Loki
Mk 2

Advanced
Settings
User Manual

SKY-HERO

Advanced Settings User Manual

CONTENTS

This user manual refers to options and settings to further increase the capabilities for your Loki MK2 system and will give advanced users more options.

To unlock this menu, (SCROLL) to advanced settings in the menu and once highlighted use the left joystick and toggle five times to the left. A popup message will show ''Advanced menu unlocked''.

You can know enter the advanced settings submenu.

<div style="background-color:red; color:white;">

CAUTION:

WHEN CONNECTING A LOKI MK2 TO THE GCS, THE UAV WILL AUTOMATICALLY USE THE SETTINGS CURRENTLY SET IN THE GCS. NO SETTINGS ARE RECORDED IN THE UAV ITSELF.

ALL SETTINGS CAN BE CHANGED DURING CONNECTION; HOWEVER, WE RECOMMEND DETERMINING THE PROPER SETTINGS BEFORE USING THE UAV.

</div>

a. Max Tilt Angle

This setting is specific to each of the connected devices.

This is probably one the most useful setting of the system and is able to be setup for each individual UAV, adding even more potential to the system. This setting will limit the maximum in-flight angle of your UAV and by extension will determine its maximum speed.
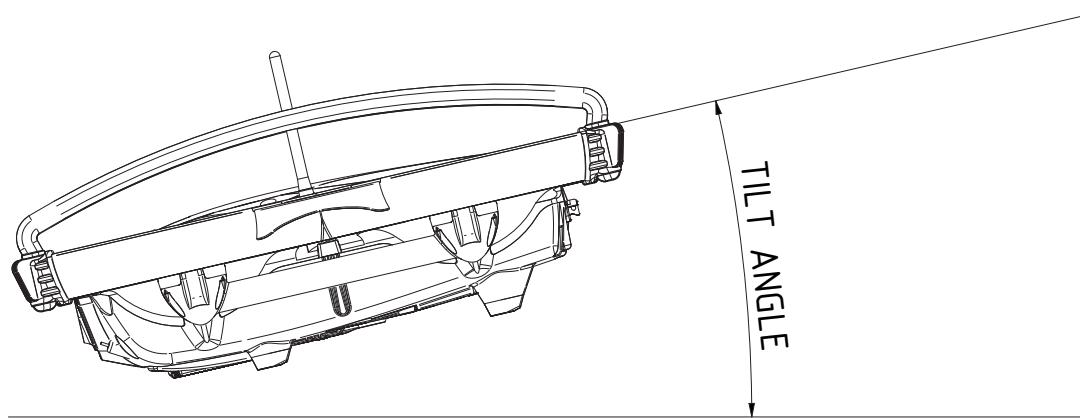
The max tilt angle can be set to

- Low : 6° Ideal for confined spaces or beginners
- Normal : 9° Best setting for most use cases
- High : 13° To be used only by more experienced pilots or windy situations

MAX TILT ANGLE BOOST

In addition to the normal angle setting, the Loki MK2 system will allow you to program a boosted max tilt angle value for each device that you can activate by turning the boost on. When triggered, a ''S'' will appear on the top bar of your GCS telemetry to indicate that you are flying in 'speed'/'boost' mode. Pressing the allocated button once will turn the boost ON-OFF.

b. Flight Mode

Having the flight mode correctly selected on the GCS is essential. This procedure will ensure you do not take-off in the incorrect mode.

Mode 1 (RC hobby mode)

J1= pitch: forward-back, yaw: left-right

J2= throttle: up-down, roll: left-right

Mode 2 (usual mode)

J1= throttle: up-down, yaw: left-right

J2= pitch: forward-back, roll: left-right

c. React Mode

CAUTION: REACT MODE DRASTICALLY INCREASES THE REACTIVITY OF THE UAV, ESPECIALLY AT HIGHER MAX ANGLES, THIS MODE SHOULD ONLY BE USED BY EXPERIENCED PILOTS IN SPECIFIC CIRCUMSTANCES

React Mode increases the Loki MK2's angular acceleration, which makes the UAV much more reactive, but also more difficult to pilot. As the angular acceleration is related to the maximum tilt angle, the reactivity will be more pronounced with higher max tilt angle settings and even more so when flying with the Angle Boost. Having both the Angle Boost and React mode make the Loki MK2 flying experience more similar to that of a racing drone; any loss of control or shock in these circumstances could result in severe damage to the UAV.

d. Device LED brightness

This setting is common to all connected devices

The UAV is equipped with two Front LEDs and two Bottom LEDs. The LED Brightness sub-menu lets you determine the level of brightness when you power them on. Powering the LEDs can be done either by pressing the Allocated Button or via the Command Action Menu, but in both cases, they will be powered on at the value set in the LED Brightness menu.

Front LEDs

You can increase or decrease the front LED brightness level by (SCROLL) up or down; 100% brightness = 12 0mW per LED.

When in this menu, you can also (CONFIRM), which will directly activate (the percentage will be preceded with an arrow) or deactivate (the arrow will disappear, the percentage will be followed by 'disabled') your Front LEDs.

Bottom LEDs

You can increase or decrease the Bottom LED brightness level by (SCROLL) up or down; 100% brightness = 1W per LED. When you (CONFIRM) you can also change the Bottom LEDs setting to **AUTOMATIC** or **MANUAL** .

When used on **AUTOMATIC MODE** , your Bottom LEDs will automatically be turned on and increment the power on the sole request of the Vertical Camera as to generate enough light for it to focus. The generated light will enable the front camera to get enough illumination to get a clear feed; even in total darkness (and without the typical 'snow' common when using direct IR light). We recommend using **AUTOMATIC MODE**.

When used on **MANUAL MODE** , the LEDs turn on at the selected power level, you will then need to assign an allocable button to trigger the LED on-off or use the Command action menu.

e. GCS Led Brightness

This setting lets you adjust the brightness of 8 LEDs on the GCS. You need to power cycle your GCS to activate the new settings.

Default settings = 160.

f. Button Allocation

This setting is common to all connected devices

The Loki MK2 GCS is equipped with 7 Allocable Buttons :

- · B1-B2-B3 3 Allocable Buttons above the Menu Button
- · L   Left Top Button
- · R   Right Top Button
- · J1   Button activated by pressing Joystick 1
- · J2   Button activated by pressing Joystick 2

The GCS user can decide which Special Function / Flight Mode to allocate to each of those 7 buttons. When in the Button Allocation Menu, (ENTER) the desired Allocated Button, (SCROLL) through the list of allocable functions / modes and (CONFIRM) when the desired one is highlighted. Repeat the process for the other Allocable Buttons.

The 4 Device Buttons are not allocable, as well as the Menu Button and the Power Button.

g. Device Binding (pairing)

> CAUTION:
> • ONLY ONE UAV CAN BE PAIRED AT A TIME, WHEN PAIRING A DRONE WITH A GCS, MAKE SURE ALL OTHER DRONES AND GCS ARE TURNED OFF
> • WHEN PAIRING, THE GCS AND UAV SHOULD BE WITHIN 1 METER OF EACH OTHER
> • USE FULLY CHARGED UAV AND GCS
> • IN MOST CASES, WHEN THE UAV AND GCS ARE DELIVERED, THEY ARE ALREADY PAIRED TO EACH OTHER

Before first use, the Loki MK2 UAV will need to be paired to your GCS. This process must be done only once and will link the Loki MK2 to one of the 4 Device Buttons on your GCS. A Loki MK2 can only be paired to a single Device Button (and thus one GCS) at a time.

STEP 1: POWER THE UAV

1. Plug in the Loki MK2 battery, attach the battery clip and turn the UAV upside-down. The Loki MK2.

The official Loki MK2 Lipo batteries that come with the drone are the only authorized batteries for use.

The Bind Button LED should be blinking green (very first use of the UAV) or solid red (UAV previously connected to a GCS).

STEP 2: ACTIVATE PAIRING PROCESS ON THE UAV

Wait for the 4 consecutive beeps indicating that all motors have been activated. This should happen within 6 seconds after powering the UAV.

Within 20 seconds after battery connection, press the small Bind Button on the bottom side of your Loki MK2 (use a pen point and press gently once, do not hold).

The Bind Button LED should now be blinking green slowly.

STEP 3: POWER THE GCS

Hold the Power Button until the 8 Front LEDs of the GCS turn white. After a short time, they will turn blue and the screen will turn on. The entire process takes about 6 seconds.

STEP 4: ACTIVATE BINDING ON THE GCS

(ENTER MENU) and (SCROLL) to 'Device Binding'. (ENTER) and then (SCROLL) to choose one of the four Device Button you want to bind your UAV to (A1 corresponding to the Device Button 1, A2 to Device Button 2, etc), and finally (CONFIRM). The binding process has now started and a pop-up message will appear on the screen of the GCS: 'Device binding, please wait ...'.

STEP 5: EXCHANGE ENCRYPTION KEY

Wait until the Bind Button LED at the bottom of the UAV turns solid green (solid green LED means that your UAV is now paired to the selected Device Button of your GCS, but not communicating with the GCS)

Connect your Loki MK2 USB-C connector to your GCS USB-C connector using the provided USB-C to USB-C cable (GCS charging cable).

A pop-up message will appear on the screen of the GCS: 'Encryption Key transferred'. The Loki MK2 can now communicate with your GCS.

STEP 6: FINAL WAIT

Video and telemetry will appear on the screen of the GCS when the process is complete, which can take up to one minute; the Device Button LED next to the selected Device Button will turn solid green, meaning that Loki MK2 and GCS are now communicating.

This process can be repeated as many times as you want: as such you can re-pair your Loki MK2 to any other Device Button on your GCS or to any other GCS by simply repeating the pairing process. Your UAV records the last pairing, so you do not need to undergo the entire pairing process again, unless the UAV needs to be paired to another Device Button/GCS. Please note that the GCS allows up to 4 devices to be connected at the same time, each paired and connected on a different Device Button.

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h. Joysticks Calibration

Your GCS is calibrated upon delivery, but with time and wear the neutral and maximal values from the GCS joystick may change and require calibration.

There are some good indicators which signal a need for calibration:

· if no hovering is possible with any UAV

· if all of your UAV are always drifting in the same direction

Joystick calibration is achieved by following these steps:

STEP 1: Move the 2 joysticks in a circle to reach the maximum joystick range in all directions.

STEP 2: When the 4 values below Left and the 4 values below Right are not varying despite you moving the 2 joysticks in circle, release both joysticks and leave them centered.

STEP 3: Press the Top Left Button («L»)

STEP 4:: A pop-up message will appear on the screen: 'Joysticks calibration done'

NOTE: Joystick calibration process can be cancelled by pressing the 'R' (Right top button), a yellow popup message "Joysticks calibration cancelled" will light up.

i. Joysticks Dead Zone

The dead zone refers to a circle zone around the neutral position of your joysticks, where no movement detection is done. A higher dead zone setting will increase the radius of the circle.

This allows pilots to prevent unwanted UAV movements caused by thumb drift when controlling the UAV.

For example: avoiding unwanted yaw inputs when throttling up or down (Mode 2 users).

More experienced pilots can decrease the value of the dead zone, as to increase the UAV flight precision, but the value should never go below 10% or above 25%. Our recommended setting is around 13%..
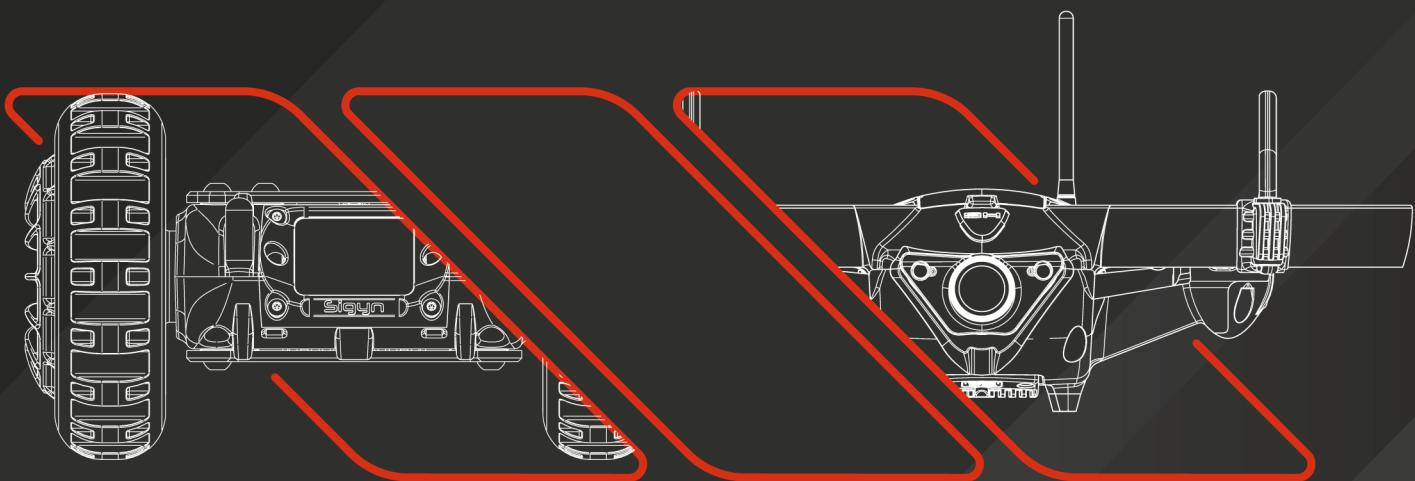
j. Lock Advanced Settings

Select this option if you want to lock your advanced settings.

Unified Indoor Tactical Recon Robots System
OPERATOR'S MANUAL

ADD-ON | Odyssy v.3.0.0

19.09.2022

⚠ Please carefully read this supplement to the user manual instructions before use

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Set Region NEW ⚠ 09 ─────────► **D GCS MENU STRUCTURE** ✦

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📌 Once an unmanned vehicle (Loki | Sigyn) is selected :
- Its own « Command Action » menu is displayed as the first menu entry of the GCS MkII
- The «Device Settings» menu is strictly limited to the features of that device
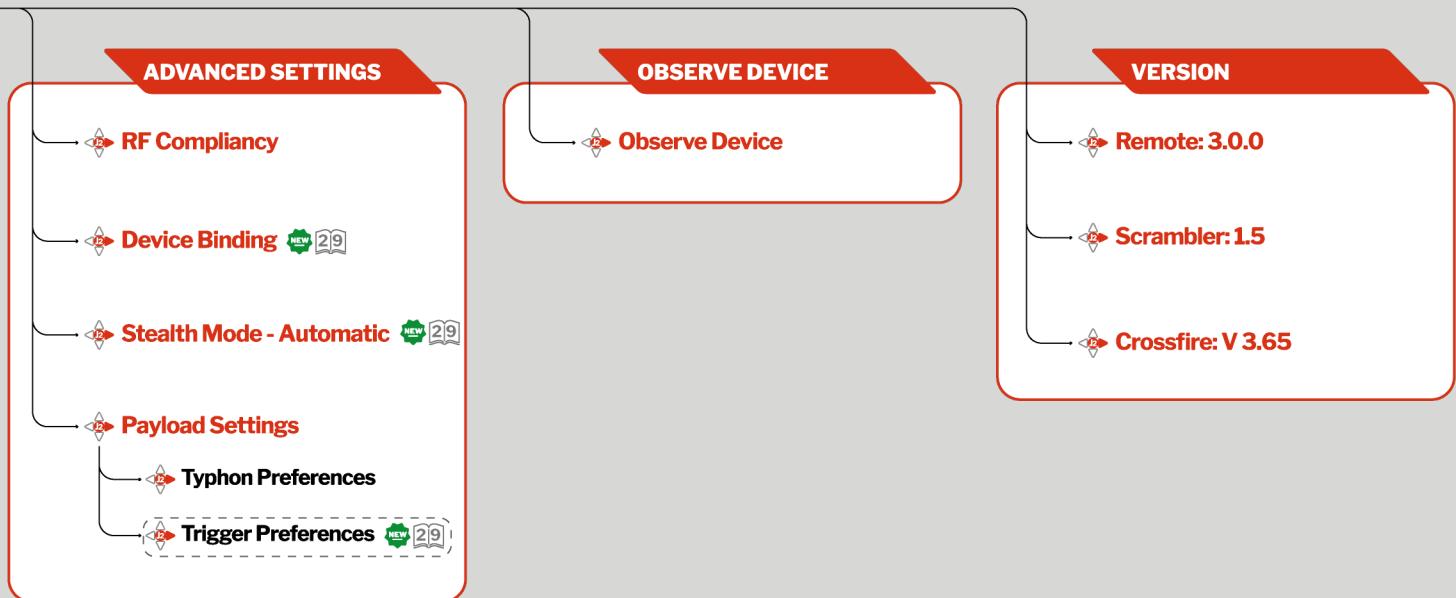
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OBSERVE DEVICE

- ◈▶ **Observe Device**

VERSION

- ◈▶ **Remote: 3.0.0**
- ◈▶ **Scrambler: 1.5**
- ◈▶ **Crossfire: V 3.65**

SKY-HERO | GCS MkII
MENU STRUCTURE | Odyssy V3.0.0
SUMMARIZED VERSION | UNBOUND DEVICE

FOREWORD

This add-on guide to the Sky-Hero Tactical System User Manual, provides details of all of the new features included in the new Odyssy version V 3.0.0 for the GCS MkII. The new features increase the capabilities and options of our unified indoor tactical recon robots system. It gives an overview of the new remote control software, based on a new menu display structure with default settings, it also includes quick steps and tips to get started.

We strongly recommend that in order to make the most of your first tactical deployment, you read the following information and instructions thoroughly before carrying out your next air / ground operation. Doing so will help ensure your safety and prevent damage to related components and devices.

This new release introduces a lot of new functionalities and new options for the GCS MkII itself and for the related unmanned vehicles as well -both drones Loki MkI, Loki MkII and the rover Sigyn MkI.

Upgrade your system components to the new Odyssy firmware V 3.0.0

In order to benefit from all the new features presented in this additional guide, it is essential that all the components are updated to the latest firmware version. Please check the currently installed version in the GCS MkII menu - under Version / Remote. If version 3.0.0. is not displayed, perform the update or contact your local distributor or the Sky-Hero team if you do not have the appropriate firmware.

- Note 1 : all custom settings and dedicated bindings will be lost after upgrading.
- Note 2 : the system will now check compatibility with configured devices and either warn or refuse to connect/bind to a device with the wrong version. Only GCS 3.0.0, Sigyn 1.0 and Loki 3.0.0 firmware will work together. Future upgrades (V 3.x.x) of Odyssy firmware for devices and controller (except for the Loki MkI) will remain compatible.

Using this Add-on Guide

⚠ Read it fully and carefully at least once | It provides important advice on the installation, use and safety of the system and its components.

⚠ Keep this guide for future reference | Make sure tthat it is always located with your Sky-Hero devices, so that your teams are fully informed about the new functionality and features

⚠ Proper upgrading ensures the stability of the system and associated unmanned devices | Stay alert for updates which will be notified directly to you by Sky-Hero or via your local distributor.

Disclaimer

In order to ensure safety and to successfully operate your Sky-Hero Unified Indoor Tactical Recon Robots System, please abide by the supplemental operating instructions and procedures within this Add-on Manual. Failure to abide by the instructions in our documentation, means that Sky-Hero will assume no responsibility for any product damage or loss - direct or indirect or legal during use, and will not provide warranty service. Never modify your products by using any unauthorized component or any method that is not required in Sky-Hero official description.

