



### **Webinar Question + Answer**

*With Joshua Resnick + Matt Chasen*

#### **For [Parallel Flight](#):**

**1. What progress have you made since the last raise?**

- a. To learn more about Parallel Flight's recent success and achieved milestones, we encourage you to visit our Start Engine page - [www.startengine.com/parallel](http://www.startengine.com/parallel)

**2. What is the cost of a unit?**

- a. There are multiple purchase options so there can be a wide range of pricing depending on configuration and custom engineering required for a given customer. It's important to bear in mind that these are industrial products, not consumer drones. For the category we aim to be the most cost-effective in the class and we aim to work with our customers so that the value they receive from using our products far exceeds the price that they pay.

At Parallel we have put in a ton of thought into the platform architecture, supply chain, and the ongoing maintenance requirements and related infrastructure of the aircraft to keep the total cost of ownership low. In it's class, not only does the Parallel platform provide exponentially higher capability and output as compared to available platforms; it does so with the lowest total cost of ownership.

**3. Can you tell us more about Parallel Flight's IP and IP strategy?**

- a. Parallel Flight Technologies is developing an IP strategy around its core patented PHEM technology, its hybrid power module, which was granted in 2021. Further IP is planned to be filed in 2022. PFT recently brought on Russel Hill as Chief IP Counsel. Russ brings 25+ years experience as an international law firm partner and in-house legal and compliance executive with a stellar record of aggressively defending IP in litigation. He's been the chief IP counsel at Lenovo, CHC Helicopter and Logitech. At the latter two, Russ also served as deputy general counsel and chief compliance officer.

**4. What is the timeline for this project with LIFT?**

- a. We are looking at 12-24 months to develop a high fidelity proof of concept aircraft. The goal is for this to be useful as a tool right out of the gate, but of course some iteration and further engineering is to be expected.

**5. What is the noise level on the hybrid?**

- a. Initially it will be fairly loud, but we are working on some great technologies with 3d printed mufflers, the sound of the combustion engine is not louder than the propeller. We are on a path to make this surprisingly quiet for a hybrid system.

**6. How does the hybrid power system work?**

- a. First principles, if you think about a gas engine - if you want to accelerate you need to open up the throttle. There is a lag usually. The second you apply electric currents, then you get instantaneous torque. The Power Module combines electric torque with gas duration.

**7. What type of fuel is it going to use?**

- a. Initially we will be running on gasoline but we have plans to be able to run on Ethanol as well as Jet-A.

**8. What sort of hybrid system does it use (ie. Does a gas engine power a generator that charges a battery?)**

- a. No, this is a Parallel Hybrid system where the gas engine and the electric motor both have a mechanical connection to the propeller. No one has done this for multi-rotors before.

**9. What other industries can this hybrid power system be applied to in the future?**

- a. While the applications are endless, we will be focusing on wildfire, medical logistics, industrial logistics, and military applications.

**10. Do you foresee any challenges?**

- a. While there are always challenges, the core engineering is done, so now it is a matter of refining our technology further. One key challenge in aerospace is reducing mass, which we are always working on.

**11. Are you considering using PHEM in fixed wing drones for heavy payload industrial logistics?**

- a. Yes, this is in our long range strategic plan.

**12. How "clean" are your engines?**

- a. They are extremely clean for 2-stroke engines, which we use because of their high power density. As we scale up and refine our technology, we will be using the most advanced and cost-effective engines we can find.

**13. What is the current estimate for 1) Integration tests and 2) Hybrid HEXA being brought to market?**

- a. 12 to 24 months for integration and beginning of testing. Time to market is TBD and dependent on testing.



**14. Has a Parallel Flight drone conducted a controlled burn, yet?**

- a. We are planning multiple controlled burns this year under our Phase 2 USDA grant. We will be updating everyone with the outcome.

**15. What is the name of your flight controllers?**

- a. While this is proprietary information, I can say that our flight controller is very advanced and is rated for Optionally Piloted Aircraft in the EU.

**16. Has the hybrid prop been run through the UCD-QuietFly simulator at UC Davis?**

- a. No, but I would love to learn more about it.

**17. How much interest have you seen from first responders/military, especially with the potential for increased range?**

- a. The main reason for interest in our technology is the increased range. Folks from these communities are very excited about the possibilities.

**18. Is Parallel Flight still going to continue with its own systems and ideas without Lift?**

- a. Absolutely - this partnership highlights one of the many applications for our technology. We are still full steam ahead with our own UAS product development.

