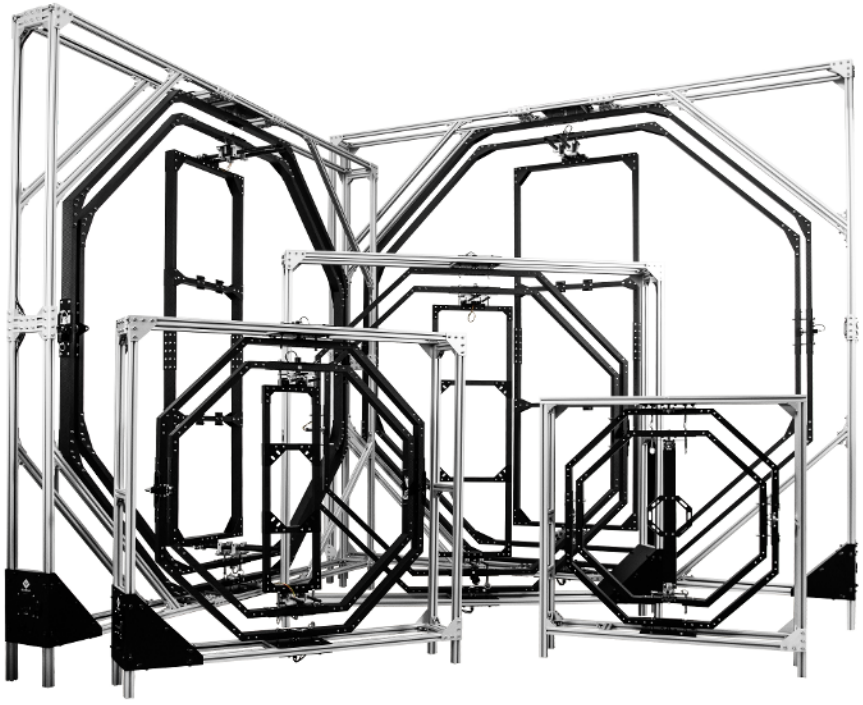
PRODUCT
CATALOG

EUREKA
DYNAMICS

División Investigación
Sidilab



PROFESSIONAL DRONE TEST STANDS FOR FASTER INNOVATION

MAKE TESTING **SAFE**
MAKE PROGRESS **FAST**

THE CHALLENGE
OF DRONE TESTING

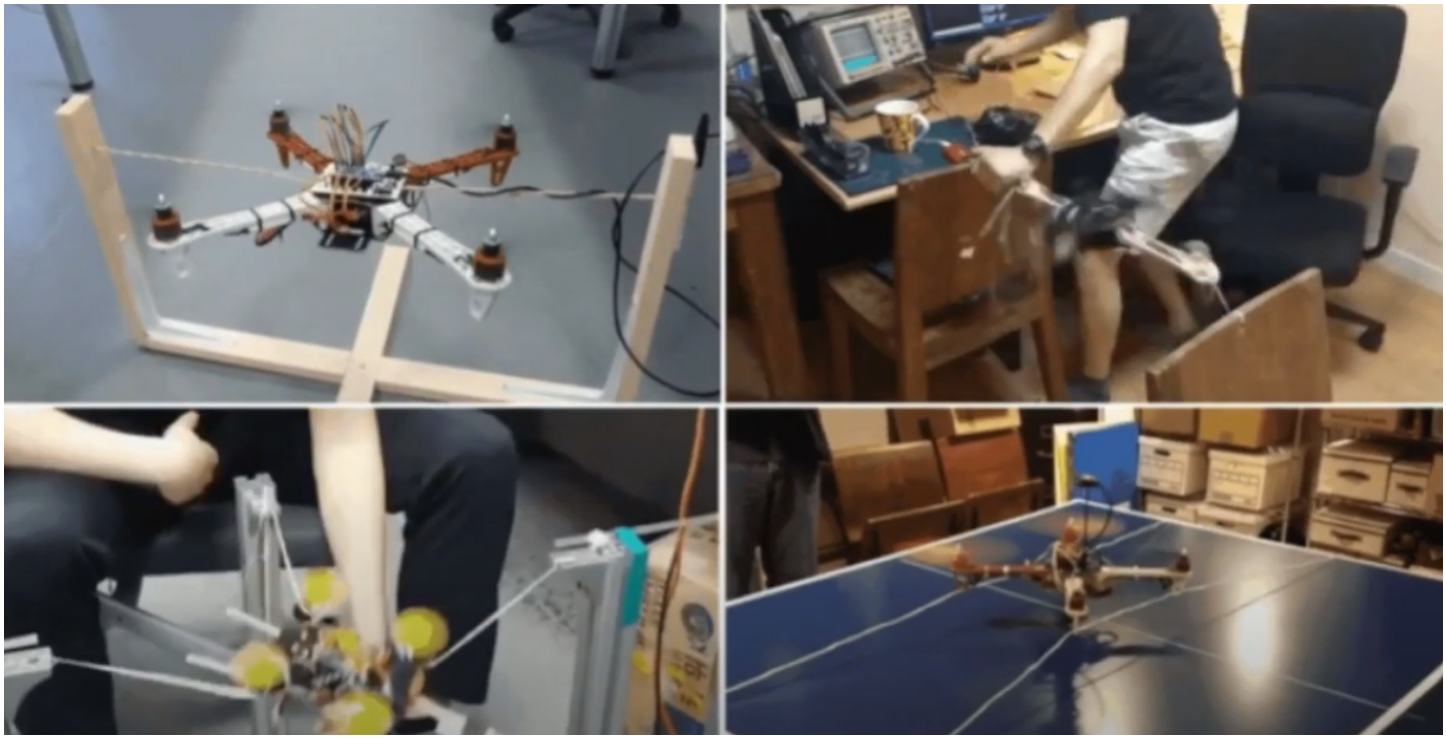
Testing new drones, autopilots, or control systems has always been **risky**, **expensive**, and **time consuming**. Traditional field testing often leads to **costly crashes**, and **long development cycles**.

