# Sigyn MkI Tactical sUGV
OPERATOR'S MANUAL
Guide v.2.1 | Odyssy v.3.2.0
11.03.2024

⚠ **WARNING |** *Please read all documentation supplied with your Sigyn MkI Tactical Ground Robot before operating it. Be aware that this professional equipment should only be operated by trained and authorized personnel.*

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FOREWORD

The information within this comprehensive guide will enable you to operate Sky-Hero's Sigyn MkI unmanned ground robot with ease. The Sigyn MkI wheeled robot is one of the main integrated devices of Sky-Hero's robotic tactical recon system. It can therefore be deployed individually or in combination with other Sky-Hero system components, such as the Loki MkII sUAV, the Narfi MkI Pole Camera Head* as well as generic accessories like our Wearable Screen and payloads*, all operated by the core controller, the GCS MkII.

* Please refer to the guides associated with each of these components to learn more about their use

The following pages and sections provide all the necessary details for the activation, use and maintenance of the Sigyn MkI tactical sUGV and its controller, the GCS MkII. Guidance for the use of this robot is also detailed within this guide.

Reviewing this manual and complying with its instructions, is essential for correctly using the robot and avoiding any operating errors. Before using the robot for the first time, and for future reference, we recommend that you read it in its entirety, paying particular attention to the warnings in the various sections of this manual. Sky-Hero SA cannot be held responsible for any potential damage caused to the operator, persons, property or materials resulting from misuse of this device.

The explanations and specifications in this manual are provided for informational purposes only and are subject to change without notice. However, the latest version of this manual is available upon request from your local official reseller.

1. CAPTIONS

Pay particular attention to the callouts that occur throughout this operator's manual:

CAUTION | Indicates a potentially hazardous situation.

IMPORTANT | Something to be aware of during unmanned robot operation.

NOTE | Additional information.

TIPS | How to get the most out of your Sigyn MkI.

REFERENCE | A page no. that directs you to a specific section of this manual

DETAILED INFO | A page no. that directs you to "Add-on Operator Manual"

The reference to each of the major components of the system presented here will be as follows:

GCS MkII Remote Controller	Sigyn MkI Tactical sUGV
Within the schematics : **X** 📖 **Page 17**	Within the schematics : **X** 📖 **Page 16**
In text : **(X)**	In text : **|X|**

SAFETY GUIDELINES

1. COPYRIGHT WARNING

Reproduction or retransmission of any part of this manual in any form or by any means, whether electronic, mechanical, photocopying, recording or otherwise, is forbidden without the express written permission of Sky-Hero.

2. DISCLAIMER

This section provides details for safe operation. Please closely follow the steps in these instructions in order to ensure safe and successful operation of your Sigyn MkI. Also, it's highly recommended to read all of the best practices and safety information before your first use.

Failure to follow these safety guidelines and instructions could result in injury or damage to you, your Sky-hero product, or other persons, property, and could also void warranty coverage.

If the customer fails to follow safety instructions, Sky-Hero is not liable for and provides no warranty coverage for any product damages that occur during use, be they direct or indirect, legal, special, incidental, or economic (including but not limited to loss of profits). Do not use unapproved components or attempt to modify the ground robot in any way inconsistent with the instructions in the official documentation.

> *Please note that the content on this page is not a substitute for your judgment and common sense when operating your Sky-Hero ground robot. You are solely responsible for assuring your Sky-Hero devices are operated safely and in accordance with all local laws and regulations. Only you can ensure that you operate your Sign MkI in an appropriate manner which never jeopardises the safety of yourself, other people, or their property.*

- The Sigyn MkI system is not a toy and should not be used or handled by a person under the age of 18 years. Furthermore, this tactical device is intended for professional use only. Any user of this remote control device must have received appropriate training and be familiar with all of the operating instructions in this manual.

- Before using the Sigyn MkI system :

  a. 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.

  b. Special attention should be given to the paragraphs marked "CAUTION";

  c. Ensure you are aware of the local regulations applicable to the use of unmanned system and their accessories.

  d. Remember that unless its operated safely and in accordance with this guide, the Sigyn MkI system may expose you or others to equipment damage, personal injury, or both, which could result in serious harm or death.

- Be aware that videos and photos that are promoted and advertised by Sky-Hero and its affiliates have been made by experienced professionals. In the event of any uncertainty operating your Sigyn MkI system and its accessories, always refer to the most recent version of the Sky-Hero documentation.

■ 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 Sigyn MkI system.

3. WARNINGS | SIGYN MKI sUGV

■ Sigyn MkI is not weatherproof – don't operate it in rain, snow, puddles, etc.

■ Do not immerse this product in any liquid. This can lead to a complete malfunction of the device.

■ Avoid operating the Sigyn MkI 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 extreme direct heat sources and 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 drop the Sigyn MkI onto hard ground, from a height greater than 6 m | 19,6 ft. A fall from a height greater than this, could result in the complete breakage of the unit and the projection of parts that could cause injury.

■ Do not drive in extremely hot temperatures above 50°C | 122°F, or in extremely cold temperatures below -20°C | -4°F

■ When not in use, first remove the Li-ion batteries from the device. Then store the Sigyn MkI and the removed batteries 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 as well as 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.

4. 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.

5. WARNINGS | LI-ION & LIPO BATTERY

- Sigyn MkI uses removable, lightweight, rechargeable Lithium-Ion (Li-Ion) batteries and GCS MkII uses 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-ion and lithium-polymer batteries before purchase.

- The batteries are designed for integrated system use 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-ion and lithium-polymer batteries as they are very sensitive to charging characteristics and may explode, burn, or cause a fire if misused or mishandled.

  a. The operator is responsible for any damage or injury caused by the misuse or mishandling of lithium-ion/Polymer batteries and chargers.

  b. Charge only with the provided charger designed for this specific type of lithium-ion or lithium-Polymer battery.

  c. Charging should be completed in an open area. Always charge in or on a fire-proof surface. Never leave batteries charging unattended.

  d. Please note that the Sigyn MkI Li-Ion and GCS MkI LiPo batteries cannot be charged at temperatures above 45°C (113°F). The temperature range for charging the Li-Ion and LiPo battery is 0°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 (and also 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. PRE-OPERATE GUIDELINES

- Ensure that all of the devices, especially the battery compartment, the camera lenses and LED sensors are dust and smudge-free prior to operation. In order to clean your device, please use ONLY a dry cloth. No liquids or detergents should be applied to any part of the product as this may cause serious damage.

- Inspect the body structure and the camera glasses for visible damage and debris prior to drive.

- Examine the wheels to make sure that they are in the correct position.

- Check that the battery cover is properly attached. Never use the product without his battery cover.

- Make sure you have properly inserted the dedicated Li-Ion 18650 batteries with sufficient charge to complete the mission, ideally with at least 50% charge.

- Inspect the GCS MkII for visible damage prior to operation.

- Ensure that the GCS MkII controller is suitably charged for the mission.

- Verify that both devices are associated in a proper Sky-Hero software version.

- Only use accessories that came with the Sigyn MkI sUGV, or which are sold or authorized by Sky-Hero for use with the ground robot. Using unapproved accessories presents serious risks to safety and will void the product's warranty.

> *If any part of the ground robot or the ground control station fails to function correctly or has visible damage, do not operate the Sigyn MkI.*

OVERVIEW

OVERVIEW

The following is a description of the contents of each package containing a Sigyn MkI.

The "Sigyn MkI Core Tactical System" contains all components, including the controller, and this package allows you to directly control the ground robot.

The second package, the "Sigyn MkI Extension Set", is, as the name suggests, an add-on to the system that requires you to have already purchased a GCS MkII controller. This second package if purchased alone will not allow you to control the Sigyn MkI directly.

> ℹ️ *Please note that depending on the packages purchased, the binding procedure between the Sigyn MkI robot and the GCS MkII system controller differs.* 📖 **Page 23**

1. SIGYN MkI PACKAGES

Sky-Hero | Sigyn MkI Core Tactical System includes :

- 1x GCS MkII
- 1x Sigyn MkI
- 4x Li-Ion 18650 Battery
- 1x Li-Ion 18650 Battery Charger with Plug
- 1x EU/UK USB-C Wall Charger
- 1x USB-C to USB-C Cable
- 1x Tactical Backpack
- 1x Flex Divider
- 1x Pouch for Sigyn MkI
- 1x Binding Key

- 1x Firmware Upgrade Set:
    - 1x USB-C SD Card Reader
    - 1x SD Adaptor
    - 1x Nano SD Card
- 1x Sigyn Refresh Kit:
    - 4x Tyre Outer Ring
    - 2x Camera Glass
    - 2x Camera Glass Holder
    - 1x Battery Door Protection
    - 2x Carbon Plate
    - 1x Set of Screws

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Sky-Hero | Sigyn MkI Extension Set includes :

- ■ 1x Sigyn MkI
- ■ 4x Li-Ion 18650 Battery
- ■ 1x Li-Ion 18650 Battery Charger with Plug
- ■ 1x Pouch for Sigyn MkI

- ■ 1x Sigyn Refresh Kit:
    - ■ 4x Tyre Outer Ring
    - ■ 2x Camera Glass
    - ■ 2x Camera Glass Holder
    - ■ 1x Battery Door Protection
    - ■ 2x Carbon Plate
    - ■ 1x Set of Screws

2. SIGYN MkI REQUIRED ITEMS

The items required for the basic operation of the Sigyn MkI, regardless of the package held, are as follows :

A. 1x GCS MkII	
B. 1x Sigyn MkI	**G.** 1x Firmware Upgrade Set:
C. 2x Li-Ion 18650 Battery	1x USB-C SD Card Reader
D. 1x Li-Ion 18650 Battery Charger	1x SD Adaptor
E. 1x EU/UK USB-C Wall Charger	1x Nano SD Card
F. 1x USB-C to USB-C Cable	**H.** 1x Binding Key

For the selected components listed here, see the Sigyn MkI Core System

> ✎ ***Only these elements and their use will be the subject of discussion on the following pages.***

OVERVIEW

3. SIGYN MkI HARDWARE

An operator-friendly robot that provides teams with superior scouting through two ultra-sensitive Day-Night cameras. While 150-degree views allow for an impressive scope, dimmable IR LEDs on the front, back, and top of the vehicle provide video clarity and NVG lighting.

