TYTO ROBOTICS

PRODUCT CATALOG

CONTENTS

03 ABOUT TYTO ROBOTICS

05 THRUST STANDS

- Series 1585
- Flight Stand 15/ 50
- Flight Stand 150
- Flight Stand 500

11 ENGINE TEST STAND

- Flight Stand 60

13 DEP TESTING

- Distributed Electric Propulsion testing of up to 8 motors and propellers

14 BALANCING & ACCCESSORIES

- Dynamic Balancing
- Accessories

18 WINDSHAPERS

- Wind Tunnels
- Wind Walls
- Propeller Testing Station
- WindProbe 3D

25 SOFTWARE

- Flight Stand Software
- RCbenchmark Software
- WindControl Software

29 ADDITIONAL RESOURCES

- Flight Stand Training Course
- eBook & Articles
- Database

33 PRODUCT SUMMARY

ABOUT TYTO ROBOTICS

Expert equipment for expert performance.

Tyto Robotics is a Canadian aerospace company located in Gatineau, Quebec. Founded in 2014, the company specializes in test equipment for UAV developers. Over 1000 businesses, research institutions, and universities all over the world are using Tyto Robotics' tools for testing and development of aerial vehicles, motors, and propellers.

Since our company's humble beginnings, we have refined the design of our mechanical, electrical, and software products to offer the most accurate and precise data possible. We are proud to say that we are now the world leader in UAV propulsion testing.

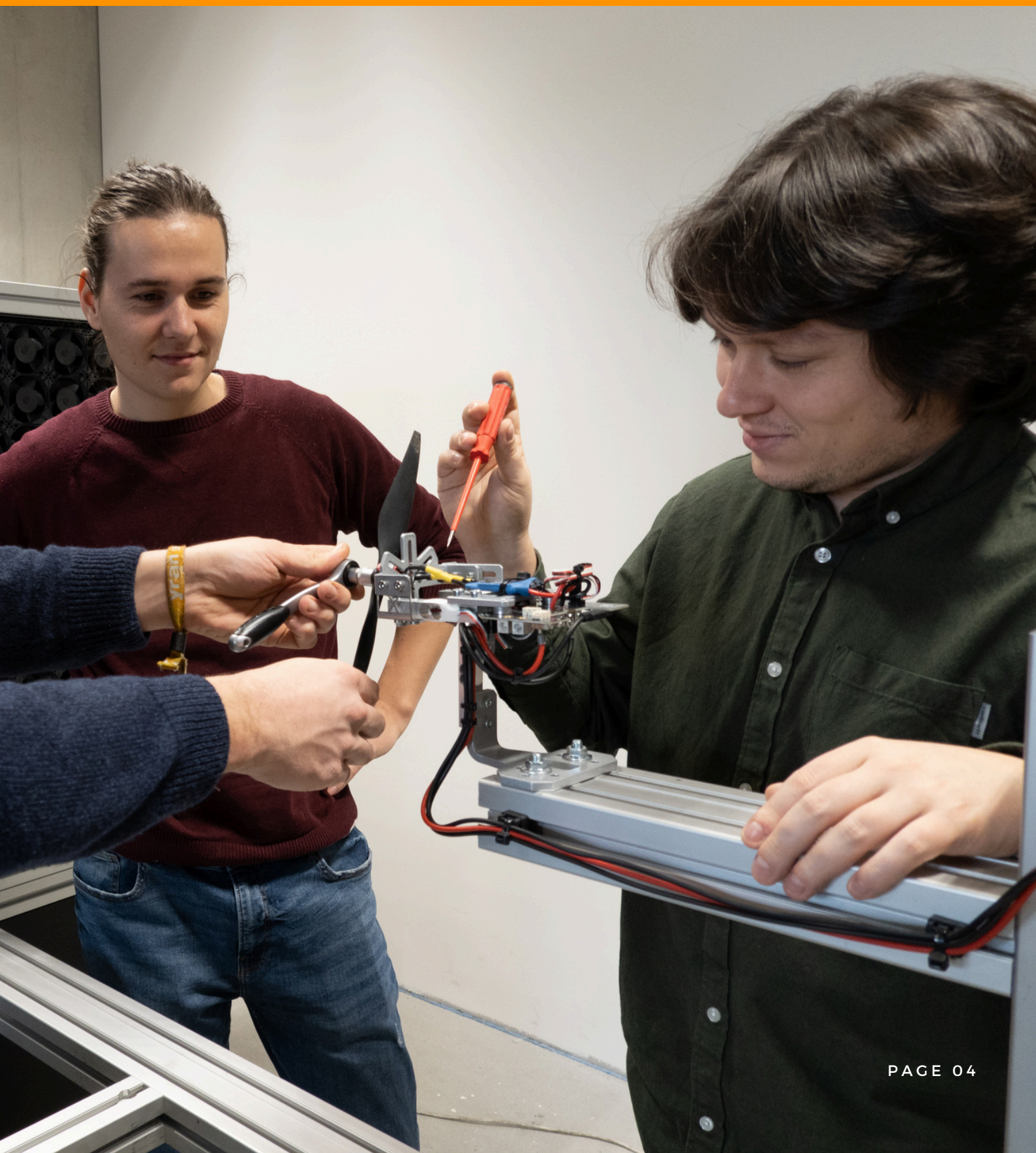
Tyto Robotics serves a variety of customers in both the public and private sectors including the NASA Jet Propulsion Laboratory, Lockheed Martin, Airbus Helicopters and MIT. We welcome feedback from our clients and are constantly improving our products to meet their testing needs.

Our company continues to grow as we strive to serve our industry with professional testing tools for all sizes of UAVs and excellent customer service.

Charles Blouin
Chief Executive Officer,
Co-Founder

Dominic Robillard
Chief Technical Officer,
Co-Founder

OUR MISSION IS TO PROVIDE DRONE DESIGNERS WITH THE BEST PROFESSIONAL TESTING EQUIPMENT FOR OPTIMIZING THEIR UAVS.



THRUST STANDS

Our thrust stands are precision tools for measuring the performance of motors, propellers, and complete UAV propulsion systems. They provide accurate data on system power and efficiency, enabling users to optimize designs for maximum reliability and performance.

Designed with UAV developers and researchers in mind, our robust hardware and powerful software make propulsion testing faster, easier, and more repeatable.

Series 1585

5 kgf of thrust
2 Nm of torque
50 V / 55 A

Flight Stand 15 & 50

up to 50 kgf of thrust
up to 30 Nm of torque
up to 180 V / 300 A

Flight Stand 150

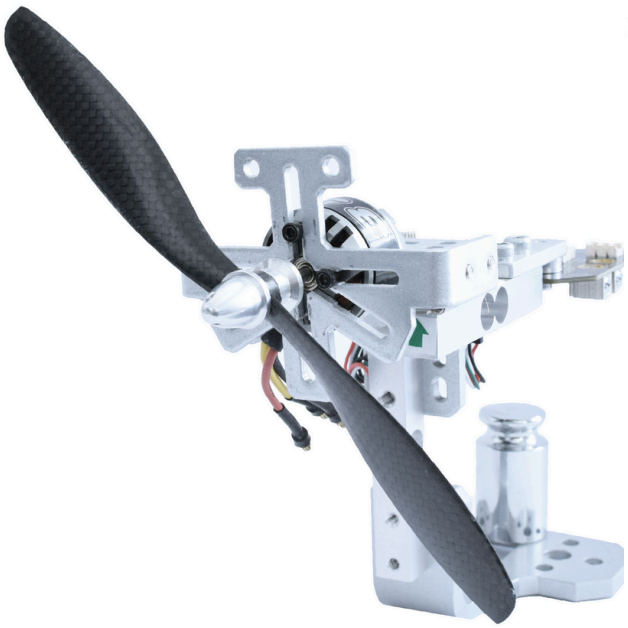
150 kgf of thrust &
150 Nm of torque at
1,000 V / 500 A

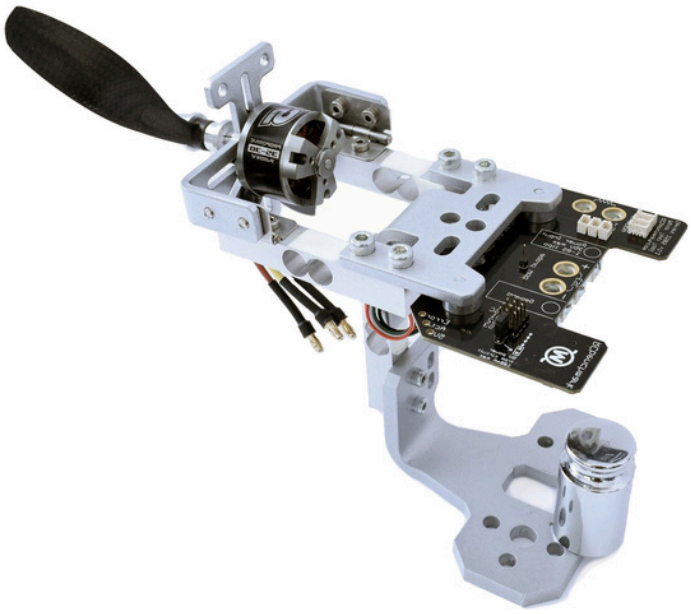
Flight Stand 500

500 kgf of thrust &
1500 Nm of torque at
1,000 V / 500 A

SERIES 1585 THRUST STAND

The Series 1585 thrust stand is built for characterizing and optimizing the propulsion systems of small and medium sized drones. Record thrust, torque, voltage, current, and rotation speed to derive system power and efficiency.