Without a reliable **fail-safe system**, every flight-test risks turning into a **disaster**.

Due to the **unstable** nature of drone dynamics, performing tests and calibrations before free-flight is absolutely necessary. This has led to several **rudimentary** drone testing techniques.

One of many is the **"rope" technique**, which has been used to test a drone's flight stability by tying it to a secure point, such as a ceiling or a frame.

The rope allows the drone to ascend and move within a **limited space**, preventing it from drifting too far and reducing the **risk of damage**.



Although this method is useful during early-stage testing, propellers and ropes should never go together as this could lead to unpredictable **accidents.** This method also constrains the drone's full range of rotational dynamics, making it **unsuitable for advanced testing** and maneuvers.

On the other hand, there are various **advanced drone testing devices and systems** that attempt to address first-flight tests, such as motion tracking systems and fixed-base flight training platforms. Although they play their part in the development process, most of the time they exceed budget expectations, especially for educational institutions and small development teams.

Most importantly, the biggest challenge is that if a drone causes property damage or injures people, the **legal** and **financial** consequences can far exceed the cost of the drone itself.

Even with state-of-the-art equipment, flight-tests are not fail-proof and mid-flight errors likely end in an incident where the drone crashes, is lost, or otherwise malfunctions.

That is why development programs need a **safer**, **faster**, and **cost-effective** way to validate their aerial systems. That is where Eureka Dynamics comes in.

THE SOLUTION
FOR DRONE TESTING

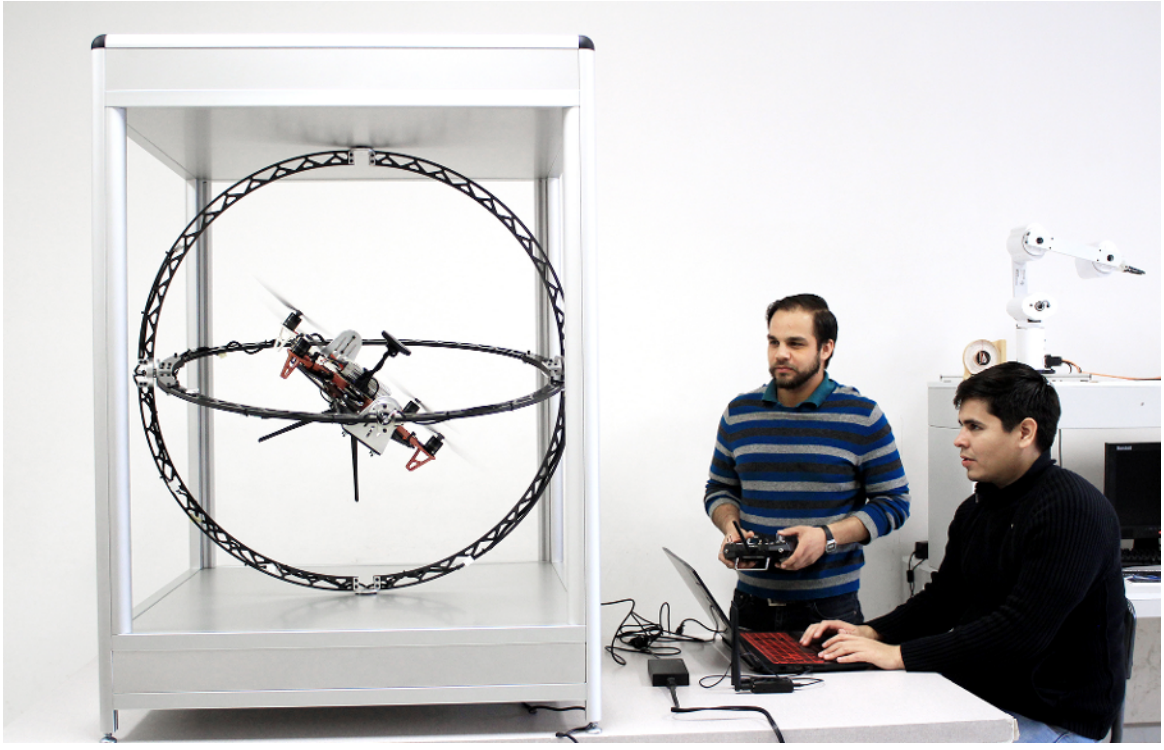
At Eureka Dynamics, we develop **secure testing systems** like the FFT GYRO - an innovative platform that allows drones to be tested safely in a **fully controlled environment**. Our platform enables near **real-flight behavior** without the risks of uncontrolled flights, helping teams validate autopilots, sensors, control algorithms, and hardware **before moving to actual airborne tests.**

The platform **simulates the rotational dynamics of flight,** enabling a first system validation, stabilization and maneuvering while keeping the drone securely tethered to the ground.

