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# GROUND CONTROL STATION

USER MANUAL

Revision: 1.1

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# 1 STATEMENT OF CONFIDENTIALITY AND NON-DISCLOSURE

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# 3 RECORD OF REVISION

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<b>Revision No.</b>	<b>Content</b>	<b>Date</b>
1.0	Initial Release	08.DEC22
1.1	Spelling corrections	10APR23

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## 5 SAFETY

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The information that follows, together with local site regulations, should be studied by personnel concerned with the operation or maintenance of the equipment, to ensure awareness of potential hazards.

Switch off supplies before removing covers or disconnecting any RF cables, and before inspecting damaged cables or antennas.

Avoid standing in front of high gain antennas (such as a dish) and never look into the open end of a waveguide or cable where strong RF power may be present.

Users are strongly recommended to return any equipment that requires RF servicing to Thread Systems OÜ.



**CAUTION:** This system contains MOS devices. Electro-Static Discharge (ESD) precautions should be employed to prevent accidental damage.

# 6 WARNINGS, CAUTIONS AND NOTES

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UAVs of any kind are dangerous and can cause serious injury. Please read, understand, and follow the cautions and instructions.

Throughout the manual warnings and cautions are used to highlight various important procedures. They are defined as:



**AN OPERATING PROCEDURE, INSPECTION, REPAIR OR MAINTENANCE PRACTICE, WHICH IF NOT CORRECTLY FOLLOWED, COULD RESULT IN PERSONAL INJURY, OR LOSS OF LIFE.**



**AN OPERATING PROCEDURE, INSPECTION, REPAIR OR MAINTENANCE PRACTICE, WHICH IF NOT STRICTLY OBSERVED, COULD RESULT IN DAMAGE OR DESTRUCTION OF EQUIPMENT.**



An operating procedure, inspection, repair or maintenance condition, etc., which is deemed essential to highlight.



# 7 GROUND CONTROL STATION (GCS)

## 7.1 GCS SET



Figure 1. GCS set

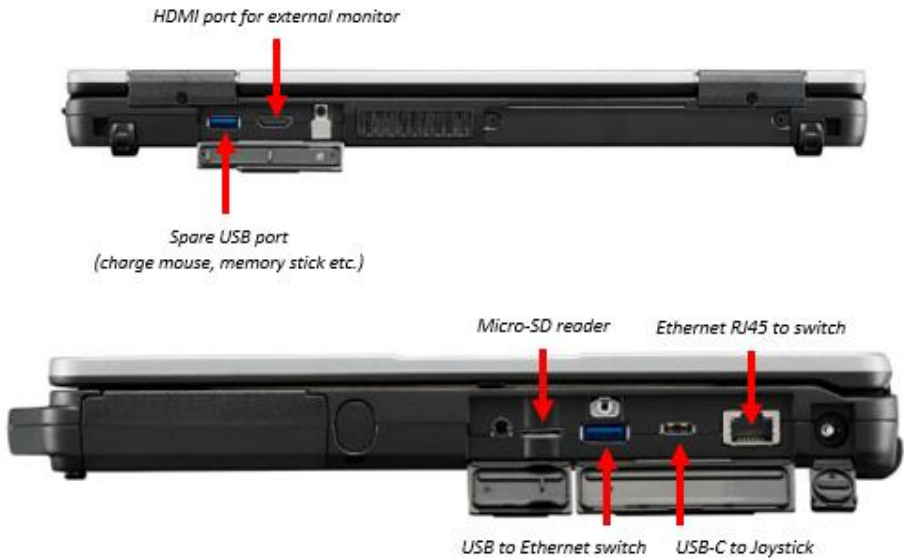
NR	DESCRIPTION
1.	Rugged case
2.	GCS- Panasonic
3.	Controller
4.	GCS batteries
5.	Battery charger
6.	GCS and Battery charger AC adaptors
7.	Mouse wit Bluetooth receiver
8.	Ethernet cable
9.	Switch
10.	Wrist GPS Foretrex 601
11.	Anemometer
12.	USB A to USB C mouse charging cable
13.	USB C to USB C controller cable

## 7.2 GCS PARTS

### 7.2.1 Rugged case

Parameter	Value
Weight (full)	8,2 kg
Dimension (outer)	L:464 mm W:366 mm H:176 mm
Temp range	-30°C up to 90°C
IP code	IP67

## 7.2.2 GCS



The GCS consists of a Panasonic Toughbook FZ 55 mk2. The manual for Panasonic FZ 55 mk2 can be found from: [pc-dl.panasonic.co.jp](http://pc-dl.panasonic.co.jp).