Product information

- The Series 1585 is developed specifically for drone designers and researchers with a USB interface and powerful software for automated control and data-logging.

Set-up information

- The Series 1585 includes an electrical RPM sensor, but it may be incompatible with certain motor/ESC/ voltage combinations. We recommend adding the optical RPM probe to enhance motor speed measurements.

TECHNICAL SPECIFICATIONS

Specification	Range	Tolerance
Thrust	±5 kgf	±0.5% R.O.*
Torque	±2 Nm	±0.5% R.O.
Voltage	0 - 50 V	±0.5% R.O.
Current	0 - 55 A	±1% R.O.
Angular speed	0 - 190,000 eRPM**	±1% R.O.
Coil resistance	0.003 - 240 Ohm	±0.5% R.O.

***R.O. = rated output**

****Electrical RPM (eRPM), divide by the number of motor poles to obtain true mechanical RPM.**

FLIGHT STAND 15/50

The Flight Stand 15/50 thrust stand allows you to precisely characterize your motors and propellers by measuring thrust, torque, RPM, current, voltage, temperature, airspeed, power, and efficiency.

The Flight Stand offers frictionless force measurement by using solid-state mono-block load cell to measure thrust and torque. It offers a sampling rate up to 1,000 Hz for dynamic, real-time testing, and is calibrated according to ASTM protocols.

Available versions:

- **FS15/50 Standard:** essential performance characteristics for static tests.
- **FS15/50 Pro:** enhanced performance characteristics for dynamic tests over a wider range of values with the highest possible accuracy. Supports a 1,000 Hz sampling rate and contains two additional general analog inputs for third party sensors.
- **FS15/50 Dual Motor:** Includes two Flight Stands and a coaxial testing kit, enabling dual powertrain testing in various configurations.
- **DEP Testing:** Distributed electric propulsion testing for up to 8 motors & propellers.

TECHNICAL SPECIFICATIONS

Specification	15 Standard	15 Pro	50 Standard	50 Pro
Thrust	±15 kgf ±0.15 kgf	±15 kgf ± 0.5% of measured value	±50 kgf ±0.5 kgf	±50 kgf ± 0.5% of measured value
Torque	±8 Nm ± 0.1 Nm	±8 Nm ± 0.75% of measured value	±30 Nm ± 0.375 Nm	±30 Nm ± 0.75% of measured value
Voltage	0 - 180 V	0 - 180 V	0 - 180 V	0 - 180 V
Current	0 - 150 A	0 - 150 A	0 - 300 A	0 - 300 A

FLIGHT STAND 150

The Flight Stand 150's impressive design and performance mirror that of the Flight Stand 15/50, but with thrust and torque measurement up to 150 kgf and 150 Nm.

It is designed to meet the needs of companies and institutions building and testing very large UAVs. The stand comes with an enhanced software for manual of automated control of tests, including an advanced data management system with live data plots, noise filtering, powertrain mapping, data resampling, and more.

Applications:

- **Real-time dynamic testing:** dynamic tests are possible thanks to the Flight Stand 150's 1,000 Hz sampling rate. Test acceleration, vibration, torque ripple, and more.
- **Efficiency and power characterization:** Compare electrical input with mechanical output. Automatically calculate motor, propeller and overall system efficiency.
- **Endurance and reliability testing:** study the endurance of your system's components using custom automated tests. Our user-friendly software allows you to easily design and run step tests, ramp tests, flight replay tests, or any other protocol you need.

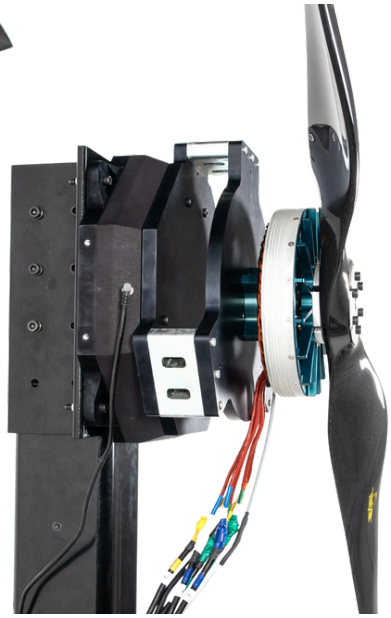
TECHNICAL SPECIFICATIONS

Thrust	Torque	Voltage	Current	Rotation Speed
±150 kgf ± 1% of measured value	±150 Nm ± 1.25% of measured value	6 - 1,000 V	500 A	Two-blade propeller: 16,800 RPM Three-blade propeller: 11,200 RPM Four-blade propeller: 8,400 RPM

FLIGHT STAND 500

The Flight Stand 500 is our biggest thrust stand to date, offering thrust measurement up to 500 kgf and torque measurement up to 1500 Nm. It can measure voltage up to 1,000 V and has three different options for current measurement.

It is designed to meet the needs of companies and institutions building very large drones, eVTOL aircraft, and electric airplanes.



Key features:

- **ASTM calibration:** load cells are calibrated to the ASTM E74 standard for thrust and ASTM E2428 standard for torque.
- **CAN ESC support:** there is a wide variety of CAN protocols available, which is why we've made it possible to control any CAN ESC as an external input.
- **Python control API:** users who prefer to program tests in an external text editor can fully control their tests using the Python API. We've created several examples and test templates to help users setup the API and get started.
- **Frictionless measurement:** our tools have a solid-state system for measuring thrust and torque, meaning there are no moving parts between the motor and load cells.

TECHNICAL SPECIFICATIONS

Thrust	Torque	Voltage	Current	Rotation Speed
±500 kgf ± 0.75% of measured value	±1500 Nm ± 1% of measured value	6 - 1,000 V	5 - 500 A	Up to 16,800 RPM

OUR THRUST STANDS HELP YOU IMPROVE THE PERFORMANCE OF YOUR DRONE THROUGH SAFE AND EFFICIENT PROPULSION TESTING

ENGINE TEST STAND

Measure the performance of internal combustion engines and propellers. The Flight Stand 60 provides the reliable, high-precision data needed to optimize engine performance and efficiency.

Flight Stand 60

60 kgf of thrust & 30 Nm of torque with fuel flow measurement up to 800 mL/min

FLIGHT STAND 60

The Flight Stand 60 is capable of measuring thrust up to 60 kgf, torque up to 30 Nm, fuel flow rate up to 800 mL/min, and temperatures up to 800°C. The stand's kit includes a fiber optic RPM sensor, fuel flow sensor, thermocouples for measuring exhaust and system temperature, and an airspeed pressure sensor to capture airflow.

The Flight Stand 60 features a vibration-resistant design including tailored dampers for various engine sizes. Additionally, the system's thrust and torque sensors are calibrated to ASTM standards to ensure high accuracy measurements.

Applications:

- **Carburetor adjustment and engine break-in:** the Flight Stand 60 provides all the data necessary to fine tune your engine's carburetor before operation.
- **Measure fuel endurance:** our Flight Replay software feature allows you to replay your flight on the stand, replicating fuel burn to enable accurate endurance estimates.
- **Cylinder performance synchronization:** verify the performance of cylinders by examining temperature gradients using the thermocouples provided.
- **Generate 3D plots of engine performance:** add a third dimension to your RPM-thrust graphs in order to compare engine power and efficiency.

TECHNICAL SPECIFICATIONS

Thrust	Torque	Fuel Flow	Airspeed	Rotation Speed
±60 kgf ± 1% of measured value	±30 Nm ± 1.25% of measured value	20 - 800 mL/min	2 to 28 m/s	Two-blade propeller: 16,800 RPM Three-blade propeller: 11,200 RPM Four-blade propeller: 8,400 RPM

DISTRIBUTED ELECTRIC PROPULSION (DEP) TESTING

Test up to 8 motors and propellers simultaneously with our DEP testing platform.

The testing platform is based around our Flight Stand thrust stands. Watch this video to see how it works.

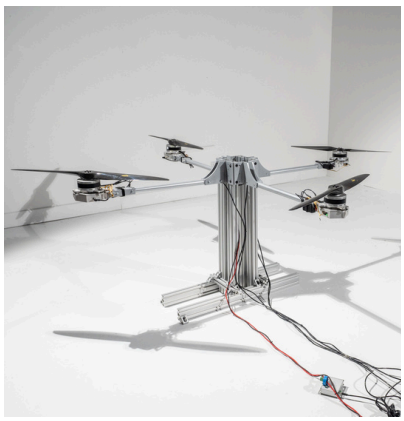
With the Flight Stand software you can control all 8 powertrains simultaneously through manual, automated, or Python-controlled tests.