Our solutions are trusted by top **universities**, **research centers**, **defense** and **drone companies** around the world.

Institutions that prioritize **innovation**, **safety**, and **efficiency** in their drone programs rely on Eureka Dynamics to support their **research**, **testing**, and **development** efforts.

THE RIGHT TOOL TO TEST WITH CONFIDENCE



FIRST-FLIGHT TESTER
GYROSCOPE

The **FFT GYRO** is a specialized gyroscope that can move freely in the **roll**, **pitch**, and **yaw** axis without any limitation, while supporting a drone in the center.

Its **safe structure** allows the system to be installed in an **open** or **closed space** and **interact with people** in real time.

With its adjustable height for different multi-rotors, the **center of rotation of the drone** can be **aligned** with the center of rotation of the gyroscope allowing the drone to **rotate about it's true center of rotation**.

It can hold **different types** and **sizes** of **multi-rotors,** from small **racing drones** to big **industrial drones**.

The FFT GYRO is essentially **useful for everyone that works with drones** or UAVs.

From **beginner users** that want to **learn how to fly**, to **drone development companies** that want to keep leading the market. It comes out as a **solution** for a **wide variety of problems** that are very common in this field.

The FFT GYRO is not only a tool for research and development. It is the tool that **makes easy to work with drones** and helps to stay ahead of the game.

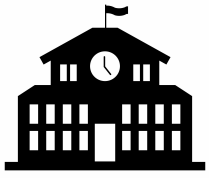
FIRST-FLIGHT TESTER
GYROSCOPE

The first utility of the FFT GYRO is **safety**, which reduces time and costs by **avoiding accidents** and damage of the equipment.

However, the relevance of the FFT GYRO lies in its **accuracy** to read and record angle movements.

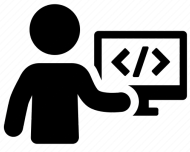
It provides **highly accurate measurements of Roll, Pitch, and Yaw angles** when performing flight tests, essential data for flight control adjustments.

Overall, the FFT GYRO is a **valuable tool** that significantly contributes to the success of **advanced engineering projects**, particularly those focused on **innovation**, leading to **faster development**.



ACADEMICS

Teach and train your students with real drones inside the classroom in a completely safe environment.



DEVELOPERS

Implement, test and validate your developments with real drones. Do not limit to just theory or simulations.

INTEGRATORS

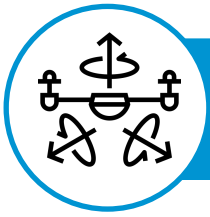
Perform tests safely with your new accessories, devices or specially-designed software for your unique aircraft projects.

TYPES OF
TESTS TO PERFORM

Depending on how far along your project is, there are several tests you can perform to ensure everything is working correctly. Here are some key tests to consider:

System Integration Check

Make sure all systems work properly together before flight tests: motors, propellers, navigation system, etc.



Flight Stability Control

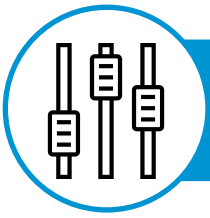
Test the drone's stabilization control. Set Roll and Pitch to 0° and gradually increase the throttle until the drone stabilizes horizontally.

Navigation System Verification

Check IMU (Roll, Pitch, and Yaw) accuracy by comparing with FFT GYRO´s readings. Rotate the drone while attached to manually calibrate.

Command Response Test

Test the Roll, Pitch, and Yaw commands by moving the remote control levers and checking if the drone responds as expected.



PID Parameter Adjustment

If everything is functioning well, you can adjust the PID parameters of the flight controller if needed, to ensure the drone operates smoothly and safely.

Robustness and Emergency Tests

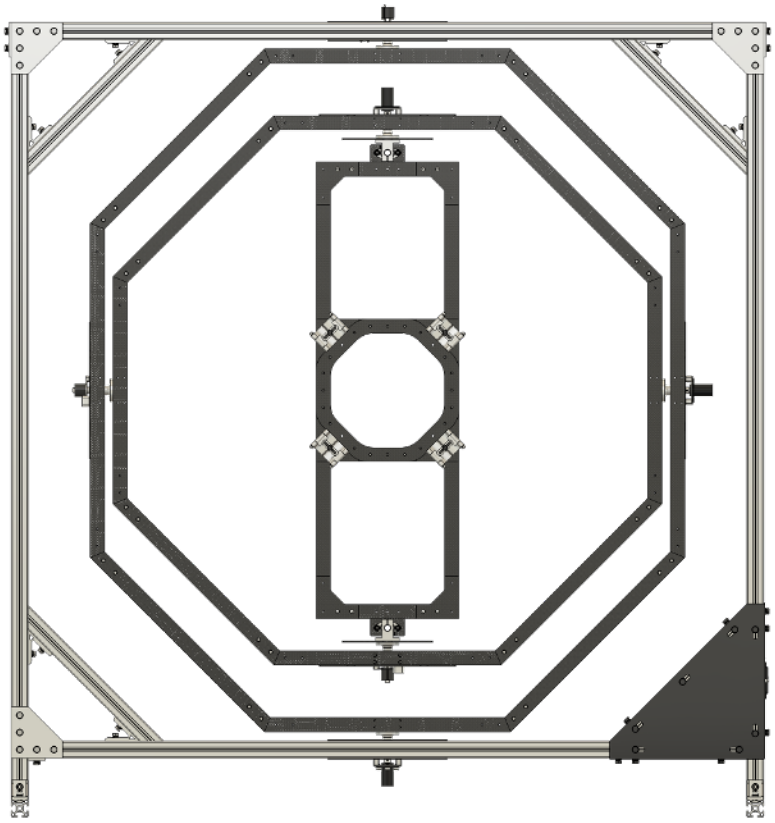
Test controller's robustness by adding weight on one side and see if the drone compensates. Simulate failures like lost signal, to check if emergency mode works.