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SET-UP KEY STAGES

SET-UP KEY STAGES

On GCS Start-up

⚠ 1 **Mandatory Setup Stage**

Set Region

▶ Region

▶ CE
▶ FCC

GCS Settings

⚠ 2 **Mandatory Setup Stage**

Joystick Settings

Joysticks Calibration

Follow instruction on screen

GCS Settings

⚠ 3 **Recommended Setup Stage**

Calibrate Battery

Follow instruction on screen

Three key steps have been introduced into the configuration of the new version (V3.0.0) of the tactical system, this is in order to not only meet the legal standards of the country of use but also to ensure that you get the best possible experience from this unmanned tactical system. These initialisation stages require particular attention by the operator, prior to deployment of the system and operation of vehicles. It is essential that they are properly configured prior to the first use. The 3 key-stages to system initialization that need to be adjusted to guarantee the best performances for your operations are; Set Region, Joystick Calibration and Calibrate battery. They are described in detail further below :

⚠ **1** **Mandatory Setup Stage**   # NEW | Set Region

GCS System Initialisation

This setting configures the frequency and power limits of both UAV/UGV control and video signal in compliance with the regulations of the country of operation (CE | FCC). Once the area of use is determined, it is recorded along with the corresponding power level of the video and control signals. To change the region of use, it is necessary to reset the GCS MkII using the «Erase Everything and Reboot» option found in the controller menu: GCS Settings / Firmware Management / Erase Everything and Reboot.

However, you have the opportunity to change the defined region setting to the «OPEN» mode (Advanced Settings / RF Compliancy / Control | Video) in order to increase the general performances of your system. Please refer to your local regulations before applying these changes as in the «Open» mode, all video frequencies are available for both CE and FCC regions. Also the signal strength for the control of unmanned devices can be increased beyond the defined standards.

⚠   **«Set Region» is mandatory before using anything else**

⚠ **2** **Mandatory Setup Stage**   # NEW | Joystick Calibration

GCS Settings / Joystick Settings / Joystick Calibration

First and foremost, the joystick calibration is required to be able to operate the UAV/UGV. Secondly, although all components have been accurately installed and tested when the GCS MkII is assembled, slight mechanical differences may occur. To get the most accurate control possible, it is strongly recommended to calibrate the joysticks before the first use.
The same applies thereafter, with time and wear, the neutral and maximum values of the GCS joystick may change and recalibration will be necessary.

Please refer to the «GCS Settings» section in this add-on guide to learn more.

⚠   **«Joystick Calibration» is required in order to actually operate any vehicles**

⚠ **3** **Recommended Setup Stage**   # NEW | Calibrate Battery

GCS Settings / Calibrate Battery

In order to have the best estimate of the remaining battery percentage available for the GCS MkII, it must be calibrated during system initialization. The remote control will only display the exact percentage once the battery has been calibrated, otherwise no indication will be displayed (« - - - % » will be shown on the top right corner of the GCS MkII screen). This configuration step is highly recommended once the system is activated for the first time. However, It is also advised that the battery be calibrated from time to time, (due to its natural degradation over time) so that its accurate capacity is always known.

Please refer to the «GCS Settings» section of this supplementary guide for information on how to perform this calibration step.
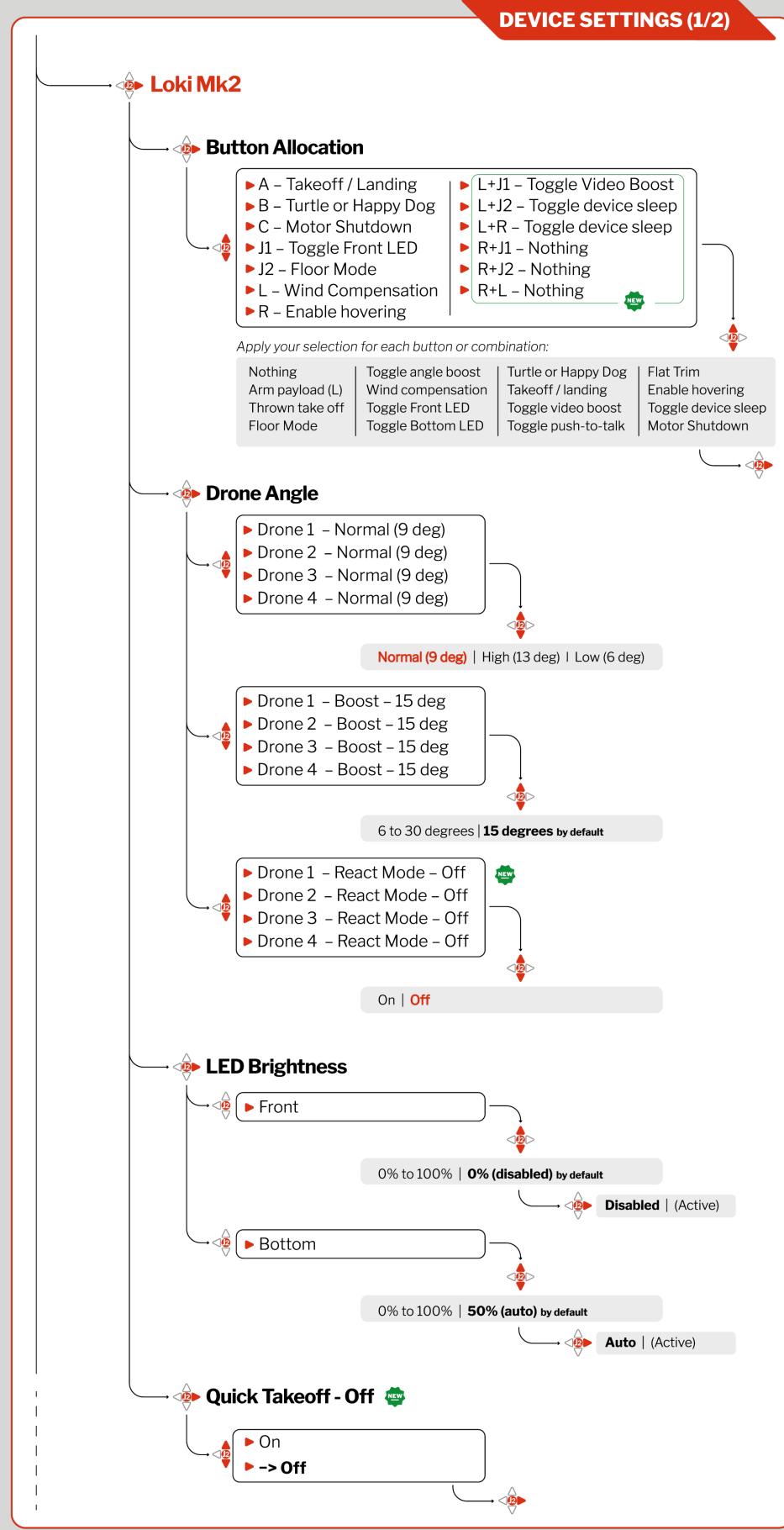
⚠   **«Calibrate Battery» is optional, but but it must be performed in order to see the battery estimation**

NOTES

DEVICE SETTINGS

Loki Mk2

Button Allocation

▸ A – Takeoff / Landing
▸ B – Turtle or Happy Dog
▸ C – Motor Shutdown
▸ J1 – Toggle Front LED
▸ J2 – Floor Mode
▸ L – Wind Compensation
▸ R – Enable hovering

▸ L+J1 – Toggle Video Boost
▸ L+J2 – Toggle device sleep
▸ L+R – Toggle device sleep
▸ R+J1 – Nothing
▸ R+J2 – Nothing
▸ R+L – Nothing

Apply your selection for each button or combination:

Nothing	Toggle angle boost	Turtle or Happy Dog	Flat Trim
Arm payload (L)	Wind compensation	Takeoff / landing	Enable hovering
Thrown take off	Toggle Front LED	Toggle video boost	Toggle device sleep
Floor Mode	Toggle Bottom LED	Toggle push-to-talk	Motor Shutdown

Drone Angle

▸ Drone 1 – Normal (9 deg)
▸ Drone 2 – Normal (9 deg)
▸ Drone 3 – Normal (9 deg)
▸ Drone 4 – Normal (9 deg)

Normal (9 deg) | High (13 deg) | Low (6 deg)

▸ Drone 1 – Boost – 15 deg
▸ Drone 2 – Boost – 15 deg
▸ Drone 3 – Boost – 15 deg
▸ Drone 4 – Boost – 15 deg

6 to 30 degrees | **15 degrees** by default

▸ Drone 1 – React Mode – Off
▸ Drone 2 – React Mode – Off
▸ Drone 3 – React Mode – Off
▸ Drone 4 – React Mode – Off

On | **Off**

LED Brightness

▸ Front

0% to 100% | **0% (disabled)** by default

Disabled | (Active)

▸ Bottom

0% to 100% | **50% (auto)** by default

Auto | (Active)

Quick Takeoff - Off

▸ On
▸ **–> Off**

Once a Loki MkII is selected, the «Device Settings» menu is strictly limited to the features of that device.

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NEW | Button Allocation Combinations

Device Settings / Loki Mk2 / Button Allocation

In addition to the 7 unique action buttons, 6 more configurable button combinations have been added to provide additional quick shortcuts to increase the number of quick actions. These combinations are the combination of two buttons used simultaneously to perform the desired action previously defined. In practice, these combinations are based on the initial selection of a top button (L or R) with a 2nd button as shown here. For a button combination to achieve its intended purpose, the first defined button (L/R) must be held down (1 sec.) until the overlay screen appears. Once the overlay screen is displayed, press the second defined button to perform the desired action.

It is advisable not to associate critical actions/functions with these 6 button combinations. Note that when associating button L to the «Arm payload» mode and a connected payload component, the combinations based on this button are disabled.
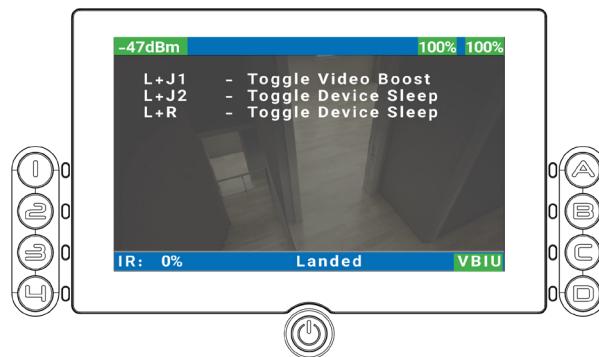
FIG. Overlay screen | Combinations with R button

FIG. Overlay screen | Combinations with L button

NEW | React Mode defined by drones

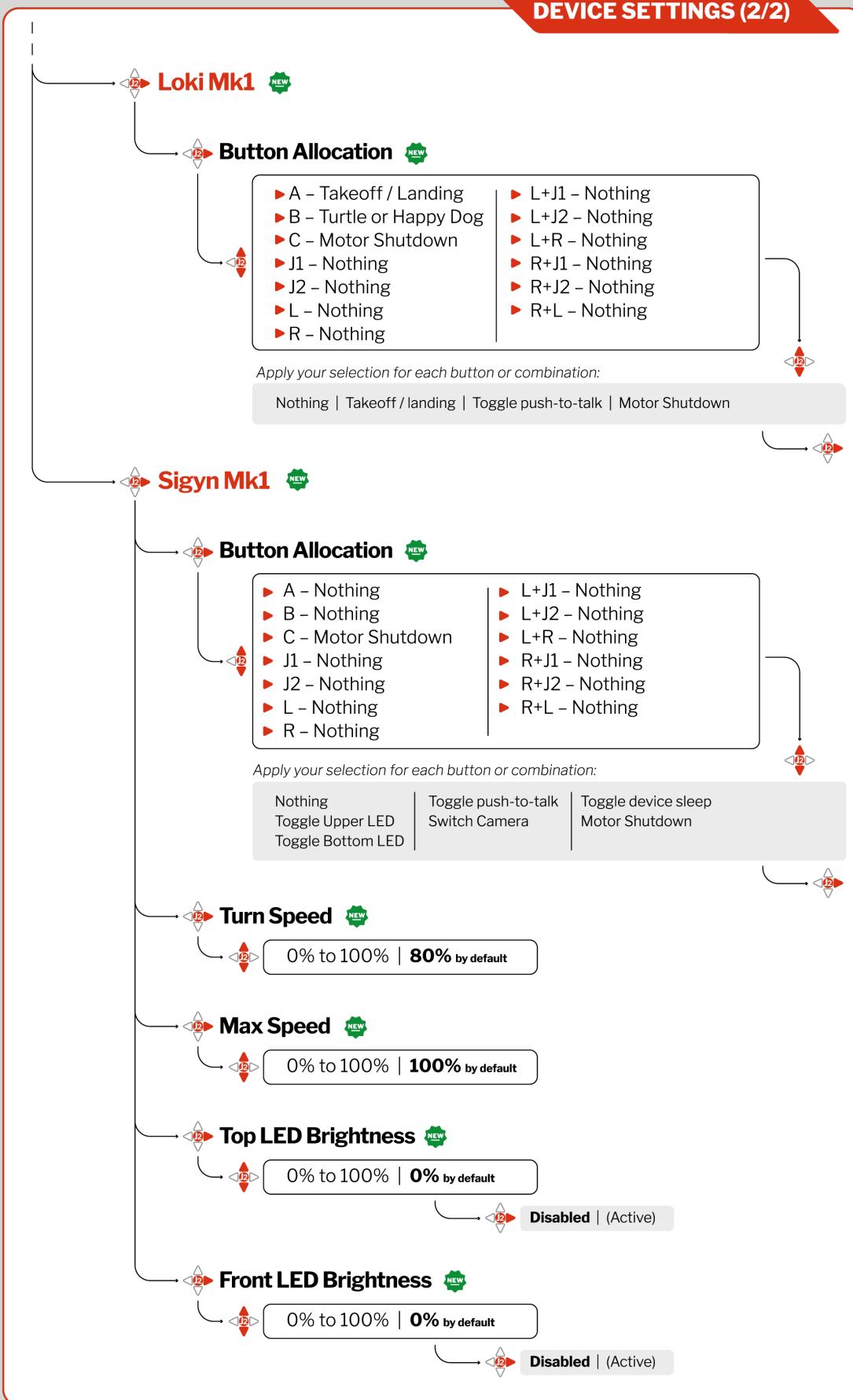*Device Settings / Loki Mk2 / Button Allocation*

To allow more freedom in the choice of flight angles of the various associated drones, the «React Mode» can now be selected on a per-drone basis.

NEW | Quick Takeoff

Device Settings / Loki Mk2 / Quick Takeoff

The new «Quick Takeoff» mode allows you to start spinning the motors in advance, so that you can quickly takeoff when needed. The motors start turning while the drone is still on the ground and then the drone waits for an action to be taken on the flight control joystick, either upwards to initiate takeoff, or downwards to switch off the motors. The A button associated with a conventional take-off and landing will only offer the latter option, once «Quick Take-Off» mode is activated.

Loki Mk1 NEW

Button Allocation NEW

▶ A – Takeoff / Landing
▶ B – Turtle or Happy Dog
▶ C – Motor Shutdown
▶ J1 – Nothing
▶ J2 – Nothing
▶ L – Nothing
▶ R – Nothing

▶ L+J1 – Nothing
▶ L+J2 – Nothing
▶ L+R – Nothing
▶ R+J1 – Nothing
▶ R+J2 – Nothing
▶ R+L – Nothing

Apply your selection for each button or combination:

| Nothing | Takeoff / landing | Toggle push-to-talk | Motor Shutdown |

Sigyn Mk1 NEW

Button Allocation NEW

▶ A – Nothing
▶ B – Nothing
▶ C – Motor Shutdown
▶ J1 – Nothing
▶ J2 – Nothing
▶ L – Nothing
▶ R – Nothing

▶ L+J1 – Nothing
▶ L+J2 – Nothing
▶ L+R – Nothing
▶ R+J1 – Nothing
▶ R+J2 – Nothing
▶ R+L – Nothing

Apply your selection for each button or combination:

Nothing	Toggle push-to-talk	Toggle device sleep
Toggle Upper LED	Switch Camera	Motor Shutdown
Toggle Bottom LED		

Turn Speed NEW

0% to 100% | **80%** by default

Max Speed NEW

0% to 100% | **100%** by default

Top LED Brightness NEW

0% to 100% | **0%** by default

Disabled | (Active)

Front LED Brightness NEW

0% to 100% | **0%** by default

Disabled | (Active)

Once a Loki MkI or a Sigyn MkI is selected, the «Device Settings» menu is strictly limited to the features of that device.

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NEW | Loki Mk1 compatible

From now on, the current GCS MkII controller can be combined with the Loki MkI. Thanks to this compatibility mode, 1st and 2nd generation UAVs can now be combined at the same time and controlled via a single, state-of-the-art remote control. Consequently, a new configuration menu has been associated with this vehicle. It should be noted that the associated video channel must be configured manually. No telemetry information is available for the Loki. Concerning the information generated natively by the Loki MKI, it remains exactly the same to the ones displayed on the original remote control of the 1st generation Loki.

NEW | Button Allocation

The Loki MkI also has the button allocation system, just like the Loki MkII. However, it should be noted that while all button combinations (similar to the Loki MkII) remain available, the functionality associated with this first generation drone is limited to the onboard technology.

NEW | Sigyn MkI compatible

As a unified tactical system, like all the drones in the Sky-Hero range, the Sigyn MkI is also listed in the GCS menu, which not only allows it to be operated but to also adapt its whole functionality set. Functionality such as the allocation of buttons for specific actions, as well as its speed of movement or rotation, as described below.

NEW | Button Allocation

As with the Loki MkI and Loki MkII, all the buttons on the Sigyn MkI can be configured as desired, either by direct action buttons (1 button) or by a combination of these (L/R + another button). Note that dedicated quick actions made especially for the rove can be defined here as quick action, such as the switch camera or the lighting of the upper and lower LEDs.

NEW | Max Speed

This feature allows you to increase or decrease the speed of the Sigyn robot. Adapting the speed of movement goes hand in hand with near silent movement - ideal for some specific mission scenarios.

NEW | Turn Speed

The rotation of the drone is managed by the left joystick (J1). This parameter changes the manual rotation speed.

NEW | Top and Front LED Brightness

This parameter offers the possibility of modifying the intensity of the Sigyn's IR LEDs, whether they are the front IR LEDs or those on the top and bottom of the device

NOTES

AUDIO-VIDEO SETTINGS

AUDIO/VIDEO SETTINGS

Video Channel

▶ Device 1 – A1 – 5865 MHz
▶ Device 2 – A3 – 5825 MHz
▶ Device 3 – A5 – 5785 MHz
▶ Device 4 – A7 – 5745 MHz

A1 5865MHz | A2 5845MHz | **A3 5825MHz**
A4 5805MHz | **A5 5785MHz** | A6 5765MHz
A7 5745MHz | A8 5725MH

Extended to SH Channels in Video OPEN mode

Video Power

▶ Device 1 – 1
▶ Device 2 – 1
▶ Device 3 – 1
▶ Device 4 – 1

0 | **1**

Additional power level 2 | 3 in Video OPEN mode

Scrambling Mode

On | Off | **Invert** NEW

Video Brightness NEW

0% to 100% | **50%** by default

Headphone Level

0% to 100% | **20%** by default

Overlapping Channels - Off NEW

▶ On
▶ **–> Off**

Additional menu entry in Video OPEN mode

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NEW Scrambling Mode : Invert

In 2.12 firmware version, these settings offer the possibility to only activate or deactivate the scrambling system. Scrambling is achieved by swapping parts of image randomly to make the image unrecognizable without the matching descrambling algorithm. This advanced scrambling mode is activated when the settings are ON. It implies a faster degradation and a shorter range of the video signal. To overcome this drawback, a mode, called INVERT, is now selectable. In this case, the video signal wave is simply inverted. The result is a less complex and effective scrambling, but it offers the benefit of combining scrambling with better reception of the video feed over longer distances.

