

LOCKHEED MARTIN



# mGCS CAPABILITIES GUIDE

Mini and Small UAV Ground Control Operator Software



# Mini and Small UAV Operator Software

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## Discover mGCS

mGCS is a ground control software application that serves as the UAV operator's user interface for controlling and monitoring mini and small unmanned vehicles. It is designed for use on portable computers and hand-held controllers and is engineered to integrate to virtually any vehicle system. In cases where sensor and/or vehicle control is not available, mGCS doubles as a Remote Viewing Terminal (RVT). mGCS is STANAG 4586 compliant commercial off-the-shelf (COTS) software.

## Interoperability with STANAG 4586

Lockheed Martin CDL Systems is an active participant in the development and evolution of the NATO interoperability standard for unmanned vehicles: STANAG 4586. This standard establishes a common control protocol to promote UAV interoperability.

In the STANAG 4586 framework, mGCS communicates with the UAV and its sensors through the Vehicle Specific Module (VSM), a component designed to translate the STANAG 4586 protocol to the vehicle's native protocol and to encapsulate vehicle specific functionality. mGCS can assume control of vehicles utilizing a STANAG 4586 compatible VSM or communicate directly with vehicles that natively support the STANAG 4586 protocol. This enables the interoperability of unmanned vehicles and their sensors, irrespective of type, from a common operator interface.

## System Requirements

mGCS is designed to work with commercially available portable computers as well as custom hand-held controllers. The following system requirements are recommended:

- x86 system hardware
- Intel Core i5 or better
- Red Hat Enterprise Linux 5.5 or newer
- Joystick (optional)
- Touchscreen (optional)
- Recommended platforms: Panasonic CF-19 or CF-31



# Capabilities & Features

## A Superior User Experience

Mini and small UAV missions are characterized by operations in which operators must maximize their effectiveness and achieve objectives in short timeframes and in challenging environments. mGCS is designed to be exceptionally easy-to-use allowing operators to focus on flying the mission, not the aircraft. Operators require minimal training to use the software. mGCS features:

- An intuitive user interface optimized for touchscreens minimizes training requirements
- Two view modes allow the operator to toggle between the video and map display as the primary view mode
- A color-coded warning, caution, and advisory system allows system health messages to automatically popup
- Intuitive information readouts provide real-time context to vehicle and sensor operation
- Critical information such as fuel remaining and controller battery life is displayed at all times

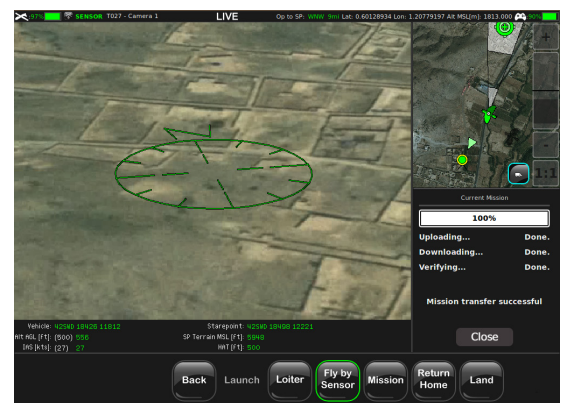
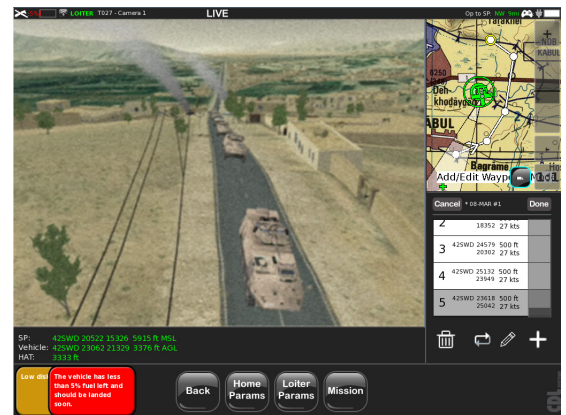
## Integrated Real-Time Full Motion Video