**19. Can the battery be recycled?**

- a. Our systems are hybrid so we don't have to waste large quantities of batteries. The small onboard batteries are replaced roughly every 2000 hrs. They will be recycled if such services are available.

**20. FAA doesn't allow unmanned drones to fly outside of operators point of view. Neuron has implemented an ""aviation surveillance as a service"" system to allow drones to seamlessly join existing air traffic. The aviation tech firm then utilized Hedera Network's Hedera Consensus Service to "gather, store and order" drone data. Neuron CEO Niall Greenwood said: "We have made unmanned, long-distance drone travel possible using safety-critical aviation infrastructure. Each flight creates millions of data points, which no other public ledger has been fast enough to log and correctly order." Any thoughts?**

- a. This sounds like an exciting platform and I look forward to learning more about it!

For [LIFT](#):

- 1. What specific plans are there for cooperation between Lift and Parallel Flight. (I was only able to catch the last minute of Matt Chasen's talk so if this was explained I'm sorry.)**
  - a. We hope you'll check out the replay! While we're still on track to launch customer flights this year with the all-electric HEXA aircraft, we're collaborating with Parallel Flight to develop a hybrid version that will significantly expand flight time and range. Ultimately, a hybrid version opens up a multitude of use cases for the general public, first response, and the military.
  
- 2. Why did LIFT choose to work with Parallel?**
  - a. Making a great hybrid powertrain is remarkably engineering-intensive. Joshua and his team have spent several years and made multiple iterations on powertrains that are the same as what HEXA uses. The development they've already done is highly applicable to HEXA, and it would take us many years to achieve the work they've already done.
  
- 3. Is LIFT going to pursue any other range-extension technologies?**
  - a. This isn't an exclusive relationship, and we're looking at other technologies in addition to Parallel, including hydrogen fuel cell and other possible hybridization technologies.  
This is one of the possibilities we're most excited about because of the extensive development and proven success of Parallel's technology.
  
- 4. What's the maximum distance you expect HEXA to be able to fly with this hybrid version?**
  - a. 60-90 miles in 60 minutes
  
- 5. Will this require other changes to the aircraft?**
  - a. The hybrid system will likely require modifications to HEXA's rotor-crown section. However, the goal is to make as few modifications as possible so it is substantially the same aircraft in all other respects.
  
- 6. Is a hybrid system going to weigh less or more and if so, will it still be ultralight?**
  - a. We're going to try to keep the weight down to conform to Part 103. If we can, ultralights are limited to 5 gal of fuel, and we think 5 gal of fuel should expand our range / flight duration to 60 minutes or more. If we're unable to conform to Part 103 due to the added weight, we'll seek certification.

**7. Why go hybrid? How much CO2 emissions will there be?**

- a. While battery energy density is improving all the time, there is still a pretty severe limitation on all-electric aircraft. As with hybrid cars, which are more efficient than internal combustion cars, we think hybrid eVTOL aircraft can be more efficient and have less CO2 emissions than traditional helicopters.

**8. What about noise levels?**

- a. We still expect this system will be significantly quieter than a traditional helicopter, but there will now be two sources of noise - the electric rotors and the internal combustion system.

**9. What challenges do you expect to overcome?**

- a. While you get extended range with hybrid, it's also a more complex system. There will be increased complexity and maintenance cost, but we think the benefits are worth it.

**10. What use cases does this open up for the aircraft? Could these be sent remotely to pick up and drop off people, like a cab service, and or to bring along family members one by one to a destination close by?**

- a. The all-electric model of HEXA is really an aerial micro-mobility vehicle with short range. Hybridization would extend that range up to 60-100 miles. This can support round-trip flights, commuter flights, first response, and military applications. It could even support an on-demand, unmanned HEXA pickup from just about any home or business, provided there is clear space for takeoff and landing.

**11. When do we get to do the demo flight that was paid for years ago?**

- a. Thanks for your early support! While we aren't able to announce specific dates, we are on track to launch customer flights this year. We recently shared that our Flight Ops team is ramping up to support the tour by offering flight training and beginner flights to our employees. We can't wait to fly with you!

**12. Will there be hop stops like with planes that refuel for longer trips?**

- a. We are going to build a network of vertiports, which will allow for short hops and battery recharging as well as maintenance and flight support. Our first vertiport location has been preliminarily approved by the FAA for development in Austin, TX.