NEW Video Brightness

The «Video Brightness» setting offers the same options as the previously named «Screen Brightness» setting. Only the name of this feature has been changed to be more accurate with respect to its effective purpose.

NEW Overlapping Channels

Now, with this new feature, all supported video channels (A | E | SH) are all accessible regardless of your initial region selection. This new entry in the Audio/Video Settings menu only appears when the OPEN mode is activated. This new feature was mainly developed to allow units to use complementary third-party receivers with very limited video reception frequencies.

When using several robots simultaneously with the same remote control, it is still important not to select different channels with similar frequencies (e.g. SH 24-5769 Mhz and A6-5765 Mhz) as they could overlap with each other. This could result in a more degraded or even erroneous video return, as the receiver may then display the video of another robot associated with another GCS remote control.
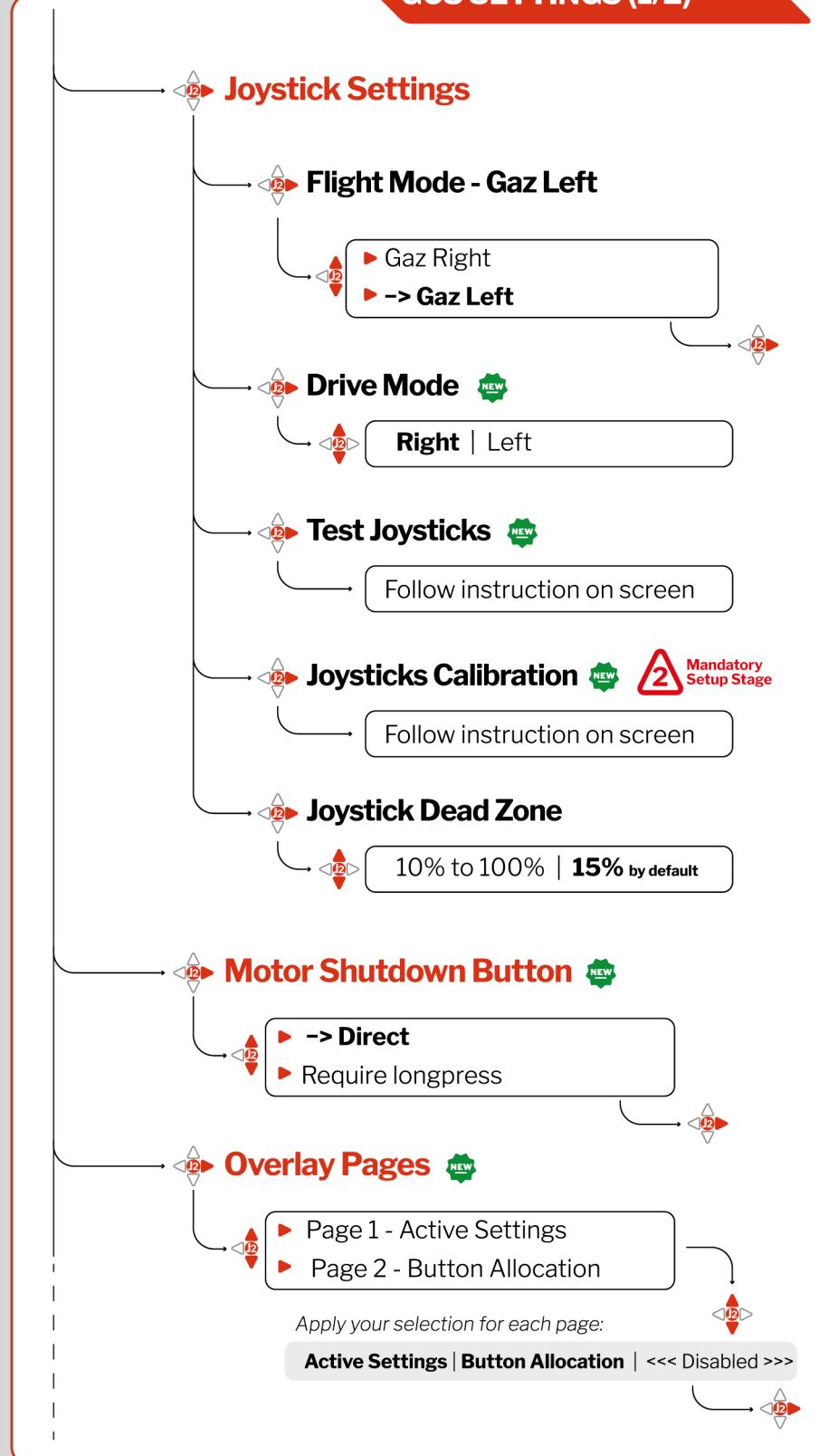
It should be noted that once the scrambling mode is activated, these third-party viewing screens, irrrspective of the frequency chosen, will not be able to decrypt the received video feed.

NOTES

GCS SETTINGS

Joystick Settings

Flight Mode - Gaz Left

▶ Gaz Right
▶ –> Gaz Left

Drive Mode NEW

Right | Left

Test Joysticks NEW

Follow instruction on screen

Joysticks Calibration NEW ⚠2 Mandatory Setup Stage

Follow instruction on screen

Joystick Dead Zone

10% to 100% | 15% by default

Motor Shutdown Button NEW

▶ –> Direct
▶ Require longpress

Overlay Pages NEW

▶ Page 1 - Active Settings
▶ Page 2 - Button Allocation

Apply your selection for each page:

Active Settings | Button Allocation | <<< Disabled >>>

NEW | Drive Mode for Sigyn Mk1

GCS Settings / Joystick Settings / Drive Mode

The Drive Mode specific only to the Sigyn robot allows the manual directional commands to be allocated to the left or right Joystick of the remote control. Once the joystick is chosen, this selection will be applied to all Sigyns associated with the remote control used.

NEW | Test Joysticks

GCS Settings / Joystick Settings / Test Joysticks

Mainly developed for troubleshooting purposes, this parameter allows you to test the correct operation of each joystick. In order for this option to work correctly, it is first necessary to perform the important step of calibrating the joysticks.

NEW | Joystick Calibration

GCS Settings / Joystick Settings / Joystick Calibration

The calibration of the control joysticks is one of the 3 key steps, along with the choice of the region and the calibration of the battery, which should ideally be carried out before using the various connected vehicles. The calibration of the joysticks compensates for any original mechanical differences and thus avoids any impact when controlling the various connected devices.

NEW | Motor Shutdown

GCS Settings / Motor Shutdown

The shutdown of the engines of both the Loki MkI/MkII and the Sigyn MkI is now configurable. The button allocated to this action can now respond to a single press or a long press (1.5 sec.) to trigger the effective shutdown of the vehicles' motors. This second option has been designed for the eventuality of a control handling error in the field. In the event of an operating error, it ensures that the engines are not accidentally and uncontrollably switched off.

NEW | Overlay pages

GCS Settings / Overlay Pages

2 screens superimposed on the broadcast video image are accessible for each selected device and specific to the settings assigned to each of them. To access these overlay screens, you must press the button associated with the device (1-4) to see overlay screen 1 and press the same button a second time to see overlay screen 2. The overlay 1 screen will display by default to all «Active settings». The overlay 2 screen defaults to the details of the buttons allocated to the selected device. You are free to change this by default selection. You can also disable either or both overlay screens.

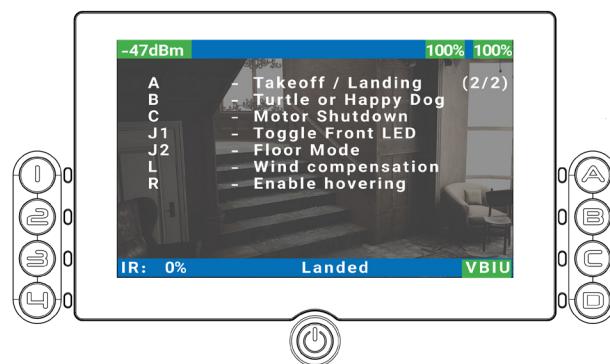FIG. Overlay screen - Active Settings

FIG. Overlay screen - Button Allocation

GCS SETTINGS (2/2)

Calibrate Battery `NEW` ⚠️ ③ Recommended Setup Stage

> Follow instruction on screen

GCS LED Brightness

> 0% to 100% | **70%** by default

Firmware Management `NEW`

- **SD Card Upgrade**

  > Follow instruction on screen

- **Erase Settings and Reboot**

- **Erase Everything and Reboot**

- **Reboot**

- **Read license file** `NEW`

  > Follow instruction on screen

- **Lock for shipping** `NEW`

  > Follow instruction on screen

NEW | Calibrate Battery

The calibration of the GCS MkII battery is one of the important stages in the initialization of the system (however it is not essential for device operation). This feature accurately calibrates the displayed GCS battery level. It ensures that the battery level - displayed in the upper right corner of screen) shows the most accurate estimate of the remaining battery charge. The GCS must be fully charged (2.5 hours if fully depleted) before performing this calibration. The charge level is indicated by the LED on the bottom edge of the GCS next to the USB-C connection. Wait for the LED to turn green. Once the LED is lit in the expected color, unplug the charger and wait 5-10s seconds before starting calibration. Once selected simply confirm (right joystick/2 to the right) to start the calibration. Once done, the battery percentage is displayed by replacing --- % with 100%. If your GCS has never been used, it is necessary to fully charge the GCS battery, as it is delivered with a charge level between 30% and 60% (to avoid its degradation before the first use).

NEW | Read License File

This function is exclusively linked to the use of the trigger payload. The use of the latter requires an associated license, the upload of which into the GSC will unlock all of the associated functionality found in Advanced Settings/Payload Settings/Trigger Preferences. To install the license, the SD card including it must be inserted into the associated reader on the bottom edge of the GCS. Select then «Read license file, the included «license.txt» file is read by the GCS system. Once installed, the associated trigger payload settings are then accessible, and the system is fully functional.

NEW | Lock for Shipping

This feature gives users the opportunity to block all the functions of the GCS MkII in the context of transportation (sending devices to distributors for maintenance/repair), storage (protecting devices from any undesired use by third parties). If you need to personally unlock it, request the specific unlocking sequence from your local distributor or the Sky-Hero team
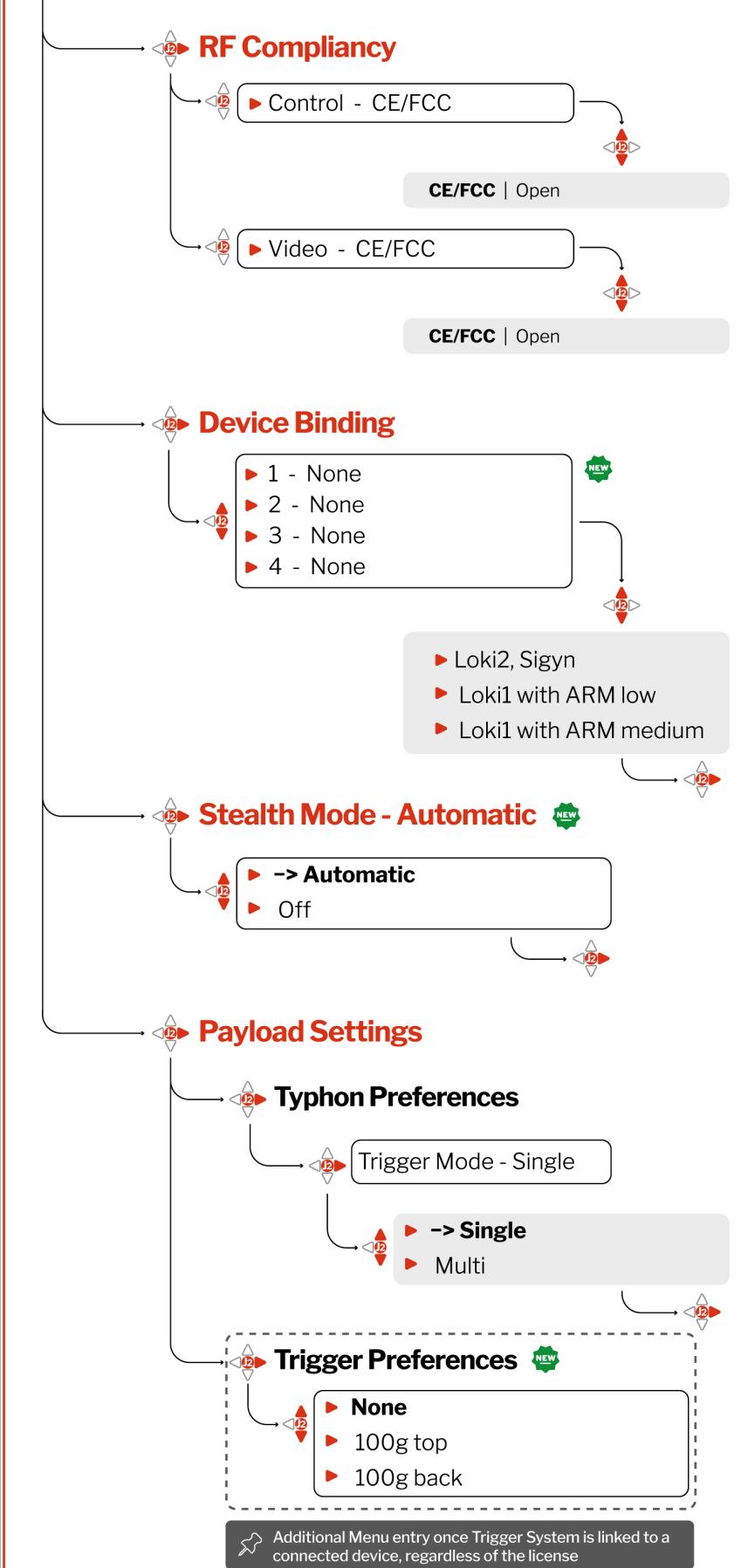
NOTES

ADVANCED SETTINGS

ADVANCED SETTINGS

RF Compliancy

▶ Control - CE/FCC

CE/FCC | Open

▶ Video - CE/FCC

CE/FCC | Open

Device Binding

▶ 1 - None
▶ 2 - None
▶ 3 - None
▶ 4 - None

NEW

▶ Loki2, Sigyn
▶ Loki1 with ARM low
▶ Loki1 with ARM medium

Stealth Mode - Automatic *NEW*

▶ **–> Automatic**
▶ Off

Payload Settings

Typhon Preferences

Trigger Mode - Single

▶ **–> Single**
▶ Multi

Trigger Preferences *NEW*

▶ **None**
▶ 100g top
▶ 100g back

Additional Menu entry once Trigger System is linked to a connected device, regardless of the license

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NEW | Device Binding

In relation to the support of the Loki MkI and Sigyn MkI robots via the GCS, the device association menu integrates the entire Sky-Hero range. Because of their integrated system, the Loki MkII and Sigyn MkI are combined. The Loki MkI has a second association setting for the type of lower frame, either Arm Low (grey lower frame) or Arm Medium (black lower frame). Once the choice of devices and/or configuration has been made, the association with the device on the chosen button is automatic.

When no device is selected the list of bound devices and their channel will be shown.
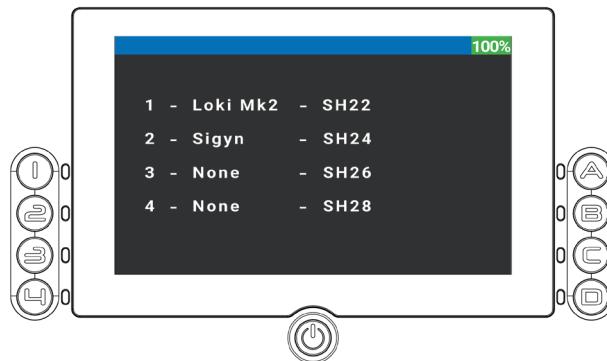
FIG. Displayed screen of bound devices and channels

NEW | Stealth Mode

Once the stealth mode is activated, it causes all the internal LEDs - mainly related to maintenance and debugging - of the the Loki MkII and Sigyn MkI to be switched off. These LEDs go out automatically after 10 seconds once the mode is activated. There is one exception however, one internal LED of the Loki MkII (located into the lower frame front left side) remains lit. This is because this LED associated with the hardware is directly hardwired to the power lines. Note that this feature does not apply to the Loki MkI.

NEW | Trigger Preferences

This hidden menu is available when you have connected to a device that has a trigger payload connected. Once the license (refer to GCS Settings / Firmware Management / Read license file) is executed, the menu allows the use of this new breaching option with the appropriate payload. A pop-up submenu then offers to choose the location of the tactical charge, either no charge or a 100 gram charge placed above or behind.