5 Payload Connector
with rubber cap

8 Battery cover

Binding LED 4 button
with rubber cap

9 Status LED

3 Upper IR LEDs

UPPER FRAME

Antenna 10

7 ON/OFF Button

6 Lower IR LEDs

LOWER FRAME

2 Front IR or White LEDs

1 Camera

REAR MASK

Antenna 10

2 Front IR or White LEDs

1 Camera

FRONT MASK
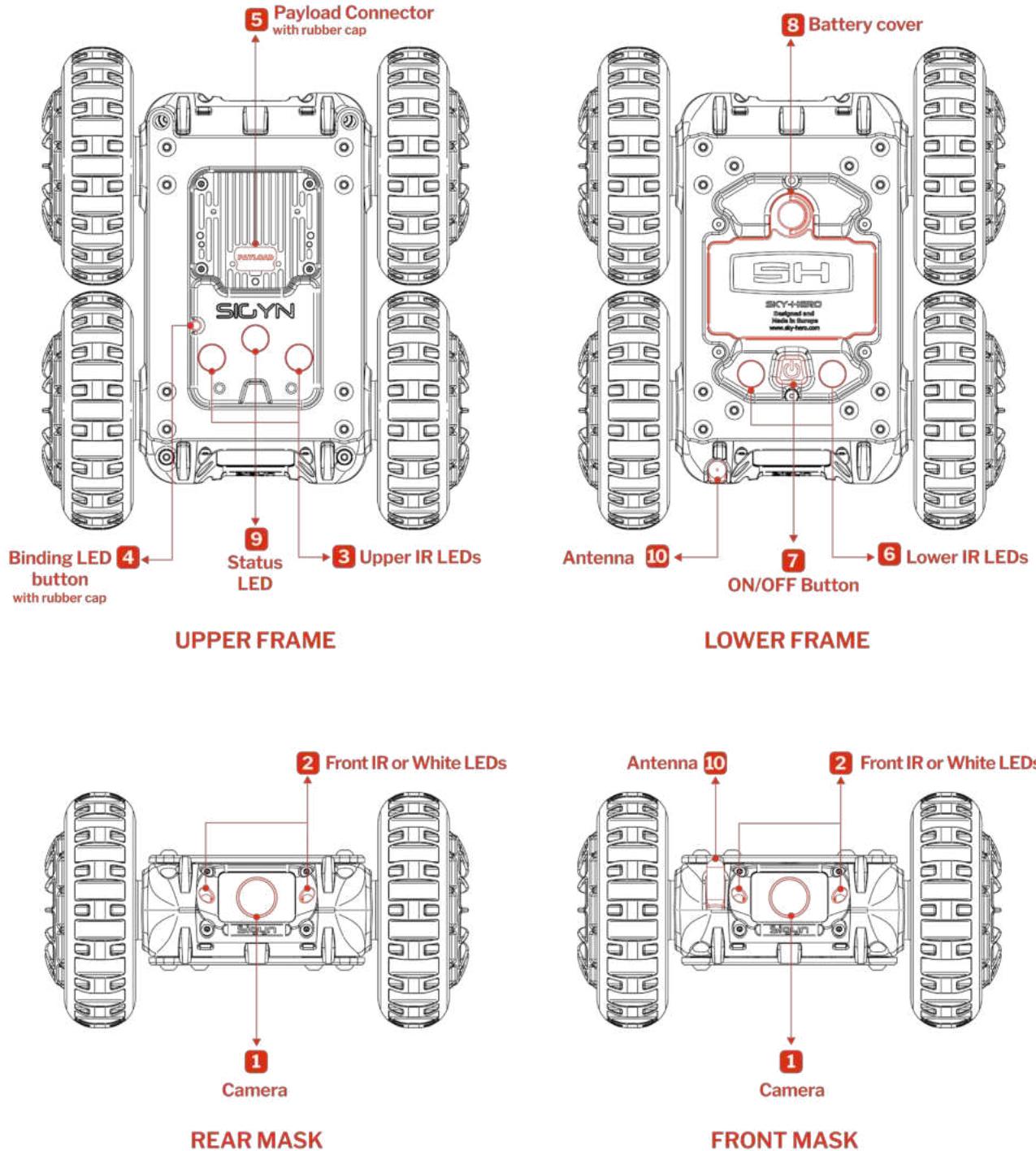
The Sigyn MkI is not weatherproof. It may be slightly splashed but cannot be immersed in any liquids. Preferably, do not operate it in any precipitation, including rain, fog, snow, or similar environments. Do not rest in sand, dirt or on similar terrain where particles can get trapped and interfere with the workings of the device.

4. GCS MkII HARDWARE

4.1. THE DEVICE

A small remote ground controller with a highly intuitive cyber secure interface that simultaneously handles the control and monitoring of multiple unmanned vehicles, including the operation of their sensors and plug-in payloads.

OVERVIEW
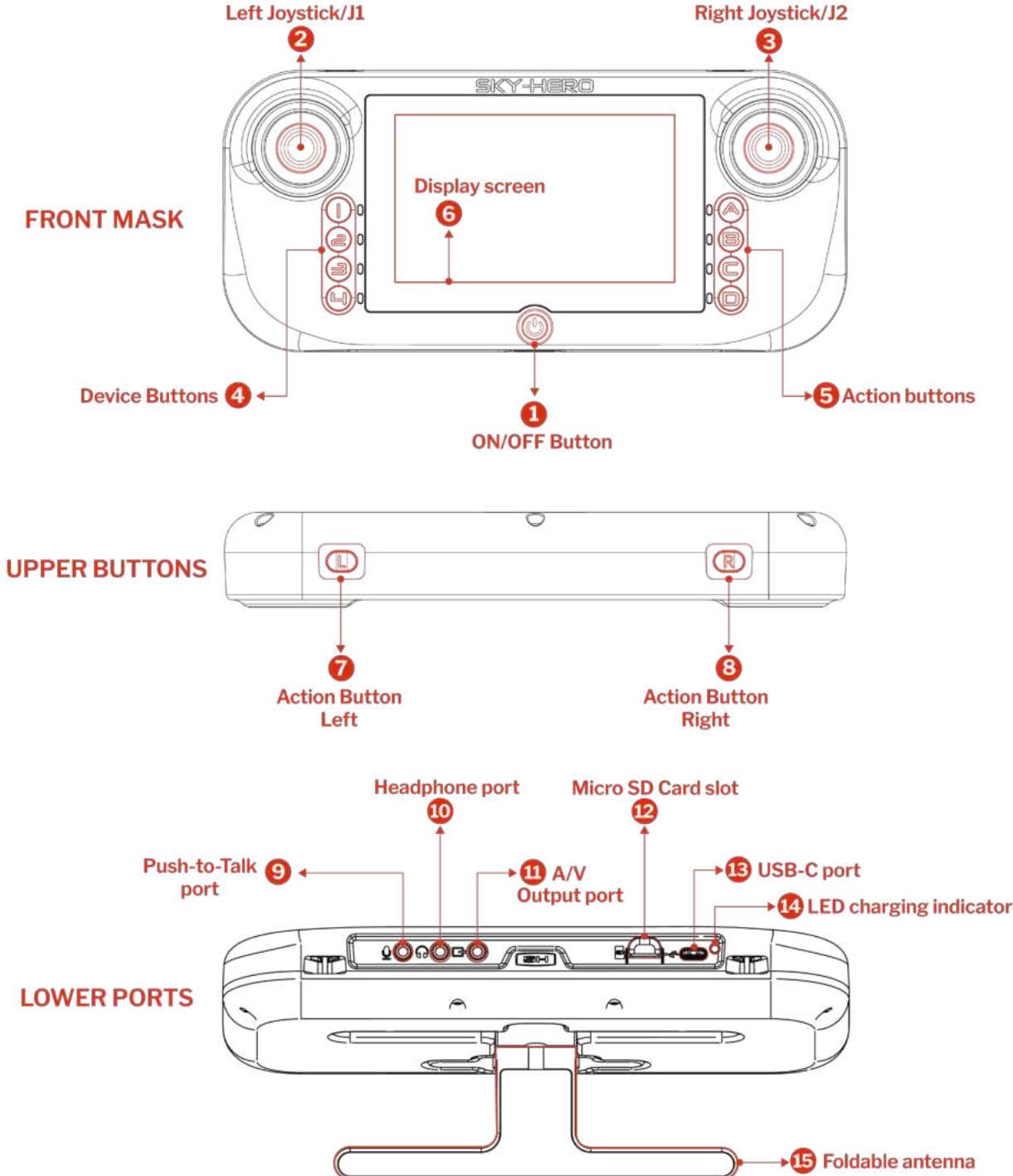
> ⚠ **The GCS MkII is not weatherproof. It can be lightly splashed, but cannot be immersed in liquids. It should not be used in precipitation, including rain, fog, snow, or similar environments. Do not place it in sand, dirt, or similar terrain where particles may be trapped.**

4.2 CONNECTIVITY

4.2.1 Ports

4.2.1.1 RADIO INPUT AND HEADPHONE PORT

The radio input and headphone output **(9)(10)** follow the CTIA standard. It accepts a 4-channel 3.5 mm TRRS connector. The pinout of the jack is as follows :

Ground line (-)
MIC (+)
Right Channel (+)
Left Channel (-)

CTIA Standard
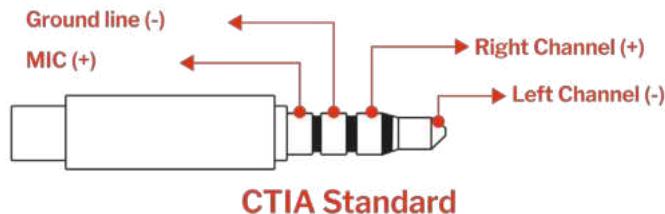
4.2.1.2 AUDIO/VIDEO OUT PORT

Use an analog 3.5 mm line-out jack to connect to your A/V receiver; the A/V output jack **(11)** follows Sony convention:

Ground line (-)
Right Channel (+)
Video (+)
Left Channel (-)

Left
Right
Video

Sony Convention AV output jack
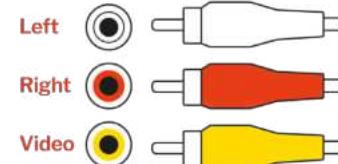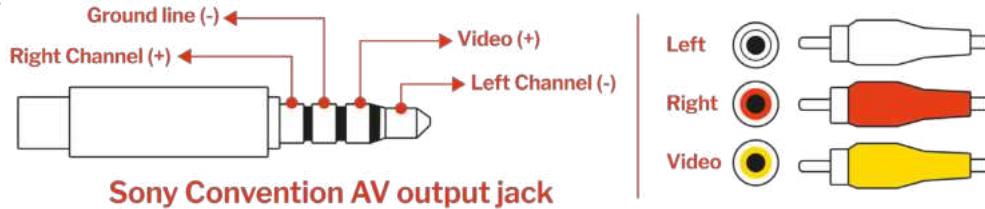
4.2.1.3 CHARGING USB-C PORT

A USB-C receptacle **(13)** that supports the 24-pin rotationally symmetrical USB connector system (USB Type-C connector). Due to its rotational symmetry, the USB-C plug can be inserted into the receptacle in either orientation.