FFT GYRO
CONFIGURATIONS

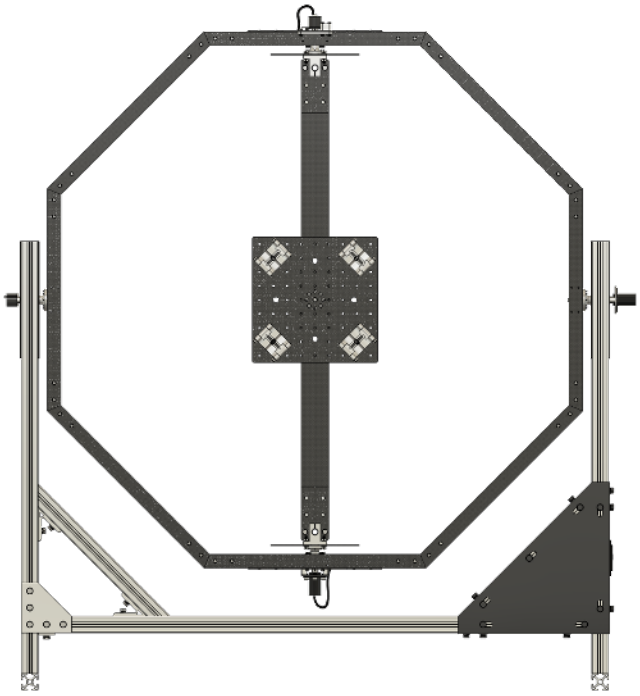
We're always working to improve our products based on user feedback. Some users pointed out that the yaw movement in the **FFT GYRO G3.5**, being the **weakest on a drone**, had too much inertia.

To address this, we released the **FFT GYRO G4.0** to reduce yaw inertia by changing the order of rotation to Yaw first, then Roll, and finally Pitch **(YRP)**.

The key difference between the **G3.5 (RPY)** and **G4.0 (YRP)** lies in the **order of rotation, inertia, and connectivity**.



FFT GYRO 450 PRO CARBON **G3.5**



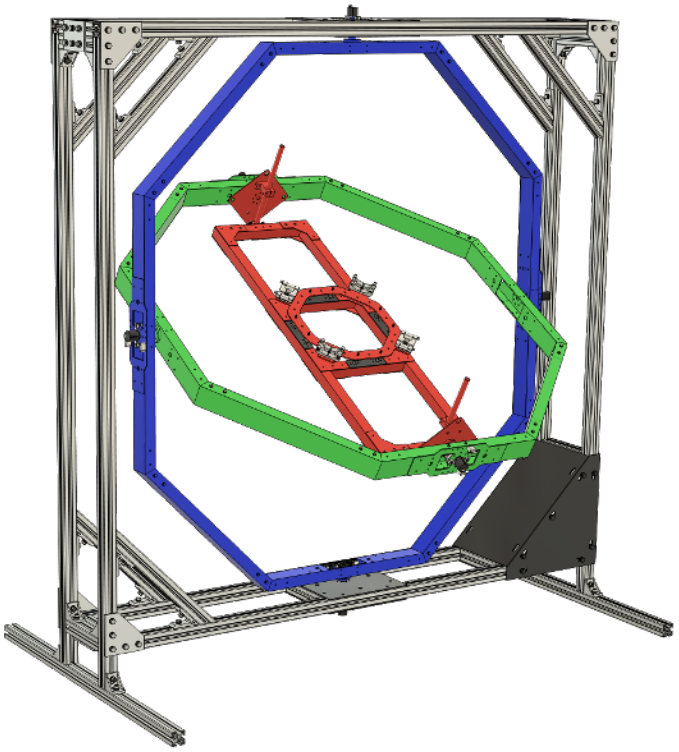
FFT GYRO 450 PRO CARBON **G4.0**

3.5 RPY
ROLL, PITCH, YAW

The gimbals follow the **AHRS convention**, allowing direct measurement of these angles.