ADVANCED SETTINGS

NOTES

OBSERVE DEVICE & VERSION

◁⏸▶ **Observe Device**

A1 5865MHz	A2 5845MHz	A3 5825MHz
A4 5805MHz	A5 5785MHz	A6 5765MHz
A7 5745MHz	A8 5725MHz	

E1 5705MHz	E2 5685MHz	E3 5665MHz
E5 5925MHz	E6 5905MHz	E7 5925MHz
E8 5945Mhz		

SH10 5251MHz	SH11 5288MHz
SH12 5325MHz	SH13 5362MHz
SH14 5399MHz	SH15 5436MHz
SH16 5473MHz	SH17 5510MHz
SH18 5547MHz	SH19 5584MHz
SH20 5621MHz	SH21 5658MHz
SH22 5695MHz	SH23 5732MHz
SH24 5769MHz	SH25 5806MHz
SH26 5843MHz	SH27 5880MHz
SH28 5917MHz	SH29 5954MHz
SH30 5991MHz	

VERSION

Remote: 3.0.0

Serial : ADQA-QVZL-VAEg-NTdQ-c
▶ Save serial# to SD card

Scrambler: 1.5

Crossfire: V 3.65

Serial : 756940080

NOTES

BEHAVIOUR OF GCS BUTTONS

GCS MkII SLEEP MODE
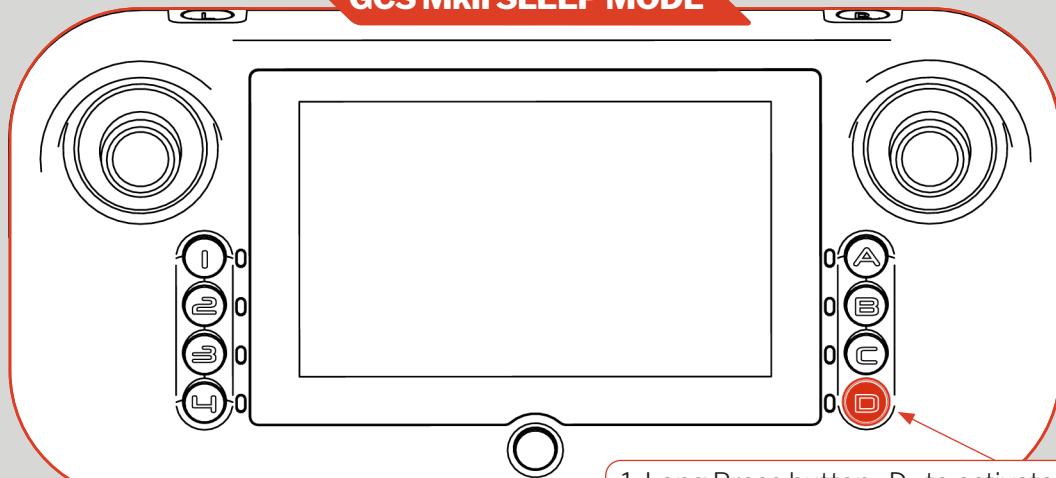
1. Long Press button «D» to activate Sleep Mode
2. Long Press button «D» to deactivate Sleep Mode

DEVICE DISCONNECT
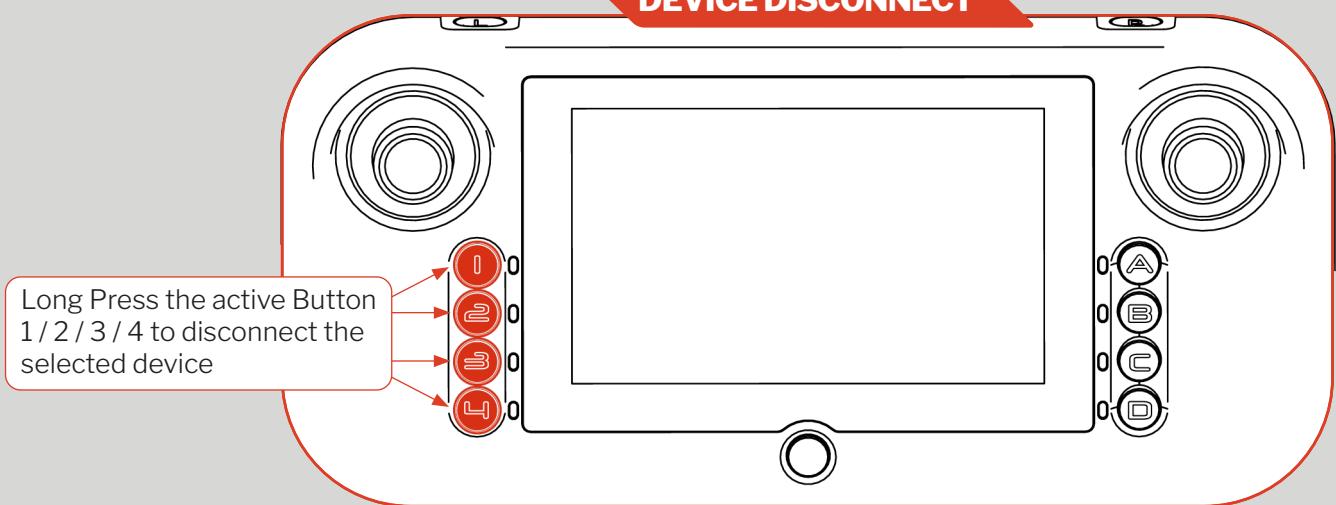
Long Press the active Button 1 / 2 / 3 / 4 to disconnect the selected device

BUTTON COMBINATIONS

J1

J2
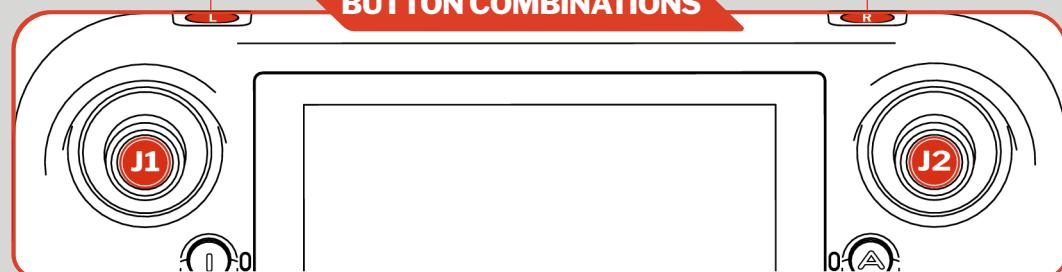
L Button* as Master:

Quick action 1 | Press L then press R
Quick action 2 | Press L then press J1
Quick action 3 | Press L then press J2

* L Button not combinable in Arm Payload mode

R Button as Master:

Quick action 4 | Press R then press L
Quick action 5 | Press R then press J1
Quick action 6 | Press R then press J2

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In this new version of the GCS MkII V3.0.0 firmware, the behaviour of certain buttons and associated actions have been adapted but also added to facilitate a generic and tactical set of operational manipulations.

NEW | GCS MkII Sleep Mode

The GCSMkII Sleep Mode activation has been modified. This feature allows the remote control to be put to sleep with minimal power consumption from both, UAV/UGV and GCS. When in Sleep Mode, the display is off and the LED on the Menu button (D) is lit in yellow. When you wake up the controller, the display will show the screen detailing the list of associated unmanned devices and corresponding button (1-4). Note that you do not return to the last selected menu entry.

The «Sleep Mode» can now be activated with a long press on the D button instead of pushing both joysticks down inward position for 3 seconds. Please note that the «Sleep Mode» will be allowed if the device is connected to a moving device (e.g. in flight). To recover normal operation and reconnect immediately to your device, please repeat the same process.

Please refer to the diagram on the left for the operation of the button.

NEW | Disconnection of bound devices

In order to disconnect any bound devices, a long press on the active device button (1-4) will simply disconnect the associated unmanned vehicle. Disconnecting means cutting off all signal transmissions (video | audio | control) between the GCS MkII and the paired device(s).

Please refer to the diagram on the left for operation of the buttons.

NEW | Quick actions button combinations

As explained before in the section «Device settings», a set of 6 new button combinations has been developed to provide the operator with a greater number of quick actions. These combinations are achieved by combining the L and R buttons with each other or independently with the buttons on each of the two joysticks (press the joystick).

The possible combination are the following ones : L+R, L+J1, L+ J2, R+L, R+J1, R+J2 These additional button combinations can be customised and linked to the corresponding feature set of the device(s) used. Note that when associating button L to the «Arm payload» mode and a payload component, the combinations based on this button are disabled.

Please refer to the diagram on the left for the handling of the buttons.

BEHAVIOUR OF GCS MkII BUTTONS

NOTES

INFO ON GCS MkII SCREEN

LOKI MkII STATUS

Quality of the control signal. The closer to 0dBm, better it is. Turns yellow when the signal is weak (< -76dBm) and red when the signal is bad (< -93dBm)

-47dBm   Floor   V S R   80% 60%

Device Battery Power Level
GCS Battery Power Level
R : React mode enabled
S : Tilt angle boost enabled
V : Video boost enabled

Indicator for floor mode and wind compensation. When both are enabled floor mode will be shown (as wind mode is ignored in floor mode).

Floor mode is also shown in the autopilot state but only when effectivly flying in this mode. Here in the top bar it wil be shown even when landed. On takeoff the drone will be in floor mode.

Autopilot state :
- Landed
- Hovering
- Alti
- Gaz
- Floor
- ...

IR : 50%   Hovering   V B I U

Sensor states. Green when ok, yellow when invalid and red when defective.
V = vertical camera
B = barometer
I = IMU
U = ultrasound

Brightness of the bottom IR LEDs. Blue when 0% and green when > 0%

LOKI MkI STATUS

-47dBm   Armed   60%

Indicator for arming status and turtle mode.
When unarmed and the throttle is pushed all the way down the status bar will say «Ready». At that moment you can press the takeoff button to Arm and fly the Loki 1. The status bar will then say «Armed».

«Turtle» can be shown in the status bar. This status is shown when the user have pressed the button to select the turtle mode.

SIGYN MkI STATUS

-47dBm   S D   80% 60%

S : Stealth mode enabled
D : Active camera is the rear back, downward facing camera

M I

Sensor states. Green when ok, yellow when invalid and red when defective.
M = motors
I = IMU

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The information displayed on the GCS MkII screen specific to unmanned vehicle telemetry has been slightly adapted for greater clarity.

NEW | All Devices - Quality level of video reception

The data related to the quality of video reception (left and right) has been removed

NEW | Loki MkII - Displayed Status

The IR LED power level notification now only displays the status of the bottom IR LED power level which is information provided via telemetry. The power level of the front IR LED has been removed from the GCS screen itself as it is determined by directly adjusting the power by selecting the correct option located in Loki Mk2 Settings / LED Brightness or Sigyn Settings / Top | Front LED Brightness . This status as well as the status of the bottom IR LED can always be found in the Overlay - Active Settings page (see GCS Settings / Overlay pages).

Refer to the diagram on the left for an overview of the different states that can be displayed when using the Loki MkII.

NEW | Loki MkI - Displayed Status

Refer to the diagram on the left for an overview of the different states that can be displayed while using the Loki MkI.

NEW | Sigyn MkI - Displayed Status

There is no footer displayed on the GCS MkII screen when operating with the Sigyn MkI (this is in order to have a better view of the floor and possible «drops» e.g. stairs).

Refer to the diagram on the left for an overview of the different states that can be displayed while using the Sigyn MkI.
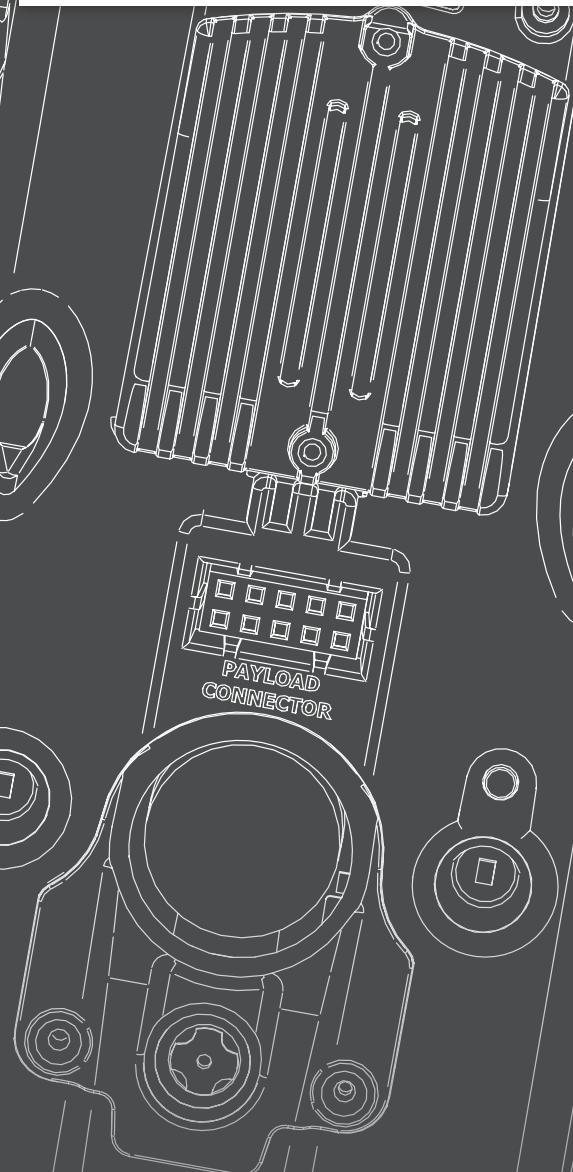
INFO ON GCS MKII SCREEN

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If you have feedback or comments about this user guide, please reach out to: contact@sky-hero.com

Loki Mk 2

Precautions, good practices and maintenance

PAYLOAD CONNECTOR

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Precautions, good practices and maintenance

CONTENTS

1. GOOD PRACTICES AND PRECAUTIONS

Your Loki MK2 is equipped with multiple sensors which aid the pilot during the mission. However, this generates some trade-offs and limitations. The operator should always be the person in control and not the embedded computer; only use your Loki MK2 if you feel confident with it and have learned its limitations. Position hold (hovering) should only be used if you feel that your UAV is too hard to control or if a steady position must be held but is too difficult to achieve manually.

a. Hovering

> LIMITATIONS: ALL SENSORS AND INDICATORS SHOULD BE DISPLAYED IN GREEN ON YOUR GCS SENSOR STATUS BAR TO ENABLE STEADY HOVERING. IF ANY INDICATORS ARE YELLOW OR RED, HOVERING IS LIKELY NOT POSSIBLE.

• **SHADOW:** If a strong light is shining directly above your UAV, it will generate a shadow on the floor. Under certain circumstances, the UAV's shadow will be the highest contrast pattern on the ground, on which the vertical camera will then focus. In this situation, the UAV will follow its own shadow pattern and be unable to hold its position or may even drift in the direction of its shadow. This is more likely to occur when your UAV is close to the ground; the shadow should fade at higher distances.

TIP: For that reason, "Automatic Hovering" should be used with some precautions.

• **DUST:** Dust will also greatly reduce the ability of the Vertical Camera to focus on high contrast objects, which in turn, makes hovering difficult.

TIP: When taking off in dusty environments, it is advised to use the "Throw to Take-off" option to minimize the dust spread.

• **REFLECTIVE FLOORS:** Highly reflective flooring, snow, ice, water, etc. will make it near impossible for the camera to focus.

• **LOW CONTRAST FLOORS:** Low contrast floors or floors with few details to anchor on (polished concrete floors, monochrome floors, etc.) will be difficult for the camera to focus on, as it gives little feedback to the computer.

• **MOVING OBJECT:** If the highest contrast object is moving, the UAV will try to hold its position against the moving object, which will make it impossible to hold an absolute position.

TIP: Furthering the distance from that object should remedy this situation as the Vertical Camera will be able to anchor on other objects.

In most cases, your UAV will be able to hold a good and strong position, and "Hovering" should light up on your GCS. If your Vertical Camera is not able to focus or if the distance cannot be computed, hovering will not be achieved. This can be caused by any of the above situations, by the minimum altitude not being reached, or by a defective sensor.

Advice

> CAUTION : IF THE "HOVERING" STATUS CANNOT BE ACHIEVED (AND THE UAV IMMEDIATELY SWITCHES TO ALTITUDE OR GAZ), AND IF ALL SENSOR STATUS INDICATORS ARE GREEN, THIS USUALLY MEANS THAT THE GCS NEEDS A JOYSTICK CALIBRATION.

• When direct light creates a strong shadow affecting the ability to hover, the pilot should gain altitude to reduce the UAV's shadow and enable a correct position hold.

• Hovering enables the drone to reset gyroscope sensors and should be used after big impacts or when the UAV shows abnormal flying behavior.

• Always try to activate Hovering Mode after exiting Floor Mode and reaching the minimum 50cm altitude, as well as after take-off (hovering is absolutely required when first taking off after battery change).

• Try to keep some distance from walls, objects or the ceiling when Hovering is needed for a long time period as the UAV might still experience a subtle drift while hovering, and thus end up against the wall, object, ceiling, etc.

b. Take off – Landing

LIMITATIONS : WHEN TAKING OFF OR LANDING, THE UAV WILL HAVE THE SAME LIMITATIONS AS THE "HOVERING" PROCESS, SUCH AS FOLLOWING ITS OWN SHADOW, DRIFTING WHILE LANDING, OR BEING UNABLE TO GET AN ACCURATE POSITION HOLD AFTER TAKE-OFF.

Advice

· If possible, always let the UAV perform the Hovering/Position Hold after takeoff. If you are forced to abort the process (by moving the joysticks), make sure to manually activate Hovering Mode as soon as possible later in the flight.

· Just before starting a landing process, make sure to perform the hovering process first as this will avoid any unwanted landing behaviors.

· The pilot should be extra careful when landing/ taking-off in grass, dust, wet areas, etc. In those situations, it may be beneficial to use the "throw to take-off" function to avoid locking the motors and propellers or generate an over current protection where "emergency" pops up on GCS.

· If drifting is observed while landing, the pilot can always redirect the UAV towards the desired landing space by using the joysticks.

c. Altitude

There is a physical limitation for both the Vertical Camera and the distance sensor:

· Minimum focus distance of the Vertical Camera is 50cm from the ground; no position hold can be achieved below this height.

· Maximum accurate distance sensing is 25 meters; no position hold can be achieved above this height in daylight.

· Maximum focus distance of the Vertical Camera is affected by ambient light. If light is low, the Vertical Camera will not be able to focus on distant objects.

d. Battery

LIMITATIONS : THERE IS NO GENERAL SHUTDOWN BUTTON; THE UAV BATTERY WILL DRAIN AS LONG AS IT IS CONNECTED TO THE UAV. PLEASE REMOVE THE BATTERY WHEN NOT FLYING THE DRONE, AS A COMPLETELY DRAINED BATTERY **CANNOT BE RECOVERED** AND IS NOT COVERED BY ANY WARRANTY.

Advice

· The UAV will perform an automatic forced landing when the UAV battery reaches 3%, but it is strongly recommended to land the UAV before reaching that point; The battery level indicator on the GCS will turn from green to red once it reaches 10%. Landing before reaching 3% guarantees full landing control and allows time for hovering before executing the landing. This will avoid any unwanted behavior caused by a forced emergency landing.

· Before switching the batteries in the UAV, it is strongly advised to first exit the connection between GCS and that drone by pressing the corresponding Device Button, then switch batteries after disconnection, and finally launch a Connecting process.

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e. After crash

After a crash or a heavy impact, it is always recommended to perform a series of close inspections on the UAV.

Motor arm position

In the event of a heavy impact, the motor arms can slightly pop out of their position. If this happens, pop them back in place.
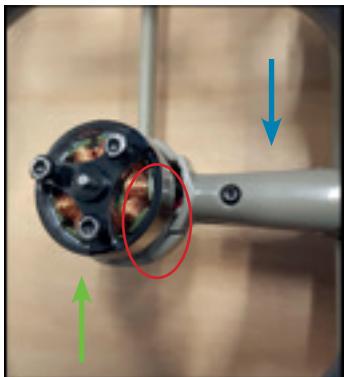
This motor arm needs to be popped back into position. Apply gentle pressure on the top of the propeller, in the direction of the green arrow, and apply pressure on the top of the motor arm, in the direction of the blue arrow. Correct position is shown in image to the right.
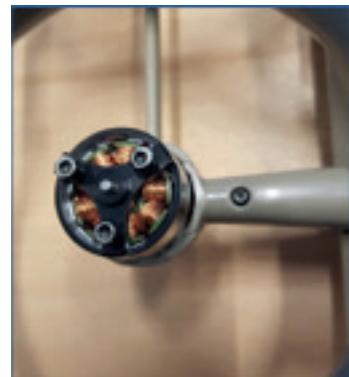
General inspection

After a crash or an impact, it is good to listen to your UAV's noise level as a different sound would generally indicate a change in the UAV form factor. Inspect the following items:

· Propellers: Please replace propellers if there is a missing, damaged, or bent blade. In the event that the blade is only partially bent, you can always try to bend it back in its original form, however, this may weaken the propeller.

· Duct Insert: Pop the duct back in place if it is popped out as shown in the following picture. If the duct is broken or cracked, replace it.

