

# **ORB**

A E R O S P A C E

1 - 11 - 21

# Aviation Reimagined.

A large American flag is suspended vertically in a spacious hangar. In the foreground, a small, brown, high-wing aircraft is flying horizontally across the frame. The hangar's interior is visible, showing structural beams, pipes, and a person standing near a cart in the lower center.

For The First Time in 60 Years

# Meet the Next Generation



**Range:** 1,070 NM

**Payload:** 500 LBS

**Cruise:** 185 MPH

**Endurance:** 355 Min

## Michigans' Race Horse in Agility Prime

An economic equalizer.

An energy revolution.

An unprecedented aircraft.

# ORB

/ôrb/  
Noun

1. A commercially viable, autonomous, electric, vertical take-off and landing aircraft.
  - a. Autonomous aircraft that fits in your backyard, and your budget.
  - b. 24/7/365 aerial logistics.
  - c. Medevac, search and rescue, aerial mapping.

*"Delivery Orbs are taking over last-mile logistics"*

Current electric aircraft have **less performance, payload, and range** than piston helicopters, yet still cost more.

**So it begs the question:** What commercial utility do they have?

**None:**



*Cruise:* 43MPH  
*Range:* 17NM  
*Payload:* 353LB  
*Cost:* \$300k+



Robinson R44

*Cruise:* 130MPH  
*Range:* 400NM  
*Payload:* 600LB  
*Cost:* \$300k+

Drone Technology doesn't scale. **ORB** technology does.

**Transition Vehicle** Vertical Take-off : Horizontal Flight

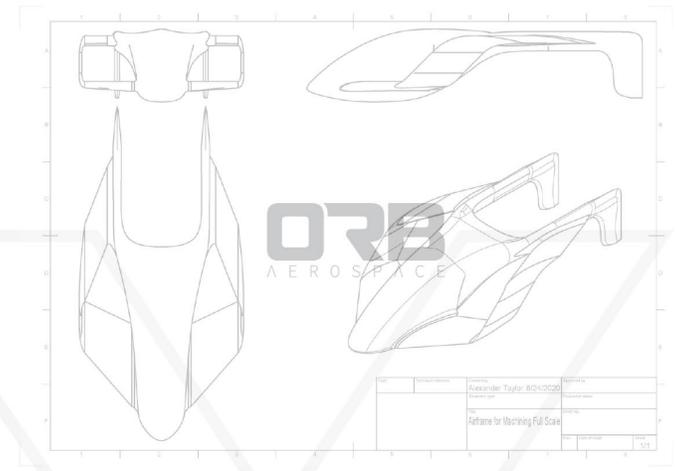
**Drag Coefficient** Cd 0.023 : High Efficiency Laminar Flow

OR **Turbine** Conventional Turbines can achieve 1,000NM + of range.

**Fuel Cell** Organic compounds produce 8x the energy density of lithium batteries for approximately 700NM of range.

**Fuel Cell Options:** Novel organic compounds developed by our partners: 8X increase in energy densit

**Hybrid Propulsion:** Turbine-generator powering both vertical and horizontal propulsion.



**Tandem Seating**

Or 13.6M3 Cargo Capacity

**Advanced Avionics**

Sense and avoid,  
AR/HUD Cockpit,  
Full autonomy.

**Universal Pilotage**

Manned, unmanned, autonomus and remote pilot capabilities.



**Fuel Cell:** Urea Peroxide uses organic inert liquid fuel with greater than 8x the energy density of Lithium ion batteries and equivalent power densities.

**Triple Redundant Propulsion**

And a recovery chute for 4X redundancy in safety systems.

**Wing Modularity**

Adapts to every mission profile and use case. Disassembles quickly.

