Flybrix Building and Flying Instructions: Quad Starter Kit
Start with a basic quad
Learn the basics of building, connecting motors and flying.

Build your expertise
Try two new designs that use different supplies and are fun to test.

Get inspired!
Learn the fundamentals of building and flight. It’s the how and why Flybrix works the way it does! Plus, you’ll be ready to build and fly your own creations.

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Introduction

Flybrix is designed for experimentation, creativity and learning. Trial and error is the heart and soul of this kit. Why? That’s where the “a-ha” moments happen, that’s where the learning happens, that’s where the lines between fun and education get blurred. Flybrix is all about providing a safe, fun, sometimes silly platform for asking and answering “how” and “why” questions that take us on the journey of understanding how things work.

In this manual are three quadcopter designs and a basics lesson giving you the fundamentals for building your own creations. We’re continually adding more build instructions to the Flybrix site!

If you happen to get turned around in the process, we’re here for you! Visit the forum on flybrix.com, or email support@flybrix.com for help.

Taking to the skies: Once you’ve built your airframe, it’s time to fly! Ask anyone who flies drones, they’ll tell you flying is a skill. It takes practice to do well. Some people even go to special piloting schools to learn how to do it! Flybrix is the perfect platform to learn how to become an ace pilot because the drones you build are small, light and they collapse on hard crashes. They go back together in a jiffy. The designs we’ve given you are stable, balanced frames that fly well. Experiment with flying these designs first to get a feel for how to fly Flybrix. Or not… You do you!

Exploring more: Once you’re ready, take your kit to the next level by visiting the user forum on flybrix.com. You’ll see other ways to use the parts you already have, plus see some exciting new ones, learn how to tweak your airframes, share schematics, and meet the Flybrix community. On the last page of these instructions we have a few game ideas that are fun to play, even with just two people!

Leveling up: Download the Flybrix Chrome extension from the Chrome Web Store for access to our code, configuration tools, community, and more! The Configurator visualizes the data that comes off your Flybrix and your controller. Features like: sensor feedback, balance, thrust levels, motor positioning, battery output etc. When you start getting into new designs with different motor placements and adding motors, The Configurator will be your go-to in order to get your airframes adjusted to get them flying. Visit our GitHub page www.Github/Flybrix for more programming). Flybrix is all open-source and hackable.

The BETA ZONE: in the Flybrix app, if you touch the Flybrix logo in the upper right hand corner, that will take you to the BETA ZONE where we are testing new features. As the name suggests, these are in BETA form, so there aren’t any instructions. Check out the features and let us know what you like and if you have any questions in the Flybrix Forum. www.flybrix/forum.
Getting Started: know your kit

- Tweezer
- Binding Cord
- Angled Motor Boom Arms
- Dual-Sided Motor Boom Arms
- Straight Motor Boom Arms
- CUSTOM BOOM-ARMS 3 STYLES
- PROPS (2 SIZES)
- BRICKS
- FLIGHT CONTROL BOARD
- 2 LIPO BATTERIES
- PROP WRENCH
- 4 MOTORS
- USB CORD
- CHARGER

Flybrix
Getting Started: Know Your Kit

**Brick Bag:** There are enough bricks in this kit to build a varieties of quadcopters. Get creative later on by adding your own bricks! The color of your bricks will most likely be different from the instruction pictures. It's important to reference shape and size of your bricks while you're building, **not color matching.**

**Prop wrench:** Use this wrench to pop your propellers off to avoid damage to your motors.

**Battery:** Pay close attention to the way the battery connector is keyed. It's dangerous to plug the battery in backwards to both the charger and the flight board.

The battery has one side of the connector plain plastic and the other side has metal connection points.

Connect the battery with the plain plastic side up.

Properly connected battery!

Here are some additional resources so you can read up on battery safety:

- Battery Safety (A)
- Battery Safety (B)
- Battery Safety (C)
- Battery Safety (D)

BEFORE YOU START BUILDING... Charge your battery!

PRIOR TO FLYING: **UPDATE YOUR FIRMWARE.** We are constantly updating the software and firmware that improve the Flybrix experience.
Let’s Build the “Flat X-Wing” Quad

All Flybrix airframes have their strengths and weaknesses. The point is to have fun getting to understand where these strengths and weaknesses occur, why and how through building and flying.

This particular design called the “Flat X Wing” is quick to build, light and nimble in the air, is moderately balanced, and breaks apart quite spectacularly on most crashes. There next build in the instructions offer more flight stability. The following build offers more durability. Give them all a try!