	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A12	A12
	GND	TX1+	TX1-	VBUS	CC1	D+	D-	SBU1	VBUS	RX2-	RX2+	GND
	GND	RX1+	RX1-		SBU2	D-	D+	CC2	VBUS	TX2-	TX2+	GND
	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1

USB-C Pinout and features
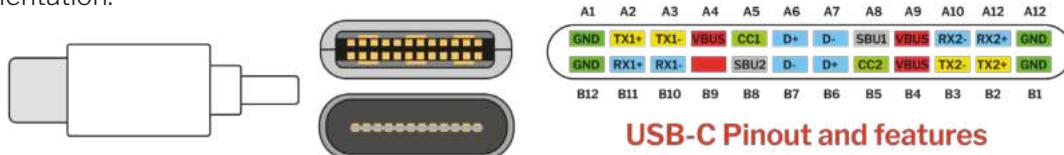
4.2.2 SD Micro Slot

A slot **(12)** that accepts only one Micro SD card with a maximum capacity of 32 GB. The inserted Micro SD card is only intended to update the device with specially formatted files.

PIN 8
PIN 7
PIN 6
PIN 5
PIN 4
PIN 3
PIN 2
PIN 1

Micro SD

PIN	1	2	3	4	5	6	7	8
SD	DAT2	CD/DAT3 CMD	VDD	CLK	VSS	DAT0	DAT1	
SPI	X	CS	DI	VDD	SD & Micro VSS	DO	X	
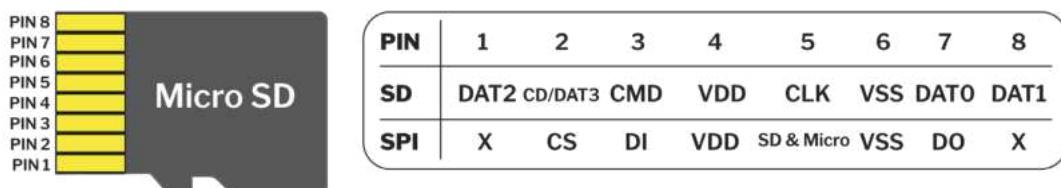
Micro SD card and features

> ℹ️ *Under no circumstances does the system offer the possibility of storing the audio and video stream of the vehicle used on the Micro SD card, nor does it offer the possibility of reading any file in a format other than that provided by Sky-Hero for updating the device.*

5. GCS MKII SOFTWARE

To get the most out of the GCS MkII, it is important to understand the details of its operation and display. As a controller, the GCS MkII not only controls your unmanned device, but also allows you to connect it to the system, adjust the various settings, and update the firmware. Each of these operations has its own section in the remainder of this document:

5.1. HOW TO NAVIGATE IN THE GCS MkII MENU

Once switched on via the central button **(1)**, the system allows you to interact with the elements displayed on the screen. To do this, only the right Joystick/J2 **(3)** and the D button **(5)** are required. The other buttons or joysticks within the remote control do not offer any interaction at this stage.

■ Press D button **(5)**	⇨	Access or Exit the menu
■ Move the Right-Hand Joystick/J2 **(3)** to the Right	⇨	Go a level down and/or confirm
■ Move the Right-Hand Joystick /J2 **(3)** to the Left	⇨	Go back
■ Move the Right-Hand Joystick /J2 **(3)** Up and Down	⇨	Scroll the menu
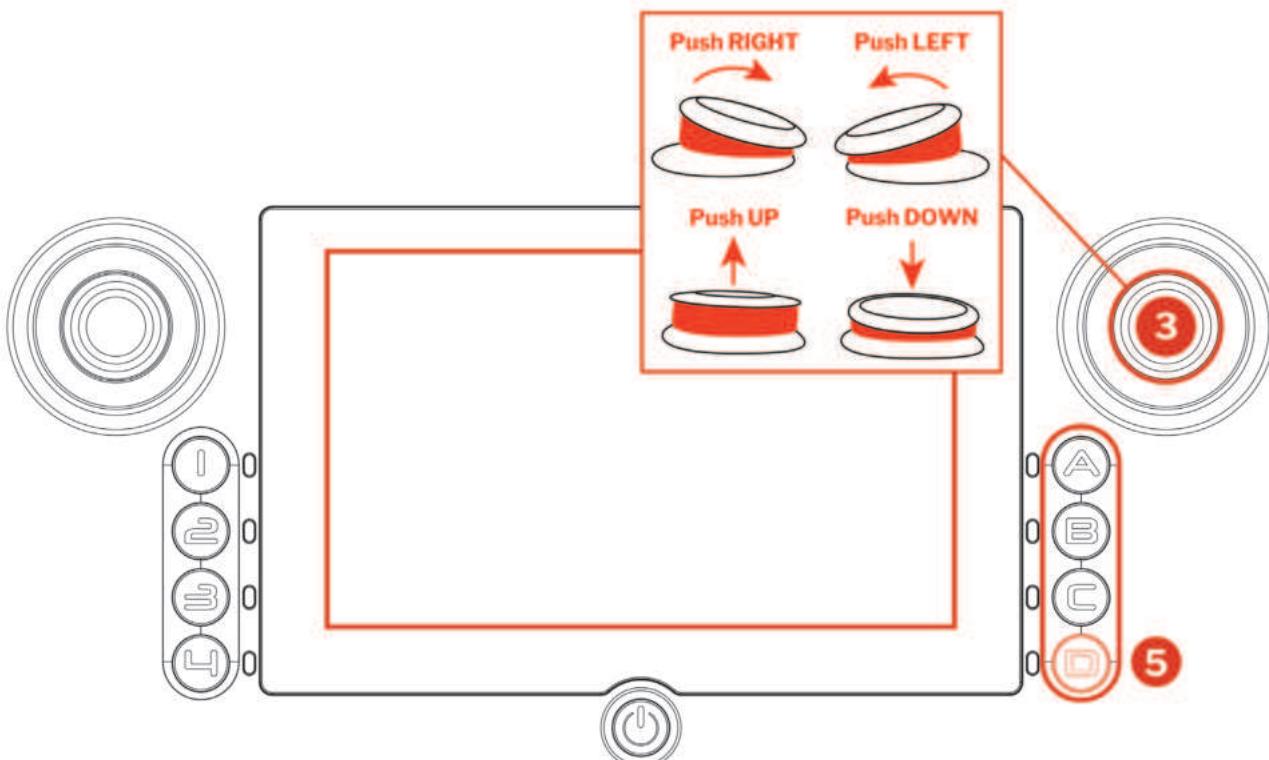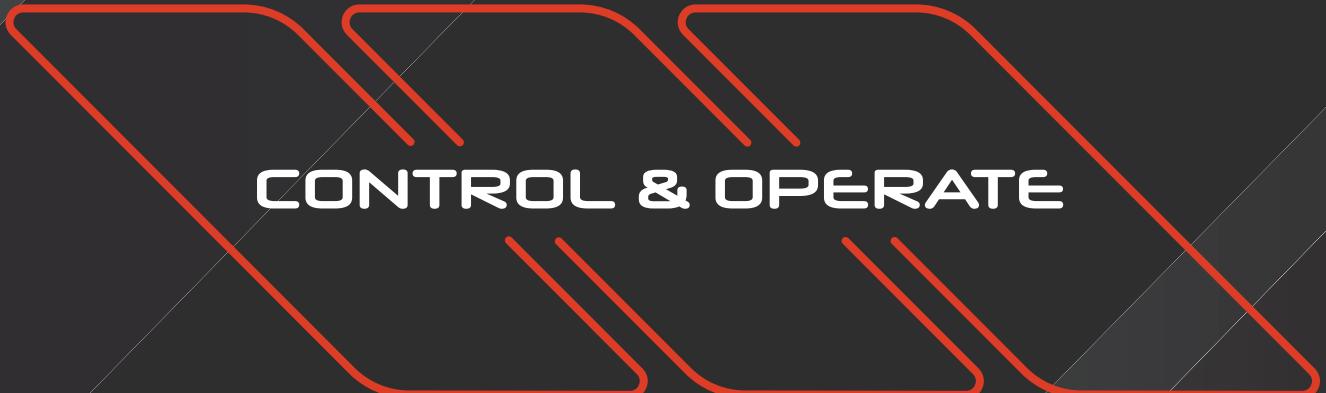
CONTROL & OPERATE

1. START

1.1 SET UP

STEP 1 - Charge your batteries in an open area:

■ For the GCS MkII Embedded LiPo battery: use the USB-C cable in the dedicated port **(13)** with the packaged power adapter.

    ■ For the Sigyn MkI independent Li-Ion 18650 batteries, connect the supplied charger to the power adapter.

The current state of charge of the battery is indicated :

■ For the GCS MkII:

    ■ In sleep mode, the LED **(14)** to the left of the USB-C charging port indicates the charging status. It changes from red (battery depleted) to yellow (charging) to green (battery fully charged).

    ■ When the GCS MkII is turned on by pressing the central button **(1)**, the battery level is displayed in the upper right corner of the screen which indicates the charge percentage.

■ For the Sigyn MkI:

    ■ Please refer to the battery level indicator on the supplied battery charger. When the batteries are inserted into the charger, the status of each battery is indicated by four blue LEDs in vertical bars. During charging, the percentage of battery remaining is indicated by one or more flashing blue LEDs. Once charged, the four bars for each battery are blue and solid.

> *It is normal for the controller and battery to be warm during charging.*

CONTROL & OPERATE

STEP 2 - Once the GCS MkII's status LED turns green **(14)**, it's time to calibrate the battery. In order for the GCS MkII to have the best estimate of the percentage of battery life remaining, 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).

1. Unplug the charger and wait 5-10 seconds before starting calibration.

2. Turn On the GCS MkII by long pressing the ON/OFF button **(1)**

3. Enter the menu (press D Button **(5)**), navigate and select the «GCS Settings Menu»

4. In this last menu, select "Calibrate Battery".

5. Once selected simply confirm by pushing the right joystick/J2 **(3)** to the right, and this will start the calibration process. Once done, the battery percentage is displayed by replacing --- %, with 100%.

STEP 3 - Once the Sigyn MkI dedicated batteries are charged, please insert them into the appropriate slot in battery bay of the robot:

1. Unscrew the battery cover **|8|** on the lower frame.

2. Insert the batteries starting with the positive terminal and then pushing in the negative terminal (label).

3. Screw the battery cover **|8|** back on.

1.2. BINDING DEVICES

The recognition of the deployed robot by the controller is linked to a specific binding protocol that must be re-initiated if you already possess other Sky-Hero tactical vehicles. This binding process must be repeated to synchronize several vehicles controlled by the same GCS MkII. Please refer to the appropriate procedure below for the hardware you own.