**Hybrid-Turbine SJX:**

1070NM Range  
500lbs Payload  
185MPH Cruise

**Fuel Cell SJX:**

300NM Range  
500lbs Payload  
185MPH Cruise

# Safety

Technicals



SJX

Scaled Drones



Single Engine Failure ▮ Full Function

Dual Engine Failure ▮ Horizontal Landing @ Airport

Power System Failure ▮ Horizontal Landing @ Airport

Complete Power System Failure ▮ Emergency Landing / BRS

IMU Failure ▮ Horizontal Landing @ Airport

Structural Failure ▮ Ballistic Recovery Parachute/  
Unaffected Flight Mode

Single Engine Failure ▮ Likely Fatal Accident

Dual Engine Failure ▮ Fatal Accident/Loss of Control

Power System Failure ▮ Fatal Accident/Loss of Control

Complete Power System Failure ▮ Fatal Accident/Loss of Control

IMU Failure ▮ Fatal Accident/Loss of Control

Structural Failure ▮ Fatal Accident/Loss of Control



THE FUTURE OF VERTICAL LIFT

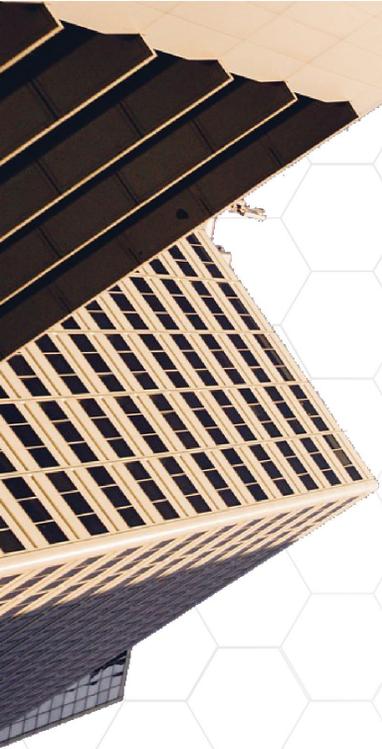
# MARINE

# LAND



# URBAN AGILE

C O M B A T D E P L O Y M E N T



# DoD

The Department of Defense has identified a capabilities gap in their vertical lift for aerial logistics, personnel transportation, austere operations, search and rescue and reconnaissance. They've designated an independent contracting program, Agility Prime, to support the development of Orbs and integrate them across the DoD.

Air Force



24/7/365  
land anywhere,  
deliver anything,  
move anyone.

- Close Air Support
- Strategic Air Lift
- FOB Re-Supply
- Manned + Unmanned
- Silent Operation

Special Forces



- Silent Operation
- Autonomic Evac
- Sensor Compatible
- Sense and Avoid
- Low/No Radar Profile

A parachute, UAV,  
rescue helicopter, and  
power generator rolled  
into one agile unit.

Army



Affordable vertical  
lift rivaling the safety of a  
truck with the efficiency  
of an airplane.

- Air Drops
- Evac
- Resupply
- Reconasaince
- Silent Power Generator

**The first Advanced Air Mobility design with Agile Combat Employment in mind, filling a critical capability gap for all branches of the DoD.**



- 24/7 Autonomus Logistics, Surveliance, Air Transport.
- Compatible with Existing Infrastructure.
- Risk-Free Rescue Operations
- Forward Operating Base Deployment, Power Genration, and Extraction

# NASA

NASA's vision for Advanced Air Mobility (AAM) is to help emerging aviation markets to safely develop an air transportation system that moves people and cargo between places previously not served or underserved by aviation – local, regional, intraregional, urban – using revolutionary new aircraft that are only just now becoming possible.



**SJX Range**

+~25KTS in Cruise --~15KTS on bottom-line stall speed less accommodating for externally mounted payloads.



**SJX Overwatch**

185MPH Cruise with hard mounts for externally and internally mounted standard multi spectral sensor ball integration (Overwatch) Payloads

**Infrastructure :**

Facility agnostic, mission agnostic, "land anywhere do anything" versatile and affordable platform.