· Main Frame Condition: if the upper frame is cracked or broken, it is recommended to replace it.

· Stiffner: If broken, please replace.

· Front Camera Position: Check the rubber surrounding the camera and lens position. Please pop lens back in rubber glove if needed.

Occasionally, there might be a slight change in the form factor of the UAV's upper frame even if there doesn't appear to be. Before taking off again, please manually spin the propellers to make sure they are not dragging along the Duct Inserts.

Flat trim

Finally, if possible, perform a flat trim after a big impact/crash.

f. Camera lens cleaning

A dirty or greasy Front Camera lens will lead to poor camera performance and picture glare. Use only glass cleaners and cleaning clothes when cleaning the Front Camera.

g. Health status

· The embedded computer will constantly monitor the health status of your Loki MK2's main sensors and display them on the bottom right corner of your GCS. When the UAV is not flying, the sensors should be yellow. In flight, all sensors should be green.

· Occasionally, while flying, the distance sensors ("U") and/or the Vertical Camera ("V") can switch to yellow, indicating that Hovering Mode is not currently available.

· If the barometer sensor ("B") switches to red, no hovering/altitude hold will be possible. In this case, it is advised to remove the UAV's battery and let UAV cool down for a few minutes before next use.

· The computer will also record heavier crashes and store these logs in an internal memory; This will allow the GCS to advise you on the general UAV's health status or need for maintenance.

h. GCS

CAUTION: NEVER STORE YOUR GCS EXPOSED TO HEAT OR HUMIDITY (EX: INSIDE A CAR IN DIRECT SUNLIGHT). NEVER STORE YOUR GCS WITH A BATTERY LEVEL BELOW 30%. NEVER LEAVE YOUR GCS CONNECTED TO A CHARGER WHILE UNATTENDED. USE ONLY SLIGHTLY DAMP CLOTHS WITH NATURAL SOAP TO CLEAN YOUR GCS.

2. MAINTENANCE

The Loki MK2 is likely the most impact resilient drone on the market and can survive high amounts of abuse, but regular maintenance will further help to keep the UAV in good working order. A good rule of thumb is to change pieces whenever you see them damaged, broken, or cracked.

a. Propellers

No Tools Required

The easiest and best way to keep your Loki MK2 in good condition, is to avoid the use of damaged propeller as much as possible; This generates a lot of vibrations, wears down the motor bearings quickly, and shortens the gyroscopes' lifetime.

The battery will also suffer from higher vibrations as all the sensors will be disturbed leading to over corrections and thus higher power use and shorter flight time.
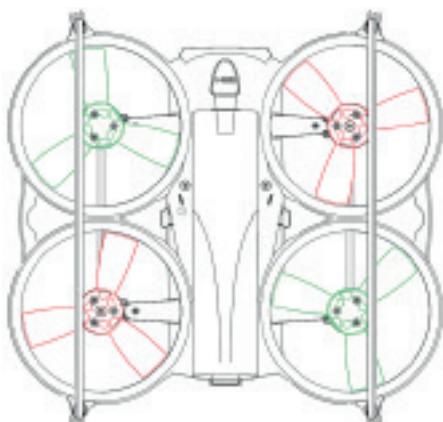
Make sure to use the correct propellers:

· clockwise propellers have a hole in the middle and are represented in red.

· counter-clockwise propellers have no hole and are represented in green.

b. Stiffners

Tools: T5 screwdriver

Broken stiffners will lead to potential increase of vibration levels and generate a weakness in case of impacts, it is strongly recommended to never fly with damaged stiffners.

Refer to the appropriate video for stiffner change.

c. Motors

Tools: T5 screwdriver + Hex 1.5 mm screwdriver

Motor lubrication: Put a drop of bearings oil on the motor ball bearings (up and down) after every 5 hours of usage.

Refer to the appropriate video for motor change. We recommend changing the 4 motors all together to guarantee the best flight performances; however, you may replace only 1 if the other motors have been used less than 3 hours.

d. Bullbars

No Tools Required, Instant CA Glue

Refer to the appropriate video for bullbar change.

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e. Landing pads

No Tools Required, Instant CA Glue

Refer to the appropriate video for landing pads change. As these are made of rubber, you can glue them with any instant glue.

f. Upper frame

Tools: T5 screwdriver + T9 screwdriver

Refer to the appropriate video for upper frame change, and pay extra attention to the antennas; the thin long antenna goes in the rubber antenna sleeve, while the small front antenna must be free and not pinched between the upper and lower frame. Don't forget to put the rear battery clip in place before re-assembly.

3. CHARGER – BATTERIES

CAUTION: NEVER LEAVE A BATTERY CONNECTED TO A CHARGER UNSUPERVISED AS CHARGING FAILURE MAY CAUSE FIRE. BATTERIES CAN BE EXTREMELY DANGEROUS, THUS IT IS ADVISED TO FOLLOW ALL PRECAUTIONS BELOW. CONTACT support@sky-hero.com IF YOU HAVE ANY FURTHER QUESTION ABOUT THE CHARACTERISTICS OF THE BATTERY.

a. GCS

CAUTION: IT SHOULD BE NOTED THAT THE GCS MKI'S BUILT-IN LIPO BATTERY CANNOT BE CHARGED ABOVE 45°C. THE TEMPERATURE RANGE TO BE RESPECTED FOR THE CHARGING OF THE LIPO BATTERY IS BETWEEN 0 °C AND 45 °C

CAUTION: NEVER STORE YOUR GCS WITH A BATTERY LEVEL BELOW 30% TO AVOID DEEP LIPO DISCHARGE WHICH CANNOT BE RECOVERED.

· Connect a USB charger (wall charger or power bank) to the USB-C connector to charge your GCS.

· The Charging LED will turn red when charging, yellow when 80% charge is achieved, and green when fully charged.

· The provided SH Fast charger (3A USB-C charger) will fully charge the GCS in 3 hours (0 to 100%), and partially charge (0 to 40%) within one hour.

· A normal charger (1A USB charger) will fully charge the GCS in 7 hours (0 to 100%).

· When checking your GCS battery level, always remove the charger and wait for at least 5 seconds to be sure that the charge value is updated.

b. UAV

I. General Description

CAUTION: THE OFFICIAL LOKI MK2 LIPO BATTERIES ARE THE ONLY AUTHORIZED BATTERIES.

Your Loki MK2 uses a Sky-Hero proprietary battery with embedded power and balancing connectors and an extremely resilient plastic casing. This battery uses lithium technology which offers the best power to weight ratio.

Do not open the plastic casing under any circumstances, unless advised by Sky-Hero or its official distributors' support team.

There is no shutdown button, therefore, the UAV battery will drain as long as it is connected to a UAV. Please remove the battery when not flying the drone, as a completely drained battery cannot be recovered and is not covered by any warranty.

II. Charging

STEP 1: Connect the two main power cables of the hub to the main power output sockets on the charger, with the red cable connected to "+" and the black cable connected to "-".

STEP 2: Connect the small cables with white connectors to the "3S" output on the side of the charger.

STEP 3: Select the "LiPo" setting and "3A" as the charging current on the charger.

STEP 4: Plug the charge into a power source, then place your Loki MK2 Lipo battery on the hub.

Never connect a battery or leave a battery connected to the hub unless all hub wires are plugged properly into the sky-hero charger; A short circuit and/or fire may occur if the cable connectors come in contact with each other.

Never connect the battery to the charging hub until the hub is connected to the charger and the charger is connected to a working power source/AC outlet.
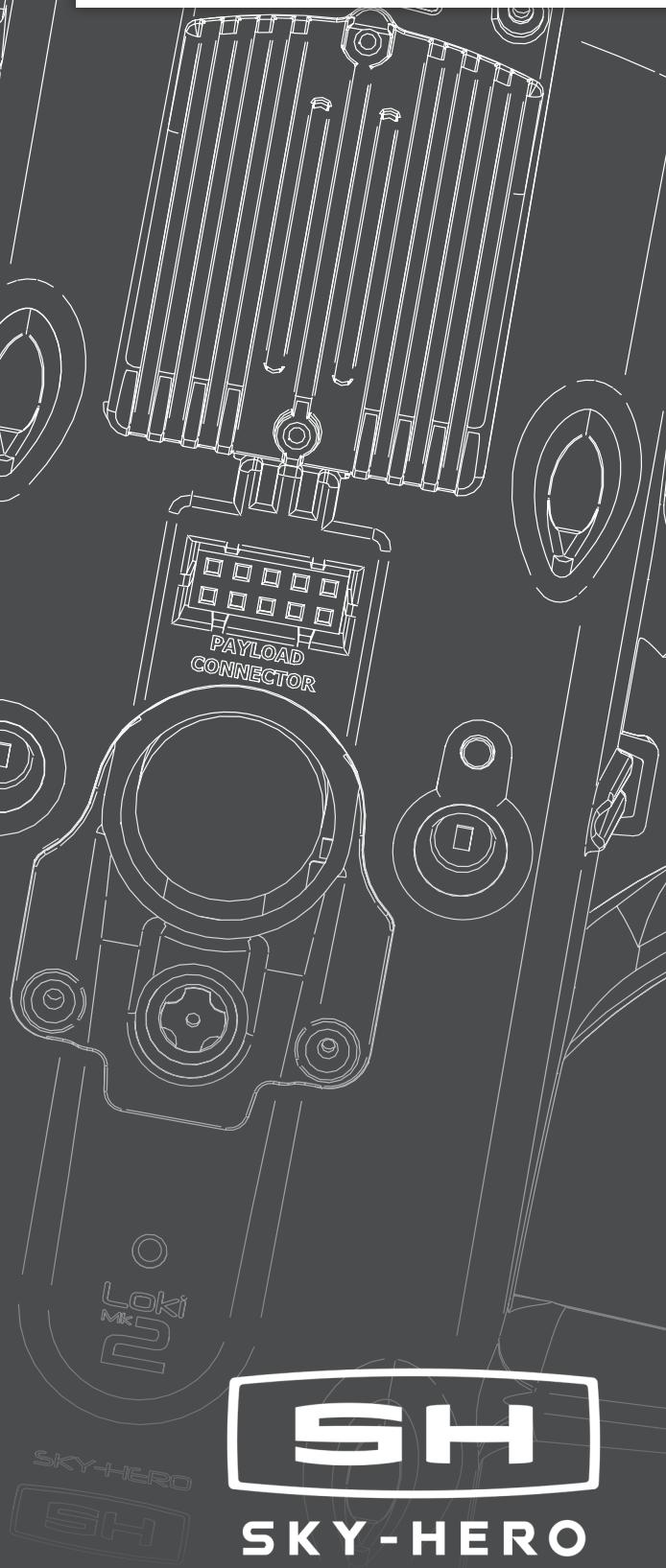
Refer to the provided charger instruction manual for further information.

III. Storage Precautions

· Never store a battery with less than 30% battery life remaining.

· Never store a fully charged battery for more than 4 weeks; charge and discharge at least every 4 weeks to maintain best battery performances.

· If storage must exceed 4 weeks, first fully charge the battery then immediately after, discharge it until the battery reaches 60%.

· Long storage periods should never exceed 12 weeks.

Loki

Mk 2

PAYLOAD
CONNECTOR

Loki
Mk 2

SH

SKY-HERO

CONTENTS

1. FIRST USE

With the success of the first Loki system, we are proud to introduce the completely new Loki MK2, which offer a broad array of possibilities when flying the UAV indoors or outdoors.

To ensure functionality in most situations, the Loki MK2 does not require GPS, WiFi, cellular, or other networks and will work as a standalone system. The Loki MK2 relies on embedded video captors and distance sensors to understand its position and movements. This not only improves the system's general capabilities and maximizes its resilience when flying indoors, but also strongly increases the ease of use. However, some limitations are explained in our additionnal guide : Precautions, good practices & maintenance

a. Disclaimer

1. THE LOKI MK2 SYSTEM IS NOT A TOY AND SHOULD NOT BE USED OR HANDLED BY A PERSON UNDER 18 YEARS OF AGE.
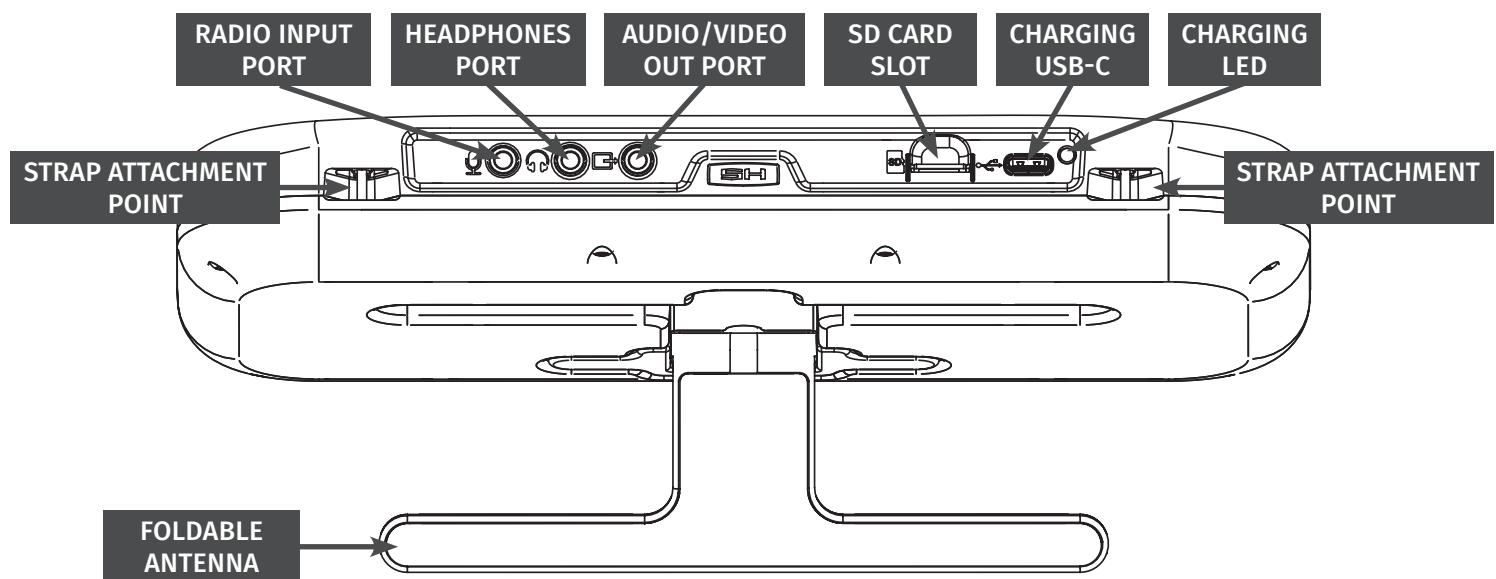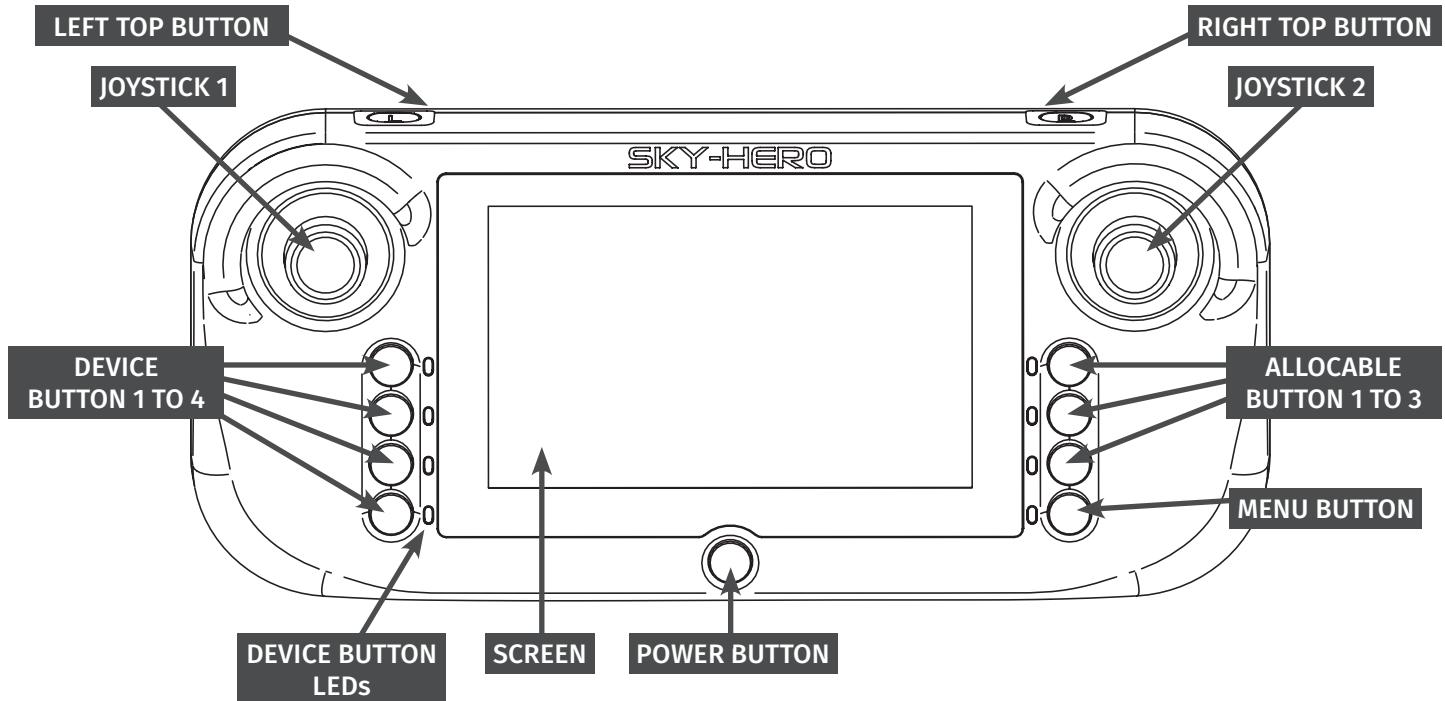
2. BEFORE USING THE LOKI MK2 SYSTEM :
· CAREFULLY READ THE USER MANUAL, THE PRECAUTIONS & GOOD PRACTICES AND ALL INFORMATION AND DOCUMENTATION AVAILABLE
  ON www.sky-hero.com, WHICH MAY BE UPDATED AT ANY TIME WITHOUT PRIOR NOTICE;
· SPECIAL ATTENTION SHOULD BE GIVEN TO THE PARAGRAPHS MARKED **"CAUTION"**;
· ENSURE YOU ARE AWARE OF THE LOCAL REGULATIONS APPLICABLE TO THE USE OF UAVs AND THEIR ACCESSORIES;
· REMEMBER THAT THE LOKI MK2 SYSTEM MAY EXPOSE YOU OR OTHERS TO EQUIPMENT DAMAGE,
  PERSONAL INJURY, OR BOTH, WHICH COULD RESULT IN SERIOUS HARM OR DEATH.

3. BE AWARE THAT VIDEOS AND PHOTOS THAT ARE PROMOTED AND ADVERTISED BY SKY-HERO AND ITS AFFILIATES HAVE BEEN MADE BY EXPERIENCED PROFESSIONALS AND DRONE PILOTS. IN THE EVENT OF ANY UNCERTAINTY OPERATING YOUR LOKI MK2 SYSTEM AND ITS ACCESSORIES, ALWAYS REFER TO THE MOST RECENT VERSION OF THE SKY-HERO DOCUMENTATION.