Recreate the layout of motors and propellers in your UAV for realistic testing.

Back-to-Back Coax

Wing Edge

Quadcopter



BALANCING & ACCESSORIES

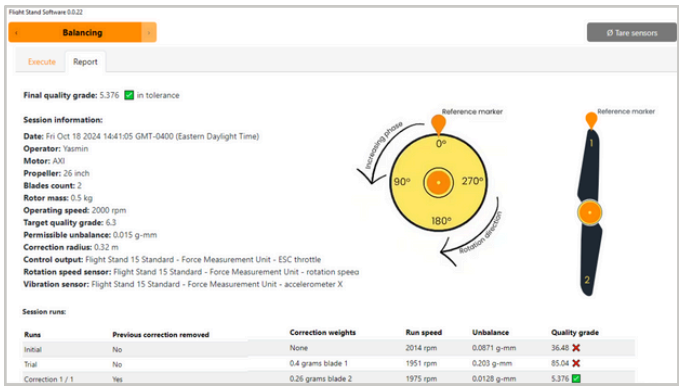
We offer several add-ons and upgrades to help you characterize your propulsion system in even greater detail.

The balancing feature is designed to allow users to meet ISO 21940-11 grade balancing standards with just a few quick spins of the motor and propeller.

Our accessories are designed to expand the capabilities of our thrust stands, allowing you to collect even more in-depth data.

Balancing

Dynamic balancing to ISO 21940-11 standards



Accessories

Enhanced and expanded data collection

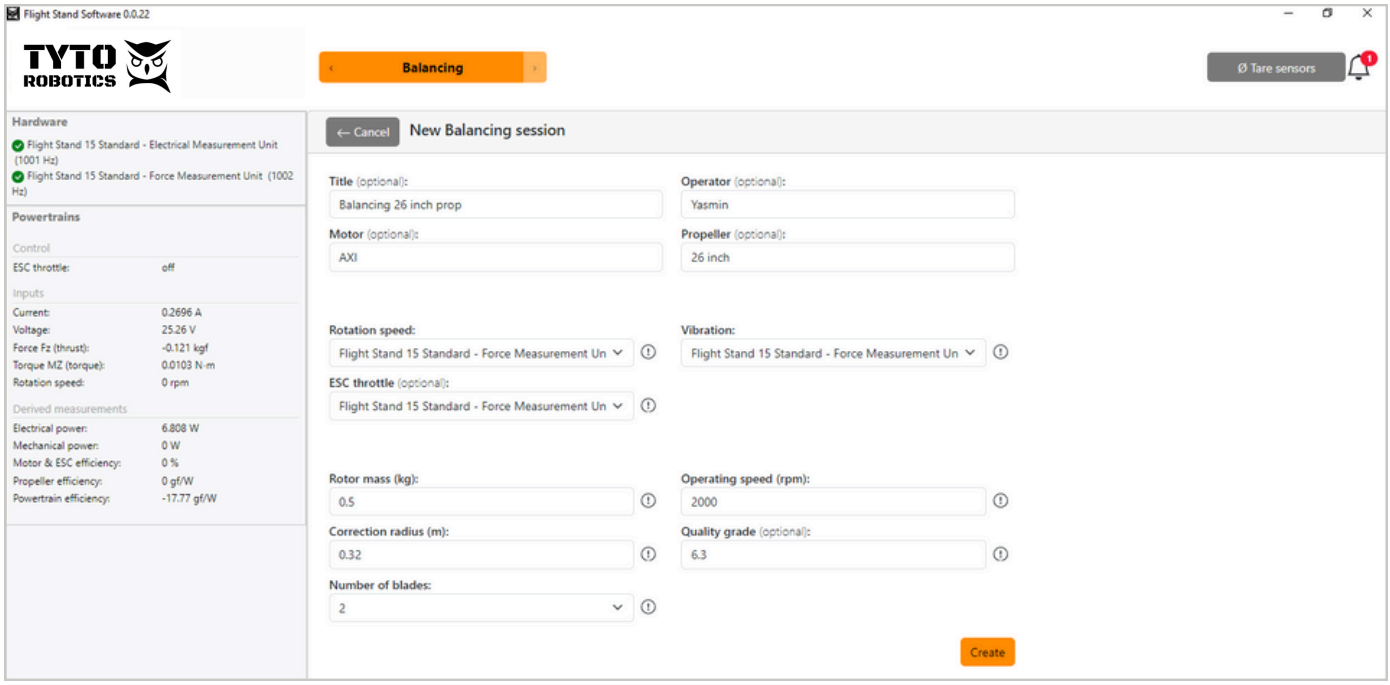
BALANCING

The dynamic balancing feature is designed to allow users to meet ISO 21940-11 balancing standards with just a few quick spins of the motor and propeller. With the ability to reduce vibration, minimize noise, stabilize cameras, and extend the service life of components, this feature is an extremely valuable upgrade to your Flight Stand.

Accessible through a software license, the propeller balancing feature integrates seamlessly with Tyto Robotics Flight Stands. The module guides users through each step of the balancing process, from initial characterization to precise weight placement and final corrections.

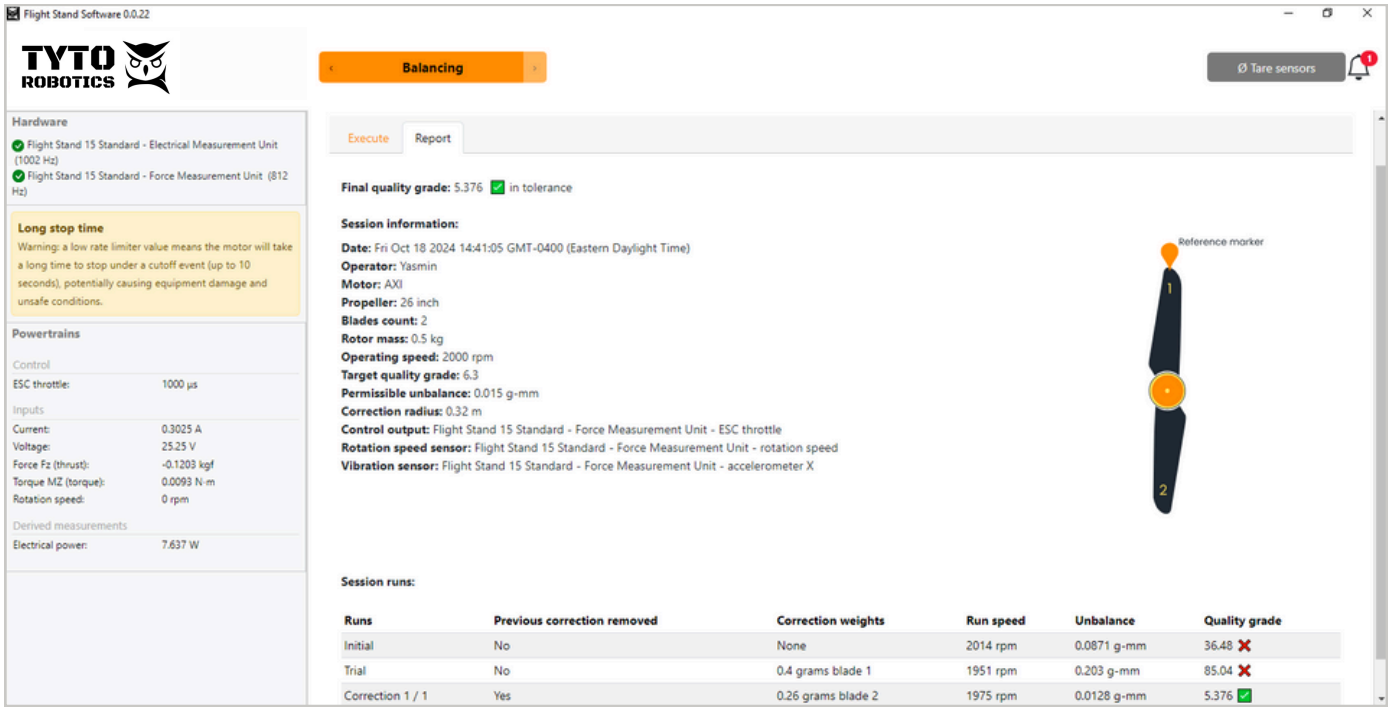
How it Works:

- **Step 1:** Open the Balancing tab in the Flight Stand software. Click “New Session” and enter your powertrain details: rotor mass, correction radius, and operating RPM.
- **Step 2:** Enter your target ISO quality grade. The default is 6.3.
- **Step 3:** Enter the number of blades from 1-12, or select disc mode to balance a motor.



BALANCING

- **Step 4:** Click “Create” then use the slider to increase the throttle until you reach your target RPM. Click “Capture” to take a base reading.
- **Step 5:** The software will recommend a trial weight. Add a weight (tape, glue, epoxy) of this mass to your propeller at the correction radius specified in Step 1.
- **Step 6:** Use the slider to increase the throttle until you reach your target RPM. Click “Capture” to take a second reading.
- **Step 7:** The software will suggest a permanent correction weight to achieve a passing grade. Add the weight to your propeller, increase the throttle and click “Capture”.
- **Step 8:** You should now get a green check mark indicating that you are within tolerance. It may also suggest an additional correction to achieve a passing grade.
- **Step 9:** View the test summary in the Report tab.



