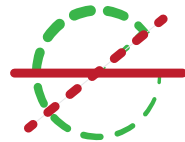


GliderThrow_{v3}



Digital Angle Throw and Differential Meter



Manual

V3-2023

Introduction

Dear Customer, thank you very much for purchasing GliderThrow v3, a tiny wonder that will make your model airplanes setup much easier and repeatable for long and enjoyable flying seasons.

GliderThrow v3 has been initially conceived for setting the aileron and flap throws of a model glider but you will find that it can be used on most every model airplane and for a variety of applications.

Concept

GliderThrow v3 is a new system that comprises two or more sensors, one for each wing or surface of your airplane.

Each sensor is equipped with a gravity sensor that computes the direction of the gravity with respect of itself. When the sensor is lying horizontally flat it will sense the gravity comes perpendicularly vertical to it. When the sensor is lying in an inclined surface it will notice and measure its gravity inclination.

Most of the control surfaces are not horizontal at its rest position, for dihedral or other geometrical model airplane features, the sensor will compensate for the inclination due to dihedral and it will only display the magnitude which is in the direction of its sensing plane.

The axis perpendicular to the sensor's sensing plane is marked in the units and corresponds to the bottom edge of the sensor box where the charging port is located. You have to install the sensor with this edge PARALLEL to the hinge you want to measure throw.

Since the gravity has a very well-known direction of application you will not be able to measure your rudder's throw directly: all gravity push will be "compensated" and you will receive unpredictable readings. To measure your rudder's throws, just position your fuselage such the rudder and the sensor are essentially horizontal where the gravity sensors are most accurate.

Due to the calibration of the sensors themselves, when measure any control surface up (negative measurement in GliderThrow), as we approach -10° , there is a deviation in the measurement. Downward, (positive measurement in GliderThrow) we don't have that calibration limitation until we approach 90° .

if you need measurements close to -10° (surface up), rotate the sensors 180° , which will allow them to remain within the calibration ranges. Just keep in mind that the values in this case will be positive in the app.

Characteristics

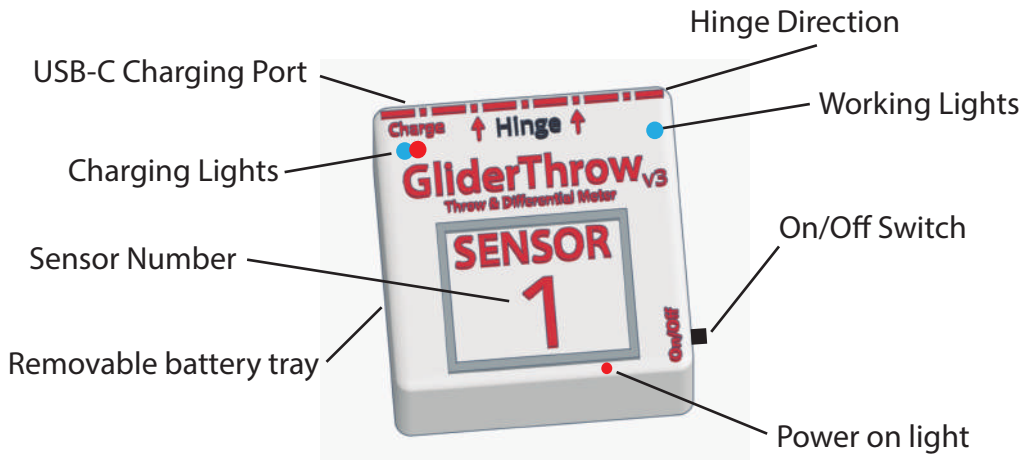
GliderThrow is a precision equipment that has been carefully manufactured, assembled and calibrated before it reaches your hands.

All mechanical parts have been manufactured in PLA by 3d printing.

Dimensions:

Single Device dimensions Height x Width x Depth: 16x37x37mm.

Single Dimensions With Magnetic Peg: 32x37x37mm.



Weight:

Single unit Weight: 22g

Single unit Weight with Magnetic Peg: 28g

Power:

120mAh Removable and rechargeable Lithium Battery LIR 2450 (About 2 hours of continuous operation) Charging : USB-C Cable (not included)

Charging Time: About 1 Hour

Specifications:

Resolution: 0,1 degrees.

0,1 millimeters

Precision: Better than 0,3 degrees (first quadrant, 0-90 degrees)

How to use

How to use GliderThrow

Power On the system

Make sure your GliderThrow batteries have charge enough, GliderThrow is a totally wireless equipment, it uses a Li-Ion battery for power that has to be recharged from time to time to operate.