4.0 YRP
YAW, ROLL, PITCH

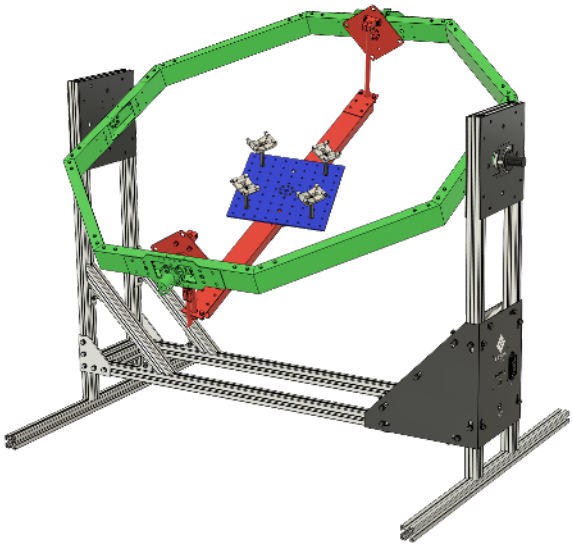
A new **rotation order**, reducing yaw inertia for more responsive testing. This change improves maneuverability.



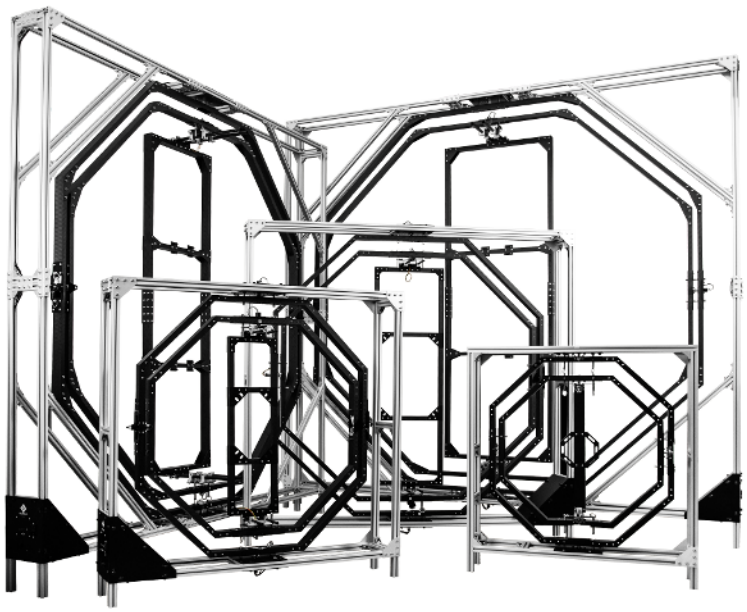
ROLL

PITCH

YAW



FEATURE / VERSION	G 3.5	G 4.0
Angle Measurements	Follows the AHRS convention, takes direct measurements.	Does not follow AHRS, measurements are processed.
Free-channels for custom connection	Yes	No
Gimbal Inertia	Fixed and stable inertia	Reduced, but variable inertia
Drone Maneuverability	Yaw gimbal adds considerable inertia, affecting drone maneuverability.	Better responsiveness for maneuver testing, achieving near-real flight performance.
Drone Mount Type	Hollow in the center of the mount. Free space for batteries, landing gear, payload, etc.	Base plate, easily interchangeable for customizations. Not hollow.