Parameter	Value
Weight (full)	2,08 kg
Screen diagonal	14"
Dimension (outer)	L:345 mm W:272 mm H:33 mm
Operating Temperature	-10°C to +50°C
Storage temperature	-20°C to +60°C

The GCS software usage is explained in detail in the GCS software manual.

## 7.2.3 Controller

The controller is used for payload control and guided flight of the aircraft.



Figure 2. Controller

Parameter	Value
Weight	280 g
Dimension	L:160 mm W:106 mm H: 66 mm
Operating Temperature	+5°C to +35°C



**DO NOT USE THE CONTROLLER OVER WIRELESS CONNECTION,  
PROBLEMS WITH THE GCS MAY OCCUR.**

## 7.2.4 Battery- Panasonic FZ-VZSU1HU



Figure 3. GCS battery

In the set there are 4 batteries total. Two are attached to the GCS and two as spare batteries.

Parameter	Value
Dimension	L:134 mm W:71 mm H:20 mm
Weight	0.367 kg

## 7.2.5 Battery charger



Figure 4. Battery charger

The battery charger is designed for charging the battery pack for the Panasonic computer series. The charger can charge up to four batteries simultaneously. To recharge a battery pack, an AC adaptor and AC power cord, included with this product, is required. Charging will take approximately 5 hours to fully charge the batteries, regardless of the number of batteries being charged.

**Indicators:**

The power indicator on the battery charger lights green when power is being supplied (when the adaptor is connected).

Not lit	The battery pack is not inserted or not being charged.
Orange	Charging is in progress.
Green	The battery is fully charged.
Blinking red	The battery pack or the charging circuit is not operating properly.
Blinking orange	The battery cannot be charged temporarily due to the following reasons: Internal temperature is out of the acceptable range.

Parameter	Value
Dimensions	L:190 mm W 107 mm H:84 mm
Weight	0.4 kg

## 7.2.6 AC adapter



Figure 5. AC adapter

The set includes two AC adapters. One of the adapters is for the GCS and the second one is for the battery charger. Both are identical.

Parameter	Value
Weight	0.4 kg
Dimensions	L:145 mm W:33 mm H:56 mm
Input	AC 100 to 240 V
Output	DC 15.6 V 7.05 A

## 7.2.7 Mouse- Logitech MX Anywhere 3



Figure 6. Mouse

The mouse is paired with the GCS via Bluetooth. Up to three devices can be connected and switched between them with a click of the bottom button.

Parameter	Value
Weight	99 g
Dimensions	L:101 mm W:65 mm H:35 mm
Wireless operating distance	10 m

## 7.2.8 Ethernet cable 2m

To connect GCS with the switch.



## 7.2.9 Switch



Figure 7. Switch

The Ethernet switch is used to connect two or more devices into one network.

Parameter	Value
Weight	54 g
Dimensions	L:136 mm W:50 mm H:18 mm
Battery	1x CR2032
Measuring range temperature	-30°C to+59°C

## 7.2.10 Wrist GPS- Garmin Foretrex 601



1. POWER	Hold to turn the device on and off, enter night vision mode, and enter watch mode. Select to turn the backlight on and off.
2. PAGE GOTO	Select to scroll through the main pages in sequence. Select to go back to the previous view from a menu or option. Hold to navigate to a waypoint.
3. ENTER MARK	Select to open the menu for the page. Hold to mark a waypoint.
4. V^	Select to scroll through menus and pages. Select to zoom out or zoom in on the map page.

Figure 8. Wrist GPS buttons

A wrist GPS is used to determine the location coordinates as well as barometrical altitude. The user manual for the Garmin Foretrex 601 can be found from: [support.garmin.com](http://support.garmin.com)

Parameter	Value
Weight	80 g
Dimensions	L:73 mm W:43 mm H:22 mm
Battery	2x AAA
Battery life	48 h
Operating Temperature	-20°C to 70°C

## 7.2.11 Anemometer- XPLORED 2

The anemometer is used to measure the wind speed. The instrument will provide instant wind speed as well as the maximum measured wind speed.



Figure 9. Anemometer

To change the measuring units, depress the button for approx. 4 seconds until the units start to change. The following units can be selected: km/h (kilometers per hour), mph (miles per hour), knots, m/s (meters per second) and fps (feet per second). When the unit of your choice appears, release the button and the unit of measurement is selected.