Access to real-time and archived full motion video from an electro-optical sensor is crucial in maximizing situational awareness and ensuring that mission objectives are consistently and effectively met. mGCS includes an integrated video viewer featuring:

- Discover, preview, and select from multiple available video sources
- Display video in live or playback mode
- Digital video support (MPEG-2 and H.264 with KLV metadata (MISB 0601.2), as defined in STANAG 4609)
- Software-based decoding of digital video eliminating the need for a dedicated video card
- Textual and graphical video overlays indicating vehicle location, altitude, speed, sensor stare-point location, and sensor height above target

Live sensor and video data can be manipulated using built-in features that give the operator the ability to:

- Manually slew sensor stare-point
- Reposition sensor stare-point by using the video display or map
- Dynamically control sensor zoom
- Operate sensor using a joystick
- Capture and save still video frames as images (JPG, TIFF, lossless NITF2.1 with metadata)
- Pause and resume live video
- Record live video
- Pause, rewind, and fast-forward recorded video



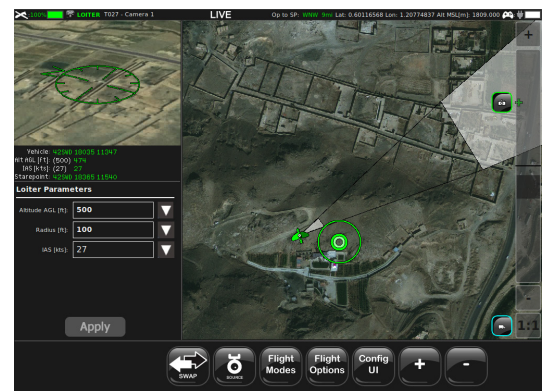
## Interactive Map for Enhanced Situational Awareness

Situational awareness is key to ensuring mission effectiveness and operational safety. The interactive map provides real-time geo-referenced position and direction information. The operator can:

- Toggle between large-video/small-map and small-video/large-map view modes
- Dynamically create, edit, and upload vehicle missions
- Specify headings, loiter points, and waypoints by directly clicking/touching the desired point of interest
- Adjust map zoom levels

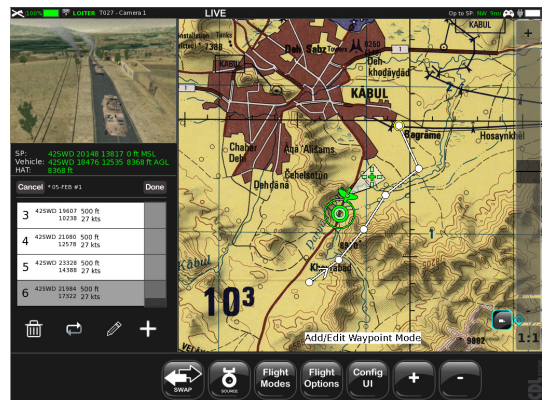
To accommodate a wide range of common standards and operator preferences, the software supports:

- Import of National Geospatial-Intelligence Agency (NGA) raster formats (ADRG, CADRG, CIB)
- Import of scanned maps, digital maps, satellite imagery, and other geo-referenced imagery
- Common Operating Picture (COP)
- MIL-STD-2525C Common Warfighting Symbology
- Digital Terrain Elevation Data (DTED) Level 0, Level 1, Level 2
- Latitude and longitude (DMS, DMM), MGRS and UTM coordinate systems
- Metric and imperial units



A number of commonly used flight modes are available to the operator:

- Fly-by-sensor mode (vehicle flight path determined by selected sensor stare-point)
- Configurable loiter mode
- Manual altitude/airspeed/roll control mode
- Mission waypoint mode
- Configurable launch mode
- Configurable landing mode
- Return home mode



Three operational modes are available to the operator:

- Monitor sensor video with no control
- Monitor sensor video with full sensor control
- Monitor sensor video with full sensor control and full control of UAV

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