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About us

Texas A&M Harmony is a student design team competing in Boeing's global *GoFly Prize* started in fall 2017. Out of +3,500 competing teams, startups, and individuals from around the world, we are the only US university team left standing.

Our team consists of **8 aerospace engineering graduate students**, one of whom is an active UH-60 **Blackhawk helicopter pilot** for the South Korean Navy. We have hands-on engineering experience in rotorcraft aero-acoustics, unconventional aircraft flight dynamics, and electric powertrain engineering.

We are advised by **4 PhD engineers** who have earned **NASA and American Helicopter Society medals for their outstanding contributions** to rotorcraft acoustics and novel vertical lift technologies just in the past 5 years.



TEXAS A&M UNIVERSITY
Department of
Aerospace Engineering



We have won \$70,000 so far, and now we want to go the distance to win GoFly and realize the dream of *personal* flight.

GoFly Prize

GoFly is a **\$2 million international competition** to spur development of ultra-safe "**personal flying devices**" that you can roll out of your garage and fly to work *without* waking up the neighbors or flinging debris everywhere. This isn't a flying car that you get *in*—this is a flying motorcycle you get *on* and be one with the sky.



In spring 2018, we were **1 of 10 teams** selected by Boeing as winners of the early **design stage** (Phase I) where we won \$20,000 to start development of a prototype.

Other US winners included teams from University of Kansas, Penn State, and Georgia Tech. Teams from Delft University in the Netherlands and startups from America Europe were also selected as Phase I winners.

In spring 2019, we were **1 of 5 teams selected by Boeing as winners of the early build stage** (Phase II) where **we won \$50,000** towards continued development of a full-scale vehicle for the final Phase III flyoff in spring 2020. **We and Delft are the only university teams left competing against companies from America and Europe.**

In **spring 2020**, Boeing will host a grand fly-off open to all teams to compete for sub-prizes for noise, speed, and innovation as well as the **\$1 million grand prize.**

Aria: Your Solo in the Sky

We have designed a unique vehicle that fundamentally addresses obstacles to mainstream flying vehicles: **size and noise.**

Compared to the bandwagon multi-rotor (outsized “quadcopter”) design that most other teams are pursuing, we **our coaxial-rotor design provides more thrust** out of a given footprint **at half the power.** Moreover, the specially-engineered rotors **generate 5X less noise** than the quadcopter design which means **our vehicle won’t sound like a giant swarm of bees** when you go for an early Saturday flight. Finally, our design can be **readily adapted for +150 miles of range via gas power** unlike other multi-rotor designs tailor-made for limited endurance electric propulsion.



Specifications:

- Electric tech-demonstrator
- <8.5 ft. footprint
- 200 lb. payload
- **Quieter** at 50 ft. than a hairdryer by your ear!

Fundraising needs

For Phase II, we built a 1/3rd scale model and validated all our aerodynamic and noise predictions with wind tunnel, free-flight, and acoustic tests. Now, we are working to build and flight test the full-scale version at the new RELLIS campus of Texas A&M University. We want to repeat our stellar engineering process one more time.

Although our vehicle will be remotely-piloted by an FAA certified UAV pilot, we still want to build it using flight-proven hardware, such as fail-redundant autopilot computers, certified control systems, and rugged electric motors. We estimate a total development cost of about \$500,000 as follows:

System	Cost [USD]
Rotor system & blades (inc. spares)	150,000
Motor drive system	30,000
High-energy battery system	50,000
Redundant autopilot + ground station	20,000
Flight control systems (inc. spares)	50,000
Ground power systems	20,000
Vehicle hull	45,000
Full scale "iron bird" test facilities	35,000
Full-Scale flight test	50,000
Miscellaneous	50,000
Estimated Total Cost	500,000

Your support

We seek **monetary and in-kind donations** towards our engineering efforts. For monetary donations, we have set up a **tax-deductible** payment mechanism through the Texas A&M Foundation [[link](#)]. For in-kind donations, we have set up a separate sponsorship package to match our needs to your services—please contact us directly for more information at tamuharmony@gmail.com.

We offer 3 tiers of recognition for general sponsors via our vehicle and facilities:



Hypersonic: \$10,000 and beyond

- Logo/name placed on high-front of vehicle
- Sub-scale rotor blade signed by team
- All *Supersonic* benefits



Supersonic: \$1,000 - \$10,000

- Logo/name placed on low-front/side of vehicle
- Individual recognition at all events
- All *Sonic* benefits



Sonic: up to \$1,000

- Logo/name placed on side of vehicle
- Behind-the-scenes tours of lab space and flight hangar
- Team polo



Bullseye: We also provide an opportunity for custom sponsorship recognition. Rather than provide a general donation, a sponsor can elect to pay for a *specific* component or service required by the team in return for special privileges towards this equipment.

For example, a donor may choose to purchase a test dummy for the team and name the dummy as he/she wishes. The team must then use this name and provide regular updates on its uses via social media.

Impact

In 2004, the Defense Advanced Research Projects Agency (DARPA) hosted its inaugural “Autonomy Grand Challenge” to spur development of fully-autonomous vehicles. No teams could complete the challenge—including natural favorites MIT—but teams from “underdogs” Stanford and Carnegie Mellon advanced the farthest.

In 2005, DARPA hosted the competition again, and this time Stanford won while Carnegie Mellon’s two teams placed second and third. Now, these schools are the hubs for autonomy research, and they receive billions in investments from old and new autonomy players [1,2] while MIT contends with cancelled millions [3].

The GoFly grand challenge is a similar opportunity to put Texas A&M University and Texas at large on the map for the still infant fields of electric vertical takeoff and landing (e-VTOL) and urban air mobility wherein old and new players like Boeing and Uber are investing hundreds of millions of dollars [4, 5].

Supporting Texas A&M Harmony is an invaluable method to make this happen.