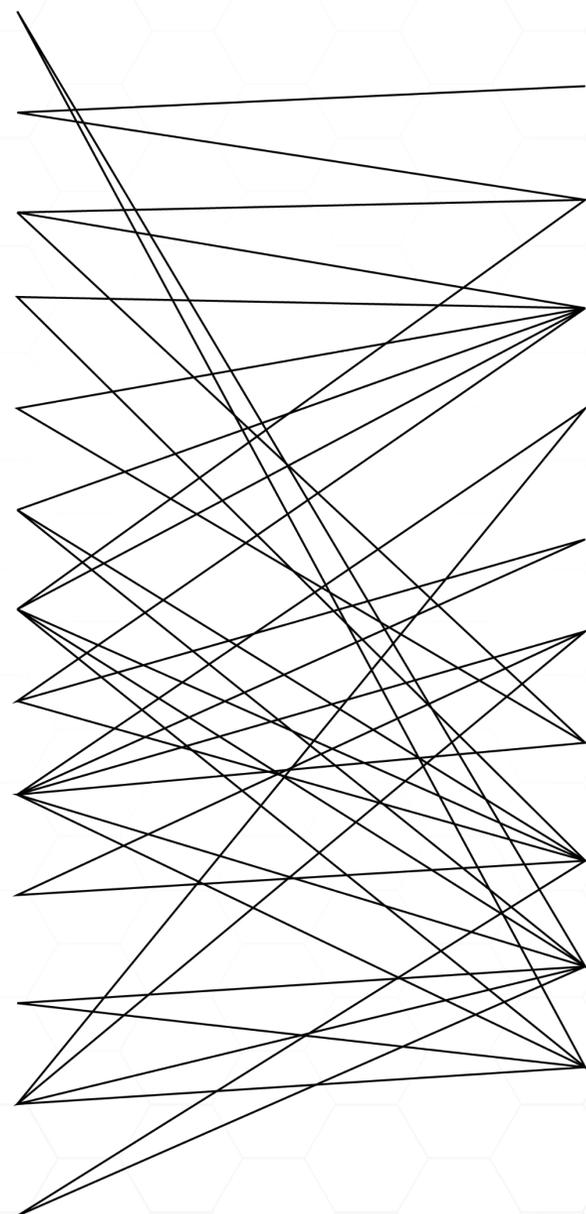
**Logistics :**

Using existing Turbine/JetA Infrastructure or Urea/Ammonia, an affordable agricultural by-product.

# Ideal For Special Ops' Stated Missions

**U  
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- Civil Affairs
- Hostage Rescue and Recovery
- Counterinsurgency
- Military Information Support Operations
- Counterterrorism
- Security Force Assistance
- Countering Weapons of Mass Destruction
- Special Reconnaissance
- Direct Action
- Unconventional Warfare
- Foreign Humanitarian Assistance
- Preparation of the Environment
- Foreign Internal Defense



- Unmanned Evac**
- Rapid Autonomous Infill - Outfill**
- Overwatch**
- Mobile Power Generation**
- Search and Rescue**
- Austere Operations**
- Close Air Support**
- Electronic Warfare**
- 24/7 Aerial Logistics**
- Personnel Transport**

# Technicals

Efficiency



< Drag Coefficient  
< Radar Cross Section  
+  
Data Link Security



Cost

## C-130J

Purchase Price : **\$67.3M**  
Operating Cost : **\$5,520/Hr**  
1,000Hr Cost : **\$72.8M**  
Max Payload : **35,200lbs**  
Combat Radius : **900NM**

## Bell UH-1N

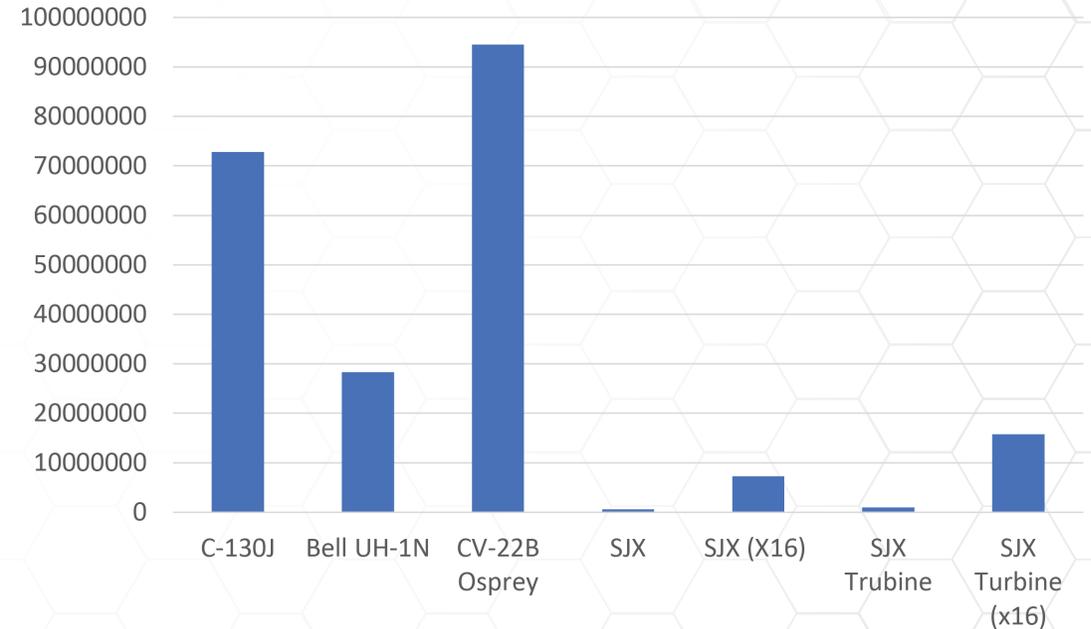
Purchase Price : **\$26.2M**  
Operating Cost : **\$2,104/Hr**  
1,000Hr Cost : **\$28.3M**  
Max Payload : **2,182lbs**  
Combat Radius : **119NM**