1. Attach (4) Boom-Arms to (2) 1x8 bricks.

*Notice the next few instruction pictures are in black and white. That’s to remind you that the colors of your bricks don’t matter. Use the brick shapes as your reference for which bricks to use.
2. Attach the flight control board.

*The “front” of your airframe is where the cables attach to the flight control board. Orientation is important when you’re building!

3. Attach (1) 1x4 brick to the back of your airframe below the battery connector cords, with one row of the brick sticking out past the 1x8 bricks.

Attach (1) 2x4 brick to the front of your airframe, flush with the 1x8 bricks.
Design check-In

4.

Attach (1) 1x4 brick to the top of the flight board.
5. Attach (1) tail fin.
Attach the flat brick that comes with your battery to the 1x4 brick. This tile has velcro on it, to hold the battery in place.

6. Colors and placement really matter in the next few steps! Take two motors that have black and white leads coming off the bottom. Gently push the motors into the boom arms from the bottom to the top. Push them in so they’re about even with the bottom edge of the boom arms.
Now, get two more motors that have the red and blue cables coming off the bottom. Gently push the motors into the boom arms from the bottom to the top. Push them in so they’re about even with the bottom edge of the boom arms.

* The difference between the red/blue motors and the black/white motors is that the red/blue motors spin clockwise and the white/black ones spin counter clockwise. This is the key to lift and steady flight.

Your Quad Starter Kit contains two sizes of props. (Orange/red props are 60mm and the yellow/black props are 65 mm).

The 65 mm props spin faster and create more lift.

Quadcopter instructions are designed for one size of propeller to be used on all four motors at one time.

If you want to experiment with using different sizes of props at the same time, realize your flight results will be unpredictable - but it might make for a fun set of flight tests!
Propellers have a unique shape. Notice in this side view, there's a “twist” to the blades of the propeller. This twist pushes air to create lift when the propeller spins.

In order to create lift, the leading edge of the propeller should angle from high to low when it spins.

This particular propeller creates lift when it spins clockwise because of the angle of the propeller blades.

The two shapes of propellers are designed for the direction the motors spin. One is designed to spin clockwise “A” to create lift, the other is “B” which spins counterclockwise to create lift. Attaching the wrong props and motors will not create lift, so your airframe won’t fly.

Notice from the top view, the propellers have a slight downward curve. Now you know how to recognize the top of the prop versus the underside!
On the underside of the 60mm props, you'll see "A" and "B" markings. (On the larger, 65mm props, there are no "A" or "B" markings. There are arrows on the top of the propellers, or you can rely on propeller shape to know how to attach them).

When attaching your props, make sure the top of the propeller is facing up, and the underside is facing down (toward the ground).

Take a moment to familiarize yourself with propeller shape, that way you'll avoid making mistakes attaching your propellers... and you'll be on your way to deeper understanding of how propellers work!

On the larger, 65mm props, there are no "A" or "B" markings. There are arrows on the top of the propellers that indicate the direction the propeller spins. Now that you know the prop basics, the pro move is to rely on propeller shape to know how to attach them!

To learn more about propellers, click here to read our blog article!
8. This step takes attention to detail!

Time to add the props!
The “B” props attach to the black/white motors that spin counterclockwise. The “A” props attach to the blue/red motors that spin clockwise. Each propeller has a very small label on it. B props go on the black/white motors and the A props go on the red/blue -- always.

You can also try your 65 MM props!

Motor Design Check-In

Take a look at your motor connectors. On the very ends you can see white marks. These marks will be used to line up the pins on these motor connectors and your flight control board. Lining up these white marks with marks on your flight control board takes attention to detail.

FLYBRIX
In the next step, we’ll show you how to connect your motors. For right now, take a look at your airframe and find the 4 white marks on both sides of the edge of your flight control board that you’ll use to line up your motor connector pins. The red arrows show you where the white marks are on the flight control board. The dotted line shows you how to match up the marks on the flight control board and the motor connectors.

*NOTE The white marks on the motor connectors are on the opposite side of the motors, so it may be that to get the correct alignment, the white marks on your motor connectors face inward, toward the board.

Let’s get the motors connected! One by one, wrap each motor cable around the boom arm a few times so it stays out of the way of the spinning props and connect the motor pins to the flight board. For your quad to fly, the motors need to be connected to the correct ports on the flight control board. Line up the white marks and gently push the motor connector into the port. Another way to check to make sure you have the right ports by finding the numbers on the ports marked on the opposite edge of the motor ports from the white marks. Use ports 0 and 6 on one side and 1 and 7 on the other.