Switch Sensor 1 ON, a red led and a blue led will glow.

Switch Sensor 2 ON, a red led and a blue led will glow as well on sensor 2.

Wait a few seconds for both units to handshake: both blue led will be blinking, red ones will remain steady on.

Connect the display to the system

In your Smartphone/PC, search for a WiFi AP called "**GliderThrow**" Connect to "Glider-Throw" AP WiFi using **123456789** as password.

In many SmartPhones you will be advised that the network selected have no internet connection and ask about selecting another WiFi connection. You might select "No".

The time while using GliderThrow your device will have NO internet connection.

Open your web browser and open a new window or browse to and type: **http://192.168.4.1** and you will get automatically redirected to GliderThrow screen.

To access the GliderThrow Quad screen, the address you have to type in the browser is different:

Address to access GliderThrow Screen: **http://192.168.4.1**

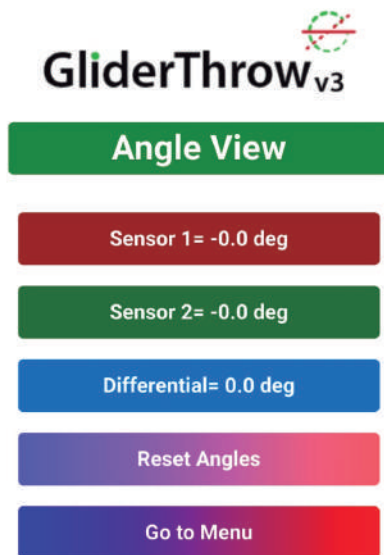
Address to access GliderThrow Quad Screen: **http://192.168.5.1**

You can see the details of accessing GliderThrow Quad in the dedicated section below.

How to use

Browse GliderThrow

You will be now in this screen that displays the angle, in degrees, captured by both sensors; Always wait a few seconds to allow both signals to stabilize (Sensor 2 will always be a little lagging since is the satellite sensor, this behavior is normal).



In this Screen you can check the reading of both sensors and perform any adjustment in your plane for instance if your reference information is in degrees or if you want to do so.

Differential = (Sensor 2 – Sensor 1) You will find soon utility for this diferential!

You can as well send both signals to zero by tapping or clicking “Reset Angles”.

The remaning of the session will display angles or throws relative this reference moment/position. We recommend waiting a few seconds more for signal stabilization before “reset Angles”.

This “Reset Angles” is very useful when the control surface s original position is not horizontal.

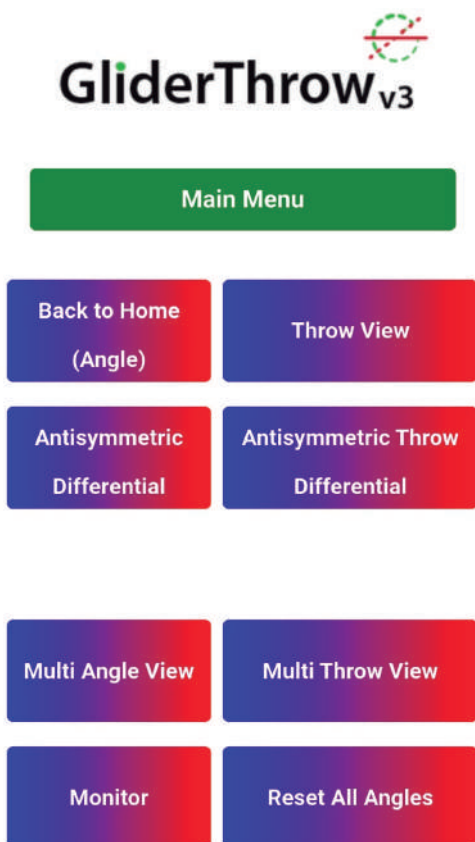
To clean this reference values you must reset Sensor 1 by switching it to OFF and then to ON, but you can always generate a new reference point by “Reset Angles” again.

How to use

Browse GliderThrow

Sensors and their displays are colored in red and green as the navigation sidelight of the airplanes, where port side (left when sitting as a passenger in the airplane) is red and the green is at starboard. Also twin engine aircraft number their engines, number 1 is the port one and number 2 is the starboard. This is just mnemonic, place them where you find more useful.