Parameter	Value
Weight	52 g
Dimensions	L:41 mm W:93 mm H:17 mm
Operating Temperature	-30°C to +60°C

## 7.2.12 USB A to USB C cable for Mouse

The charging cable for the mouse. Also, possible to use it with the controller.

## 7.2.13 USB C to USB C cable for Controller

The cable is used to charge and connect the controller to the GCS.

# 8 GCS ASSEMBLY

## 8.1 ASSEMBLY WITH 2 GCS

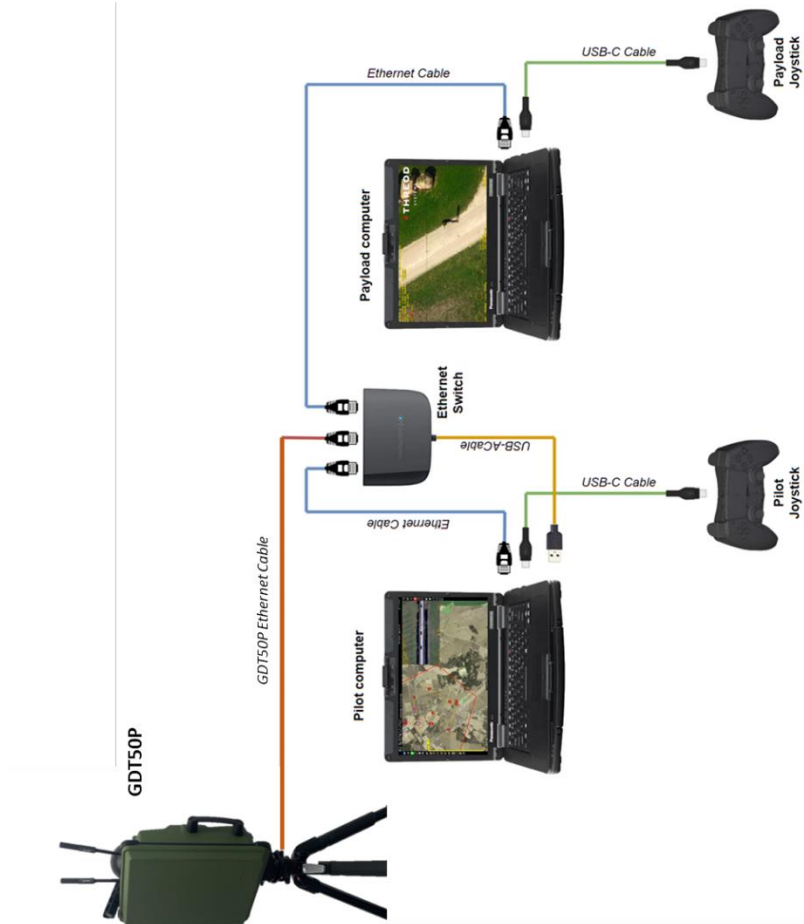


Figure 10. Two GCS setup

## 8.2 ASSEMBLY WITH 1 GCS



Figure 11. One GCS setup

# 9 MAINTENANCE

	Each use	Monthly	yearly
Charge battery	x	x	x
Check contacts	x	x	x
Clean contacts with contact cleaner		x	x
Update GCS software		X	x

## 9.1 CHARGE THE BATTERY

BB-2590 battery can be charged using the provided battery charger which connects directly to the battery header of the BB-2590 battery and takes in 220VAC. While charging, the system can also be operational as the battery header acts as an UPS module providing external power to the system while also charging the battery.

The batteries are Lithium-Ion type with a protective circuitry that prevents them from excessive discharging. When the battery output voltage per cell drops a certain threshold value, the battery will switch off and will need servicing by Threod Systems. For this reason, the batteries have to be periodically charged, even if not used. The batteries have a charge indicator (per each cell in the battery) and the user should not leave the batteries with a minimum charge (below two LED bars) for more than two weeks without re-charging them.

## 9.2 CHECK AND CLEAN CONTACTS

Before and after each use of the equipment, the user should ensure that all the contacts, especially the radio modules pogo-pin connectors, are clean and that there are no moisture or particles in them. In case there is any dirt in the connectors, the user should clean the connectors thoroughly with the supplied contact cleaner.

The user should also clean all the contacts and equipment generally before storing it for longer periods and also periodically during normal operations (once a month).

## 9.3 UPDATE GCS SOFTWARE

The GCS software on the GCS may require updates from time to time, which is supplied by Thread Systems. These updates are not performed by the user, but by a trained Thread Systems technician.

# NOTES