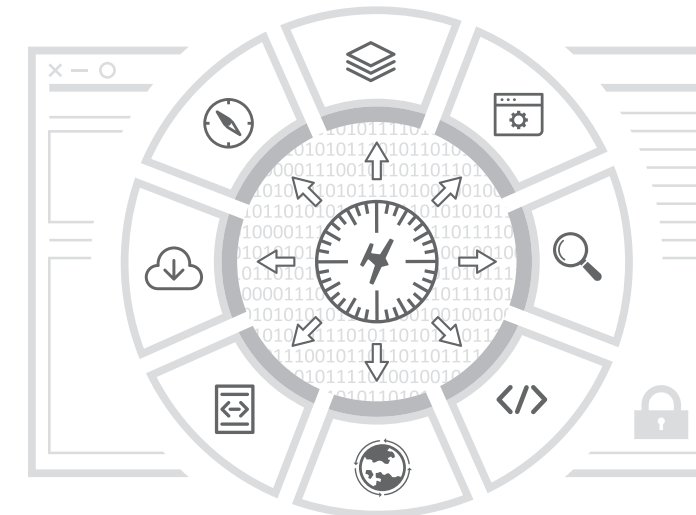


Modular, Extensible, Scalable

The modular design of VCSi allows you to assemble the capability that you require, while only purchasing the components you need.

VCSi is extensible through a robust plug-in architecture and detailed software development kit, allowing you to include custom capabilities specific to your needs.

Through a dockable approach to panels, you can easily customize and organize your interface. Layouts are easily created and accessed for any number of use cases. This enables VCSi to run effectively on a laptop or expand across several monitors.



Robust Plug-in Architecture

Every VCSi license includes a detailed and thorough Software Development Kit (SDK) enabling you to undertake plug-in development. This descriptive SDK walks new users through the API and plug-in architecture that VCSi is built upon, making it easy to integrate your unique capabilities or to leverage local content.

Alternatively, work with us to add your unique capabilities to VCSi through contracted plug-in development.



Standards Based

VCSi supports:

- STANAG 4586 for UAV Interoperability
- STANAG 4609 KLV Metadata
- RTP and UDP video feeds
- Vehicle Specific Modules are available for MicroPilot®, Kestrel™, and Piccolo autopilots





Lockheed Martin.
Your Mission is Ours.TM

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