4. TO THE EXTENT PERMITTED BY APPLICABLE LAW, SKY-HERO SA, ITS SUBSIDIARIES, AND THEIR RESPECTIVE DISTRIBUTORS AND RETAILERS SHALL NOT BE HELD LIABLE FOR ANY DAMAGES ARISING FROM, OR IN CONNECTION WITH, NON-COMPLIANCE WITH THE DOCUMENTATION OR THE APPLICABLE REGULATIONS BY YOU OR ANY PERSON USING YOUR LOKI MK2 SYSTEM..

b. UAV and GCS Schematics

LEFT TOP BUTTON

RIGHT TOP BUTTON

JOYSTICK 1

JOYSTICK 2

SKY-HERO

DEVICE
BUTTON 1 TO 4

ALLOCABLE
BUTTON 1 TO 3

MENU BUTTON

DEVICE BUTTON
LEDs

SCREEN

POWER BUTTON

RADIO INPUT
PORT

HEADPHONES
PORT

AUDIO/VIDEO
OUT PORT

SD CARD
SLOT

CHARGING
USB-C

CHARGING
LED

STRAP ATTACHMENT
POINT

STRAP ATTACHMENT
POINT

FOLDABLE
ANTENNA

Radio input

The radio input and headphones output follow the CTIA standard. The pinout on the jack is as follows:

Microphone
Ground
Audio (Right)
Audio (Left)
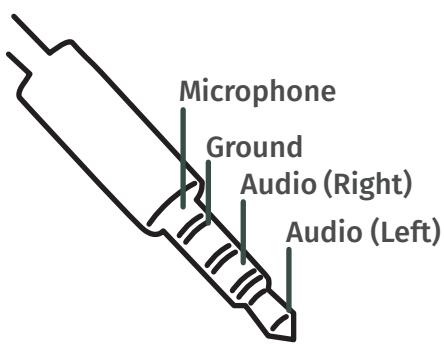
Audio/video

The AV Line out follows the Sony convention:
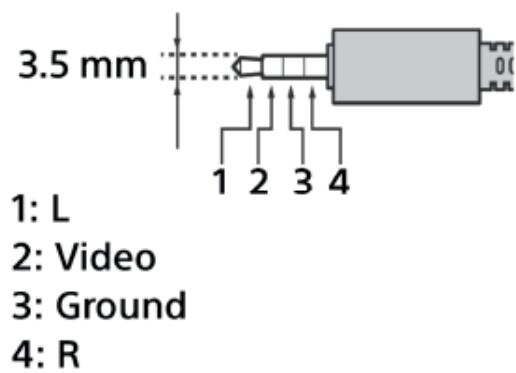
3.5 mm

1 2 3 4

1: L
2: Video
3: Ground
4: R

FLOOR/WIND MODE

VIDEO BOOST STATUS

SPEED MAX TILT ANGLE BOOST STATUS

REACT MODE STATUS

DEVICE CONTROL SIGNAL LEVEL

| -46dBm | | Floor | V | S | R | 93% | 87% |

DRONE BATTERY LEVEL

GCS BATTERY LEVEL

ULTRA SOUND HEALTH STATUS

BOTTOM LED POWER LEVEL

| IR: 50% (ok) | | Landed | 9 | 9 | V | B | I | U |

IMU HEALTH STATUS

UAV STATUS

VIDEO RECEPTION QUALITY LEFT

VIDEO RECEPTION QUALITY RIGHT

VERTICAL CAMERA HEALTH STATUS
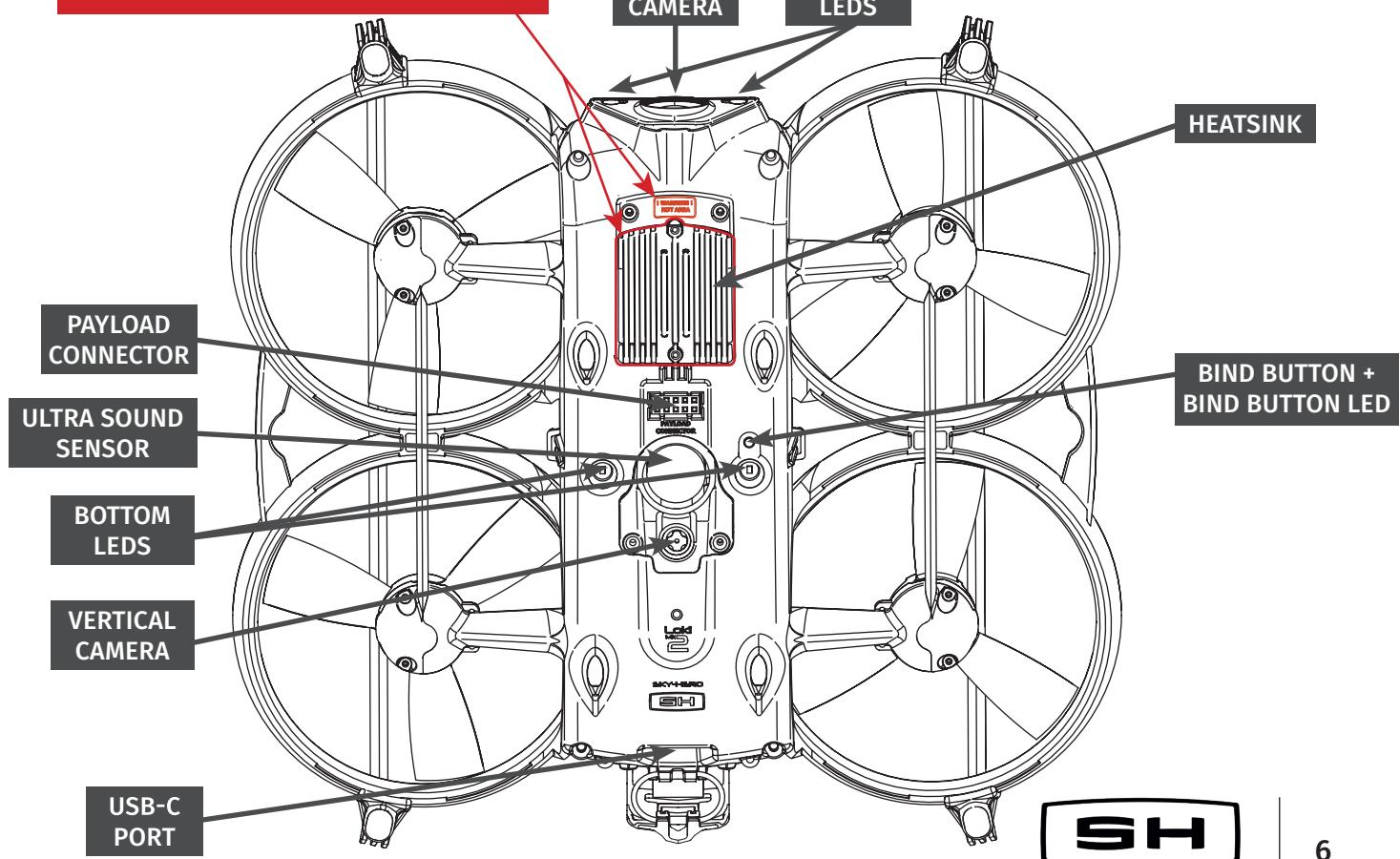
BAROMETER HEALTH STATUS

CAUTION :
· DO NOT COVER VERTICAL CAMERA, LEDs, OR ULTRA SOUND SENSOR.

· DO NOT TOUCH HEAT SINK AS IT CAN BE QUITE HOT
REMINDER OF THIS WARNING AFFIXED TO THE DRONE

FRONTAL CAMERA

FRONTAL LEDS

HEATSINK

PAYLOAD CONNECTOR

ULTRA SOUND SENSOR

BOTTOM LEDS

VERTICAL CAMERA

BIND BUTTON + BIND BUTTON LED

USB-C PORT

SH
SKY-HERO

c. GCS Menu Navigation

Navigating the menu is accomplished using the Menu Button and the Joystick 2 only.

- (ENTER MENU) : Press the Menu Button, which enables you to enter/exit the menu at any time
- (SCROLL) : Use Joystick 2 to move up or down, which enables you to select the submenus
- (ENTER) : Push Joystick 2 to the right to enter the submenu
- (CONFIRM) : Push Joystick 2 to the right to confirm a choice in the menu/submenu
- (BACK) : Push Joystick 2 to the left to exit the current submenu and go back one level

d. Before First Flight

CAUTION: YOUR LOKI MK2 SYSTEM COMES READY TO USE AND HAS BEEN TEST-FLOWN IN OUR FACILITY. HOWEVER, SOME SETTINGS MIGHT NEED TO BE ADJUSTED TO GUARANTEE THE BEST PERFORMANCES FOR YOUR USER CASES.

I.   Compliance

These settings allow adjustement of the power levels of both UAV control and video signal. By default, FCC or CE compliant mode is used (depending on your region). However, you may want to change these settings to «OPEN» in order to increase the general performances of your system. When switching to «OPEN», the Control will automatically be adjusted up to 250 mW; while the Video Power will need to be adjusted in the Video Power sub menu. Please refer to your local regulations before applying these changes.

a. Control

Mode	Max Power	Frequencies
FCC	100 mW	915 MHz
CE	25 mW LBT	868 MHz
Open	250 mW	868/915 MHz

b. Video

Mode	Max Power	Number of channels
FCC / CE	25 mW	8
Open	350 mW	37

II. Video Channel

Select the frequency you want to use for your audio video transmission. Be sure to use different frequencies when several devices are used during a same mission to avoid interference between devices. The UAV paired on Device Button 1 will be listed as Device 1, the UAV paired on Device Button 2 listed as Device 2, etc. By default, the system is limited to 8 channels (5725 MHz to 5865 MHz) and to Video Power 1 (=25 mW). However, when switching to «OPEN» in the Compliance menu, more frequencies and higher power levels are accessible. This mode is accessible via the "Compliance \ Video" menu. As those additional frequencies and power levels could be subject to special authorizations or licenses, please refer to the local regulation body for accurate information.

FCC settings	
Name	Frequency (MHz)
A1	5865
A2	5845
A3	5825
A4	5805
A5	5785
A6	5765
A7	5745
A8	5725

Open settings									
Name	Frequency (MHz)	Name	Frequency (MHz)	Name	Frequency (MHz)	Name	Frequency (MHz)	Name	Frequency (MHz)
A1	5865	E1	5705	SH10	5251	SH18	5547	SH26	5843
A2	5845	E2	5685	SH11	5288	SH19	5584	SH27	5880
A3	5825	E3	5665	SH12	5325	SH20	5621	SH28	5917
A4	5805	E4	5645	SH13	5362	SH21	5658	SH29	5954
A5	5785	E5	5885	SH14	5399	SH22	5695	SH30	5991
A6	5765	E6	5905	SH15	5436	SH23	5732		
A7	5745	E7	5925	SH16	5473	SH24	5769		
A8	5725	E8	5945	SH17	5510	SH25	5806		

III. Video power

The Loki MK2 system uses an analog video transmission which offers greater reliability while eliminating screen freezing, latency, and reboot time. The system broadcasts around the 5.8 GHz frequency band, producing good performance even when multiple devices are connected.

You can select a specific value for each device used. Please note that Video Power 0 is used for ultra short range to control functions without disturbing other users.

Level	Video power
0	1 mW
1	25 mW
2	250 mW ("OPEN" mode only)
3	350 mW ("OPEN" mode only)

IV. Video Scrambling

CAUTION: USING SCRAMBLING WILL LIMIT THE MAXIMUM RANGE YOU CAN REACH WITH YOUR VIDEO SYSTEM AS THE GLITCHES FROM THE ANALOG SIGNAL WILL HAVE AN INFLUENCE ON THE WHOLE PICTURE'S QUALITY.
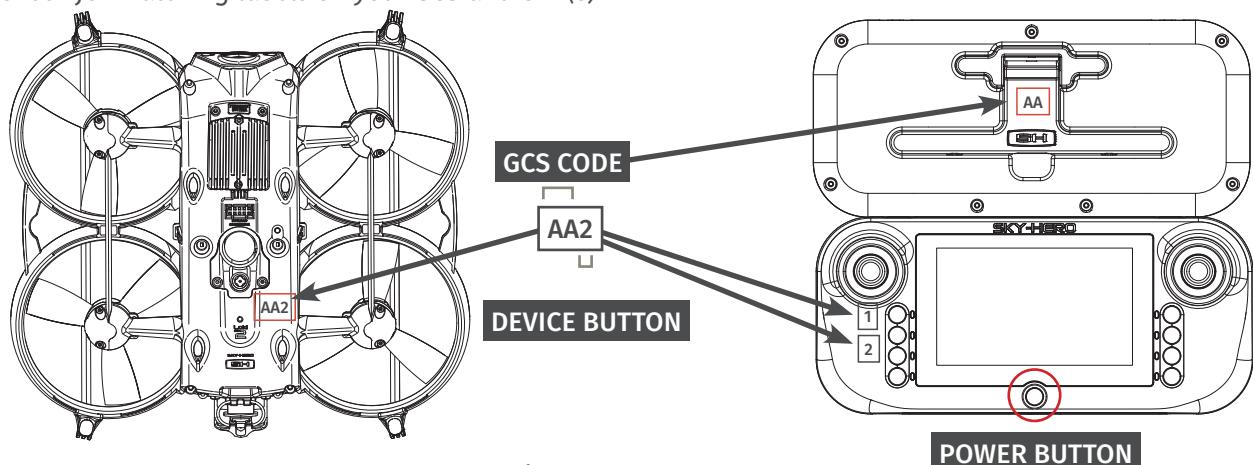
This setting is common to all connected devices
Turning scrambling ON will enable you to make your video signal unreadable by non-Loki MK2 users.

e. Take off

STEP 1 : *Check for matching labels on your GCS and UAV(s)*

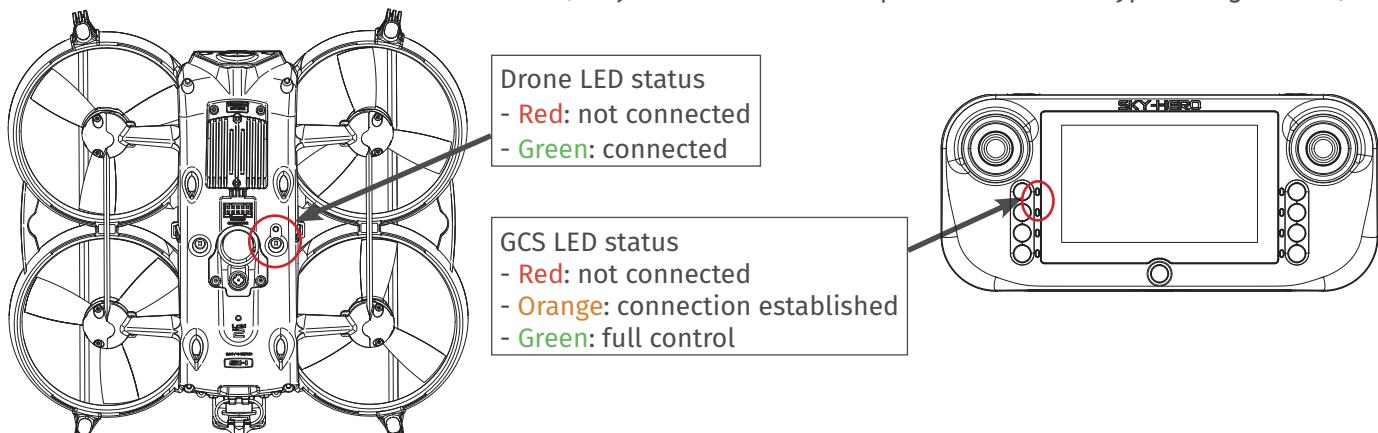GCS CODE

AA

AA2

AA2

DEVICE BUTTON

POWER BUTTON

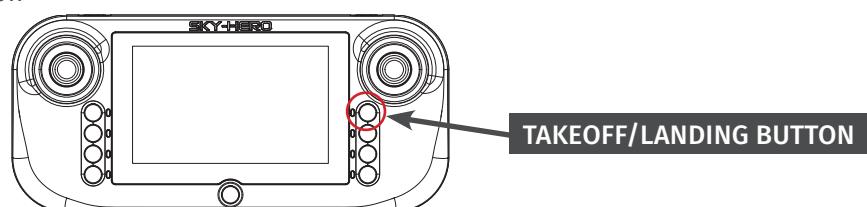STEP 2 : *Press the power button on your GCS to turn it on*
STEP 3 : *Plug a fully charged battery in your UAV(s)*
STEP 4 : *Select the drone by pressing the matching device button on your GCS*
STEP 5 : *Wait until a connection is established (the first time it can take up to 30s due to encryption negotiation)*

Drone LED status
- Red: not connected
- Green: connected

GCS LED status
- Red: not connected
- Orange: connection established
- Green: full control

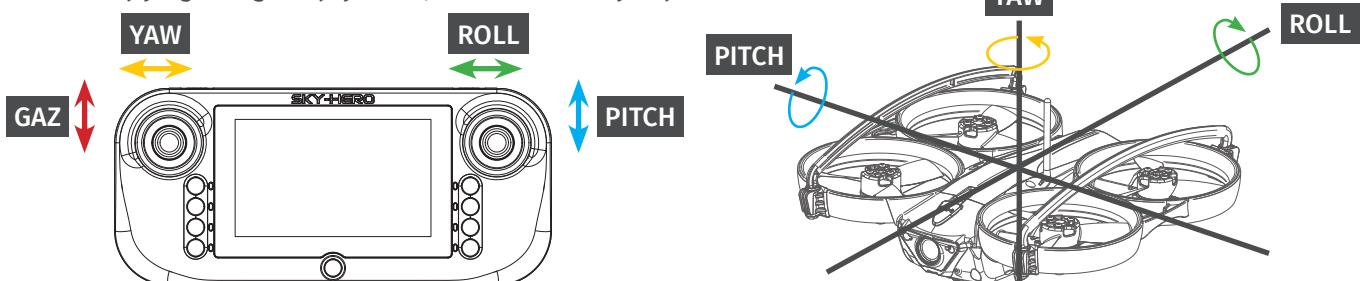STEP 6 : *Press the takeoff/landing button*

TAKEOFF/LANDING BUTTON

STEP 7 : *Wait until hovering*

| IR: 50% (ok) | HOVERING | 9 | 9 | V | B | I | U |

Hovering status will show up on the bottom bar of the GCS screen

STEP 8 : *Start flying using the joysticks, mode 2 is set by default*

YAW   ROLL

GAZ   PITCH

YAW

PITCH   ROLL

STEP 9 : *Press the takeoff/landing button to land your UAV.*

SH
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f. Switching to another device

When two or more UAVs are ready to fly (the process described in the previous section has been completed for all devices), you can easily switch between devices by pressing the matching device button on your GCS. This will stop the link with your actual device and create a link with the new device you want to control.

It is recommended to land the UAV before switching to another as the UAV will not be controlled anymore and will only refer to embedded sensors to hold its position, switching between devices can take up to 5 seconds, because of the encryption process.