OPTION A - You own a **Sigyn MkI Core Tactical System** : In this case only, the GCS MkII is already bound with the Sigyn MkI. The devices have the latest firmware. All the necessary configuration steps, such as setting regional parameters, will have already been defined.

However, if the units are not paired, it is still necessary to follow the initial GCS MkII configuration procedure to set your regional parameters (which will set the associated transmit and receive frequencies and output power.

1. Turn On the GCS MkII by pressing ON/OFF button **(1)**

2. On GCS start-up prompt, define your «Region of use (CE/FCC)», to automatically configure the frequency and power limits of UAV/ UGV control and video signal in compliance with the regulations of the country of operation. 📑 **Pages 9 & 23**

3. Enter the menu (press D Button **(5)**), navigate and select the «GCS Settings Menu»

4. In this menu, select first «Joystick Calibration» and follow the instructions. To get the most accurate control possible, it is strongly recommended to calibrate the joysticks before the first use. 📑 **Pages 9 & 25**

5. Exit the menu (press D Button **(5)**)

OPTION B - You are in possession of a **Sigyn MkI Extension Set** :

1. Turn on the GCS MkII by pressing ON/OFF button **(1)**

2. Enter the menu (press Button D **(5)**), navigate to and select «Version».

3. Check if your remote firmware is on the latest release :

- If Yes, proceed to step 4 to bind the Sigyn MkI and GCS MkII.

- If No, proceed first with the firmware upgrade of the devices. 📖 **Page 45**

4. Then, bind the GCS MkII together with the Sigyn MkI :

- Turn On the Sigyn MkI by pressing central button **|7|** on the lower frame. The status LED on upper frame **|3|** becomes green.

- You have 40 sec. to press the binding button on the device. If this time limit is passed, turn off the Sigyn MkI and restart step 4.

- Turn the Sigyn MkI back on the upper frame and remove the small protective rubber cap **|4|** next to the upper LEDs.

- You will see the small LED binding button with a steady red light.

- Use the binding key to gently press it once. The LED button will start flashing green. Now, bind the device with the remote.

- To start the binding process, on the GCS MkII, enter the menu (press Button D **(5)**), navigate to «Advanced Settings Menu» and select it.

- In this menu, select «Device Binding», navigate to the desired left button **(4)** to allocate to your device, select it; then select «Loki2, Sigyn» on the following screen. A pop-up message appears on the GCS MkII screen showing «Connecting» - along with incrementing dots - to indicate the binding operation is progressing.

- Once the binding is complete, the GCS MkII displays the Sigyn MkI A/V stream. On the Sigyn MkI, the binding LED button turns steady green.

- Put the rubber cap back on the binding button on the Sigyn MkI.

2. CONNECT

2.1. TURN ON THE DEVICES

Now that all of the devices required for the deployment (Sigyn MkI and GCS MkII) have been charged and bound, you are ready to start connecting and using them.

STEP 1 - Turn On the Sigyn MkI by pressing the central button **|7|** on the lower frame. The LED on upper frame **|3|** will show a green light. Sigyn MkI is now activated.

> ⓘ   ***To turn off your Sigyn MkI, press the central button |7| on the lower frame. The LED on upper frame |3| will show a red light and then fades away. Sigyn MkI is deactivated.***

STEP 2 - Turn On the GCS MkII by pressing ON/OFF button **(1)**

STEP 3 - On the GCS MkII, push the button on the left **(4)** associated to the Sigyn MkI tactical ground robot.

STEP 4 - You will then see on the GCS MkII the A/V stream transmitted by the Sigyn MkI. You can start adjusting the settings and ultimately operating the ground robot.

2.2 SETTINGS MENU

To get the most out of your Sigyn MkI, you may want to adjust some settings before using it. Any changes to the parameters are made from within the interface displayed on the GCS MkII. For ease of understanding, we will separate the GCS MKII-specific parameters from the Sigyn MkI-specific parameters.

We refer you to the "Operator's Manual Add-on | Odyssy v.3.0.0" for a full explanation of all the features available. Here we will focus only on the basic features (A/V Settings, GCS Settings | Advanced Settings | Observe Device | Version) and Sigyn MkI-specific features (Device Settings). Cfr. GCS MkII Menu 📖 **Page 26**

SKY-HERO | GCS
MKII

MENU STRUCTURE V3.0.0
COMPLETE VERSION

Legend

GCS MENU STRUCTURE
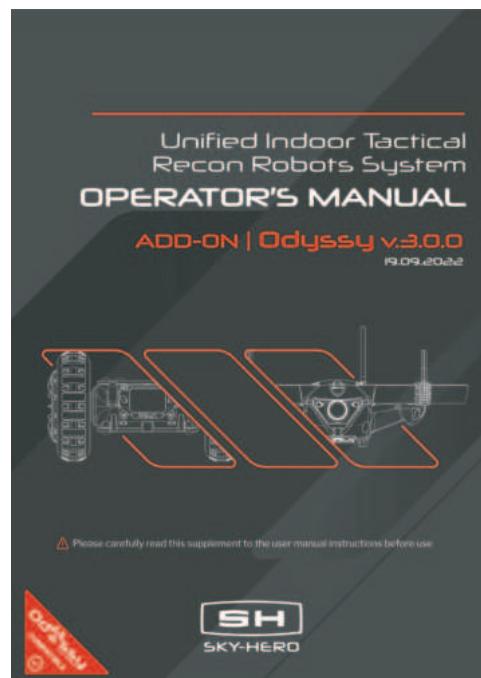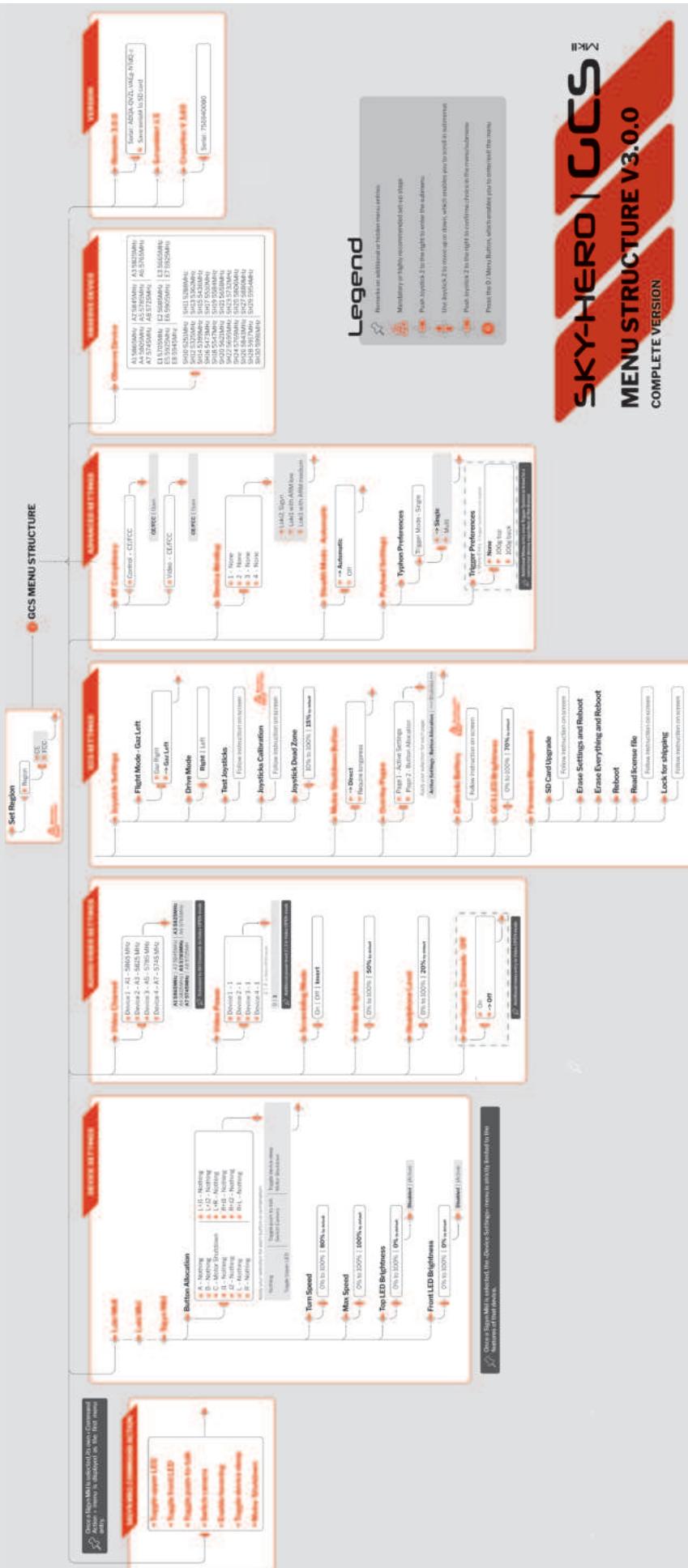
2.2.1. GCS MkII Settings Menu

2.2.1.1 SET REGION

This setting prompted at GCS MkII initialization configures the communication frequency and signal output power limits of both UAV/UGV control and video signal in compliance with the regulations of the country of operation (CE | FCC), this was already described above and applied in Sigyn MkI setup stage.

Once the area of use is determined, it is recorded along with the corresponding power level of the video and control signals.

	Mode	Max Power	Frequencies
Control	CE	25 mW LBT	868 MHz
	FCC	100 mW	915 MHz

	Mode	Max Power	Number of channnels
Video	CE/FCC	25 mW	8

The choice of the region is one of the 3 key steps, along with the calibration of the battery and the calibration of the joysticks, which should ideally be carried out before using the various connected vehicles.

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.
1. *Go to the GCS Settings menu item.*
2. *Select the Firmware Management menu.*
3. *Choose the Erase Everything and Reboot option and activate it by moving the right-and joystick/J2 to the right.*

You have the opportunity to change the defined region settings to the «OPEN» mode in order to increase the general performance 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 CE and FCC regional standards:
1. *Navigate in the GCS MkII Menu to Advanced Settings*
2. *Select RF Compliancy menu*
3. *Choose Control or Video*
4. *Move the right-hand Joystick/J2 (3) up or down and select Open*

	Mode	Max Power	Frequencies
Control	Open	250 mW	868/915 MHz

	Mode	Max Power	Number of channnels
Video	CE/FCC	350 mW	37

CONTROL & OPERATE

CONTROL & OPERATE

2.2.1.2 AUDIO/VIDEO SETTINGS

This menu allows you to adjust the various parameters related to the audio and video characteristics of the controlled robot, such as video channel selection, video signal strength, encryption mode, audio volume...