## CV-22B Osprey

Purchase Price : **\$72.1M**  
Operating Cost : **\$22,434/Hr**  
1,000Hr Cost : **\$94.5M**  
Max Payload : **8,300lbs**  
Combat Radius : **428NM**

## Turbine SJX

Purchase Price : **\$0.65M**  
Operating Cost : **\$310/Hr**  
1,000Hr Cost : **\$1.57M**  
Max Payload : **500lbs**  
Combat Radius : **535NM**



# ORER

1070NM OF RANGE AND UTILITY  
Istanbul to Milan





Distance ?  
1,070 mi ▾



# ORB AERO

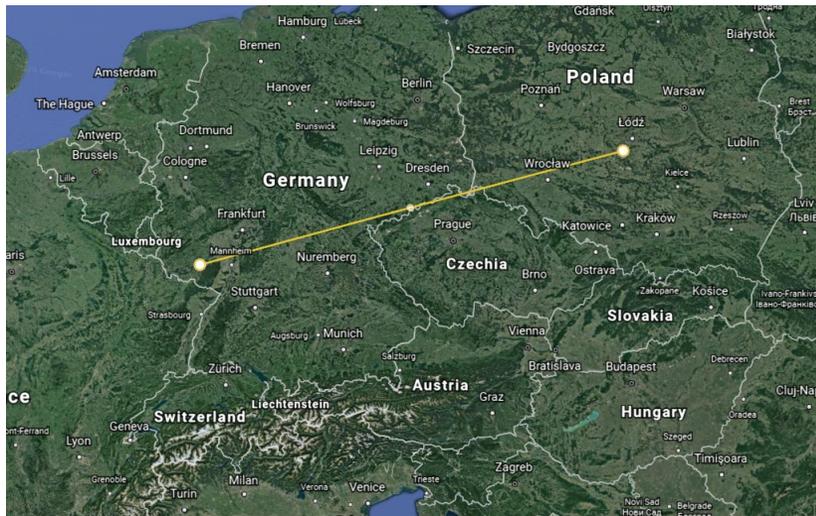
ETAR — EPLK — ETAR

Ramstein AFB — Lask Poland — Ramstein AFB

Round trip executive travel between Ramstein Germany to Lask Poland.

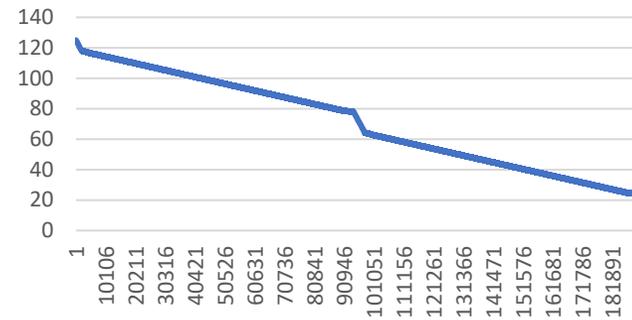
Total Distance: **923 Miles** Total Time: **319.9Min** Fuel Burn: **35.3 Gal**

Payload: **500lbs** Cost to Operate: **\$2,094** % Fuel Remaining: **13,7%**



SJX delivers 2 officers per aircraft to the Polish air base in Lask for executive meetings and returns.