By tapping or clicking "Go to Menu" you will get into:



How to use

Browse GliderThrow

By tapping or clicking “Throw View” you will get into:



GliderThrow^{v3}

Throw View

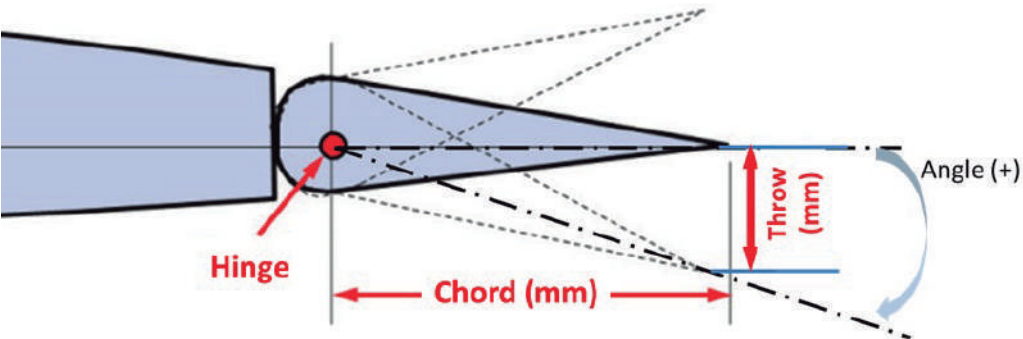
Sensor 1= -0.0 mm

Sensor 2= 0.0 mm

Config Surface Chord

Menu

Here you can see the throws, in mm, calculated with Chords stored in the units, according to this diagram.



How to use

Browse GliderThrow

When tapping or clicking “Config Surface Cord” you will enter in:



Throw Configuration

Sensor 1 Chord (mm)

Sensor 2 Chord (mm)

Go to Throws Page

Save and Return

Select the appropriate values for your model, these values in mm must be positive integers below 300.

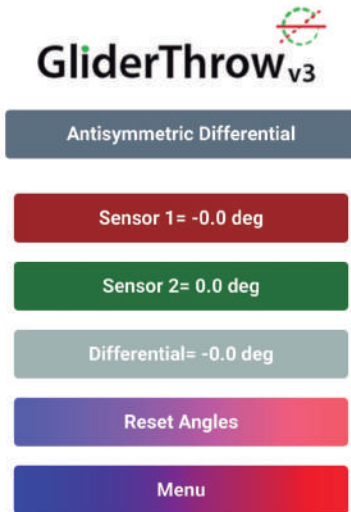
Tap or click “Save and Return” to make these new values operative, tap or click “Back to throwview” or “previous page” in the browser if you are not sure to store them.

Once set, these values are stored in non-volatile memory and will be ready next time you power up the system.

How to use

Browse GliderThrow

Back in the menu, by tapping or clicking "Antisymmetric Differential" or "Throw Antisymmetric Differential" you will enter in:



When you are trimming or calibrating a Symmetric Flight Control, like the flaps you want both sides control surfaces deflect the same: Symmetry in an airplane is critical for stable flights... Then the standard page is ideal it will show the difference in reading of the two sensor: Remember sensor 2 minus sensor 1.

But when you want to calibrate a antisymmetric Control like Ailerons (roll) you want they deflect in opposite direction say left (1) upwards (negative) and right (2) downwards.

Here the antisymmetrical view is ideal since it will show you the "SUM" of the two readings being Zero if they are equal but in the opposite direction. In the case of our example (rolling left) you normally want the upward surface deflect more than the downward surface (to diminish adverse yaw effect and maintain stall margin) in this case the antisymmetric view will show a NEGATIVE value.

In case you command a rolling right, sensor 2 upward and 1 downward the result will be the same: a negative value will mean the upward control surface is deflecting more than the downward.

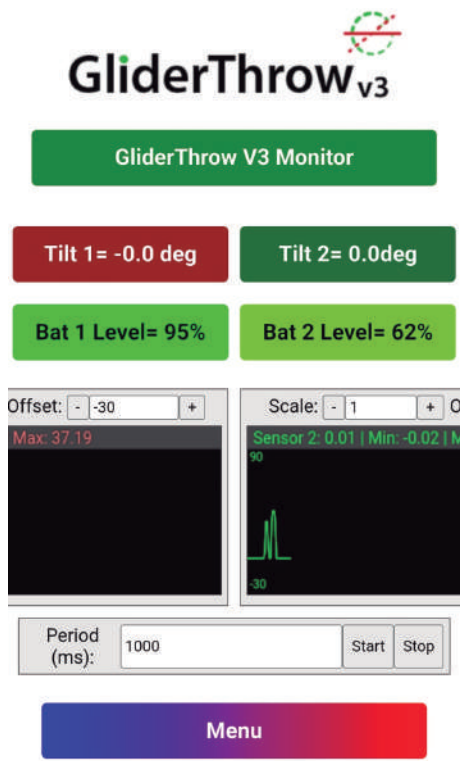
This is applicable when trimming Ailerons and Rudder in a V-Tal.

use this indication to set your model to the manufacturer's indications and to your favourite (maybe secret) settings.