Now, attach your pilot and windshield. If you’re a beginning pilot, it’s easier to fly with less weight on the quad. You can leave off the pilot and the windshield if you like, or add your own accessory pieces to trick-out your airframe in a new way!
10. Connect your battery to the cable attached to the flight control board. Remember battery safety! Plugging in the battery the wrong way can heat up and short circuit your flight control board.

For a reminder, click here.

Now stick your battery with the velcro side down to the brick with the velcro tab.

If your battery is properly charged, the LEDs on the flight control board should be blinking. If not, it’s time to charge your battery!

11. The next steps will walk you through basic flight controls. From there, follow the 1, 2, 3 steps on the Flybrix app to get airborne!
The app mimics the controls of an external joystick transmitter, so knowing how an external controller works, applies to how the app controls work. Learning how to fly starts with understanding how your controller works. Flying takes practice to master. There are many resources available online that help explain further how to fly. Here's one of our video picks. If you're new to being a pilot, be patient with yourself as you learn, flying a quadcopter is not like a toy that has one joystick, for example a toy helicopter. Flying multicopters are much more involved. Stick with it, you'll get it!

Here are some terms that can get you started:

- **Thrust** creates a force that lifts your airframe up off the ground.
- **Pitch** creates a torque that tilts the nose of your airframe either up toward the sky or down toward the ground.
- **Roll** creates a torque that tilts your airframe side to side. Imagine wings on an airplane, they can tilt back and forth toward the ground or toward the sky.
- **Yaw** creates a torque that spins your airframe while remaining flat in the sky with no tilting either forward, backward, or side to side.
We suggest reading all the way through these instructions before beginning. There are 4 things you need to do to with either the app (or the joystick controller to fly):

Pairing (aka binding) This step connects the flight control board to the app. Essentially it means the two can “talk” to each other. (Step 1 in the app)

Arming - which means props are able to spin. (Step 3 in the app)

Disarming - stopping props from spinning. Upon landing or crashing, make sure to disarm your motors. Leaving the motors on and unable to spin stresses the motors, causing them to burn out prematurely. (Step 3 in the app)

PRE FLIGHT

When you’re ready to fly, make sure the “front” (the side of your airframe where the leads connect to the flight control board) face AWAY from you. If the leads are facing you on takeoff, your controls will be reversed, making it very difficult to control your airframe!

Grab your app and follow the 1, 2, 3 steps on the homescreen to get airborne!

NOTE: An external joystick controller can be added to the Quad Starter Kit if you prefer a different flying experience (sold separately at flybrix.com). For external joystick controller instructions are here.

If you’ve flown drones before, you’ll be able to fly your airframe just like a ready-to-fly drone, however since Flybrix drones are made using bricks rather than a rigid unibody frame, Flybrix is not designed to fly like a performance or acrobatic drone.

Flybrix is about experimenting and learning through trial and error. Here are some tips and tricks for flying.

Take off from a flat surface. Every time your airframe turns on before you fly, the flight control board calibrates to what it believes is “flat”. If you take off from an uneven surface, the motors auto-tune in flight to keep your airframe level. This means if you take off with a right tilt for example, your airframe will veer right.

It’s also important to remember when you build your airframes, make sure they have a flat bottom.

Throttle-up for a clean takeoff rather than letting your airframe sit on the ground with the motors spinning and gently increasing the throttle. After a few tries, you’ll get a feel for how much to throttle-up for a clean takeoff.

Controls not working as expected? For example, if you’re trying to bank right using your roll controls and your airframe goes left... Make sure your airframe is facing with the battery connector leads on the flight control board facing you. If you have the cords pointing away from you, the controls are flipped and you’re flying with the controls reversed.

Erratic flight? This is a little tricky, because erratic flight can be caused by a number of things, like piloting skill, the weight and balance of your builds etc. But let’s say you’ve built an airframe according to the instructions we gave you as an example. You shouldn’t experience erratic flight. Check to make sure your battery is fully charged and your software is completely up-to-date.
All motors aren’t spinning at takeoff? Check your motor connections to ensure they’re plugged in properly. It’s easy to miss one pin either not plugged in, or the white marks on the flight control board and the white marks on your motors not matching-up.

Drifting? If your airframe consistently drifts in one direction even after checking you’re taking off from a completely flat surface, you can adjust the trim settings in the BETA ZONE to compensate for the drift.