The GCS is equipped with a failsafe. As such, all devices will have the following behavior when switching to another device :

If flying: they will try to hover

If flying below 50cm: they will try to hover but after a couple of seconds without reaching any position hold, they will initiate a landing

If on Floor Mode: they will cut their motors

If standing still: they will keep their state

In the case where there is an unintentional loss of communication between the GCS and the UAV (extensive range, or GCS turned off), the actively controlled UAV will automatically land. Any other connected, but non-communicating UAV will keep its state.

In all cases, the devices will keep broadcasting audio-video on the set video channel and power. Settings changes done in the GCS regarding any non-communicating device will only be effective when communicating again to those devices.

a. Default GCS button allocation.

B1 – Takeoff /Landing

B2 – Turtle or Happy Dog mode

B3 – Motor Shutdown

B4 - Menu

L – Wind compensation

R – Enable hovering

J1 – Toogle Front LED

J2 – Floor mode

L - WIND COMPENSATION

R - ENABLE HOVERING

J1 - TOOGLE FRONT LED

J2 - FLOOR MODE

B1 - TAKEOFF/LANDING

B2 - TURTLE OR HAPPY DOG MODE

B3 – MOTOR SHUTDOWN

B4 - MENU
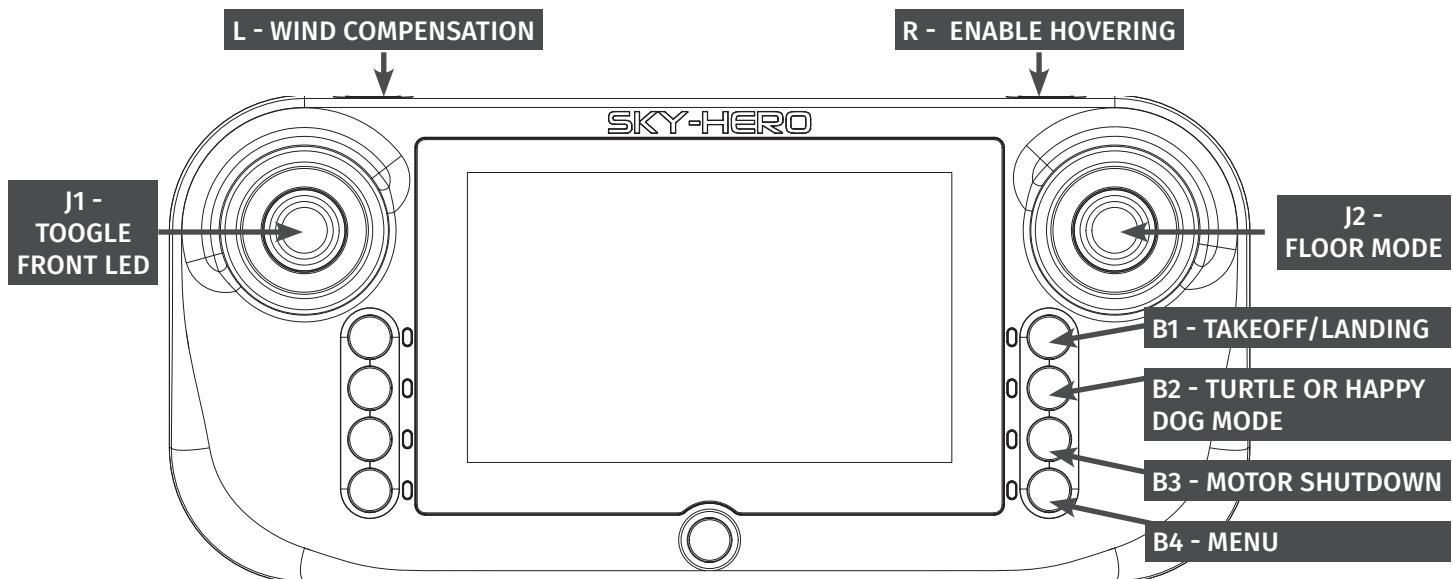
b. B1 – Takeoff /Landing

CAUTION: PRESSING THE TAKEOFF BUTTON WILL START THE MOTORS AND SPIN THE PROPELLERS AT HIGH SPEED. TAKE ALL THE PRECAUTIONS NEEDED TO AVOID ANY POSSIBLE CONTACT WITH THEM, AS ROTATING PROPELLERS CAN CAUSE SEVERE INJURIES.

I.   Takeoff

Automatic takeoff of the UAV, with a smooth acceleration of the propellers' spinning speed. The UAV will automatically reach a hovering position, about 1 meter from the ground, joysticks should not be moved during the takeoff process. Motors and propellers must be able to rotate freely or your Loki MK2 will stop the process to avoid damage; in this case, "Emergency" will appear on the bottom of the GCS screen.

The pilot can always decide to cancel the automatic hovering process and altitude gain by moving its joysticks as soon as the UAV leaves the ground. In that case, it is advised to press the Hovering button ("R") as soon as possible to achieve the best UAV performances. At least 1 hovering process is needed every time a new battery is connected, as this allows your UAV's computer to calibrate its sensors.

The takeoff procedure can be cancelled at any time by pressing the allocated button again.

II.   Landing

CAUTION: THE BEST WAY TO ACHIEVE A PERFECT SMOOTH LANDING IS TO FIRST ASK FOR A HOVERING, WAIT FOR SYNCRONIZATION, AND THEN PERFORM THE LANDING.

Automatic landing of the UAV, with a smooth deceleration of the propellers' spinning speed.
The UAV will remain controllable during the landing, as to allow the pilot to adjust the landing area; the whole procedure can be cancelled at any moment by pressing the takeoff landing button again.

c. B2 – Turtle or Happy Dog mode

I.   Turtle

If for any reason your Loki MK2 should arrive on the floor upside down, the Turtle function allows you to flip it back to the correct position. A pop-up message will light up on your GCS when the UAV is inverted. As the Loki MK2 understands its position, it will flip over in the most favorable direction.

II.   Happy Dog

The Loki MK2 can be used as a high-power IR light generator; just land the UAV in the space you want to lighten and engage the Happy Dog function. This function will turn the drone upside down and switch all IR LED on full power. To exit, press the button again and it will flip back to normal position and recover the previous LED settings.

This function can also be used to get your UAV out of a trapped situation. For example, partially locked under an obstacle.

d. B3 – Motor Shutdown

Also called as emergency shutdown, this function will immediately cut all four motors, regardless of the UAV's current situation or position, leading to instant UAV crash down. This can be used if the UAV starts to exhibit abnormal flight behaviour and cannot be recovered by the operator.
After this emergency, the UAV can be flown again by pressing takeoff landing (B1) but it is recommended to first proceed to a closer mechanical inspection after the crash of the UAV.

e. L – Wind compensation

CAUTION: WIND COMPENSATION SHOULD ONLY BE USED OUTDOOR AND AS FAR AWAY AS POSSIBLE FROM WALLS, WINDOWS OR OBSTACLES

In Wind Mode, the drone will automatically adjust its angle to "fight" the wind. As a result, the max tilt angle of your drone will be increased by the additional angle needed to fight the wind.
The Wind Mode can be activated at any time, except in conjunction with Floor Mode, by pressing the appropriate allocated button (L) or via the Command Action Menu. "Wind" will appear on your GCS.
It is strongly advised not to enter Wind Mode indoors. Since this will make max tilt angle relative, your UAV may interpret a wall, a window or obstacle, as very strong wind, and as a result will compensate by adding more and more angle to generate movement, which could result in a crash.

CAUTION: HOVERING (= 3D POSITION HOLD) IS AUTOMATICALLY ACTIVATED AFTER TAKEOFF SO TRY NOT TO TAKE OFF TOO CLOSE FROM WALLS OR UNDER LESS THAN 1M HIGH CEILINGS. HOVERING AND ALTITUDE GAIN WILL BE ABORTED IF THE OPERATOR MOVES THE JOYSTICKS DURING THE TAKEOFF PROCESS. **SKY-HERO STRONGLY RECOMMENDS THAT YOU LET THE UAV PERFORM AT LEAST 1 STABLE HOVERING AFTER EACH BATTERY CONNECTION** AS THIS ALLOWS THE COMPUTER TO UNDERSTAND THE PHYSICS OF THE UAV AND GUARANTEE OPTIMAL UAV PERFORMANCES WHILE FLYING. IT IS ALSO RECOMMENDED TO ACTIVATE HOVERING OCCASSIONALLY DURING FLIGHT (EVEN FOR MORE EXPERIENCED USERS), ESPECIALLY AFTER STRONG IMPACTS TO THE UAV, TO RESET THE GYROSCOPES ESTIMATED VALUES.

I.   Hovering-Altitude-Gaz

When actively flying, your UAV will perform in "GAZ" mode, entailing a potential drift against walls, ceilings, floors, etc... but you can ask for a hovering (3D position hold) performed by the embedded sensors: simply press your GCS «R» button.

When activated, the "Hovering" mode will hold the UAV's 3D position in space. This position holding feature relies on all embedded sensors, therefore the position holding has a few limitations:

· Minimum focus distance of the Vertical Camera is 50cm from the ground; no hovering can be achieved below this height.

· Maximum accurate distance sensing is 25 meters; no hovering can be achieved above this height in day light.

· Maximum focus distance of the Vertical Camera is affected by ambient light; if light is getting low, the Vertical Camera will not be able to focus on objects. The embedded vertical IR lights will then power on and generate light in total darkness to provide confortable IR illumination for the frontal camera but will not be   suffisant to guarantee a stable hovering.

· The Vertical Camera cannot isolate its own shadow. In low contrast environment, where the UAV's shadow is the most contrasting feature on the ground, the UAV might start to follow its own shadow and will not be able to achieve position holding. In those cases, it is advised to fly a bit further from the ground to diminish the contrast of the shadow.

· In very low contrast or reflecting environment (such as reflective flooring, snow, water, etc.) hovering will also tend to be difficult, as the UAV will not be able to isolate any anchoring feature on the ground.

While hovering, changing the Throttle or Yaw (J1 for Mode 2 users) will keep the UAV position hold. This allows the pilot to modify the orientation or altitude of the UAV while still hovering.

Please note: The UAV status on the screen might show "Flying" which indicates that the UAV is looking to reach a position hold following a request from the pilot, but has not yet managed to do so. Once enabled, "hovering" will show up on your GCS status bar.

II.   Altitude

Once in Hovering Mode, you can switch to Altitude Mode by altering the Roll or Pitch of the UAV (J2 for Mode 2 users). Your UAV is now capable of holding its absolute altitude using barometric pressure and distance sensing and will maintain the altitude as long as you don't increase or decrease the throttle.

Since the UAV will maintain its altitude, the pilot can focus on the orientation of the UAV without any need to adjust the vertical position (altitude). In addition, flying over an object will not cause the UAV to increase its altitude. However, if that object is close to the UAV, a slight altitude increase may be experienced as a result of the pressure generated by the nearby object.

III.　Gaz

Once in Altitude Mode, you can switch to Gaz Mode by altering the Throttle of the UAV (J1 for Mode 2 users). Since Gaz Mode only requires limited use of the embedded sensors, there are no minimum or maximum altitude limits (you can fly below 50cm or above 25m) and the pilot has more direct control the UAV.
Even if the altitude is not locked, the embedded computer will control the optimal up and down speed to help you fly more smoothly.
While in Gaz mode, your UAV will drift slightly with the movement of the air. If you experience constant drifting, please perform a "flat trim," explained in a dedicated section of the manual, on the connected UAV. If all UAVs connected to the GCS are drifting in same direction, perform a GCS Joystick calibration as explained in the Advanced Settings User Manual.

g. J1 – Toogle Front LED

CAUTION : 840nM IR LIGHT USED IN THE LOKI MK2 CAN BE HARMFUL TO YOUR EYES. TAKE ALL PRECAUTIONS NECESSARY TO AVOID ANY DIRECT IR BEAM CONTACT WITH YOUR EYES, SUCH AS IR BLOCKING GLASSES.

This function will power the front LEDs to the preset brightness level set in the corresponding menu in the GCS (refer to "ADVANCED SETTINGS USER MANUAL"). Toggle again to power off.

h. J2 – Floor mode

I.　Floor

Floor Mode offers a lot of additional operational capacities as it transforms your UAV into a rover with a jumping option. This mode will allow pilots of any experience level to cover large areas with minimal crash risks and increased flight time.
Floor Mode is commonly used to fly under objects like beds and cars, or to move in a confined environment with little to no space above the UAV (false ceilings, small pipes, etc.)

II.　Access During flight

You can enter Floor Mode at any time by pressing the appropriate allocated button (J2) or via the Command Action Menu. The UAV will start to descend until it reaches the floor, and "Floor" will appear on your GCS. You can exit the mode at any time with the same button or via Command Action, and the UAV will automatically regain altitude.
It is strongly advised to hover after exiting Floor Mode to reset the gyroscopes estimated values. Please remember to reach the 50cm threshold before attempting to enter hovering.

III.　Access From Takeoff

You can also takeoff (and land) in Floor Mode, which allows for a low altitude takeoff if doing so from under objects or close to a ceiling. Activate the mode before takeoff by pressing the appropriate allocated button or via Command Action Menu and then perform a standard takeoff.

3. ADDITIONAL GCS MENU FEATURES

a. Video Brightness

Lets you adjust the brightness of the video display on the screen (0 to 240), default value is 128.

b. Device Microphone level

This setting is common to all connected devices

This value will set the UAV's embedded HD microphone level. By default, the level is set to 15%. It can be changed at any time if higher levels are required.

c. Observe Device

This mode allows the use of the GCS as an image reception device. Users can navigate using the 4 Device Buttons (Device Button LEDs will be powered on blue) and, thus, capture the image of nearby devices (whether Sky-Hero devices or not) broadcasting in the frequencies set for each Device in the Video Channel menu. In addition, the user can navigate all frequencies using the (SCROLL) of Joystick 2.

The status of the Scrambled Mode will affect the Observer Mode; if Scrambling is ON, the Observer Mode will not be able to display unscrambled images, and vice-versa.

The GCS audio-video output will stream the selected channel.

d. Version

This submenu informs the GCS user about the current GCS (= "Remote") version, the current communicating UAV (= "Drone") version and the Crossfire (embedded UHF transmitter) version.

e. Command action

This menu lets you activate functions/flight modes that are not allocated to any Allocable Button. Once in the menu, (SCROLL) through the list and (CONFIRM) when the desired function is highlighted.

To make access as fast as possible, the Command Action submenu is the first one in the GCS menu. This enables you to press MENU BUTTON and then immediately (ENTER) the Command Action submenu without the need to (SCROLL).

Motor Shutdown is listed last in the Command Action menu to enable quick access if this function is not already allocated to a button; (SCROLL) up once when in the Command Action menu to highlight the Motor Shutdown function.

Only Takeoff/Landing will require a further confirmation; the user needs to exit the menu after (CONFIRM).

I.   Thrown takeoff

<div style="background-color:red; color:white;">
CAUTION: THIS FUNCTION WILL ACTIVATE THE MOTORS AND START TO SPIN THE PROPELLERS. EXTENSIVE CAUTION MUST BE TAKEN AS SPINNING PROPELLERS CAN CAUSE SEVERE INJURIES. WEARING GLOVES IS A MUST. NEVER THROW THE UAV TOWARD A PERSON OR AN ANIMAL.
DO NOT THROW THE UAV BEFORE THE MOTORS HAVE REACHED A REGULATED CONSTANT RPM.
TRY TO THROW THE UAV AS FLAT AS POSSIBLE, AVOIDING SPIN AND ERRATIC ROTATIONS.
</div>

This function enables you to takeoff without starting from the ground. This should be used in dusty environments, high grass, watery or snowy environments, or any other situations where taking off from the ground is not viable.

Hold the UAV in one hand, making sure that your fingers are clear of the propellers, and engage the function on the GCS with the other hand. Wait for the propellers to accelerate and reach the optimal continuous rotation speed, which is indicated by a constant propeller sound; this should take a couple of seconds. Once the propellers are spinning at the appropriate speed, you can throw the UAV in the air, preferably with an upward movement, without any UAV rotation.

II.   Turtle or Happy Dog mode
II. I.   Turtle

If for any reason your Loki MK2 should arrive on the floor upside down, the Turtle function allows you to flip it back to the correct position. A pop-up message will light up on your GCS when the UAV is inverted. As the Loki MK2 understands its position, it will flip over in the most favorable direction.

II. II.   Happy Dog

The Loki MK2 can be used as a high-power IR light generator; just land the UAV in the space you want to lighten and engage the Happy Dog function. This function will turn the drone upside down and switch all IR LED on full power. To exit, press the button again and it will flip back to normal position and recover the previous LED settings.

This function can also be used to get your UAV out of a trapped situation. For example, partially locked under an obstacle.

III.   Toggle Front LED

<div style="background-color:red; color:white;">
CAUTION : 840nM IR LIGHT USED IN THE LOKI MK2 CAN BE HARMFUL TO YOUR EYES. TAKE ALL PRECAUTIONS NECESSARY TO AVOID ANY DIRECT IR BEAM CONTACT WITH YOUR EYES, SUCH AS IR BLOCKING GLASSES.
</div>

This function will power the front LEDs to the preset brightness level set in the corresponding menu in the GCS (refer to "ADVANCED SETTINGS USER MANUAL"). Toggle again to power off.

IV.   Toogle Bottom LED

<div style="background-color:red; color:white;">
CAUTION : 840nM IR LIGHT USED IN THE LOKI MK2 CAN BE HARMFUL TO YOUR EYES. TAKE ALL PRECAUTIONS NECESSARY TO AVOID ANY DIRECT IR BEAM CONTACT WITH YOUR EYES, SUCH AS IR BLOCKING GLASSES.
</div>

This function will power the bottom LEDs to the preset brightness level set in the corresponding menu in the GCS (see «ADVANCED SETTINGS USER MANUAL»). Toggle again to power off.

V. Flat Trim

The Flat Trim will reset the UAV's gyroscope flat value. It is advised to use a Flat Trim before first use, or after big impacts to reset the gyroscope.

If you observe completely erratic UAV movements, or a constant strong drifting, it is usually helpful for the UAV to undergo a Flat Trim.

VI. Floor mode

VI.I Floor

Floor Mode offers a lot of additional operational capacities as it transforms your UAV into a rover with a jumping option. This mode will allow pilots of any experience level to cover large areas with minimal crash risks and increased flight time.
Floor Mode is commonly used to fly under objects like beds and cars, or to move in a confined environment with little to no space above the UAV (false ceilings, small pipes, etc.)

VI.II Access During flight

You can enter Floor Mode at any time by pressing the appropriate allocated button (J2) or via the Command Action Menu. The UAV will start to descend until it reaches the floor, and "Floor" will appear on your GCS. You can exit the mode at any time with the same button or via Command Action, and the UAV will automatically regain altitude.
It is strongly advised to hover after exiting Floor Mode to reset the gyroscopes estimated values. Please remember to reach the 50cm threshold before attempting to enter hovering.

VI.III Access From Takeoff

You can also takeoff (and land) in Floor Mode, which allows for a low altitude takeoff if doing so from under objects or close to a ceiling. Activate the mode before takeoff by pressing the appropriate allocated button or via Command Action Menu and then perform a standard takeoff.