How to use

Browse GliderThrow

Back in the menu, by tapping or clicking “Monitor” you will enter in:



On this page you can see the percentage of charge of the batteries. Keep in mind that this value is an average estimate and should not be taken as an absolute value, however it will be useful to know the approximate state of charge of the battery.

Under these indicators you will find two boxes that we think you may find interesting to explore new possibilities for your sensors. These boxes generate graphs based on the patterns that are defined. You can safely change any of the full scale and sample rate values and check with it how your knobs oscillate and you will surely find new possibilities for these graphics!

How to use

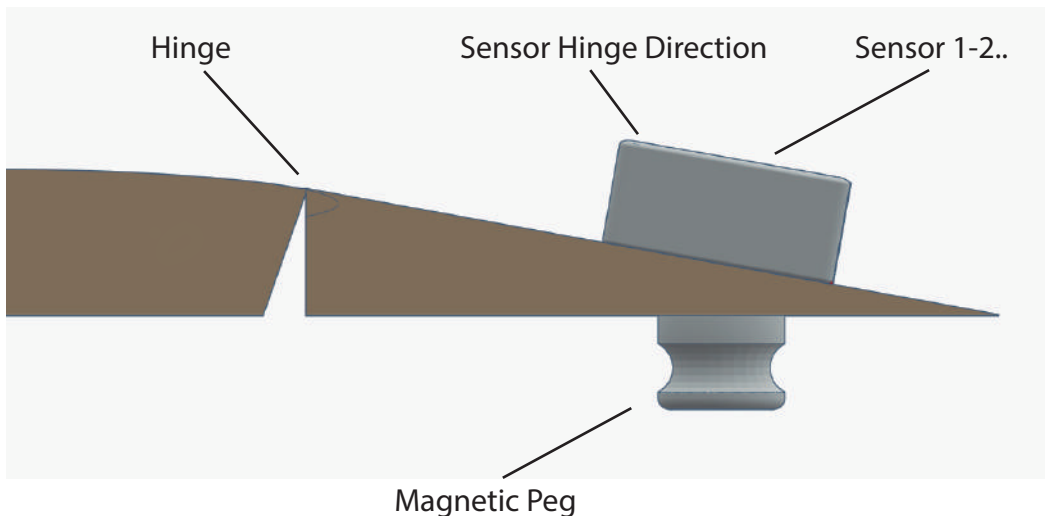
Mechanical Installation

Once familiar with the operation of GliderThrow you will want to take advantage using it onto your model airplane.

Both sensors are provided with a magnetic peg and anti-sliding coating to hold them in position despite the relative important thickness of the control surface you want to use. Closer to the trailing edge the adhesion for the sensor will be better.

It is very important that no matter how far from the hinge the box of the sensor is **PARALLEL TO THE HINGE** line and not to the trailing edge or any other feature of the model.

Failure to install the sensors parallel to the hinge line might compromise if not invalidate the accuracy of your measurement, so install always your sensors parallel to the hinge or the axis of the feature you want to measure.