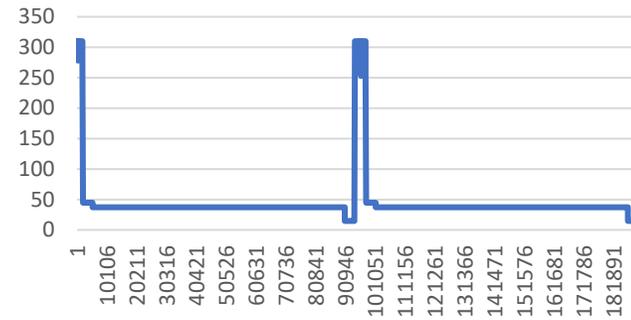
Current Fuel (KG)



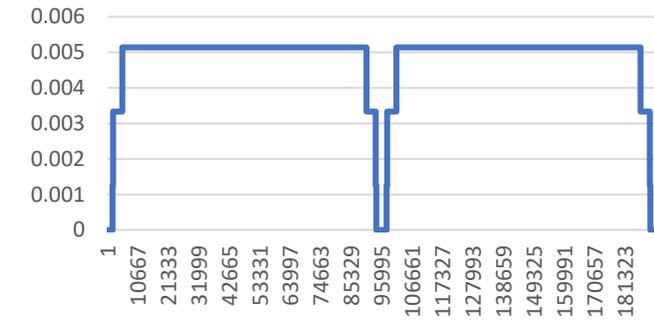
Current Altitude (mi)



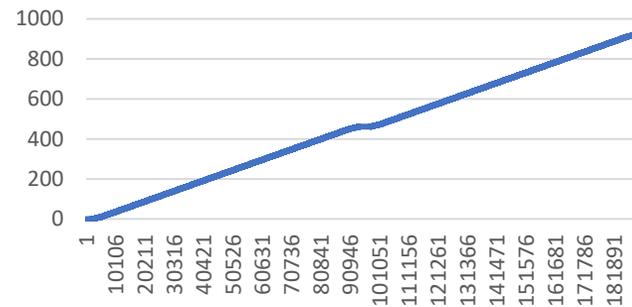
Current Power (KW)



Horizontal Speed (MPH)



Current Distance (mi)



Vertical Speed (MPH)





Distance ?  
1,070.01 mi





# Alexander Taylor

## Founder



Alex is an aircraft designer, engineer, commercial UAV pilot, and serial entrepreneur.

Alex began his life in the mission field. Growing up in Istanbul, Turkey his favorite books were "Do Hard Things", "Outliers", and "Complete Encyclopedia of World Aircraft". At age 12 he began building commercial UAVs, at 14 after returning to the United States he founded Wind Craft Quads, at 16 he was the youngest commercial drone pilot in the nation and had built a team researching new solutions for electric aerospace. In 2017 he founded Orb Aerospace with a new and selfless vision for aviation. Together, with his designs and Dr. Rusek's fuel cells, our technology has incredible potential for improving life on earth.

A group of uniquely intelligent people, dedicated to pushing the limits of aviation and the technology around it, not for the richest among us, but for the benefit of every man.



**L. Allen Heneveld**  
CFO/In-House Counsel

MBA, JD, former CPA and Certified Growth Curve Specialist. Allen has been working with disruptive businesses for over 35 years. He is an experienced and successful team & infrastructure builder.



**Brian Davis**  
Military Development

A-10C and F-16C evaluator/instructor pilot, ATP, and Air War College graduate. Command and combat tested leadership experience; Wing Chief of Safety; Global/Multi-National/ Joint Exercise development. Executive MBA.



**Prof. Dr. John Rusek**  
Energy Development

Practicing Chemical Engineer for 44 years, Distinguished Air War College Graduate, Former Chief Engineer - Energetics at NAWC/China Lake, Adjunct Professor in Aeronautics and Astronautics at Purdue University.



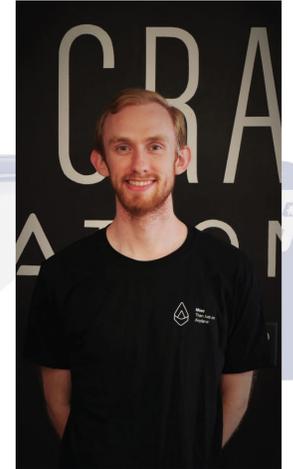
**Gavin Vonk**  
Programmer

Prodigy programmer with multi disciplinary abilities in software development, prototyping and IT systems.



**Luke Wilson**  
R&D Engineer

Is an airframe and powerplant technician engineer with broad experience in prototyping and product development.



**Levi Vandekamp**  
Electrical Engineer

Levi is an electrical engineer with a broad range of experience in many technical disciplines.