📑 **Pages 18-19**

➡ **VIDEO CHANNEL**
Specify the video channel for each of the four devices under control

Be sure to use different frequencies when several devices are used during a same mission to avoid interference between devices. The sUGV paired on Device Button 1 **(4)** will be listed as Device 1, the sUGV paired on Device Button 2 **(4)** listed as Device 2, etc. By default, the system is limited to 8 channels (5745 MHz to 5865 MHz)

1. Enter the "**Video Channel**" Menu

2. Select the desired device and confirm by pushing the right-hand Joystick/J2 **(3)** to the right

3. The screen shows the video channel currently in use. Scroll up or down to set it to one of the video channels available in your area (CE or FCC).

CE SETTINGS	
Name	Frequency (MHz)
A1	5865
A2	5845
A3	5825
A4	5805
A5	5785
A6	5765
A7	5745

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

💡 *The Open Mode gives you the opportunity to extend the number of accessible channels (from 7 to 21 channels). As those additional frequencies could be subject to special authorizations or licenses, please refer to the local regulatory body for accurate information (It is your responsibility to ensure that you do not contravene any local regulations!)*

OPEN SETTINGS											
Name	Frequency (MHz)	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		
		E8	5945	SH17	5510	SH25	5806		

SH
SKY-HERO

➡ **VIDEO POWER**
Define the Video power for each of the four controlled vehicles.

The Sigyn MkI system uses an analog video transmission which offers greater reliability,

Whilst also 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 the ultra-short range to control functions without disturbing other users

1. Enter the "**Video Power**" Menu

2. Select the desired device and confirm by pushing the right-hand Joystick/J2 **(3)** to the right

3. The screen displays the current video channel and its power level (1 by default). Scroll up or down to set the video power level (0 or 1).

Level	Video Power
0	1mW
1	25mW

The Open Mode gives you the opportunity to access increased power level (2 and 3). As those additional power levels could be subject to special authorizations or licenses, please refer to the local regulatory body for accurate information.

Level	Video Power
2	250mW
3	350mW

➡ **SCRAMBLING MODE**
Activate or deactivate the scrambling system, and ultimately reverse the scrambling signal

This setting is common to all connected devices. Turning scrambling ON will enable you to make your video signal unreadable by non-Sigyn MkI (Loki MkII, Narfi MkI) users.

1. Enter the "**Scrambling Mode**" Menu

2. Select the desired status :

    a. **ON** - Scrambling is achieved by swapping parts of the image randomly to make the image unrecognizable without the matching descrambling algorithm. It implies a faster degradation and a shorter range of the video signal.

    b. **OFF**

    c. **INVERT** – By selecting this mode, 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.

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.

➡ **VIDEO BRIGHTNESS**
Adjust the brightness of video displayed on the GCS MkII screen

1. Enter the "**Video Brightness**" Menu

2. Scroll up or down to set the percentage (by default 50%) of video brightness between 0% to 100%

➡ **HEADPHONE LEVEL**
Set the sound level transmitted to the connected headphones

1. Enter the "**Headphone Level**" Menu

2. Scroll up or down to define the percentage (by default 20%) of headphone level between 0% to 100%

2.2.1.3 GCS SETTINGS

This menu contains all the configurable items related to the controller itself, from joystick settings to the system update process. 📖 **Pages 22-25**

➡ **JOYSTICK SETTINGS**
Calibrate and associate the drive action with the selected joystick for the operation of a device

1. Enter the "GCS Settings" Menu and select :

➡ [**2. FLIGHT MODE**] (only for Loki MkII sUAV)

➡ **2. DRIVE MODE |** *Define which joystick you'll use to control the Sigyn MkI*
3. Scroll up or down to assign control of the Sigyn MkI to the right joystick (default) or the left joystick.

➡ **2. TEST JOYSTICKS |** *Test the correct operation of each joystick*
3. Enter and follow the instruction displayed on screen

> 💡 *In order for this option to work correctly, it is first necessary to perform the important step of calibrating the joystick*

➡ **2. JOYSTICKS CALIBRATION |** *Avoid any impact from original mechanical differences when controlling the connected devices.*
3. Enter and follow the instruction displayed on screen

> ⓘ *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.*

➡ **2. JOYSTICK DEAD ZONE |** *Define the distance the joystick can move from the neutral position before it starts registering as an input in the control of a device (this can be considered as 'Joystick Sensitivity')*
3. Scroll up or down to set the dead zone (15% by default) of both joysticks between 10% to 100%

➡ MOTOR SHUTDOWN
Configure the shutdown of the engines of the operated devices

Also known as an emergency stop, this function will immediately shut down all motors, regardless of the sUGV's current situation, resulting in an immediate stop of the sUGV. This can be used if the SUGV begins to exhibit abnormal behavior and cannot be recovered by the operator.

1. Enter the "**Motor Shutdown**" Menu

2. Make your choice between :

   a. **DIRECT** - single press on the button allocated **(5)** to shutdown the engines of the operated device

   b. **REQUIRE LONGPRESS** - long press (1,5 sec.) on the button allocated **(5)** to shutdown the engines of the connected device

➡ OVERLAY PAGES
Change default selection or disable overlay screens

These superimposed screens on the broadcast video image are accessible for each selected device and are specific to the settings assigned to each of them.

1. Enter the "*Overlay pages*" Menu

2. Select then :

   a. **PAGE 1** – Active Settings (by default)

   b. **PAGE 2** – Button Allocation (by default)

3. Apply your display choice to the selected page: Active Settings or Button Allocation or Disabled

Overlay Screen - Active Settings

Overlay Screen - Button Allocation

➡ CALIBRATE BATTERY
Ensure that the GCS MkII battery level displays the most accurate estimate of remaining battery life

1. Fully charge your GCS MkII until the LED Indicator **(14)** turns green

2. Unplug the charger and wait 5-10 seconds

3. Enter the "Calibrate Battery" Menu

4. Select "Start Calibration" and follow the on screen instructions.

> ⓘ *The calibration of the battery is one of the 3 key steps, along with the choice of the region and the calibration of the joysticks, which should ideally be carried out before using the various connected vehicles.*

CONTROL & OPERATE

➡ **GCS LED BRIGHTNESS**
Adjust the brightness of LED of the GCS MkII

1. Enter the "**GCS LED Brightness**" Menu

2. Scroll up or down to set the percentage (by default 70%) of GCS LED brightness between 0% to 100%

➡ **FIRMWARE MANAGEMENT**
Manage the firmware of the GCS MkII

1. Enter the "**Firmware Management**" menu :

➥ **2. SD CARD UPGRADE |** *Update the firmware of the GCS MkII*
Refer to 📖 **Page 47** which details the upgrade procedure

➥ **2. ERASE SETTINGS AND REBOOT | Delete only custom settings and reset them to the default state**
3. Push the right Joystick/J2 **(3)** to the right to activate

➥ **2. ERASE EVERYTHING AND REBOOT |** *Reset the definition of the region, delete the custom settings, and restore them to the default state*
3. Push the right Joystick/J2 **(3)** to the right to activate

➥ **2. REBOOT |** *Restart the GCS MkII*
3. Push the right Joystick/J2 **(3)** to the right to apply

➥ **[2. READ LICENSE FILE] (only for Loki MkII sUAV trigger)**

➥ **2. LOCK FOR SHIPPING |** *Lock all the functions of the GCS MkII in the context of transportation or storage*
3. Select "Lock unit for shipping" and follow the instructions on the screen

> *To unlock the device, ask your local distributor or Sky-Hero for the sequence.*

2.2.1.4 ADVANCED SETTINGS

This menu is related to complementary settings and features for both the GCS MkII and the Sigyn MkI, such as, (among others) the binding procedure. 🔍 **Pages 28-29**

➡ **RF COMPLIANCY**
Modify your regional settings to the Open Mode 📖 **Page 27**

The RF compliance settings allow you to check the initially defined regional settings (CE/FCC), but also to switch to open mode, which gives you a wide choice of video channels and video power levels.

1. Navigate in the GCS MkII Menu to "**Advanced Settings**"

2. Select "RF Compliancy" menu

3. Choose "Control" or "Video"

4. Orient the right-hand Joystick/J2 **(3)** up or down and select Open

➡ **DEVICE BINDING**
Bind a new device to the GCS MkII

1. Activate the Sigyn MkI by pressing the center button on the bottom frame. Once this is done, you have a few seconds to gently press the small LED on the back of the robot using the binding key to turn the Sigyn MkI into binding mode. This small LED is now blinking green.

2. Enter the "**Device Binding**" Menu on the GCS MkII

3. Select the button which will be assigned to the new device (1-4) **(4)**

4. Then select which kind of unmanned vehicle you want to associate : Loki2, Sigyn | Loki with ARM low | Loki1 with ARM medium

5. Orient the right-hand Joystick/J2 **(3)** to the right to apply your choice. The association with the device on the chosen button is automatic:
A number of notifications will be displayed in the footer of the GCS MkII to inform you of the progress of the appliance association process: BINDING … then CONNECTING …

6. Once the binding process is done, the name of the robot will appear in the GCS MkII list of bound robots (1-4) **(4)**. On the Sigyn MkI the little status LED will remain green

> ⚠ *If you attempt to link a device with an older version, the GCS MkII will display a warning message: UNSUPPORTED DEVICE. A summary of the firmware version for each device, as well as for the Scrambler and Crossfire, is displayed. You will then need to update one of the devices. See the Upgrade section below* 📖 *to proceed.*

> ⓘ *In some cases, you may see the following message in the GCS MkII footer before the binding operation: RX/TX IS LOADING. This means that the Crossfire is being updated automatically by transferring data from the robot to the GCS MkII. Once this is complete, the binding process will begin automatically.*

➡ **STEALTH MODE**
Switch off all the internal LEDs of the operated devices

1. Enter the "**Stealth Mode**" Menu

2. Select the Automatic mode (LEDs automatically switch off after 10 seconds) or Off mode (LEDs stay on)

> ⓘ *In this mode, please take extra care to check that the Sigyn MkI is switched off after use, as the status LED |9| will no longer indicate that it is on.*

CONTROL & OPERATE

➡ **PAYLOAD SETTINGS**
Adapt the triggering action when the Typhon Payload is linked to the device

This parameter cannot be used if the Typhon payload is not connected to the device.

Refer to the user manual of the Typhon payload for more details.

2.2.1.5 OBSERVE DEVICE

This menu entry gives your GCS MkII the ability to act as a simple video receiver of the video stream provided by other deployed Sky-Hero unmanned vehicles.

Operators can navigate using the four device buttons **(4)** and, thus, capture the output video feed of any nearby devices (whether Sky-Hero devices or not) broadcasting in the frequencies set for each Device in the Video Channel menu.