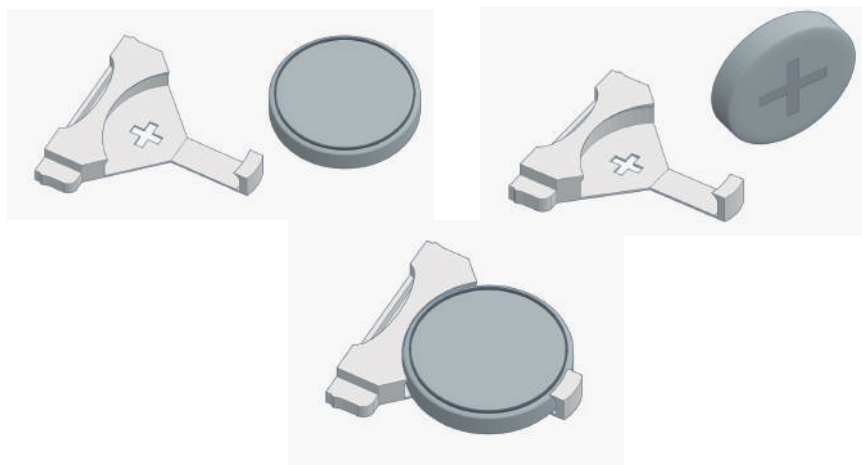
How to use

Battery substitution

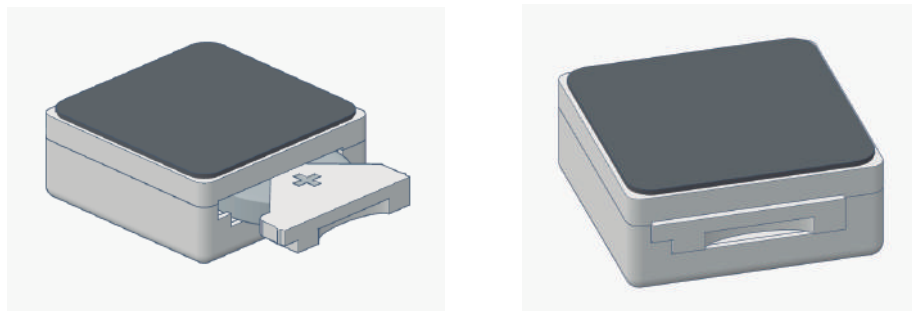
GliderThrow V3 incorporates the ability to replace the battery once its useful life has reached the end. For this task, GliderThrow V3 incorporates a removable side tray that allows the battery to be removed, just insert your fingernail into the slot and push out. The battery is a **LIR2450** unit, **NOT TO BE CONFUSED WITH CR2450 WHICH IS NOT RECHARGEABLE**.

Never replace with a battery of any other type: risk of chemical leakage, explosion and permanent damage to the device if replaced with a battery other than the LIR 2450 type with consequent loss of warranty.

To replace the battery, the polarity must be observed, positive + must go against the base of the removable tray, also marked with the + sign.



Additionally, the tray incorporates a projection in such a way that it can only be inserted back into the slot in one position.



How to use

Browse GliderThrow Quad- Multi

GliderThrow Quad is an extension of GliderThrow that allows adding two more sensors up to 8 to be able to perform the measurement of up to four control surfaces and up to four differentials.

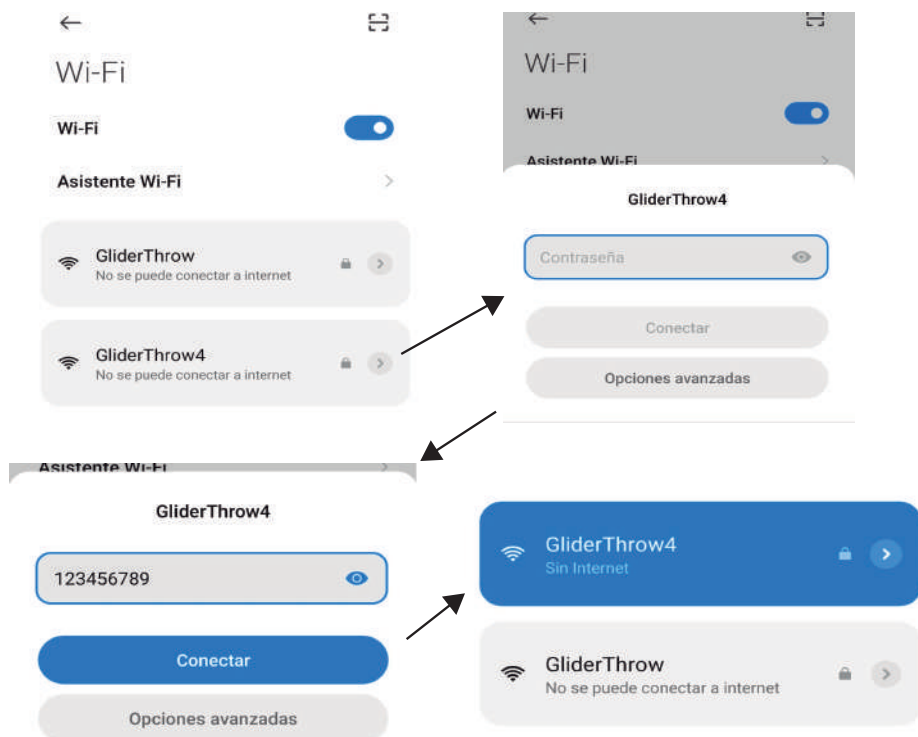
Connect the display to the system

In your Smartphone/PC, search for a WiFi AP called "GliderThrow 4. Connect to "GliderThrow 4" AP WiFi using 123456789 as password.

You will see another AP called "GliderThrow". This is the AP for using sensors 1 & 2 alone or to configure the surface chord of sensors 1 & 2 when using the four sensors.

Open your web browser and open a new window or browse to and type: **http://192.168.5.1** and you will get automatically redirected to GliderThrow screen.