TECHNICAL SPECIFICATIONS

Specification	Value
Sampling rate	Up to 800 Hz
Quality grade	ISO 21940-11 standard
Operating environment	Indoor
Correction method	Added weight
Balancing RPM range	200 - 15,000 RPM

THRUST STAND ACCESSORIES

We offer several accessories to streamline and enhance your testing process. Check out our online store for a full selection of add-ons.

FIBER OPTIC RPM SENSOR

This Fiber Optic RPM Sensor measures motor-propeller speeds in cases where standard RPM probes are unsuitable, such as inrunner motor testing. It supports speeds up to 16,800 RPM for two-blade propellers, 11,200 RPM for three-blades, and 8,400 RPM for four-blades with 1% accuracy.

THERMOCOUPLE

This high-temperature thermocouple sensor is ideal for monitoring exhaust and cylinder temperatures during propulsion testing with the Flight Stand 60 Engine Test Stand. It has a temperature range up to 800 °C and connects to engine exhaust and cylinders with an alligator clip.

IR TEMPERATURE SENSOR

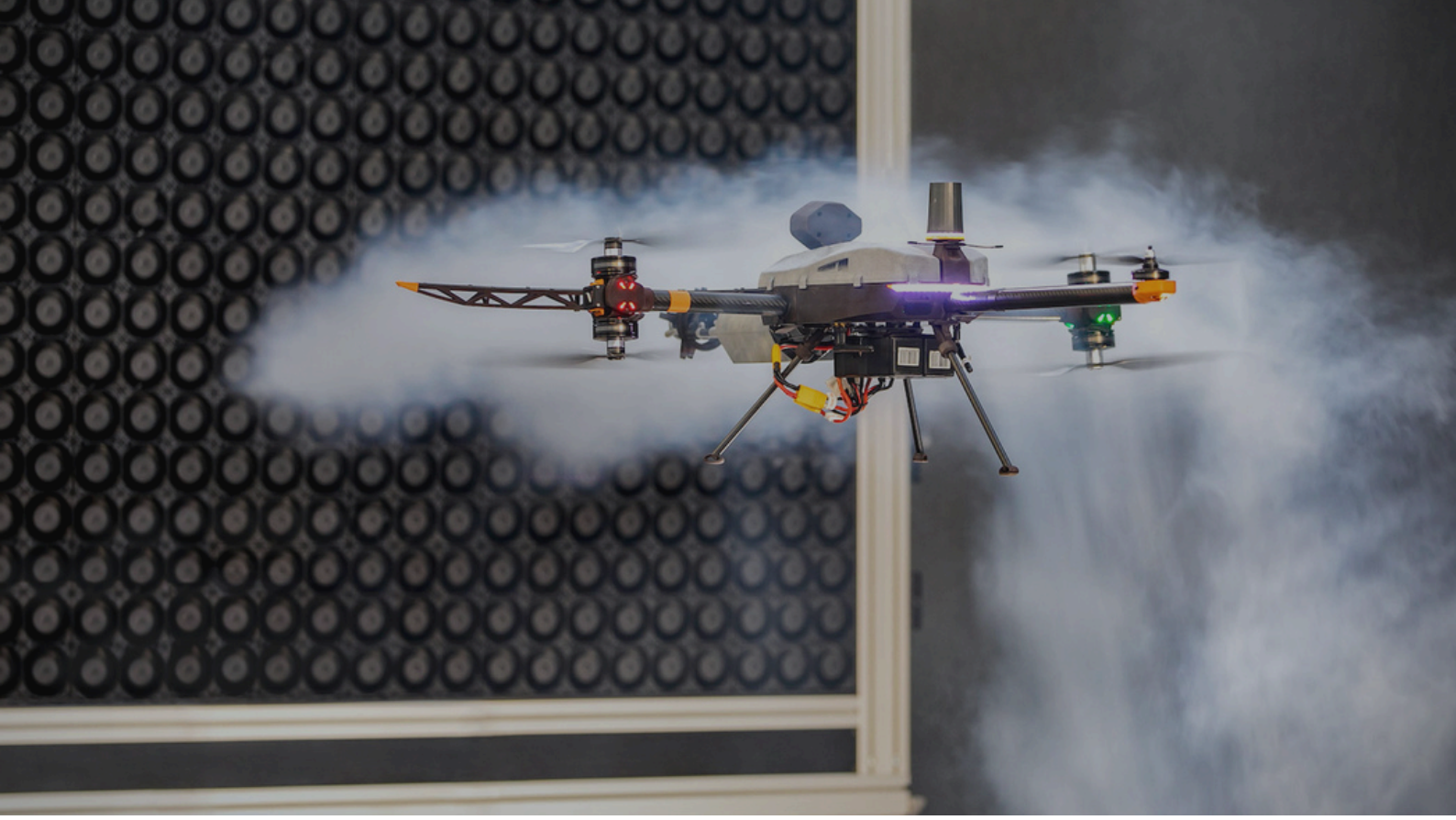
This infrared temperature sensor is compatible with Tyto Robotics Flight Stands (not including the Flight Stand 500). It can mount on numerous parts of your measurement system and measure temperatures from -40 to 85 °C (sensor temperature) or -70 to 380˚C (object temperature).

AIRSPEED PRESSURE SENSOR

This airspeed pressure sensor provides differential pressure and airspeed measurements. It supports a range of 10–498 Pa for pressure and 2.5–28 m/s for airspeed. Compatible with Tyto Robotics Flight Stands, collected data is synchronized and recorded with other thrust stand measurements.

GROUND RAILING SYSTEM

The ground railing system makes it easier to securely install your Flight Stand 15 or 50 on the ground. It helps to minimize the axial and radial distances between motors, safely positioning them with a separation distance as little as 150 mm, similar to the distance in a real multicopter.



WINDSHAPERS

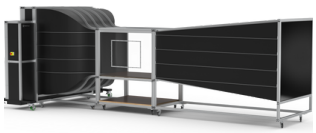
WindShapers offer a cost-effective alternative to traditional wind tunnels, with a fully modular design that can be customized to your specific testing needs.

With simple commands, you can adjust wind speed to create any 3D wind profile, from steady flows for endurance testing to dynamic gusts that replicate real-world flight conditions. Paired with WindControl software, each fan can be controlled individually to simulate the complex environments drones encounter in the field.

For deeper analysis, the WindProbe 3D system visualizes the airflow around your test object, producing a detailed 3D map of its fluid interactions.

Wind Tunnels

Closed test section with wind speeds up to 58 m/s / 130 mph

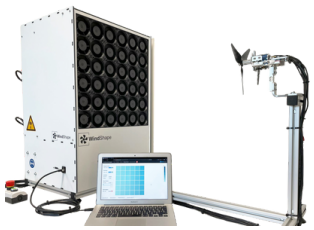


Wind Walls

Flow generators with wind speeds up to 20 m/s / 45 mph

Prop Testing Station

Compact wind wall paired with Series 1585 thrust stand



WindProbe 3D

Probe for visualizaton of aerodynamic flows

WIND TUNNELS

Windshaper wind tunnels are a precise, modular solution suitable for all kinds of aerodynamic tests involving drones, aircraft, turbines, buildings, and more. Each fan in the wind wall is controlled individually using the WindControl software.

The wind tunnel is composed of four sections: a wind wall, a convergent, a test section, and a divergent. Each section can be customized to generate the specific test conditions that you need, in terms of test space, structure, and flow speed.

Wind Wall

Convergent

Test Section

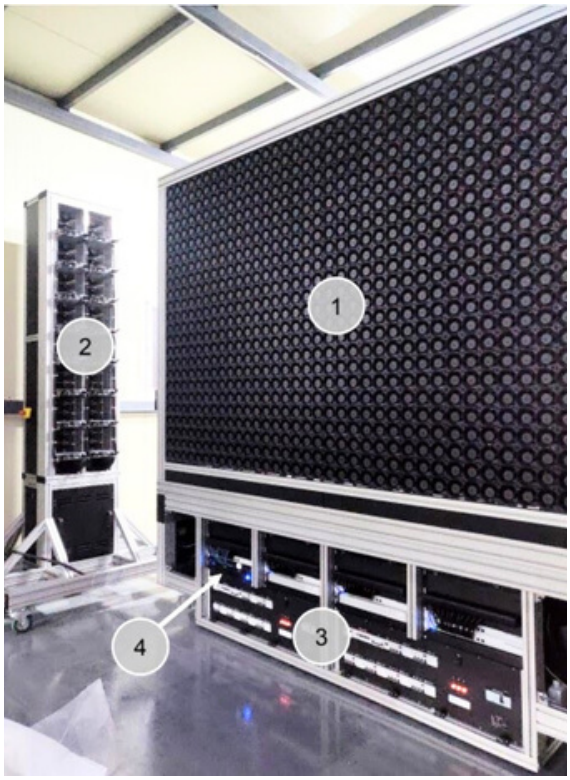
Divergent

TECHNICAL SPECIFICATIONS

Min Flow Speed	Max Flow Speed	Flow Acceleration	Flow Deceleration	Max Flow Rate
2 m/s	58 m/s	4 m/s2	3.6 m/s2	3.8 m3/s

WIND WALLS

Our wind walls offer endless possibilities for free-flight testing. Users can define the size, shape, and add-ons to match their requirements. This versatility makes it ideal for studying how unique wind profiles affect propellers, drones, buildings, and more.