Losing bluetooth signal? If the signal is lost between your airframe and the flight control board, you will have to reconnect your device. Bluetooth signals vary in strength from device to device.

Still need support? Send us a note at support@flybrix.com. We can troubleshoot with you and step you through getting flying...we’re here to help sort it out.

FOR ADVANCED USERS

MOTOR CONFIGURATION SOFTWARE:
Visit the Google Chrome Store to get the Flybrix Extension Configuration Software to adjust more settings on your airframe, for example fine motor tuning. You can also go to our GitHub (GitHub/Flybrix) to access the open source code.

FLYBRIX BETA ZONE IN THE FLIGHT CONTROL APP
If you select the Flybrix logo in the upper right hand of the flight control app you’ll be able to access the BETA ZONE features. In the BETA ZONE, we’re testing out new features and giving access to more live flight and sensor data.

Please note, the BETA ZONE does not have fully supported instructions, it’s still in BETA, so it’s more about experimentation and exploration.
“The Angle Armed” Quad Instructions

The Angle Armed Quad is built from the bottom-up. A bit differently than other quadcopters. The angled motor arms place the motors above the airframe, so the weight of the airframe acts like a pendulum in the air. The result is a stable, smooth flight. This design mimics much larger drones that are used by professionals, especially for photography and filming. Let’s Start!

1.

Start with the 2x4 brick and attach the flat tile with velcro. The steps with black and white pictures indicate that the colors of your bricks don’t matter. Use the shape and size as your guide for which bricks to use.
2. Attach (4) 1x1 knobs.

3. Attach (2) 1x6 bricks.
Design Check-In Side View

4. Attach your battery.
5. Attach (2) 1x4 bricks and (4) 1x1 knobs to the 1x4 bricks.

6. Attach (2) 1x6 bricks.
7. Attach (4) angled boom-arms. * Notice there are two left angled boom arms and two right angled boom arms.

8. Attach the flight control board.
9. Attach motors. Gently push the motors into the angled boom arms from the bottom-up. Follow the schematic for black/white, red/blue motor placement.

10. Wrap motor leads around the boom arms so the leads avoid hitting props. The schematic indicates which motor ports are used by each motor. *Be sure to align white ticks on motor connectors with ticks on the flight control board (reminder found here).
11. Attach (2) 1x1 knobs (on both sides of the motor leads at the front of the flight control board).

12. Attach (1) 2x4 brick and your pilot.
13. Attach the windshield.

14. Attach your propellers. Either use the 60 MM props that are marked “A” and “B” on the underside of the props, or use the 65 MM props that are marked with arrows on the top of the propellers.

Remember, red/blue motors spin clockwise and black/white motors spin counterclockwise. So, the arrows on the top of the 65 MM props indicate which direction the propeller spins. (In this schematic, we’re using the 65 MM props).

The color of the props don’t matter, just the shape of the prop.
15. Connect the battery to the flight control board.

All set! Connect to the Flybrix App to get flying!
The Dual Sided Quad is named after the unique boom arm motor holders. These are the only two-sided boom arms Flybrix offers. The idea behind the arms is to provide fewer bricks and more rigidity in the build. Because of these motor arm designs, the quadcopters tend to break apart less upon crashing and are a good start for beginning pilots. Let’s give this build a shot!

1. Attach (4) 1x1 knobs.
2. Attach (4) 1x1 knobs on the underside of the boom arms, in the same positioning as the knobs on the top of the boom arms.

3. Attach (2) 1x4 bricks to the underside of the boom arms on top of the 1x1 knobs. Then, set these pieces aside for the next few steps.
4. Attach the velcro tile to the 2x4 brick.

5. Attach (2) 1x4 bricks.
6. Attach (2) 1x6 bricks to the top of the 1x4 bricks.

7. Attach the battery to the velcro tile.
Design Check-In

Underside view of the battery chamber.

Attach the battery chamber to the underside of the boom arms.
9. Attach your flight control board to the 1x1 knobs on the top of the boom arms.

10. Insert the motors gently by pushing them from the bottom to the top of the boom arms. Align the bottoms of the motors with the bottom of the boom arms. Next wrap the leads around the boom arms before connecting the motors to the ports on the flight control board.

The schematic indicates motor lead color, positioning and port connection.
11. Attach (1) 2x4 brick to the front of the airframe. This brick will hold your pilot and windshield.