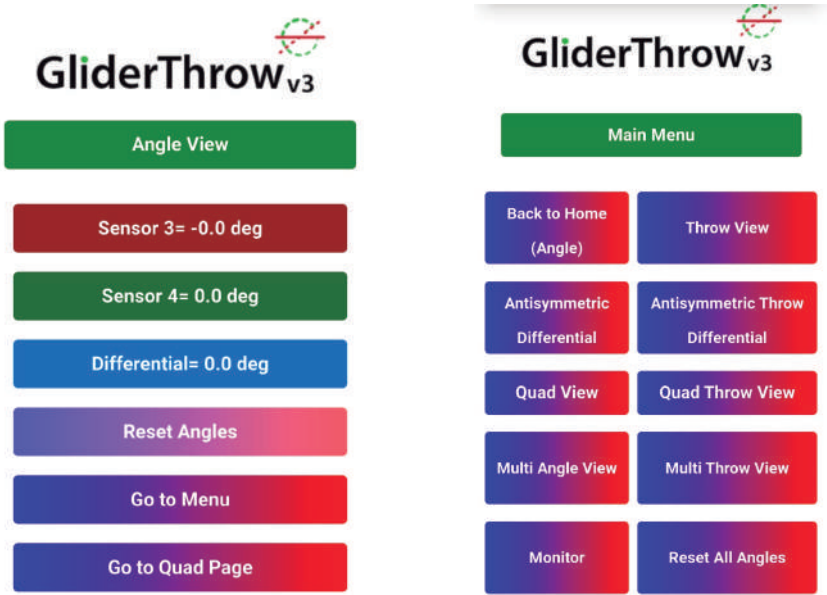
Please note that this address is different than the address used to access the GliderThrow screen (Sensors 1-2)



How to use

Browse GliderThrow Quad- Multi

You will be now in this screen that displays the angle, in degrees, captured by both sensors; Always wait a few seconds to allow both signals to stabilize (Sensor 2 & 4 will always be a little lagging since are the satellite sensors, this behavior is normal).



In this Screen you can check the reading of both sensors and perform any adjustment in your plane for instance if your reference information is in degrees or if you want to do so.

Differential = (Sensor 4-Sensor 3) You will find soon utility for this diferential!
You can as well send both signals to zero by tapping or clicking “Reset Angles”.
The remaning of the session will display angles or throws relative this reference moment/position. We recommend waiting a few seconds more for signal stabiliza-
tion before “reset Angles”.

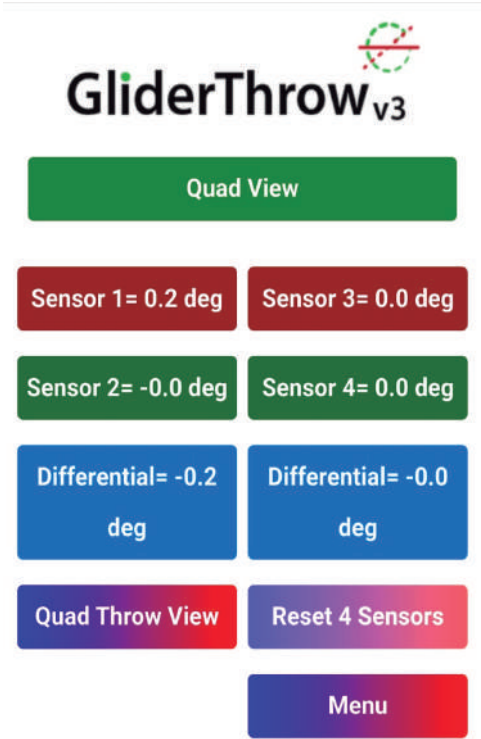
This “Reset Angles” is very useful when the control surface s original position is not horizontal.

To clean this reference values you must reset Sensor 3 by switching it to OFF and then to ON, but you can always generate a new reference point by “Reset Angles” again.

How to use

Browse GliderThrow Quad- Multi

When tapping or clicking “Quad Page” you will enter in Quad View:



In this Screen you can check the reading of four sensors and perform any adjustment in your plane for instance if your reference information is in degrees or if you want to do so.