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. 📄🔍 **Page 32**

1. Enter the "**Observe Device**" Menu

2. Scroll up or down to scan all accessible video channel frequencies.

2.2.1.6 VERSION

Find the different versions of the software installed on the current controller GCS MkII. 📄🔍 **Page 33**

1. Enter the "**Version**" Menu:

➡ **2. REMOTE | Update the firmware of the GCS MkII**
3. Select and find the complete Remote Serial as well as the option to save it to an SD card to be inserted into the appropriate slot **(13)**

➡ **2. SCRAMBLER | Check the scrambler version number**

➡ **2. CROSSFIRE (embedded UHF transmitter) | Check the crossfire version number**
3. Select and find the Crossfire serial number

➡ **2. DEVICE | Check active robot version**

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2.2.2. Sigyn MkI Settings Menu

This menu allows you to set the specific features of the device you are using, in this case the Sigyn MkI.

📑 **Page 14-15**

2.2.2.1 DEVICE SETTINGS

➡ LOKI Mk2
   [Only effective when Loki MkII is connected]

➡ LOKI Mk1
   [Only effective when Loki MkI is connected]

➡ **SIGYN**
   Adapt and customize the features of the Sigyn MkI sUGV

   1. Enter the Sigyn Menu:

   ➡ **2. BUTTON ALLOCATION |** *Configure as desired a selection of buttons to operate the Sigyn MkI*
      3. Select the button allocation sub-menu
      4. Choose the direct action buttons (1 button) **(5)(L/R)(J1/J2)** or a combination of these (L/R + another button) **(13)**
      5. Associate a quick action to the selected button of combination:

      ■ **Nothing**
         No action is associated with the button or button combination.

      ■ **Toggle Upper LED**
         This function turns on the upper LEDs at the preset brightness level set in the corresponding menu in the GCS. Toggle again to turn them off.

      ■ **Toggle Front LED**
         This function turns on the front LEDs of the Sigyn MkI active camera to the preset brightness level set in the corresponding menu in the GCS. Toggle again to turn them off.

      ■ **Toggle push-to-talk**
         This function enables the use of one the GCS' Allocatable Button as a PTT. The use of a dedicated cable for your radio system might be necessary.

      ■ **Switch camera**
         This function switches from the front camera, which is selected by default when the ground robot is in motion, to the rear camera. Regarding the inclination of the cameras in relation to their position and reversibility, the rear camera will show a downward-inclined view. You can go back to the initial front view by clicking again the same defined button.

ℹ *By default, the upward-facing camera is always the source of the transmitted video stream. The system automatically adjusts to use the front camera when the Sigyn MkI is turned upside down.*

■ **Toggle device sleep**

This function allows putting the current connected device into 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.*

■ **Motor Shutdown**

Also called as emergency shutdown, this function will immediately cut all four motors, regardless of the sUGV's current situation or position. It is mainly used when a joystick is locked in one direction. To regain control, simply move the locked joystick to the neutral centre position.

➜ **2. TURN SPEED |** *Change the manual rotation speed of the Sigyn MkI robot*

3. Select and scroll up or down to set the percentage (by default 80%) of Sigyn mkI turn speed between 0% to 100%

➜ **2. MAX SPEED |** *Increase or decrease the speed of the Sigyn MkI robot*

3. Select and scroll up or down to set the percentage (by default 100%) of Sigyn mkI speed between 0% to 100%

> 💡 *Adapting the speed of movement goes hand in hand with near-silent movement - ideal for some specific mission scenarios.*

➜ **2. TOP LED BRIGHTNESS |** *Modify the intensity of the Sigyn's IR top LEDs*

3. Select and scroll up or down to set the percentage (by default 0%) of Sigyn MkI top LED brightness between 0% to 100%

4. You can decide if you want these LEDs active or disabled. Simply push the right-hand Joystick/J2 **(3)** to the right to apply your choice.

➜ **2. FRONT LED BRIGHTNESS |** *Modify the intensity of the Sigyn's IR front LEDs*

3. Select and scroll up or down to set the percentage (by default 0%) of Sigyn MkI front LED brightness between 0% to 100%

4. You can decide if you want these LEDs active or disabled. Simply push the right-hand Joystick/J2 **(3)** to the right to apply your choice

> ⚠ *840nm IR light used in the Sigyn MkI 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.*

3. OPERATE

Now that you have bound and connected your Sigyn MkI ground robot to your GCS MkII controller and have had a chance to adjust the various parameters to your liking, you are ready to use your ground robot in the field of operation.

Sigyn MkI is controlled using the GCS MkII joysticks, top and right buttons.

3.1. BASIC DRIVING

To move the robot, simply point the right joystick in the desired direction:

■ To drive Forward : orient the Right Joystick **(3)** upward

■ To drive Backward : orient the Right Joystick **(3)** downward

■ To turn Left : orient the Right Joystick **(3)** to the left

■ To turn Right : orient the Right Joystick **(3)** to the right
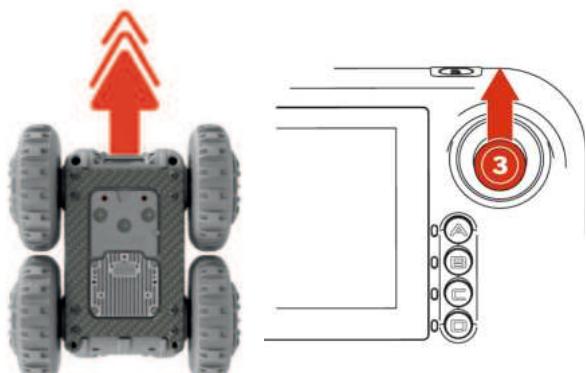
Drive Forward
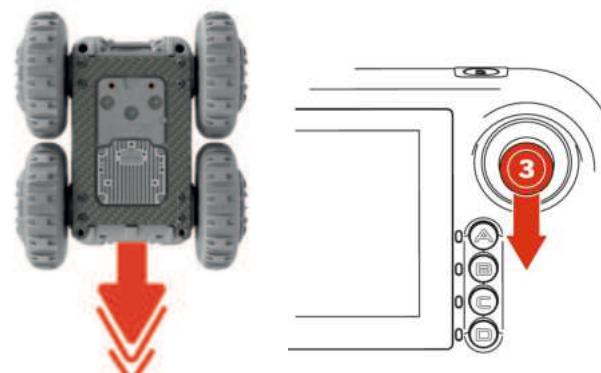
Drive Backward
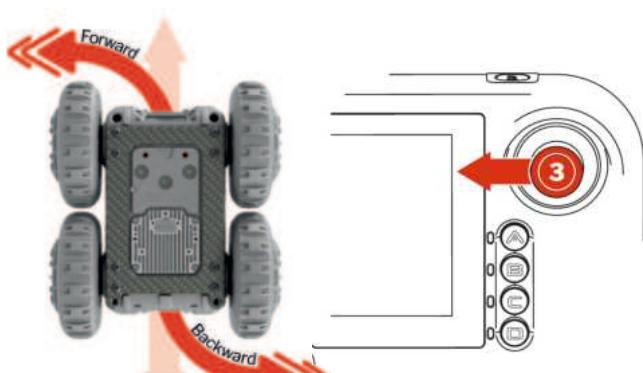
Turn Left
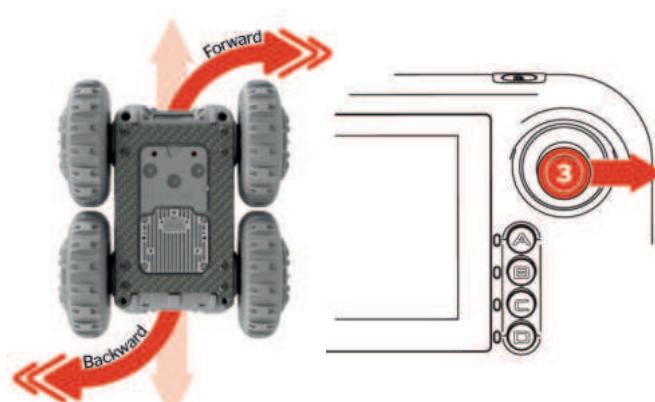
Turn Right

Note that the forward/backward speed is progressive. The more you move the joystick forward/backward, the faster the Sigyn MkI will move, until Max Speed is reached. Page 36

3.2. ADVANCED DRIVING

In order to rotate the Sigyn MkI, please follow the instructions below to proceed with the manipulation:

■ To operate an automatic clock-wise rotation of 90°, push the Left Joystick/J1 **(2)** to the right

■ To operate an automatic counter clock-wise rotation of 90°, push the Left Joystick/J1 **(2)** to the left

■ To operate an automatic rotation of 180°, push the Left Joystick/J1 **(2)** downward
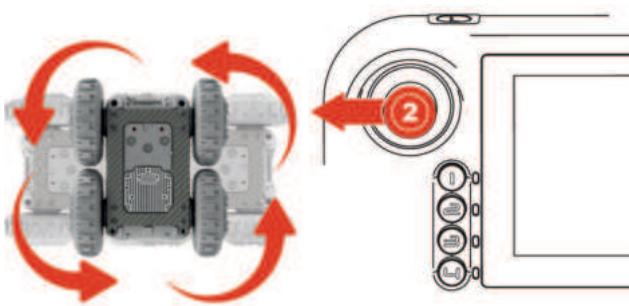
Counter clock-wise rotation of 90°
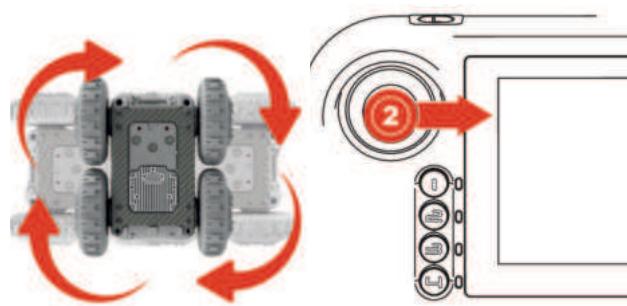
Clock-wise rotation of 90°
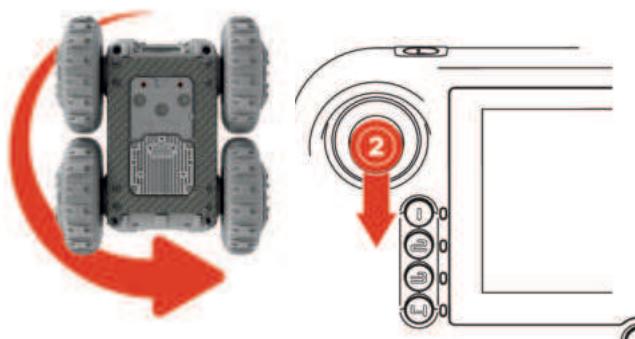
Automatic rotation of 180°

3.3 ACTIVATE DEFINED FEATURES

In addition to controlling the movement of the Sigyn MkI as described, you can activate certain features by using the predefined and/or self-defined buttons.