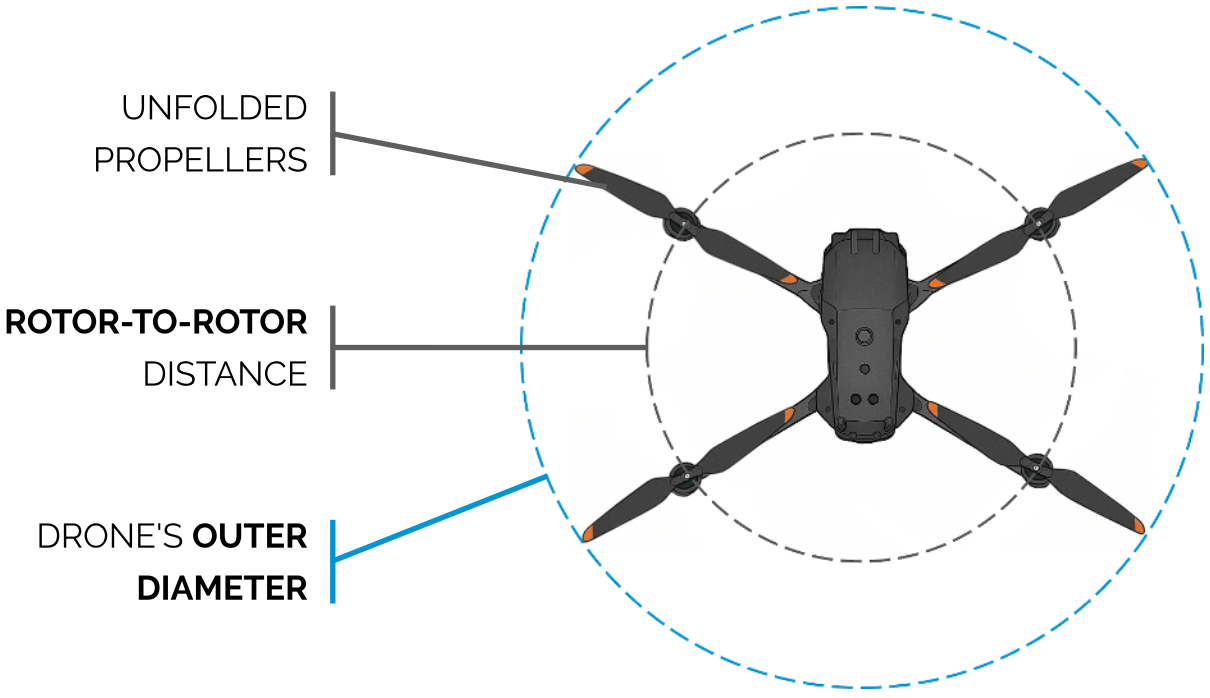


FFT GYRO SIZES

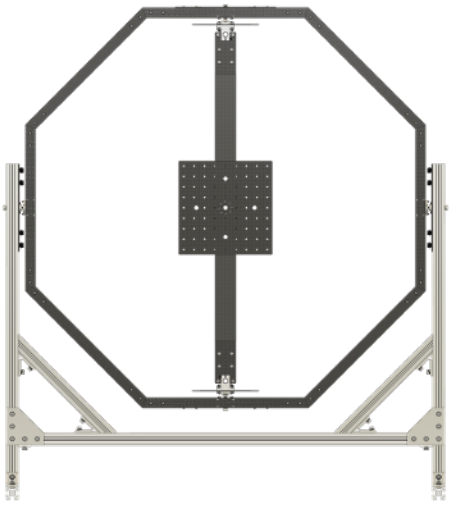
Available in a **wide range of sizes**, designed to accommodate different multi-rotor types based on standard size-to-weight ratios.

Sizes cover outer diameters (with unfolded propellers) from **0.45 m** to **2.80 m**.

SPEC/SIZE	250	450	600	800	1000	1200	1500	2000
Rotor-to-rotor distance (mm)	100 - 250	250 - 450	450 - 600	600 - 800	800 - 1000	1000 - 1200	1200 - 1500	1500 - 2000
Outer diameter (mm)	up to 450	up to 750	up to 950	up to 1200	up to 1450	up to 1750	up to 2150	up to 2750



FFT GYRO
SPECS



01

STANDARD

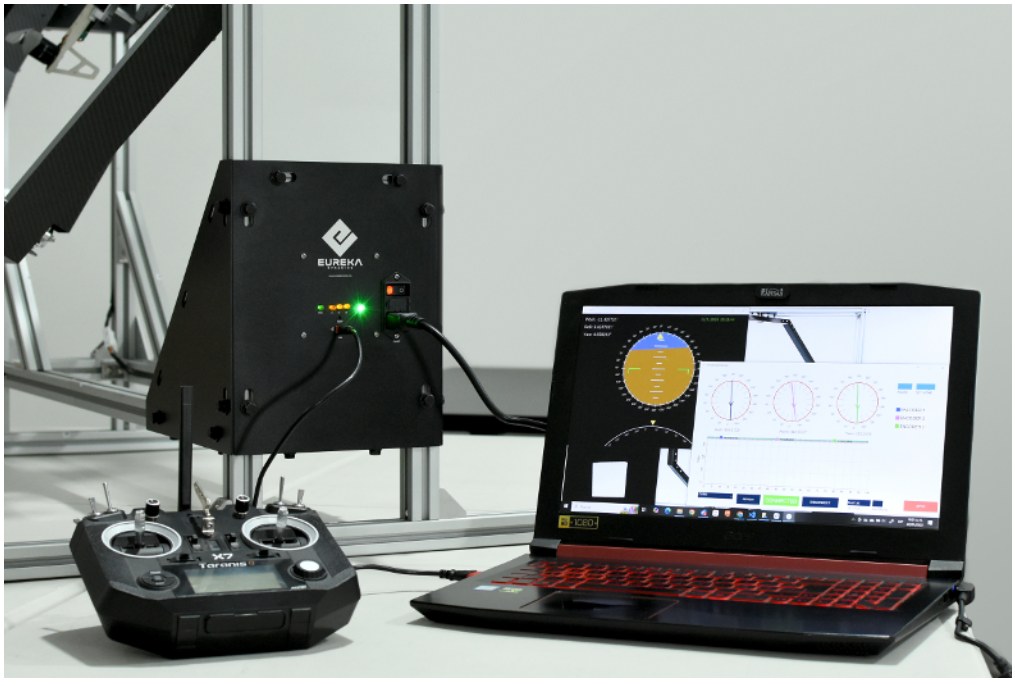
This is the mechanical test stand. A gyroscope structure to mount UAVs with full 3 degrees of freedom, but has no electronics nor sensors.

02

PRO

This system is equipped with high-resolution magnetic **encoders**, to **measure** roll, pitch and yaw angles.

Reads and records angle movements from our open-source software interface, the **FFT GYRO Test Tool**. Sensing operations also available in MATLAB/Simulink models.



FFT GYRO
ADD-ONS

Transform your gyroscope **from passive** (only reacts to the drone´s motion) **to active,** with motors.

Aside from just reading angles, motors also **control position, velocity and torque** on each axis.

This is useful for **automatic calibration processes**, or to **input an external force** — typically used to see if the drone is capable of "fighting back".