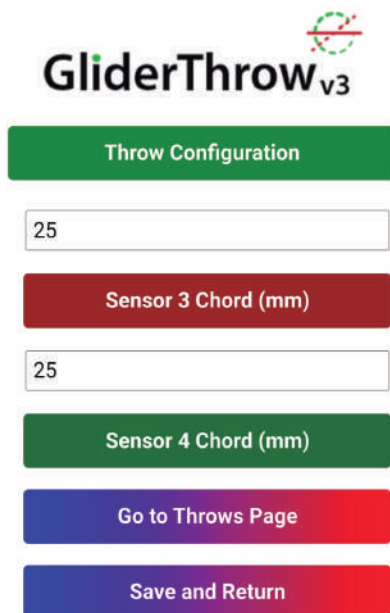
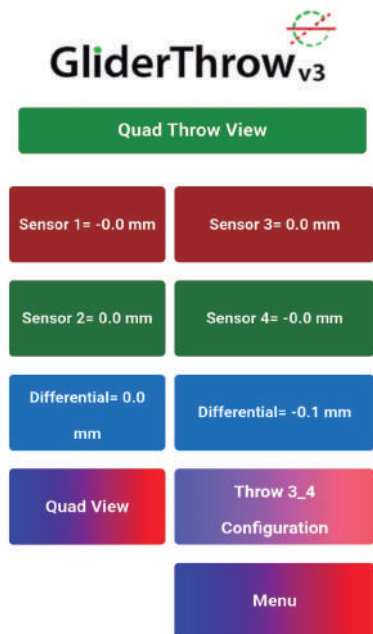
You can see 2 differential boxes, one referred to differential Sensor2 - Sensor1 and another that shows differential = Sensor 4 - Sensor 3.

By clicking in “Quad Throw View” you will enter in 4 Throw View. Here you can see the throws, in mm, calculated with Chords stored in the units.

How to use

By clicking in “Quad Throw View” you will enter in 4 Throw View. Here you can see the throws, in mm, calculated with Chords stored in the units.

When tapping or clicking “Config Surface Cord” you will enter in:



Select the appropriate values for your model, these values in mm must be positive integers below 300.

Tap or click “Save and Return” to make these new values operative, tap or click “Back to throwview” or “previous page” in the browser if you are not sure to store them.

Once set, these values are stored in non-volatile memory and will be ready next time you power up the system.

IMPORTANT:

When using together with sensors 1 & 2, to configure sensors 1 & 2 chords is needed to connect to GliderThrow SSID (instead of GliderThrow Quad SSID), select the appropriate values, click save & return and reconnect again with GliderThrow Quad SSID.

How to use

By clicking in “Multi Angle View” or “Multi Throw View” you can acces to a new function-
ality.
This new view allows you to control the values of all the sensors as well as their differ-
entials at a single glance.

In this Screen you can check the reading of 8 sensors and differentials. “Multi Throw
View” you can see the throws, in mm, calculated with Chords stored in the units and in
“Multi Throw Configuration” you can select the appropriate values for sensors 5-8.

These values in mm must be positive integers below 300.

Tap or click “Save and Return” to make these new values operative, tap or click “Back to
throwview” or “previous page” in the browser if you are not sure to store them.

Once set, these values are stored in non-volatile memory and will be ready next time
you power up the system.



GliderThrow_{v3}

Multi Angle View

Sensor 1=
-0.0 deg

Sensor 2=
0.0 deg

Differential= 0.0
deg

Sensor 3=
0.0 deg

Sensor 4=
0.0 deg

Differential 4_3=
-0.0 deg

Sensor 5=
0.0 deg

Sensor 6=
0.0 deg

Differential 6_5=
-0.0 deg

Sensor 7=
0.0 deg

Sensor 8=
0.0 deg

Differential 8_7=
-0.0 deg

Menu

Multi Throw
View

Reset All
Sensors



GliderThrow_{v3}

Multi Throw View

Sensor 1=
-0.0 mm

Sensor 2=
0.0 mm

Differential= 0.0
mm

Sensor 3=
0.0 mm

Sensor 4=
0.0 mm

Differential 4_3=
0.0 mm

Sensor 5=
0.0 mm

Sensor 6=
-0.0 mm

Differential 6_5=
-0.0 mm

Sensor 7=
0.0 mm

Sensor 8=
0.0 mm

Differential 8_7=
-0.0 mm

Menu

Multi Angle
View

Conf. 5-8 Chord



GliderThrow_{v3}

Multi Throw Configuration

Sensor 5 Chord (mm)

25

Sensor 6 Chord (mm)

25

Sensor 7 Chord (mm)

25

Sensor 8 Chord (mm)

25

Back to Multi Throws
Page

Save and
Return

Menu

How to use

HINTS:

Measuring Throws in your ailerons:

Power system up, Configure Chords if needed, install sensors per the manual, bring the ailerons to the reference point, tap "Reset Angles" do measurement in both control surfaces.

Measuring a dihedral angle of a wing:

Place both sensors in a flat surface, Power system up, install sensors in the wing you want to measure, use "Differential" indication to measure dihedral. Note for this measurement the "hinge" is the direction of flight.