In the following section, you will find information on how to use these buttons and what they are or can be used for :

3.3.1 Predefined buttons

3.3.1.1 TO SELECT THE DEVICE

Press the corresponding button (1-4)**(4)** to connect to the linked and activated device.

The color of the LED associated with each button indicates the connection status:

■ Red: no connection

■ Orange: connection established

■ Green: Full control

3.3.1.2 TO ENTER THE GCS MkII MENU

1. Press the Button D **(5)**
2. Navigate to the menu using the right joystick/J2. 📖 **Page 26**

3.3.1.3 TO ACTIVATE GCS MkII SLEEP MODE

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 the corresponding button (1-4)**(4)**.

1. Long Press button «D» **(5)** to activate Sleep Mode
2. Long Press button «D» **(5)** to deactivate Sleep Mode

> ℹ️ *Please note that the «Sleep Mode» will not be allowed if the controller is connected to a moving vehicle.*

3.3.1.4 TO PROCEED TO THE OVERLAY SCREENS

1. Press once the active device allocated button (1-4) **(4)** to see overlay screen 1, "Active Settings" (by default)
2. Press the same button a second time to display overlay screen 2, which by default shows the details of the buttons assigned to the selected device.
3. Press again the same button a third time to exit from the overlay screens mode.

3.3.1.5 TO DISCONNECT A BOUND DEVICE

Disconnecting means cutting off all signal transmissions (video | audio | control) between the GCS MkII and the paired device(s).

1. Long press the active device button (1-4) **(4)** to disconnect the associated unmanned vehicle.
2. Press the selected active device button (1-4) **(4)** again to reconnect the unmanned vehicle, or press any other button (1-4) **(4)** on another linked device to connect it.

3.3.1.6 TO SWITCH DEVICES

By connecting multiple Sky-Hero vehicles (up-to 4) to the same GCS MkII controller, you can easily switch from one vehicle to another and automatically receive and control its video stream.

1. Press one of the three remaining buttons (1-4) **(4)** to switch from the currently used robot to another one deployed at the same time. Once the button is pressed, you automatically have access to the video stream and control of the selected device.

> ⚠️ *This will stop the link with your actual device and create a link with the new device you want to control.*

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> *Note that this function will only work if at least two of the four possible vehicles – Sigyn MkI sUGV and/or Loki MkII sUAV and/or Narfi MkI Pole Camera head) are deployed at the same time using the same GCS MkII controller.*

3.3.2 Self-defined button

A selection of buttons on the Sigyn MkI can be configured as desired.

This selection includes

- The 3 right-hand buttons (A-B-C) **(5)**
- The 2 top buttons (L and R) **(7)(8)**
- The 'click' function of each of the 2 joysticks **(2)(3)**

As previously explained 📖 Page 35 , seven freely assignable actions can be associated with "quick action" by using a single button or a "combination action" via a button sequence:

- Nothing | No action
- Toggle Upper LEDs | Switching on upper LEDs of the Sigyn MkI
- Toggle Front LEDs | Switching on front LEDs of the Sigyn MkI active camera
- Toggle push-to-talk | Activate the communicator
- Switch camera | Switching from the front to the rear camera
- Toggle device sleep | Switching to sleeping mode
- Motor Shutdown | Switching off the engine (C button **(5)** by default)

3.3.3 Sample of GCS MkII action buttons allocation

As an example for the Sigyn MkI sUGV, we have assigned all the actions to the various buttons and/or button combinations in the diagram below.

> *Each operator is free to make changes according to their operational requirements.*

3.4 GCS MkII Indicators

The GCS MkII displays several key information to operate the robot, in addition to the controls of the deployed Sigyn MkI tactical ground robot. Refer to the diagram below for an overview of the different states that can be displayed while using the Sigyn MkI.

1. **Video Feed**
    The default video stream from the active Sigyn MkI front camera is displayed across the entire screen. This video stream can be replaced by the rear camera stream using a defined quick action. This allows the two camera streams to be swapped.

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

3. **Device Battery Power Level**
    This is the remaining battery indicator for the deployed device. It displays a value between 100% (fully charged) and 0% (battery depleted). Glows green when the battery is full. It turns yellow when the battery is below 40% and red when the battery is down to 10%.

4. **GCS Battery Power Level**
    This is the remaining battery indicator for the GCS MkII controller in use. It gives a value between 100% (full charge) and 0% (empty battery). Glows green when the battery is full. It turns yellow when the battery is below 40% and red when the battery is down to 10%.

5. **S**
    This letter (S) is an indication that stealth mode has been enabled.

6. **D**
    This letter (D) indicates that the active camera is the rear camera, facing down

7. **M**
    Displays the status of sensors in relation to the Motors. It is highlighted in green for OK, yellow for invalid and red for failure.

8. **I**
    Shows the inertial measurement unit (IMU) sensor status. It is highlighted in green for OK, yellow for invalid and red for failure.
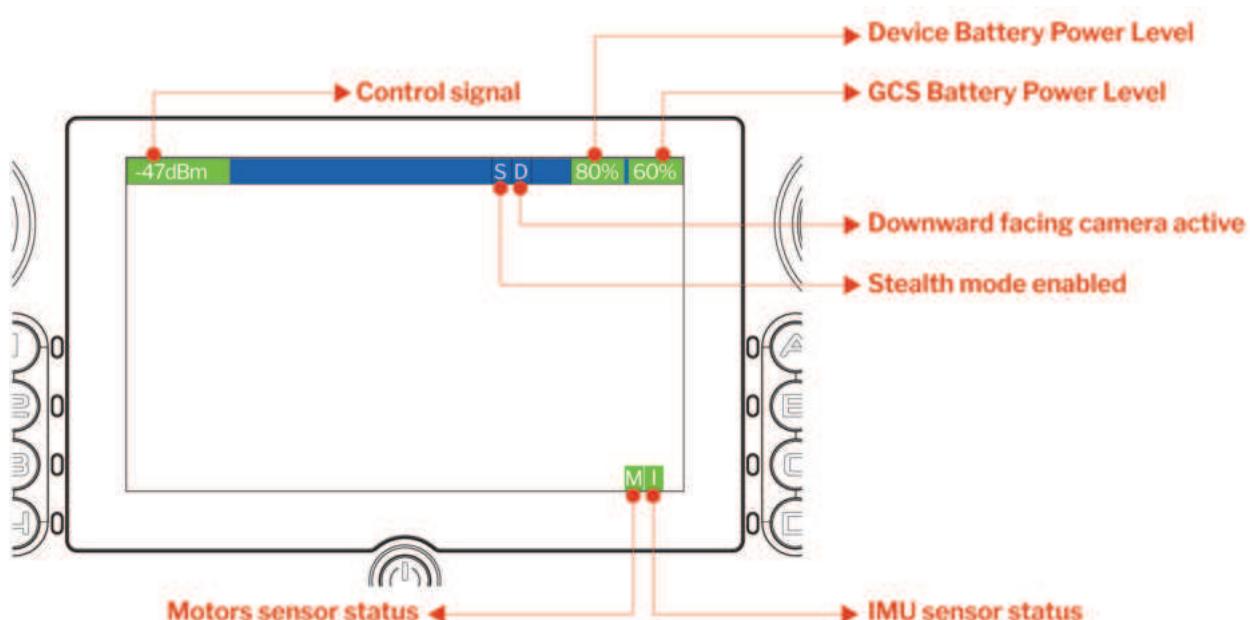
4. EMERGENCY BEHAVIORS

4.1 LOST CONNECTION

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

In all cases, the devices will keep broadcasting Audio/Video on the set video channel and power. Any changes to settings done in the GCS MkII, regarding a non-communicating device, will only be effective once communication with the device has been re-established .

4.2 LOW BATTERY BEHAVIOUR

4.2.1 GCS MkII low battery warning

In the event of a GCS MkII low battery warning - a percentage below 10% is displayed on the GCS MkII screen - it is recommended that the Sigyn MkI be returned to the operator in order to avoid losing control and video signal, which may result in being unable to recover the Sigyn MkI.

Keep your GCS MkII under load to bring it back into service.

4.2.2 Sigyn MkI low battery warning

Also, if the Sigyn MkI displays a low battery warning - a percentage below 10% displayed on the GCS MkII screen - please bring it back to the operator and proceed to replace the batteries as indicated in

Once this has been done, and after checking the battery charge status, you can continue to use it operationally.

4.3 SENSORS WARNING

4.3.1 Motors Warning

Alert notification when a problem is detected on one of the robot's motors.

The robot stops automatically. It must then be recovered, the motor problem analysed, and, (if necessary), repaired before being restarted.

4.3.2 IMU Warning

Alert notification when a problem is detected with the Inertial Measurement Unit system.

In this case, if the robot turns around, it no longer offers the automatic camera switching. Return it to your local distributor for repair if the problem persists.

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MAINTAIN & UPGRADE

1. STORAGE

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

1.1 PERFORM VISUAL INSPECTION

Before you put away your Sigyn MkI 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 for any loose screws. Check the wheels for any damage or debris, and inspect the camera lenses for dust and dirt. Also, check the battery bay.

1.2 CLEAN THE DEVICE

Cleaning your ground 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. See for cleaning tips and recommendations.

1.3 UPDATE FIRMWARE

Make sure you do any firmware updates on both sUGV and controller before putting your Sigyn MkI 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 ground robot out again. However, the updating process will be faster if you're not two or three versions behind. For details on how to upgrade, please refer to

1.4 REMOVE AND DISCHARGE BATTERIES

Proper care of your batteries will give them a much longer lifespan. If you do not plan to use your device within the next week, batteries should be discharged to 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.

1.5 STORE BATTERIES SEPARATELY

For safety's sake, your Sigyn MkI 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.

1.6 STORE SIGYN MkI IN A COOL, DRY, non-MAGNETIC PLACE

Once all the prep work has been done to prepare your device for storage, make sure to store it in suitable conditions. Your Sigyn MkI, 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.

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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 robot should be stored away from any sources of magnetism, to avoid any scrambling of the computer or electrical components.

1.7 GEARING BACK UP

When you're ready to bring your devices out of storage and get back in operation, there are a few things to check over first. You can sort of think of it as going over this list again, but in reverse:

- Do a visual check of the robot and the controller to make sure there is no body damage or corrosion of parts.

- Get your batteries out of their storage bag, and check for any signs of corrosion or that tell-tale swelling that would indicate a bad battery.