**13. How long does it take to swap all battery packs? Or is there a central charging port?**

- a. Swapping a battery set only takes about 5 minutes. The batteries can charge in as little as 25 minutes, however the faster you charge the fewer cycles you get out of a battery's life, so we charge at about half that rate and have multiple sets of batteries per aircraft.

**14. Are you limited to just single occupancy in terms of technology? Or is it possible to sort of have like bus of sort to transport a group of people?**

- a. The production model of HEXA is single occupancy to allow us to fly under FAR Part 103, which also allows anyone to fly without a pilot's license. In the future, it is very possible that we will have versions of our aircraft that accommodate passengers.

**15. For Matt: How do you envision the commercialization of HEXA, especially a hybrid HEXA? Will you just operate them out of your own vertiports and sell trips, or will you sell and/or lease HEXAs as well?**

- a. Our first locations will open allowing people to train and fly around scenic areas. As we expand to allow point-to-point flights, we'll focus on vertiport-to-vertiport routes where driving is difficult or impossible (e.g. as an alternative to ferries across bodies of water). Long-term we plan to offer direct point-to-point flights. We will launch an ownership program in the future where, much like the private jet and yacht industry, we would operate the aircraft in either a lease-back or profit sharing agreement.

**16. What plans are in store for developing a piloted version of what is now a remotely-operated, passenger-carrying drone?**

- a. When you are flying HEXA, you are the pilot in command. Ground control only takes control of the aircraft in the case of emergency.

**17. What is the Expected Weight for Passenger Capacity? Considering that a fair percentage of North American Adults are Substantially Over say 75 Kg, will this affect flight Distance and Power Utilization?**

- a. When we launch customer flights in 2022, we will have a pilot weight limit of 220 lbs. This is to ensure we maintain the requirements to fly under FAR part 103, which also allows anyone to fly without a pilot's license. The pilot weight will impact flight distance and power utilization.

**18. Can I as a private person purchase one?**

- a. To start, we are not selling HEXA to people to fly on their own. We are opening LIFT vertiport locations in ideal flight areas where we will provide training and pay-per-flight rentals, plus ground and flight control support.

**19. Does the partnership impact the tour timeline? Or is it engineered in parallel with the current operational plan for the tour?**

- a. This collaboration does not impact the tour timeline. We're very excited about launching the tour this year - it's full steam ahead!

**20. If all else fails, is there, or will there be a charging port on the vehicle where you can connect a generator? If so, what is the voltage and amperage requirement?**

- a. The batteries are charged while disconnected from the aircraft. Because the fleet will be operated and maintained from our network of vertiports, a quick battery swap for return flights or additional legs of a trip will be simple and fast.

**21. Are you tied into a reciprocating engine or are rotary or turbines possible?**

- a. Weight is the primary consideration. We could use multiple types of powerplants. The parallel system that PFT offers is novel, and we're excited to pursue a hybrid system with them using reciprocating engines.

**22. What is the legislation on the use of vertiports ? Are there enough of them to make the use of HEXAs convenient ?**

- a. At the moment, FAA hasn't defined vertiports and so we are beginning with heliport approvals. That said, heliports are not so different from vertiports. We envision a FATO area, lighting, and security as these are manned aircraft.

One key difference is the size of our aircraft and the noise differential when compared to pre-existing rotorcraft. Thus, we believe that we'll be able to have more and less intrusive vertiports. We are in the midst of building our first vertiport - the first of many. Within urban areas, a system of interconnected vertiports will enable what we call aerial micro-mobility.

**23. How are you planning to prevent or limit “Competition” or Intrusion by Current Aircraft Companies - such as Boeing, McDonnell Douglas, Sikorsky, Bell, Cessna and similar? I assume that you all have Patents on this. Any Consideration for “Licensing” Arrangements? Other Countries as Competitors ( think China)? Is TESLA or other EV “Mobility Firms” showing Interest?**

- a. In an open market, competition is a reality and a good thing. It pushes us to innovate. Of course, we have and will continue to file for patents on novel elements of the aircraft design and related systems. As far as others using our technology, we would consider allowing others to use our vertiports and possibly franchise use of the aircraft itself.

China represents a significant national competitor, as is Germany. The US Air Force is supporting us and others so that the United States maintains leadership in aerospace and, specifically, eVTOL. We’re honored to be partnering with them and have worked closely with the Air Force and DoD since 2019.

EV companies / mobility firms are beginning to show interest, especially with firms like Toyota investing in Joby. It seems logical that they would continue to demonstrate interest in the future.