Components

1. The wall of fans generating the main wind flows.
2. Side walls added to generate cross winds.
3. Distribution boxes for powering the machine, adaptable to any electrical system.
4. Control network consisting of Ethernet switches, routers, and an onboard computer.

Wind Wall Information

- Wind walls can be built to any size thanks to easily stackable wind modules.
- Individual wind modules are 25 cm2, each containing 9 wind pixels.
- Wind pixels have 2 counter-rotating fans that generate a flow speed up to 20 m/s.
- The wind wall is controlled with the WindControl software via manual control or function input u=f(x,y,t) to generate laminar or custom 3D wind flows.
- The Windshaper can also be controlled with a script using the Python control API.

TECHNICAL SPECIFICATIONS

Min Flow Speed	Max Flow Speed	Flow Acceleration	Flow Deceleration	Max Flow Rate
2 m/s	20 m/s	4 m/s2	3.6 m/s2	3.8 m3/s

PROPELLER TESTING STATION

This testing setup is designed to study the effects of different wind profiles on propellers, in order to study their performance in dynamic conditions. The kit includes a 2x2 module WindShaper and a Series 1585 thrust stand.

WindShaper Information

- The 2x2 Windshaper includes a 50x50 cm wind wall and associated components.
- The wind wall is composed of 4 modules, each with 9 wind pixels.
- Wind pixels have 2 counter-rotating fans generating a flow speed up to 20 m/s.
- The WindControl software controls the machine manually or with a function u=f(x,y,t) to generate 3D wind flows.
- The Windshaper can also be controlled with scripts using the Python control API.

Series 1585 Information

- Measures thrust, torque, RPM, current and voltage.
- System power and efficiency values are calculated automatically.
- Live recorded data is viewed in plots within the software.
- Additional sensors can be added to measure temperature, optical RPM, and airspeed.
- See previous section for more information on the Series 1585.

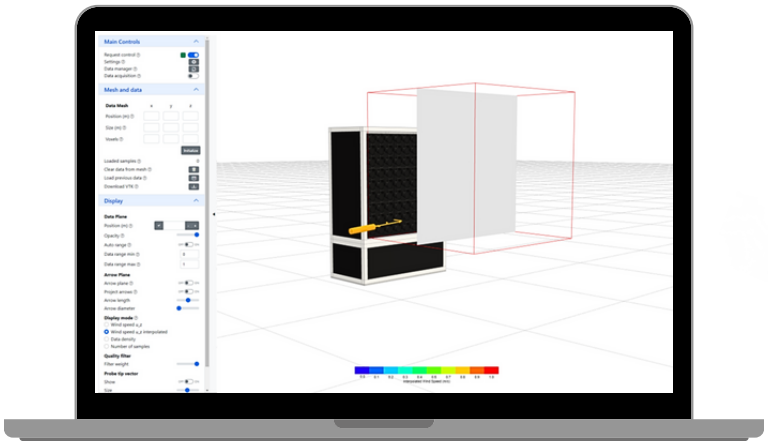
TECHNICAL SPECIFICATIONS

Min Flow Speed	Max Flow Speed	Flow Acceleration	Flow Deceleration	Max Flow Rate
2 m/s	20 m/s	4 m/s2	3.6 m/s2	3.8 m3/s

WINDPROBE 3D

The WindProbe 3D system allows users to measure and visualize aerodynamic flows in 3D space by manually scanning the area of interest with the probe.

The aerodynamic data collected by the measurement system is displayed in the WindVision software, which provides real-time visualization of the flow in 3D. The data can be recorded for later analysis and comparison with CFD data.



How it Works

The WindProbe 3D system uses two technologies to visualize aerodynamic flows:

1. The multi-hole probe – a flow measurement device that measures pressure, velocity and fluid angle of attack.
2. The motion capture system – cameras and software that can track the position and motion of an object in 3D space.

The aerodynamic data collected by the measurement system is displayed in the WindVision software, which provides a real-time 3D visualization of the flow data.

TECHNICAL SPECIFICATIONS

Specification	Value
Acquisition frequency	200 Hz
Flow velocity range and accuracy	2 - 20 m/s ±2% FSS
Flow acceptance cone	40°
Pressure sensor accuracy	0.1% FSS
Tip geometry	Pyramidal with 5 mm diameter
Max current rating	500 mA
Flow angle error	±2°

WINDSHAPER ADD-ONS

Add-on features can enhance your aerodynamic testing by simulating additional conditions encountered in the field. Test your drone in every environment with a turbulence filter, tilting mechanism, convergent and divergent, or a test section.

TURBULENCE FILTER

The Windshaper can be equipped with a flow filter to reduce unwanted turbulence. This feature ensures a laminar flow with turbulence as low as 1% and is a great option for studying ground effect and a multicopter's ability to fly in its own landing-phase turbulence.

TILTING MECHANISM

The Windshaper can be constructed with a tilting mechanism to allow for wind flow in any direction. With tilting capability up to 90°, this feature is ideal for simulating every phase of flight. Recreate an entire progression: vertical take-off and landing, transition, and forward flight.

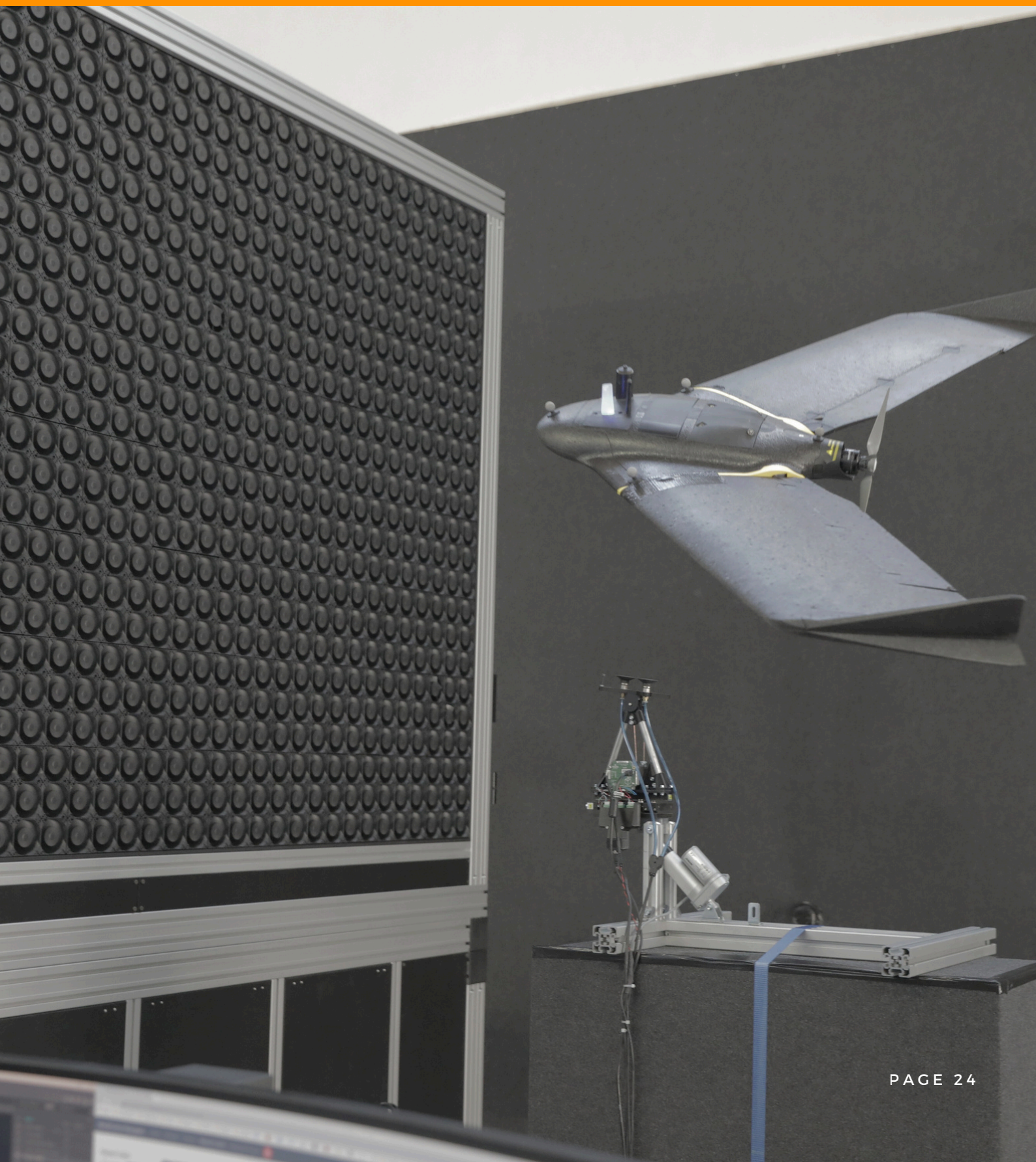
CONVERGENT & DIVERGENT

A convergent and divergent device can be added to your Windshaper to increase the maximum possible wind speed from 20 m/s up to 58 m/s within a test section, depending on the dimensions of each component. Ask our sales team for more information about this add-on.