12. Attach your pilot and windshield to the 2x4 brick.
13. Attach your propellers. On this airframe we used the 65 MM propellers. As a reminder, the red/blue motors spin clockwise, and the black/white spin counter clockwise. The 65 MM props have the arrow markings on the top indicating which direction the props should spin.

If you decide to use the 60 MM props, the schematic indicates the “A” or “B” markings on the underside of the props to use in which position.

The prop color doesn’t matter - go by shape.

14. Connect the battery and flight control board leads.

You’re set to fly. Grab your app and take to the skies!
After having built a few airframes using the instructions, maybe you've noticed some construction patterns, for example motor connection and propeller attachment are the same from build to build.

In the next few pages, we'll recap some of the building fundamentals that will help you along the way as you create your own airframes and possibly add your own bricks!

At Flybrix we believe the most creative ideas are driven by constraint. When we're forced to work within certain parameters, that's when creative problem solving comes alive.

These brief recaps will set you up to know the fundamentals for building and flight as you continue your journey of exploration!
There are 8 motor ports on your flight control board. They’re numbered 0-7 and marked on the inside of the motor ports on the board. Even ports are on the right of the board, Odd ports are on the left. When building quadcopters, you will only be using ports 0, 1, 6, and 7. Once you select the quadcopter airframe in the app, the other ports are not in use and do not receive data.

If you want to start using more ports and more motors, you can upgrade your Quad Starter Kit to a full Octocopter Kit. You’ll get more bricks, motors and other supplies to be able to build more complicated and powerful airframes!

visit www.flybrix.com to upgrade your kit.

Your flight control board has a front and a back. The reason this is important is that the board uses the same orientation to position itself for calibration and flight every time prior to take off. When flying, make sure the leads on the flight control board are facing away from you, otherwise your controls will be reversed making it difficult to fly. If you want to be a trick pilot! Give it a go!

A handy way to remember the front and back is the connector leads are on the front of the board.

Prior to flight, your board calibrates to what it believes is “flat”. If you fail to take off from a completely flat surface, your board will auto calibrate to the angle it’s on.

What happens when you take off from an angle and why? Check out the Flybrix Forum to answer this question!
When attaching the props, each prop has a marking on it. For example the 60 MM props use A or B markings on the underside of the prop. This indicates the shape of the prop. When attached to the correct motor, the propeller cuts through the air creating lift. Since the motors spin in opposite directions, the props have two shapes that correspond to the direction the motor spins. When building Flybrix, red/blue motors always need an A shaped prop. The A shaped props spin with their leading edge going from high to low, again creating lift by pushing the air upward.

What happens if the props aren’t marked with an A and B? HINT: You can tell by the shape of the props! Think about it this way... You want the leading edge of the prop to angle from low to high in the direction the motor spins to push the air upward.

One more thing... When attaching your props, make sure the prop isn’t on upside down! The flat side of the prop (all props have slight curves) should be on the bottom.

Motors for a quadcopter are always connected to the board in the same way. In port 0 always use a red/blue motor. In port 6 always use a black/white motor. Port 1 is black/white and port 7 is always red/blue. Even if your design is creative and positions the motors in new ways, make sure that port 0 always gets a red/blue motor etc. (it’s possible to change the motor configurations in the advanced settings if you want to experiment with that feature, however factory settings are standard red/blue port 0 etc).

Notice as you go clockwise around the board, the motors rotate between red/blue and black/white, and the black/white motors are diagonal across the board as are the red/blue motors.

Why do you think this is? HINT: Red /blue motors spin clockwise and the black/white motors spin counterclockwise. Do some investigative work on your own to understand the physics behind motor rotation and positioning, or visit the Flybrix Forum and ask your question!

To experiment... try putting both red/blue motors on one side of the board and both black/white motors on the other. Let us know what happens!
Here’s a summary configuration picture. Here you’ll see the red/blue motor has an “A” prop attached in port O.

Use this handy map when you’re building your own airframes to make sure your flights are a success! Build crazy cool airframes, attach the flight board, motors, props and battery and see how it goes!

One way we experiment with new builds is to go crazy and build what we want to see fly. Then we attach the motors, props etc. and give it a flight test. Through the process of elimination and thinking... we adjust our creations like adding or taking off bricks or moving parts around. That’s how we see what’s possible!

Share your experiments and creations on Flybrix.com/forum. Happy Flying!
Flybrix Game Ideas
Here are a few simple thought-starters for new ways to play and learn with Flybrix. These are games that are just silly, fun things that we’ve used to structure play with Flybrix — They’ve been tried with kids as young as 7 up to adults. You can play them with 2 people or more! Find more games at Flybrix.com.