**24. What challenges have both Lift and Parallel faced regarding liability and insurance around riders, bystanders and property?**

- a. As an aircraft manufacturer, as with any vehicle maker, insurance is essential. While safety is paramount, all activities carry risk and we want to protect both those onboard and those on the ground. We insure each, and for our recreational flights have special activity insurance for the pilots themselves.

**25. Since I am a VFR pilot, is it possible to add weightier batteries (thus exceeding the weight restriction, and classification) but allowing for longer range? Or is this not appropriate due to the testing needed for safety at a higher weight? Is this where the PFT partnership comes in?**

- a. Great question. The all-electric HEXA is an ultralight aircraft and operates exclusively under Part 103 in current manned operations. While we do get weight allowance for floats and our ballistic parachute, the FAA doesn’t recognize weight allowance for batteries as fuel.

To your specific question, we would have to certify HEXA as a heavier class, regardless of the power source if we exceed the ultralight weight (with safety allowances). Working with Parallel Flight will likely push us over that weight limit, causing us to pursue a light sport certification (assuming light sport is modified to allow electric / hybrid aircraft). For now, we’re excited about the partnership to use for first response and DoD applications. We plan to certify as LSA in the future for commercial operations.



**26. Are the weight limitations of part 103 the biggest challenge. What is the reserve time like 30 min for certified aircraft. Can a person expand the range by making this an experimental or light sport?**

- a. Yes, it's incredibly challenging to develop a sufficiently redundant electric vehicle that has a viable operational envelope and still fits in Part 103. We are testing different battery reserve levels and will trigger automated "Return to Home" and/or "Auto-Land" when the battery voltages get low if the pilot hasn't already done so manually. Because battery voltage tends to drop precipitously when it reaches its lower limit, we intend to add a safe margin, around 20%. In theory we can add somewhat larger packs if staying under Part 103 weight limits is not required.

**27. What navigation technology is used to get to desired locations?**

- a. Primarily GPS and RTK, and we can allow the pilot to add waypoints and select from pre-planned routes, but the pilot can also navigate themselves using our moving map touchscreen and the joystick. We're also looking at optical flow sensors and LiDAR for more precision in certain environments.

**28. Flying from SFO to SJC, you'd cross over or near several airports. How would a passenger/pilot communicate to avoid ATC concerns?**

- a. Great question. As we're launching under Part 103, most flying will be in Class G airspace - so outside of the surface area of the controlled airspace around controlled airports. For example, flying from the SF waterfront across the Bay to Berkeley, Sausalito, or Tiburon below 1200' is all class G. We will limit where our pilots can fly using geofences to keep them in appropriate airspace.

**29. Do you have future plans to build multi-passenger aircraft? Possibly autonomous flight for popular routes. I know the Manhattan to Montauk route is very popular in the summer here in NY. However, there are lots of noise complaints with airplanes and helicopters currently.**

- a. Yes, but multiseat aircraft require certification and get more expensive and complex quickly - so we think multiple people flying in multiple aircraft might be the most efficient approach. We think semi-autonomous flight is the best approach, where much of the flight and route is automated but the pilot is still ultimately responsible to "see and avoid". Fully autonomous flight not relying on the pilot at all will take multiple decades to certify, we think.

**30. I would like to know the issues of commuting in controlled airspace. SFO to San Jose was mentioned. Are ultralights even allowed to fly there? It seems that this is an issue that needs to be resolved before these will be practicable. Otherwise, it seems like a great match of technologies.**

a. Answered above.

**31. Have you considered how crowded the local sky will become? I am not so sure I would like to see that every day. What about sky traffic conflicts?**

a. If you think about it, with eVTOL you will be able to get where you're going in 50-80% less time than driving - so even if every car became an eVTOL and people took the same trips, there would be  $\frac{1}{2}$  to  $\frac{1}{3}$  the number of aircraft in the air at any given time than there were cars on the road. Combine that with the fact that air traffic can be spread out in 3D layers and flights can go in straight lines instead of being funneled all together on the road, you actually aren't likely to ever see aircraft very near one another - except around high density vertiports.

**32. How do you foresee airspace management regulation proceeding? Hand in hand with air mobility? Commercial use regulated differently than private?**

a. We already fly today within the existing airspace system, and foresee being able to do so for a long time. There is hardly any air traffic around urban areas today and the sky has almost infinite capacity compared to 2D road networks. Eventually new methods of automated air traffic management will need to be rolled out, and the FAA and NASA are working on this.