TEST SECTION

A walled test section can be added to your Windshaper to create a protected, enclosed test space. Test sections can be customized with the dimensions, shape and properties you need. Ideal for tests involving high speeds, scale models, and stationary test objects.

ENSURE SUCCESS ON LAUNCH DAY BY TESTING YOUR AIRCRAFT IN REALISTIC CONDITIONS IN THE LAB



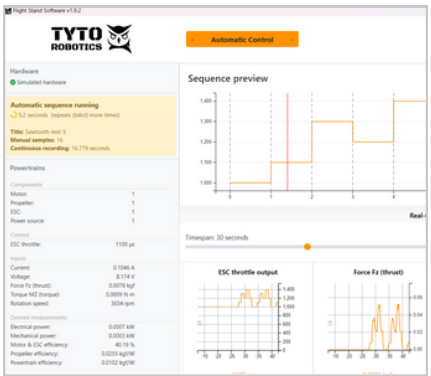
SOFTWARE

Our test equipment is paired with intuitive, feature-rich software, included at no additional cost with every purchase.

For thrust stand users, the Flight Stand software provides precise, real-time measurement and data logging for motor, propeller, and complete propulsion system testing. Our RCbenchmark software, designed for our legacy thrust stands, offers a streamlined interface with powerful analysis tools to evaluate performance and efficiency. For Windshaper users, the WindControl software enables accurate control of wind speed, function-based control of wind profiles, and export of flow conditions.

Flight Stand

Data recording and control of Flight Stand thrust stands

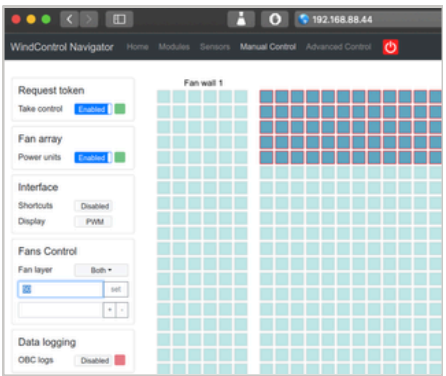


RCbenchmark

Data recording and control of Series 1585 thrust stands

WindControl

Control and manipulate wind speed and shape



FLIGHT STAND SOFTWARE

The Flight Stand software, included with every Flight Stand, provides complete control of your test stand while capturing precise performance data. Tests can be run manually or automated using test tables, imported .CSV data, or a powerful Python API.

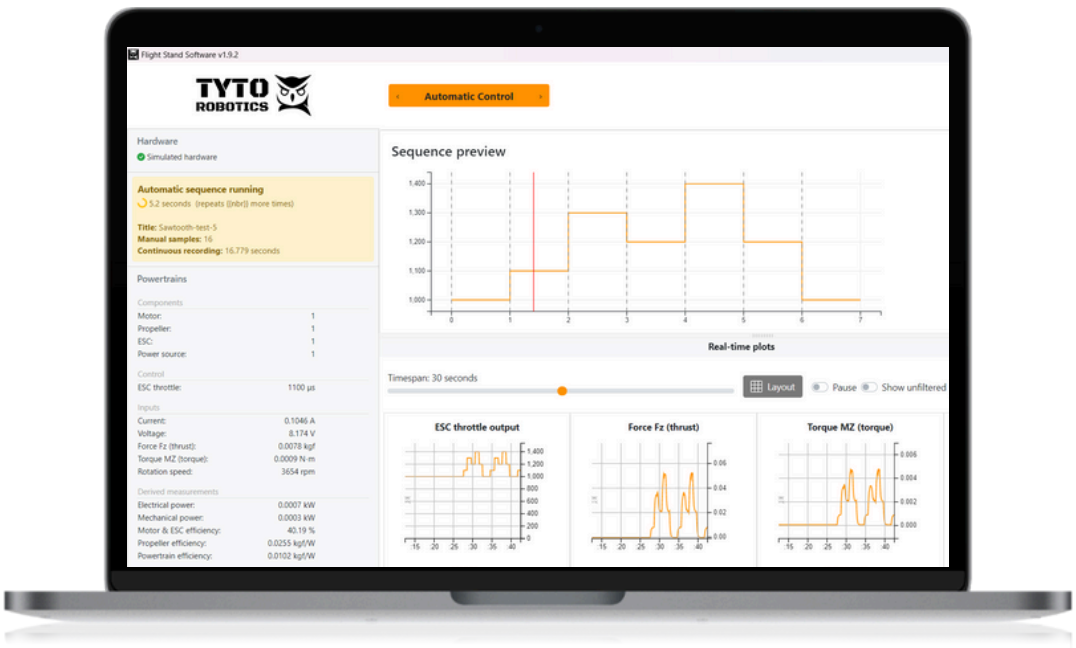
Supported protocols include:

ESC:
Standard PWM: 50, 100, 200, 300, 400, 490 Hz
Dshot: 150, 300, 600
Oneshot: 42, 125
Multishot

Servos:
Standard PWM: 50, 100, 200, 300, 400, 490 Hz

Capabilities:

- Control the thrust stand manually and view live data as it is recorded
- Automate tests with an easy-to-use interface that requires no programming
- Control the whole system from a Python API
- Upload .CSV files from your flight controller to perform flight replay tests
- Save tests directly in the software and/or export them as .CSV files
- Re-sample data for smaller files and adjust sensor noise filtering
- Map and test up to 8 powertrains simultaneously (DEP testing)
- Balance motors and propellers
- I/O API allows you to connect CAN ESCs
- Input transformations feature let's you connect third party sensors
- Wireless testing



RCBENCHMARK SOFTWARE

Our open-source propulsion testing software is included with the Series 1585. It allows users to control the propulsion system and record data with ease.

The thrust stand can be controlled manually or automatically with Windows, Linux, Mac and Chrome OS. The interface displays sensor information in textual and graphical form, which can be recorded as single data points or continuous data. We provide pre-written, editable test scripts, or you can write your own custom scripts.

Once data is recorded, you can easily export it to a .CSV file, readable with most spreadsheet softwares. Set-up your own working units, safety cut-offs and live plots to meet your needs. Your results will provide you with important information about propeller and motor efficiency as well as consumed power.

Key Performance Data

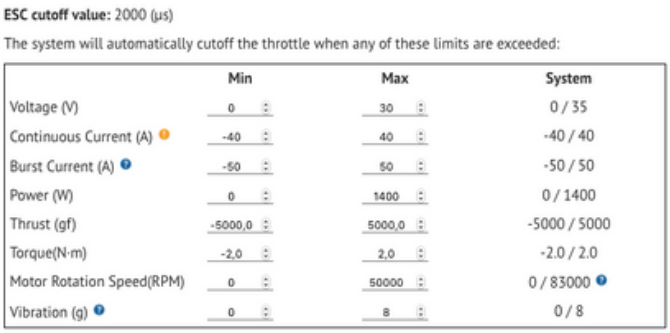
Measured Data:

- Thrust
- Torque
- RPM
- Current
- Voltage
- Temperature
- Airspeed

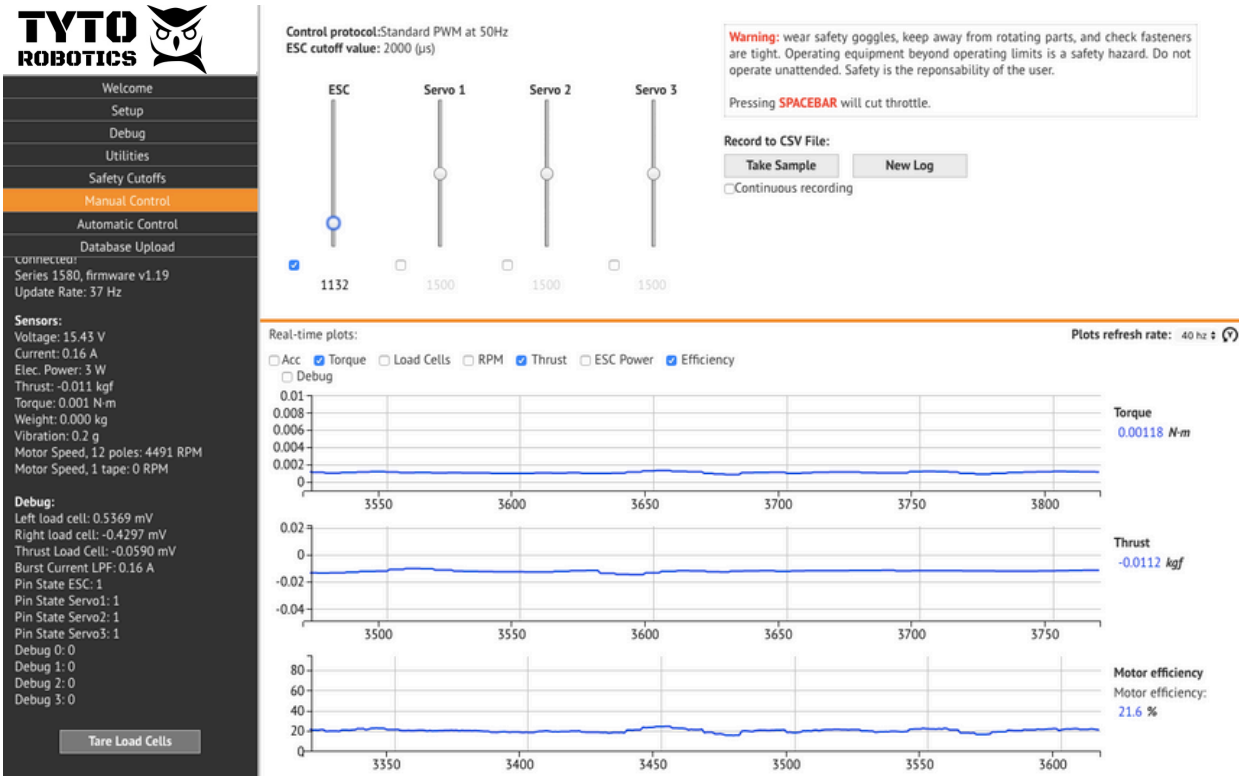
Computed Data:

- Mechanical power
- Electrical power
- Motor efficiency
- Propeller efficiency
- Overall system efficiency

Set Working Units & Safety Cut-Offs



User Interface



WINDCONTROL SOFTWARE

Windshapers are controlled with the WindControl software - an intuitive graphical interface that is accessed with a web browser application or Python API.

The WindControl software allows you to generate complex wind profiles with simple commands. Each wind pixel is individually controlled, so it is easy to produce highly unique 3D wind profiles. The Windshaper can be controlled manually using the web app or automatically through the Python API and custom scripting interface.

Once tests are completed, data from each wind module is output into a zip folder on the home computer containing time-stamped information about the Windshaper's performance and status.

Windshaper Control Options

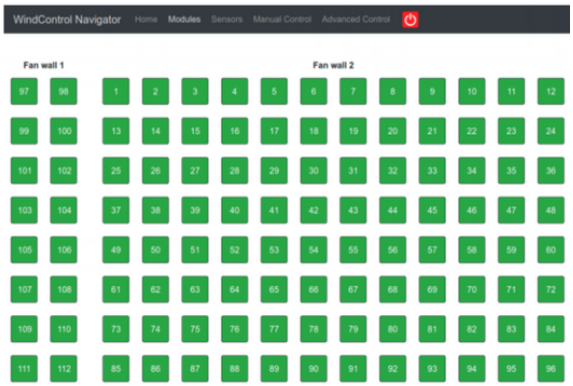
Web Application:

- Manual control of the Windshaper
- Works with any modern internet browser
- Stores test data for download

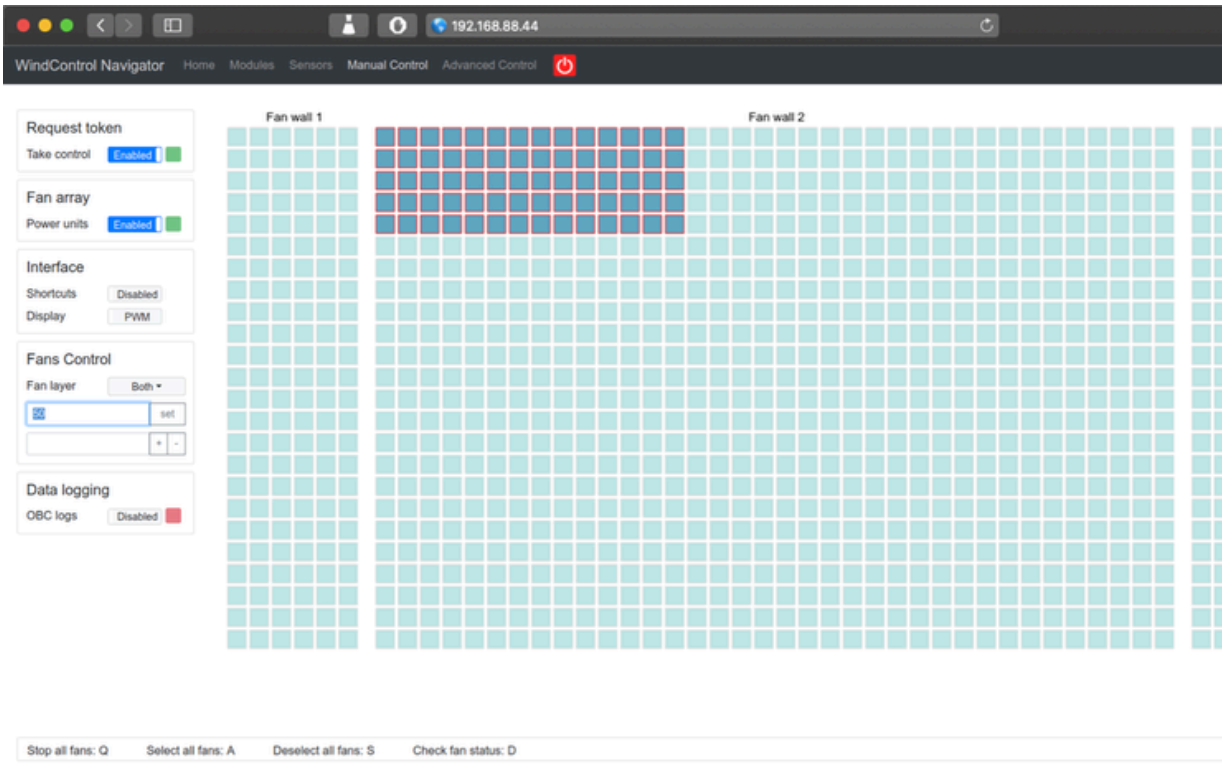
Python API:

- Python 3.6 or newer required
- Python API can be imported and used directly in Matlab
- Detailed instructions provided

Monitor Wind Modules



User Interface



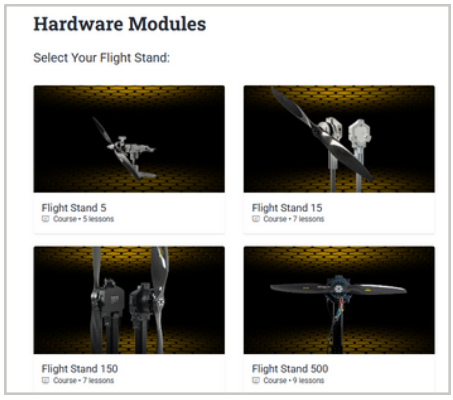
ADDITIONAL RESOURCES

At Tyto Robotics, our diverse and experienced team is committed to sharing knowledge with the UAV community.

We offer free resources for drone designers of all experience levels, including a Flight Stand training course with step-by-step guidance for maximizing your experience with our thrust stands, in-depth articles and an eBook on electric propulsion theory and industry trends, and a motor and propeller test database with real-world performance data to help compare components and make informed choices.