Use cases vary by client, from research and development to exhibitions and product demos.

These motor kits are designed to **replace the 3 encoders with 3 smart servo-motors**, attaching them to a shaft of each gimbal (roll, pitch, and yaw).

The motor kits are compatible with the FFT GYRO test tool and MATLAB/SIMULINK models for **sensing and control operations**.

01

MOTOR KIT 2.5

3 DC servo modules. Smart actuators with 360 degree of position control and high speed communication.

- Rated Torque: **0.5 Nm**
- Stall Torque: **2.5 Nm**

02

MOTOR KIT 6.0

3 DC servo modules. Smart actuators with 360 degree of position control and high speed communication.

- Rated Torque: **1.2 Nm**
- Stall Torque: **6.0 Nm**

SPEC/SIZE	250	450	600	800	1000	1200	1500	2000
Motor Kit compatibility	2.5, 6.0	2.5, 6.0	6.0	6.0	No	No	No	No

FFT GYRO MATERIALS

Each FFT GYRO size is built to support the **weight** and **thrust** of its typical corresponding drone size.

The use of **carbon fiber** ensures strength and **minimizes inertia**, helping drones achieve near-real angular performance without compromising robustness.

Also available in **aluminum**, not as light as carbon fiber, but an **affordable** option.

SPEC/SIZE	250	450	600	800	1000	1200	1500	2000
Max. weight Aluminum version (kg)	2.5	4	5	6	8	10	15	20
Max. weight Carbon Fiber version (kg)	3	5	6	8	10	15	20	40

01

ALUMINUM

High-quality, **affordable**, and corrosion-resistant. Strong and stable structure for flight tests. Its **low-ferromagnetic** properties avoid reaction to magnetic fields.

02

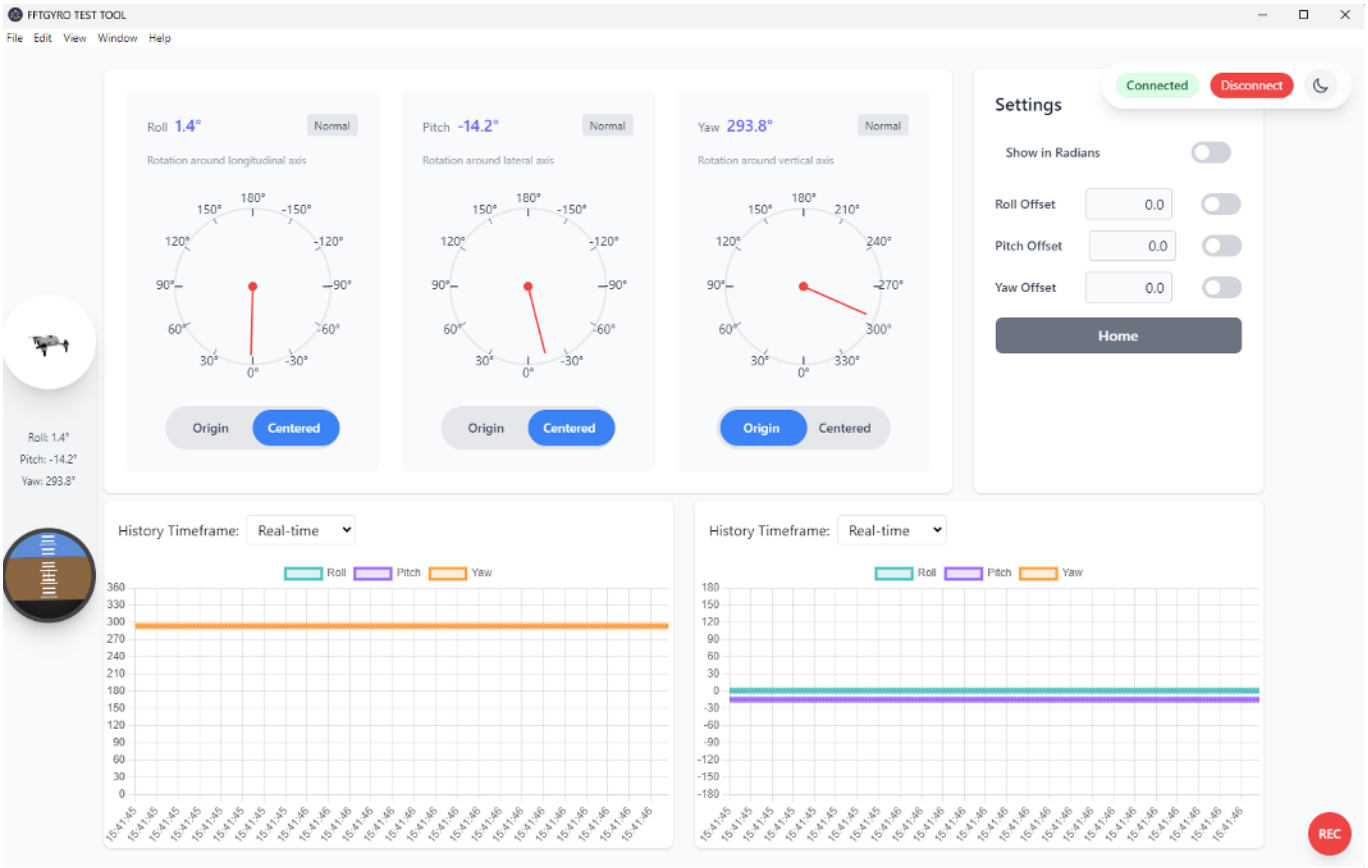
CARBON FIBER

High-performance. Strong, stiff, and **light**. Provides improved aerodynamics for professional UAVs, to minimize extra weight and added inertia. **Low-ferromagnetic**.