Measuring Model Airplane Incidence angle (the angle between main Wing chord and Stabilizer):

Place both sensors into the wing's reference plane, Power and reset angles, move and install Sensor 2 onto the Stabiliser, Use "Differential" indication to measure incidence angle.

There is a multitude of opportunities to take advantage of the differential and dual measurement.

For setting up your model airplane now you have a tool to make sure the configuration is absolutely symmetrical by making sure readings are the same in the same moment.

Precautions for accurate measuring

- 1.-Try to measure deflections as horizontal as practical.
- 2.-Avoid the model airplane changes its attitude during a measuring session. For example do not allow the model changes from resting in left wing and then leans towards right wing.
- 3.-Avoid vibrations. Like the ones the surfaces or wings experiment during high winds.

How to use

HINTS:

An excellent platform for having the model airplane resting horizontal and in a stable manner is to use GliderThrow in conjunction with GliderCG and perform Center of gravity centering while performing throws checks.

Monitoring GliderThrow activity, blue led blinking for each unit will mean data is transmitted thru wifi. Sensor 1 will also blink when sending data to the display unit, so make sure both unit's blue led blink to confirm you are getting good data, normally resetting the units will bring them to activity but also check there is a good charge level.

WARNING: GliderThrow is a wireless device but it is not a telemetry unit and is not intended to be used on board radio controlled flights. It uses radio frequency in the 2,4 GHz frequency. It will not present any harm if used in the flight field both for the user or other modelists but it MIGHT CAUSE INTERFERENCE to a receiver flying at a distance from transmitter with one or both sensors, powered, on board. In the same way, in the presence of several stations, the functionality can be lost because it is an ISM device.

DO NOT Fly with GliderThrow working in your plane

Charging:

Both units of GliderThrow have a removable Li-Ion Battery that has to be recharged from time to time. Use a standard USB-C cable (not included) for charging from a computer (recommended), your field charger if it has a USB port, or your mobile phone charger but try to avoid newer mobile chargers that charge up to 2A 5V in order to preserve battery life.

When connected to charger a new red LED will become visible, it will turn to green when battery is changed.

GliderThrow has a protection circuit that will switch itself off when battery is almost totally discharged. However charge the unit as soon as is practical to preserve battery's life.

How to use

Safety and Security

GliderThrow is not a Toy. For use only from 18 years and up.

Avoid heat exposure and continuous direct sunlight.

Avoid water contact.

Safety information for lithium batteries

You must never open the lithium batteries, throw them onto a fire or expose them to shock, as toxic fumes might leak out and there is a risk of explosion.

Never handle leaking cells with bare hands.

In the event of contamination of the eyes or hands, it is necessary to rinse with plenty of water. A doctor should be consulted in the event of irritation of the skin or eyes.

Only dispose of completely discharged cells or packed cells protected against polarity reversal in accordance with the local disposal regulations.

Do not expose the cells to direct sunlight or hot temperatures, as otherwise there is a risk of overheating.

Maintain a storage temperature of <30°C.

Keep away from small children, if swallowed promptly see a doctor

Do not dispose of the batteries in fire

Disposal Used batteries:

Batteries must not be disposed of in the domestic waste. Every consumer is legally obligated to dispose of batteries properly at the designated collection points in stores where batteries are sold.

Appliance:

At the end of its service life, never dispose of the appliance in the domestic waste. Check with your local authority or your local waste disposal services for options regarding environmentally-friendly disposal.



**Konformitätserklärung
Declaration of Conformity
Déclaration de conformité
Dichiarazione di conformità
Declaración de conformidad**

Hersteller / Verantwortliche Person
Manufacturer / responsible person
Fabricant / Personne responsable
Fabbicante / Persona responsabile
Fabricante /Persona responsable

GliderThrow / Marco A. Moreno

erklärt, dass das Produkt
declares that the product
déclare que le produit
dichiara, che il prodotto
declara que el product

GliderThrow

folgenden Normen entspricht:
complies following standards:
correspond aux suivantes norms:
corrisponde alle seguenti norme:
cumple las siguientes normas

2014/53/UE
2006/66/CE
2014/30/UE
2001/95/CE

EN 60950-1:2007
EN50385 : (2002-12)
EN 300 328 V1.7.1: (2017)
EN 301 489-1 V1.8.1: (2008-04)
EN 301 489-17 V2.1.1 (2009-05)

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Email: GliderCG.info@gmail.com

Ort, Datum / Place and date of issue / Lieu et Date / Data e luogo /Fecha y lugar

Madrid, 28-Oct. 2018