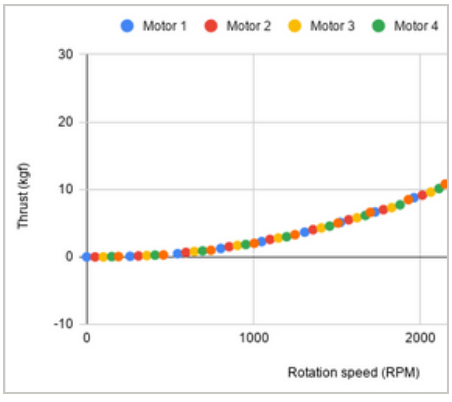
Training Course

In-depth online onboarding to make the most of your stand



eBook and Articles

Informative content on UAVs and propulsion systems



Database

Test data for brushless motors, propellers, and ESCs

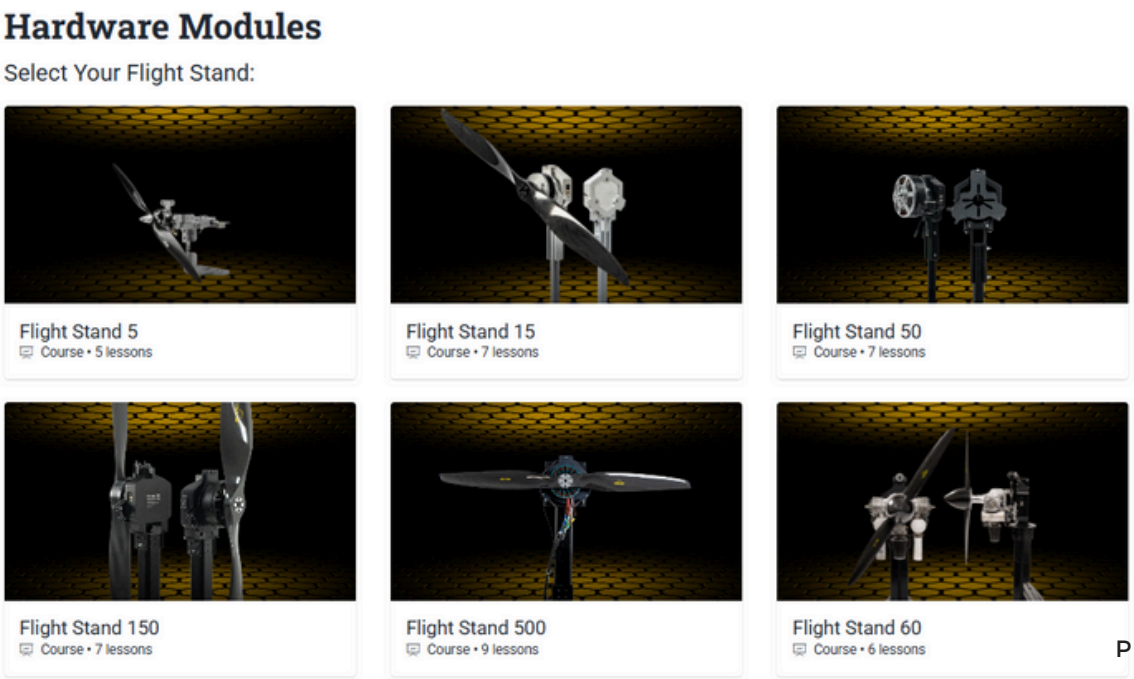
TRAINING COURSE

The Flight Stand Training Course is designed to help you master propulsion testing and get the most from your Tyto Robotics Flight Stand.

Through step-by-step installation instructions, video guides, checklists, and safety tips, you'll quickly gain the skills to operate your equipment with confidence. The course also includes progress tracking and a certificate of completion, ensuring you meet key milestones.

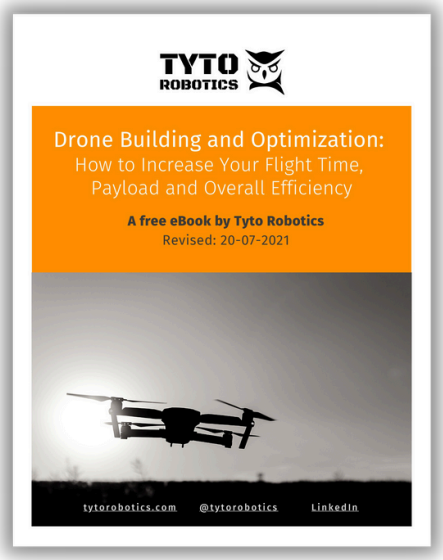
Training is divided into three modules:

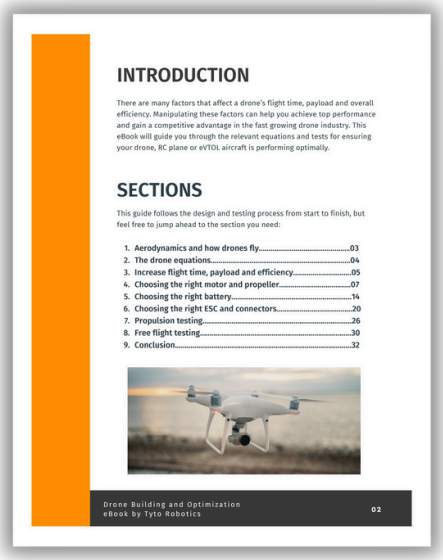
1. **Hardware**, with setup and operation guides tailored to your Flight Stand model
2. **Software**, covering all aspects of using the Flight Stand Software to run tests
3. **Applications**, choose between Propeller Balancing or Propulsion Theory to expand your expertise.



EBOOK

Our eBook - Drone Building and Optimization: How to Increase Your Flight Time, Payload and Overall Efficiency - takes your through the drone design process from aerodynamic theory to choosing your motor, propeller, battery and ESC. A great resource for designers hoping to build their most efficient drone yet. [Download it here](#).



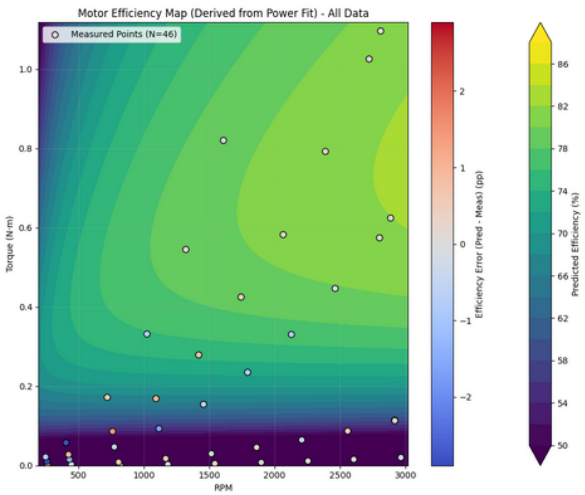


ARTICLES

We have a number of articles that cover everything from brushless motor theory to propulsion system scalability to the current state of drone manufacturers. See our [full list of articles](#) on our website.

Check out some of our top articles:

Mapping Motor Performance Without a Dynamometer



Report: Are 1-Blade Propellers Really the Most Efficient?

DATABASE

Our goal is to offer a community-driven database where anyone can upload and share their test data, greatly reducing the trial-and-error process typically required to optimize UAV propulsion systems.

The database currently contains results from more than 109 brushless motors, 171 propellers and 48 ESCs. Visit the database website to learn more or watch our video series on how to use the database to find and upload data.

The database can help to speed up the process of finding an ideal propulsion system by comparing results from other designers' public tests. Use the "Add filters" tool to narrow results to the motors, propellers and ESCs you are interested in working with, or filter by powertrain data to narrow results with performance cut-offs.

Here's an example: Let's say we want to build a quadcopter with a total weight of 2000 g. At hover, the total thrust must be equivalent to 2 kgf, or 0.5 kgf / propeller. Let's also assume we want the quadcopter to be capable of generating twice the thrust for control authority, so 1 kgf / propeller. Finally, assume we are constrained to a 5 inch propeller diameter and single motor configuration. Apply these filters to find the propulsion system which will provide the longest flight time:

- Only show tests done with a single motor
- Only show tests done with 5 inches propellers
- Only show results whose maximum thrust can reach at least 1 kilograms-force
- Add column: combined efficiency at 0.5 kilograms-force thrust
- Sort by added column: the first result is the most efficient at hover

The results of our search query are shown below:

Database Search Results

Showing 1 to 5 of 12 entries (filtered from 395 total entries)

Title	Author	Device	Date	Interpolated multi rotor propulsion efficiency at total thrust of 0.5 kgf (gf/W)	Motor	Propeller	ESC
TA110-20 Kv80 with Xoar 40x10	Erwan Labadie	Series 1780	2019-04-16	84.69	Xoar TA110-20 KV80	Xoar PJP-T-L 40"x10"	Flier Airplane 350A
TA130-25 Kv80 with Xoar 47x10	Erwan Labadie	Series 1780	2019-04-15	15.61	Xoar TA130-25 KV80	Xoar PJP-T-L 47"x10"	Xoar titan esc
Xoar 47" Propeller test	Dominic Robillard	Series 1780	2019-02-01	14.4	Xoar TA130-25 KV80	Xoar PJP-T-L 47"x10"	Xoar Pulse A200
U15XXL and 62"Prop from T-	Baiyun Tang	Series 1780	2019-12-06	11.75	T-Motor U15XXL	T-Motor 62"x24"	T Motor FLAME

PRODUCT SUMMARY

Thank you for taking the time to browse our product catalog.

For more information or to purchase one of our products, contact our sales team using this form and they will be happy to assist you within 24 hours.

Series 1585 Thrust Stand
- Datasheet
- Product page

Flight Stand 15
- Datasheet
- Product page

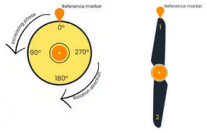
Flight Stand 50
- Datasheet
- Product page

Flight Stand 150
- Datasheet
- Product page

Flight Stand 500
- Datasheet
- Product page

Flight Stand 60
- Datasheet
- Product page

Distributed Electric Propulsion (DEP) Testing
- Product page
- Datasheets

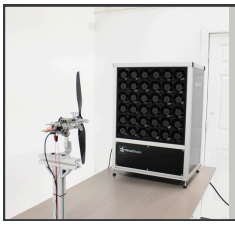


Balancing
- Datasheet
- Product page

Accessories
- Online store

Wind Tunnels
- Datasheet
- Product page

Wind Walls
- Datasheet
- Product page



Propeller Testing Station
- Datasheet
- Product page

WindProbe 3D
- Datasheet
- Product page

Software
- Flight Stand
- RCbenchmark
- Download