PRO VERSION

FFT GYRO TEST TOOL

The **FFT GYRO Test Tool** is an open-source software interface developed by Eureka Dynamics to interact seamlessly with the FFT GYRO system. It enables users to **engage with the hardware immediately** and offers the flexibility to modify the source code for custom applications.



Key features of the FFT GYRO Test Tool include:

- **Encoder Data Access:** Users can access high-resolution magnetic encoder data to measure (or record) roll, pitch, and yaw angles of the attached drone, essential for precise motion analysis.
- **Motor Control Capabilities:** The software supports read and write commands for motor control, enabling the implementation of position, velocity, or torque control strategies for each axis of the FFT GYRO.

OUR CLIENTS
TESTIMONIALS

At Eureka Dynamics we are passionate about advancing drone innovation. When you partner with us, you are not just acquiring equipment, you are gaining a committed ally that will help your team work smarter, safer and faster.

Sejong University
Seoul, South Korea

"It is a very convenient test-bed and safety is guaranteed. Even with an experimental drone controller, there is no risk of breakage, allowing for a variety of experiments. Even those who are new to flying can use it without hesitation. Not only the product is great, but the feedback provided for any questions or issues is great."

Rensselaer Polytechnic Institute
New York, United States

"Eureka Dynamics provides a unique test-bench platform for analysis and design of UAVs. Thanks to its software integration and data gathering, experiments are easy to conduct, even for undergraduate students. Support is responsive and they always follow-up on how they can help us achieve our goals with the product."

TRUSTED BY **LEADING INSTITUTIONS**

PRODUCT EXAMPLE
FFT GYRO

Given the wide customization possibilities, we have arranged a nomenclature based on the characteristics:

01

SIZE: 450

Designed for medium size multi-rotors, based on the famous 450 quad-copter frame.

02

SPECS: PRO

High-resolution magnetic encoders. Sensing and control operation from FFT GYRO Test Tool and MATLAB/Simulink.

03

MATERIAL: CARBON FIBER

No material combines better the characteristics of being strong, stiff, and light.

04

CONFIGURATION: G3.5

Fixed inertia and custom connection cable, while allowing direct angle measurements.

05

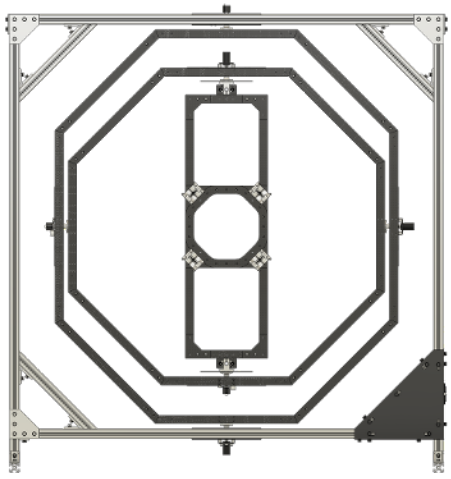
ADD-ONS: MOTOR KIT 6.0

Smart DC servo modules for advanced applications.

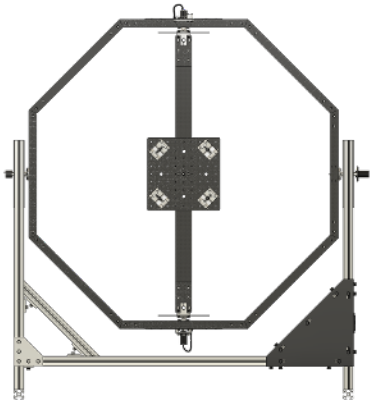
FFT GYRO 450 PRO CARBON G3.5 + MK 6.0

OVERALL SUMMARY

The FFT GYRO is a very customizable tool. You can choose the features to meet your specific project requirements.



FFT GYRO **G3.5**



FFT GYRO **G4.0**

SPECS - SIZE	Drone rotor-to-rotor distance (mm)	Drone outer diameter (mm)	Max. weight Aluminum version (kg)	Max. weight Carbon Fiber version (kg)	Motor Kit compatibility
250	100 - 250	up to 450	2.5	3	2.5, 6.0
450	250 - 450	up to 750	4	5	2.5, 6.0
600	450 - 600	up to 950	5	6	6.0
800	600 - 800	up to 1200	6	8	6.0
1000	800 - 1000	up to 1450	8	10	No
1200	1000 - 1200	up to 1750	10	15	No
1500	1200 - 1500	up to 2150	15	20	No
2000	1500 - 2000	up to 2750	20	40	No

We are happy to provide online demos, answer any questions you may have or even schedule a deeper technical conversation to design a customized solution. Feel free to reach out. We are excited to collaborate with you.

EUREKA
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