“The Black Box Design Challenge”
The goal of this challenge is to see and show how people can come up with wildly different airframe designs using the same LEGO pieces. This challenge requires more LEGO than come in the kit.
Everyone in the challenge gets the same number and shapes of LEGO. If you’re getting fancy, weigh your bricks to come in at around 50 grams or so. That way when you attach the motors, PCB and battery, you’ll be able to fly your design. Create the “black box” by blocking off what others can see you and the other challengers are building. We’ve been known to grab things that are handy like standing up books or using a shoe box for black box privacy barriers.
Build your airframe in secret. When the challengers are done, have a show and tell! Like a traditional art critique, talk about the advantages, disadvantages of each person’s design. Ask questions from the challengers why they made the decisions they did, and have the group comment on what they like, don’t like or areas they could improve... Then of course see if the designs fly!

“Pass the Potato”
Don’t ask where the name of this came from. We just made it up. The goal of this challenge is to spur collaboration and cooperation. Everyone in the challenge sits in a circle or around a table etc. Put a big pile of LEGO in the center.
Set a timer for interval timing. Experiment with how much time works for your group.
The first interval, everyone goes for the pile of LEGO and starts to build an airframe. Buzz! Time's up... Pass your work-in-progress airframe to the right. Then start the next interval. Everyone has a new airframe to add-to. Time’s up... Pass the airframe to the right. You get the picture. At the end, pass the airframes back to the person who started with it. Let them see how other people riffed on their design and where it ended up. Now, it’s time to see if they fly. Add the motors, flight control board and battery! Maybe they fly, maybe they don’t. It gets more silly and exciting when the time is tight!
You can rev on this game in a number of ways. Perhaps most of the airframes don’t fly for various reasons. Go through the pass the potato process again with the wonky designs with the directive of changing the airframe to make it possible for them to fly. Rapid problem solving can be really fun when you’re optimizing for flight. This challenge gets to be particularly hilarious when you try to sabotage each other by making design decisions that would never fly because - physics. Being handed a complete wreck of a design and figuring out how to make it work is pretty fun. Loads of lulz with this particular game.
“Battle Bricks”

This is a game designed to practice controlled flying and strategic building. Of course you don’t have to make a battle out of it, but it’s sometimes fun to see who dominates!

Pairs of players create their airframes, whatever design they want to make that flies. People quickly learn how to build to sustain hits and defend their motors.

When players airframes are ready, tie equal length strings to the bottom of the flyers (out of the way of the motors, of course). There are hook LEGO pieces that work really well for attaching the leash.

On the other side of the leash, attach a weight that the airframe can’t lift off the ground. You can even tie the strings to table legs, or chair backs, jars etc. Whatever is handy.

Now that the flight is constrained, players can practice maneuvering their airframes to attack or retreat and battle each other in the air. The challenger who’s airframe stays flying the longest wins.

“Cross the Line”

This is a relay game designed to test challengers piloting, building and problem solving skills. There are a range of variations of this game to accommodate fewer players or a limited number of kits.

Setup: Two teams. Each challenger builds their airframes. There is a line or starting area as a starting point for challengers. Depending on how challenging you want to make it, there’s another line or a target on the floor a distance away from the starting point. (*hint, really light simple designs may fly faster and be reconstructed quicker in the event of a crash)

Once each challenger completes a successful landing— and you can determine what a successful landing is. Is it crossing the line and landing in a pile of LEGO? Or is it landing with the airframe fully in tact?

The object is for each team member to pilot their airframe effectively from the starting point and land it past the opposite line or in the target before the other team.

Here are some other ideas for how to make this challenge your own!

• Only one controller per team so binding and arming are part of the challenge.
• Limits on the number of batteries each team can use. So once there’s a successful landing the battery has to be shuttled back to the next challenge. Game ends when batteries are dead.
• One “Fix it person” Say a challenger crashes before they hit the target, another team member is the only one who can reconstruct or rejigger the airframe build in a hurry to get their teammate back in the air to try again.
• Time it. The number of successful landings in a certain amount of time wins.
• Divide and conquer. Maybe you have a particularly good pilot, and another talented fix-it person, and really fast builder, and a fast runner? Let the teams decide who is in what role to maximize the number of successful landings etc.

You get the idea. Riff on what you want to optimize for. Cooperation, teamwork, specialization? Even with two people you can set this game up to accomplish “all time records” and see if you can beat your last scores.