- Charge up the batteries to a full charge.

- Do any firmware updates that may have come out while your Sigyn MkI and GCS MkII were in storage.

- Run a "test drive" beforehand to make sure everything is running smoothly.

- Refresh yourself of the key functions, to ensure you are ready to deploy operationally

2. CLEANING

It is important to keep your device free of residue and grime to guarantee it is ready to operate whenever you grab it. To keep your Sigyn MkI in top operating condition, please follow these cleaning tips:

- Use only a clean, dry microfiber cloth to clean the window cover in front of the Sigyn MkI camera lens by removing dust and smudges.

- Use only a soft, dry cloth and/or a dry soft bristle brush to wipe down the Sigyn MkI body and wheels.

- Do not apply any liquids of any kind which could weaken the various parts of the vehicle. So, do never use any water, abrasive cleansers, detergent or chemicals.

- Also do not apply any kind of lubricant or grease to the moving parts of the vehicle, especially the wheel bearings.

3. FIRMWARE UPGRADE

In order to optimize the performance of your Sigyn MkI sUGV and GCS MkII controller, Sky-Hero will provide firmware updates on an ongoing basis.

When a firmware update is available, you will receive a notification directly from your local distributor or via Sky-Hero's official communication channel.

Please make an official request to your local distributor or Sky-Hero in order to receive a secure link to download the updated firmware.

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⚠️ *Before performing a firmware update, make sure:*
- *The Sigyn MKI ground robot is not in motion, and the GCS MkII is not operating a device.*
- *The battery levels of both the robot and the remote control are not lower than 50%.*

3.1 REQUIRED ELEMENTS FOR UPGRADE

To update the system devices, you will need:

- The «Firmware Upgrade Set» included in the Sigyn MkI Core System package you purchased. This consists of : 📖 **Page 14**
    - 1x USB-C SD Card Reader
    - 1x SD Adaptor
    - 1x Micro SD Card (FAT32 file system | 32Go max.)
- The firmware update file provided by your local distributor or Sky-Hero

Remote controller and ground robot both possess a version number. ###.###.### is the format for the release version. The tuple in the release version has the format major.minor.revision. Revision is for bug fixes or cosmetic changes. Please refer to the compatibility matrix below to ensure interoperability between versions:

GCS MkII		Sigyn MkI
Version 3.0.0	Compatible with	Version 1.0.0
Version 3.1.0		
Version 3.2.0	Compatible with	Version 1.0.0
Version 3.3.0		
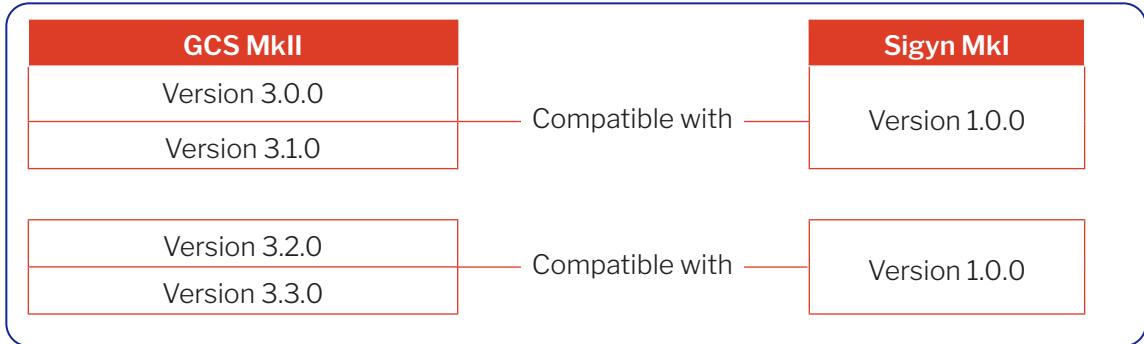
- The device(s) to be upgraded; the Sigyn MkI ground robot and the GCS MkII controller in the current case.

3.2 DOWNLOAD

1. Download on your computer the firmware upgrade package by following the secured link provided at request by your local distributor or Sky-Hero. The file must have the following structure :
   a. For Sigyn MkI : sigyn-(release number).signed.encrypted.bin
   b. For the GCS MkII : gcs-(release number).bin
2. Insert the Micro SD card into your computer using the Micro SD and the USB-C to SD card adapters.
3. Format your Micro SD card by making sure to use the FAT32 file system

ℹ️ *Make sure that your Micro SD card is empty of any previous versions so that the device(s) can be upgraded to the latest version.*

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4. Copy the gcs-(release number).bin file provided by Sky-Hero or the officially recognized distributor into the root directory of your Micro SD card.

5. Copy the sigyn-(release number).signed.encrypted.bin file provided by Sky-Hero or the officially recognized distributor into the root directory of your Micro SD card.

> *Make absolutely sure to have the file copied as gcs-(release number).bin and sigyn-(release number).signed.encrypted.bin; any change in the name of the files will not enable the devices to recognize it. As such, gcs-(release number)-01.bin, sigyn-(release number).signed.encrypted_copy.bin ... will not work.*

6. Then safely remove your Micro SD card from your computer.

> *Do not use any updated firmware release that does not have been directly provided by an official distributor or Sky-Hero, because you may end up with an incorrect, buggy or simply not working version.*

3.3 GCS MkII Upgrade Process

1. Insert the Micro SD card (marked side up) into the Micro SD slot **(13)** on your remote control.

> *Only insert the Micro SD card into its designated slot (13). Do not connect the SD to USB-C adapter with the Micro SD card to the USB-C port of the GCS MkII as this port is for charging only.*

2. Turn on your remote control by pressing the centre button **(1)** and make sure the battery is at least 50% charged.

3. Enter the GCS MkII menu by pressing the D button **(5)**.

4. Navigate to the "Advanced Settings" menu.

5. Enter this menu and select the «Firmware Management» submenu.

6. Enter the «Firmware Management» submenu.

7. Confirm the «SD Card Upgrade» option. The upgrade process will automatically begin:

    a. First, «Copying, please wait ...» will be displayed.

    b. After a few seconds, «Upgrading, please wait ....» will be displayed. Upgrading may take a few minutes. When the process is complete, the remote will restart automatically.

> *Do not remove, under any circumstance, the Micro SD card during this process.*

8. In the first GCS MkII menu level, navigate to the "Version" menu and verify that the version for the controller has changed to the new version number provided by Sky-Hero or the officially recognized distributor.

9. Switch off the remote control **(1)** and remove the Micro SD card **(13)**.

> ⓘ *An upgrade to your remote control or ground robot will not break the bonding, and the connection process will still be possible after the upgrade is complete.*

> ⓘ *If you would like to upgrade your entire system, it is recommended that you upgrade your remote control first and then upgrade your sUGV.*

> ⓘ *First connecting process after system upgrade can be slower than usual*

3.4 SIGYN MkI UPGRADE PROCESS

1. Turn the Sigyn GCS MkI on its underside and unscrew the battery cover **|8|**.

2. Remove the batteries by gently pulling on the stickers for this purpose.

3. Remove the black rubber element inside the battery compartment at the bottom of the box that covers the SD Micro card slot.

4. Insert the Micro SD card (marked side up) into the revealed slot.

5. Replace the batteries and screw on the battery cover **|8|**.

6. Turn on your Sigyn MkI by pressing the power button **|7|**. The update process will start automatically. To see the progress of the update process, turn the unit upside down and check the status of the RGB LED:

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a. Slow blinking blue means the upgrade file is being copied

b. Fast blue blinking means the upgrade file is being installed

c. Intermittent green blinking means that the upgrade is complete.

7. Turn off your Sigyn MkI by pressing the central button **|7|**.

8. Turn the unit upside down, unscrew the battery cover **|8|**, remove the batteries and remove the Micro SD card from the slot

> ⚠️ ***Be careful and attentive when removing the Micro SD card from the slot of your Sigyn MkI to avoid losing it in the internal body of the ground robot.***

9. Replace the rubber cover, insert the batteries, screw the cover |8| and switch on Sigyn MkI **|7|**.

10. On the GCS MkII, check that the version of the Sigyn MkI has changed 📖 **Page 35** to the new version number provided by Sky-Hero or by your local official distributor.

MAINTAIN & UPGRADE

WARRANTY & LICENSES

6. WARRANTY

Sky-Hero SA warrants to the original retail purchaser of this product, that should this product or any part thereof during normal consumer usage and conditions, be proven defective in material or workmanship that results in product failure within the valid warranty period from the date of purchase, such defect(s) will be repaired, or replaced (with new or refurbished parts or products) at the Company's option, with Proof of Purchase, without charge for parts or labor directly related to the defect(s). Some states do not allow limitation on how long an implied warranty lasts, so the above limitations may not apply to you.

The Company shall not be liable for any incidental or consequential damages arising from the use, misuse, or mounting of the device. The extent of Sky-Hero's liability under this warranty is limited to the repair and replacement provided above and, in no event, shall its liability exceed the purchase price paid by purchaser for the product.

This warranty does not apply to:

■ Products subjected to abnormal use or environmental conditions, accident, mishandling, neglect, unauthorized alteration, misuse, improper installation or repair, or improper storage;

■ Products with signs of tampering or altering of the serial number label or other marks;

■ Damage resulting from connection to, or use of any accessory or other product not approved or authorized by Sky-Hero;

■ Defects in appearance, cosmetic, decorative or structural items such as framing and non-operative parts.

■ Products damaged from external causes including but not limited to fire, water, dirt, sand, battery leakage, blown fuse, theft or improper usage of any electrical source.

Download the complete Sky-Hero Terms and Conditions of Sale on:
https://www.sky-hero.com/terms-conditions-sale/

7. LICENSES

Sky-Hero products make use of open-source software. For any inquiry about open-source licenses and terms of use, please contact Sky-Hero: contact@sky-hero.com

DISPOSAL OF THE PRODUCT

At the end of this product's life, please do not dispose of this product in your general household waste. Instead, in order to prevent possible harm to the environment or human health from uncontrolled waste disposal, please dispose of this product separately in accordance with your local laws and regulation.

For more information on the separate collection systems for waste electrical and electronic equipment that are available for consumers, near your home, free of charge, please contact your local municipality authority.

You can also contact the retailer from which you purchased your Sky-Hero product – he might have put recycling services in place or may be part of a specific recycling scheme.

This product will be then treated in an environmentally sound manner at a licensed recycling plant and its components will be recovered, recycled or reused in the most efficient manner.

COMPLIANCE INFORMATION

FCC compliance statement:

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

COMPLIANCE INFORMATION

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sky-hero.com

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

FCC Notice – Waiver Granted for Use under Specific Conditions

This device, Sigyn, 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.