VII.   Enable hovering

CAUTION: HOVERING (= 3D POSITION HOLD) IS AUTOMATICALLY ACTIVATED AFTER TAKEOFF SO TRY NOT TO TAKE OFF TOO CLOSE FROM WALLS OR UNDER LESS THAN 1M HIGH CEILINGS. HOVERING AND ALTITUDE GAIN WILL BE ABORTED IF THE OPERATOR MOVES THE JOYSTICKS DURING THE TAKEOFF PROCESS. **SKY-HERO STRONGLY RECOMMENDS THAT YOU LET THE UAV PERFORM AT LEAST 1 STABLE HOVERING AFTER EACH BATTERY CONNECTION** AS THIS ALLOWS THE COMPUTER TO UNDERSTAND THE PHYSICS OF THE UAV AND GUARANTEE OPTIMAL UAV PERFORMANCES WHILE FLYING. IT IS ALSO RECOMMENDED TO ACTIVATE HOVERING OCCASSIONALLY DURING FLIGHT (EVEN FOR MORE EXPERIENCED USERS), ESPECIALLY AFTER STRONG IMPACTS TO THE UAV, TO RESET THE GYROSCOPES ESTIMATED VALUES.

VII.I   Hovering-Altitude-Gaz

When actively flying, your UAV will perform in "GAZ" mode, entailing a potential drift against walls, ceilings, floors, etc… but you can ask for a hovering (3D position hold) performed by the embedded sensors: simply press your GCS «R» button.

When activated, the "Hovering" mode will hold the UAV's 3D position in space. This position holding feature relies on all embedded sensors, therefore the position holding has a few limitations:

· Minimum focus distance of the Vertical Camera is 50cm from the ground; no hovering can be achieved below this height.

· Maximum accurate distance sensing is 25 meters; no hovering can be achieved above this height in day light.

· Maximum focus distance of the Vertical Camera is affected by ambient light; if light is getting low, the Vertical Camera will not be able to focus on objects. The embedded vertical IR lights will then power on and generate light in total darkness to provide confortable IR illumination for the frontal camera but will not be suffisant to guarantee a stable hovering.

· The Vertical Camera cannot isolate its own shadow. In low contrast environment, where the UAV's shadow is the most contrasting feature on the ground, the UAV might start to follow its own shadow and will not be able to achieve position holding. In those cases, it is advised to fly a bit further from the ground to diminish the contrast of the shadow.

· In very low contrast or reflecting environment (such as reflective flooring, snow, water, etc.) hovering will also tend to be difficult, as the UAV will not be able to isolate any anchoring feature on the ground.

While hovering, changing the Throttle or Yaw (J1 for Mode 2 users) will keep the UAV position hold. This allows the pilot to modify the orientation or altitude of the UAV while still hovering.

Please note: The UAV status on the screen might show "Flying" which indicates that the UAV is looking to reach a position hold following a request from the pilot, but has not yet managed to do so. Once enabled, "hovering" will show up on your GCS status bar.

VII.II   Altitude

Once in Hovering Mode, you can switch to Altitude Mode by altering the Roll or Pitch of the UAV (J2 for Mode 2 users). Your UAV is now capable of holding its absolute altitude using barometric pressure and distance sensing and will maintain the altitude as long as you don't increase or decrease the throttle.

Since the UAV will maintain its altitude, the pilot can focus on the orientation of the UAV without any need to adjust the vertical position (altitude). In addition, flying over an object will not cause the UAV to increase its altitude. However, if that object is close to the UAV, a slight altitude increase may be experienced as a result of the pressure generated by the nearby object.

VII.III   Gaz

Once in Altitude Mode, you can switch to Gaz Mode by altering the Throttle of the UAV (J1 for Mode 2 users). Since Gaz Mode only requires limited use of the embedded sensors, there are no minimum or maximum altitude limits (you can fly below 50cm or above 25m) and the pilot has more direct control the UAV.
Even if the altitude is not locked, the embedded computer will control the optimal up and down speed to help you fly more smoothly.
While in Gaz mode, your UAV will drift slightly with the movement of the air. If you experience constant drifting, please perform a "flat trim," explained in a dedicated section of the manual, on the connected UAV. If all UAVs connected to the GCS are drifting in same direction, perform a GCS Joystick calibration as explained in the Advanced Settings User Manual.

VIII.   Takeoff /Landing

CAUTION: PRESSING THE TAKEOFF BUTTON WILL START THE MOTORS AND SPIN THE PROPELLERS AT HIGH SPEED. TAKE ALL THE PRECAUTIONS NEEDED TO AVOID ANY POSSIBLE CONTACT WITH THEM, AS ROTATING PROPELLERS CAN CAUSE SEVERE INJURIES.

VIII.I   Takeoff

Automatic takeoff of the UAV, with a smooth acceleration of the propellers' spinning speed. The UAV will automatically reach a hovering position, about 1 meter from the ground, joysticks should not be moved during the takeoff process. Motors and propellers must be able to rotate freely or your Loki MK2 will stop the process to avoid damage; in this case, "Emergency" will appear on the bottom of the GCS screen.

The pilot can always decide to cancel the automatic hovering process and altitude gain by moving its joysticks as soon as the UAV leaves the ground. In that case, it is advised to press the Hovering button ("R") as soon as possible to achieve the best UAV performances. At least 1 hovering process is needed every time a new battery is connected, as this allows your UAV's computer to calibrate its sensors.

The takeoff procedure can be cancelled at any time by pressing the allocated button again.

VIII.II   Landing

CAUTION: THE BEST WAY TO ACHIEVE A PERFECT SMOOTH LANDING IS TO FIRST ASK FOR A HOVERING, WAIT FOR SYNCRONIZATION, AND THEN PERFORM THE LANDING.

Automatic landing of the UAV, with a smooth deceleration of the propellers' spinning speed.
The UAV will remain controllable during the landing, as to allow the pilot to adjust the landing area; the whole procedure can be cancelled at any moment by pressing the takeoff landing button again.

IX.   Wind compensation

CAUTION: WIND COMPENSATION SHOULD ONLY BE USED OUTDOOR AND AS FAR AWAY AS POSSIBLE FROM WALLS, WINDOWS OR OBSTACLES

In Wind Mode, the drone will automatically adjust its angle to "fight" the wind. As a result, the max tilt angle of your drone will be increased by the additional angle needed to fight the wind.
The Wind Mode can be activated at any time, except in conjunction with Floor Mode, by pressing the appropriate allocated button (L) or via the Command Action Menu. "Wind" will appear on your GCS.
It is strongly advised not to enter Wind Mode indoors. Since this will make max tilt angle relative, your UAV may interpret a wall, a window or obstacle, as very strong wind, and as a result will compensate by adding more and more angle to generate movement, which could result in a crash.

X.   Toggle video boost

Using the Video Boost will enable you to increase the Video Power setting by 1 power level, without having to go into the dedicated menu. When active, a ''V'' will appear on top of your GCS screen, indicating your device is now flying with the boosted value. Deactivating the Video Boost will revert the video power setting back to the original value. This boost will not be affected by your compliance setting.

XI.   Toggle angle boost

For each device you can select a max angle boost. When used, an ''S'' for Speed will appear on top of your GCS screen, indicating your device is now flying with the boosted value of your max tilt angle. This is very useful when you need to be able to quickly increase the max speed of the UAV.

By default, this value is set to 15 degrees and non boosted value to 9 degrees. This setting can be further adjusted please refer to «ADVANCED SETTINGS USER MANUAL».

XII.   Toggle drone sleep

This function allows to put the current connected device into a sleep mode, generating a lower power drain and increasing the device's battery lifetime. No audio-video signal is emitted and all LED are turned off. You can recover normal operation by reconnecting to the drone (by pressing the corresponding device button) or by toggling the function again. Your GCS remains fully functional.

XIII.   Toggle push-to-talk

This function enables the use of one the GCS' Allocatable Button as a PTT. The use of a dedicate cable for your radio system might be necessary. Please contact our customer service for detailed information : support@sky-hero.com

XIV.   Motor shutdown

Also called as emergency shutdown, this function will immediately cut all four motors, regardless of the UAV's current situation or position, leading to instant UAV crash down. This can be used if the UAV starts to exhibit abnormal flight behaviour and cannot be recovered by the operator.
After this emergency, the UAV can be flown again by pressing takeoff landing (B1) but it is recommended to first proceed to a closer mechanical inspection after the crash of the UAV.

f. System sleep mode

At any time, you can set your system (GCS + 1 device) into «SLEEP MODE» and be able to quickly reactivate it when needed in no more than 3 seconds.

Start your system normally, select one device, wait for connection.

Hold the two joysticks in down inward position for 3 seconds, until your system has entered « SLEEP MODE » with minimal power consumption for both the UAV and the GCS (1 hour sleep = 25% UAV battery drain, 10% GCS battery drain).

The B4 and device LED will show orange, GCS screen will turn off.

To recover normal operation and reconnect immediately to your device, hold the two joysticks in down inward position for 3 seconds.

KEEP 3 SECONDS
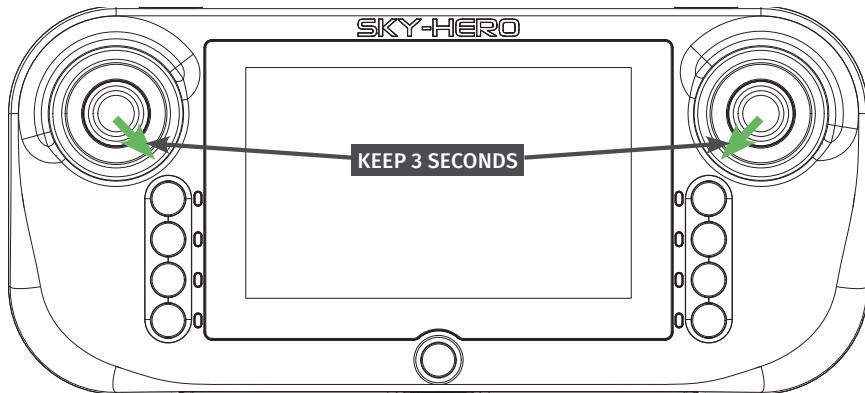
4. ADVANCED SETTINGS

This submenu is locked by default and should only be used by experienced users, please refer to the ADVANCED SETTINGS user manual.

5. WARNINGS

a. Warnings | Loki MkII sUAV

· Loki MkII is tested for how much electrical energy it use during typical use : 11.1V ; 20A
· Loki MkII is not weatherproof – don't fly in rain, snow, puddles, etc. Do not immerse this product in any liquid. This can lead to a complete malfunction of the device.
· Also avoid operating the Loki MkII in environments where small particles could enter the device body, such as sand, dust, etc. This can lead to a complete malfunction of the device. This can lead to partial or complete blocking of the wheels, poor visibility due to particles accumulating on the camera lenses, etc.
· Keep away from fire.
· To clean or dust your device, use only a soft dry cloth. Do not apply any liquids of any kind (detergents, solvents, etc.) which could weaken the various parts of the appliance. Also do not apply any kind of lubricant or grease to the moving parts of the vehicle, especially the wheel bearings.
· Do not fly in extremely hot temperatures above 50°C | 122°F. Do not operate it in extremely cold temperatures below -20°C | -4°F
· When not in use, first remove the LiPo battery from the device. Then store the Loki MkII and the removed battery in a cool, dry place with a relative humidity of less than 75%.
· The operator in command is responsible for managing directions, range, and battery level and monitoring messages and alerts displayed by the associated controller.
· Exclusively use accessories such as battery chargers authorized by Sky-Hero. Using unapproved accessories will void warranty coverage.

b. Warnings | GCS MkII Controller

· Keep away from fire, wet and dusty environments.
· To clean or dust your controller, use only a dry cloth. Do not apply any liquids of any kind (detergents, solvents, etc.) which could weaken the various parts of the appliance.
· Store the GCS MkII in a cool, dry place with a relative humidity of less than 75%. Do not leave your GCS MkII for more than 3 months without charging it.

c. Warnings | LiPo Battery

· Loki MkII uses removable, lightweight, rechargeable Lithium-Polymer (LiPo) battery and GCS MkII uses also a built-in Lithium-Polymer (LiPo) battery, which provides higher specific energy than other traditional batteries. The user must have an appropriate understanding of lithium-polymer batteries before purchase.
· The batteries are foreseen for the use of system integrations with proper protection circuitry or battery packs with a battery management system or PCB (circuit board/module).
· Use caution when working with and using lithium-polymer batteries as they are very sensitive to charging characteristics and may explode, burn, or cause a fire if misused or mishandled.
· The operator is responsible for any damage or injury caused by the misuse or mishandling of lithium-polymer batteries and chargers.

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SKY-HERO

- Charge only with the provided charger designed for this specific type of lithium-ion battery.
- Charging should be completed in an open area. Always charge in or on a fire-proof surface. Never leave batteries charging unattended.
- Please note that the Loki MkII and GCS MkI LiPo batteries cannot be charged at temperatures above 45°C (113°F). The temperature range for charging the LiPo battery is 10°C to 45°C. Do not disassemble the batteries or dual charging dock. Do not insert any foreign material into the battery terminal.
- Do not attempt to use batteries that are damaged, dented, or ruptured after a crash or drop. Avoid dropping or striking the batteries.
- Do not immerse the batteries or charging dock in water or other liquids
- If substances leak from the battery pack and get in your eyes, do not rub them. Seek emergency medical attention promptly.
- In storage as in operation, it's important not to allow the battery to come in close contact with moisture or heat sources. Store the battery in a dry and well-ventilated area at room temperature, ideally 20°C | 68°F to 28°C | 82°F.
- Do not store the battery in direct sunlight or near sharp items, moisture, metal, or reactive chemicals.
- Over time, some reduction in battery life is expected.

6. STORAGE

Knowing how to store your ground robot properly can extend its useful life. Keep in mind these tips for best storage practices:

a.   Perform Visual Inspection

Before you ever put up your Loki MkII after an operation, you should always check it over for signs of wear. This is a simple, visual once-over, that takes a matter of seconds, but can help you catch minor issues before they become major ones. Look over the outer shell for cracks or any other signs of damage. Check the propellers for any damage or debris, and inspect the camera lenses for dust and dirt. Also, check the battery bay.

b.   Clean the device

Cleaning your aerial robot includes removing any visible dirt from the shell and cameras. If you are planning to put your drone into storage for an extended length of time, make sure you do this beforehand.

c.   Update firmware

Make sure you do any firmware updates on both sUAV and controller before putting your Loki MkII away, whether it's for a short break. If you're going to be back operating it in a week or two, then you'll be ready to deploy it for the next mission. If you're planning on a longer break, you may need to perform another update when you bring your drone out again. However, the updating process will be faster if you're not two or three versions behind.

d. Remove and discharge batteries

Proper care of your batteries will give them a much longer lifespan. Batteries should be discharged between 40% to 65% percent. This is extremely important, as batteries that are stored while fully charged, or with too low of a charge, may be permanently damaged. And be sure to unplug the batteries – never store batteries in the charger.

e. Store batteries separately

For safety's sake, your Loki MkII should never be stored with the batteries installed. Always store your batteries away from direct sunlight, ideally at around 25°C | 77°F. Also, make sure that the battery charger does not come into contact with other conductive materials.

f. Store Loki MkII in a cool, dry, non-magnetic area

Once all the prep work has been done to prepare your device for storage, make sure to store it in suitable conditions. Your Loki MkII, as well as batteries, GCS MkII controller, and any other attachments, should be stored in a climate-controlled setting. The ideal temperature for storage is between 20°C | 68°F to 28°C | 82°F. Extreme cold or heat can lead to permanent damage to batteries, and also to the electrical elements of the sUGV and the controller.

Your devices should be stored in a dry place away from humidity, as a humid environment can lead to corrosion of metal elements and mildew on plastic parts or packaging materials. In practical terms, this means that your drone should not be stored in a damp basement, an uninsulated attic, in a car, or in a non-climate-controlled storage unit. Also keep in mind that your drone should be stored away from any sources of magnetism, to avoid any scrambling of the computer or electrical components.

Changes or modifications to the equipment not expressly approved by the manufacturer could void the product warranty and the user's authority to operate the equipment.

Your wireless device (model SH-00001) is a radio transmitter and receiver. It is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission (FCC) of the U.S. Government. These limits are part of comprehensive guidelines and establish permitted levels of RF energy for the general population. The guidelines are based on standards that were developed by independent scientific organizations through periodic and thorough evaluation of scientific studies. The standards include a substantial safety margin designed to assure the safety of all persons, regardless of age and health. Before a device model is available for sale to the public, it must be tested and certified to the FCC that it does not exceed the limit established by the government-adopted requirement for safe exposure.

Axon equipment (models SH-00001, SH-00002, SH-00003, SH-00005) has been tested and found to comply with the limits for Class B digital devices, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.

-Increase the separation between the equipment and receiver.

-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-Consult Axon technical support for help.

-Axon systems comply with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device must be professionally installed

This equipment complies with FCC's radiation exposure limits set forth for an uncontrolled environment under the following conditions :

1.This equipment should be installed and operated such that a minimum separation distance of 20cm is maintained between the radiator (antenna) and user's/nearby person's body at all times.

2.This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter

This portable equipment with it's antenna complies with FCC's radiation exposure limits set forth for an uncontrolled environment. To maintain compliance, follow the instructions below :

1.. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

2.Avoid direct contact to the antenna, or keep contact to a minimum while using this equipment.

FC CE

FCC Notice – Waiver Granted for Use under Specific Conditions

This device, Loki, operates under a waiver granted by the Federal Communications Commission (FCC) pursuant to DA 24-1216. The waiver allows analog-modulated devices to operate in the 5725–5850 MHz band under conditions normally reserved for digitally modulated devices, including higher transmit power and slightly relaxed out-of-band emission (OOBE) limits.

Operation of this device is subject to the following **conditions**:

1. **Authorized Use Only**:
   This device is authorized **only for use by law enforcement agencies** for emergency or safety-of-life surveillance operations. Routine monitoring or generalized surveillance is strictly prohibited.

2. **Transmission Channels**:
   The device is limited to operate over the following four channels:

   - SH23: 5729.5 – 5734.5 MHz

   - SH24: 5766.5 – 5771.5 MHz

   - SH25: 5803.5 – 5808.5 MHz

   - SH26: 5840.5 – 5845.5 MHz
     The device must prioritize the use of channels SH23 and SH26, which do not overlap with standard Wi-Fi channels.

3. **Power and Emissions**:

   - The device may exceed the OOBE limit defined in 47 CFR §15.247(d) by up to 6 dB.

   - The maximum output power is limited to 0.563 Watts with a power spectral density of 6.5 dBm/3kHz.

4. **Temporary, Mobile Use Only**:

   - This device must be **battery-powered only**.

   - It must not be used for permanent or fixed installations.

5. **Sales Restrictions**:
   This device is only authorized for sale to law enforcement agencies eligible under FCC rule §90.20. It must not be sold or leased to the general public or used by unauthorized entities.

6. **Proximity Notification Requirement**:
   If this device is deployed within **40 km of Patrick Space Force Base, FL** or **Vandenberg Space Force Base, CA**, the Department of the Air Force must be notified in advance at: thu.luu@us.af.mil.

7. **Waiver Validity Period**:
   This FCC waiver is valid for **three years from December 5, 2024**. After this period, no new devices may be sold or marketed. Existing devices may continue to operate under the waiver conditions.

Warning: Operation of this device outside of the above conditions is a violation of FCC regulations and may result in penalties.