**OPEN HEAVENS**  
AEROSPACE

# PARTNERS



**AUTODESK.**



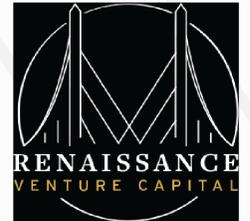
WORLD CHAMPIONSHIP  
**AIR RACE**



**MICHIGAN ECONOMIC**  
DEVELOPMENT CORPORATION



# AWARDS



Top

# Business Development

## ORB AEROSPACE Timeline

### KEY

- Federal Market Expansion
- Strategic Partnerships / Events
- Product Development (Dev-ops)
- Initial Market Deployments

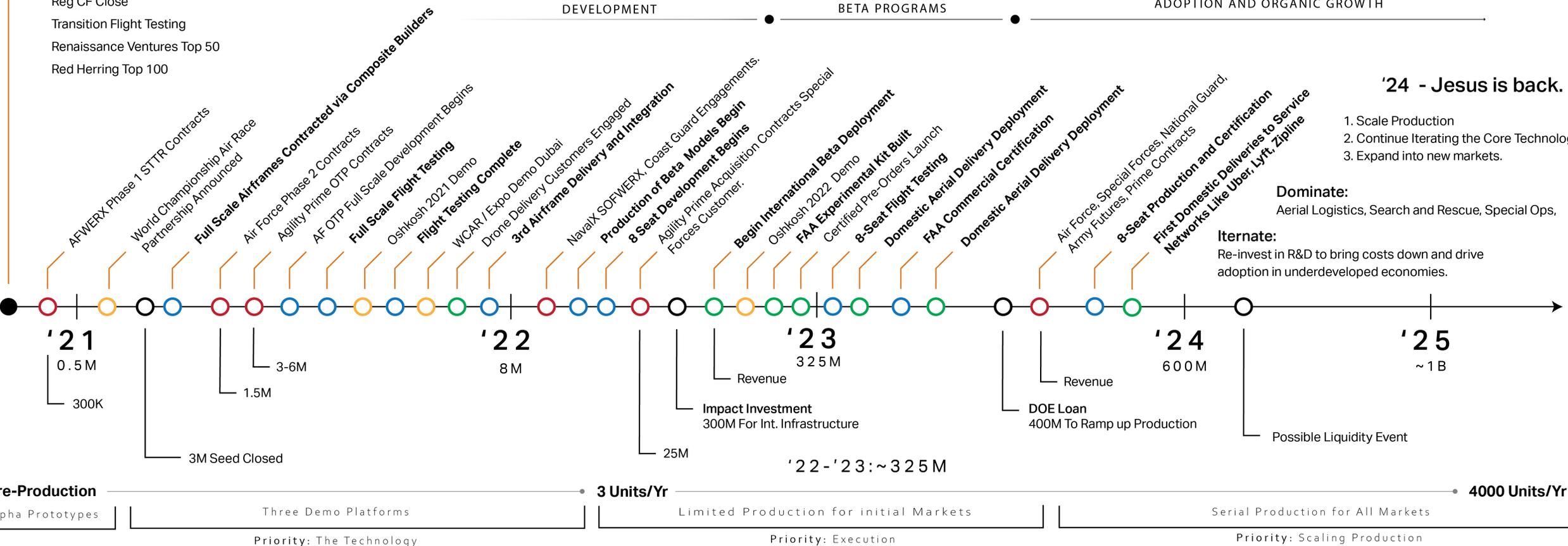
● '17 - '20

- Fuel Cell Development/ Swift Partnership
- Air Frame Structural Engineering
- Planet M Mobility Grant
- 3rd Scale Minimum Viable Product
- Reg CF Close
- Transition Flight Testing
- Renaissance Ventures Top 50
- Red Herring Top 100

DEVELOPMENT

BETA PROGRAMS

ADOPTION AND ORGANIC GROWTH



'24 - Jesus is back.

1. Scale Production
2. Continue Iterating the Core Technology
3. Expand into new markets.

#### Dominate:

Aerial Logistics, Search and Rescue, Special Ops,

#### Iterate:

Re-invest in R&D to bring costs down and drive adoption in underdeveloped economies.

# Capital and Production

Target Commercial Organizations:



Bottom

# Future Plans

## ORBAERO GROUND CREW



Grown our talented team, add new partners, advisors, and strategic investors.



Flight demonstrations and military exercises at the National All Domain Warfighting Center.

## AFWERX AGILITY PRIME



Dual Phase 1 STTRs awarded, Progressing to Phase 2 and Agility Prime Class of 2021.

## Maverick. ORBAERO



Gen 3 Performance EVTOL

## The Hatch



World-Class Production and R&D Facility

## ORB PROPULSION LABORATORIES



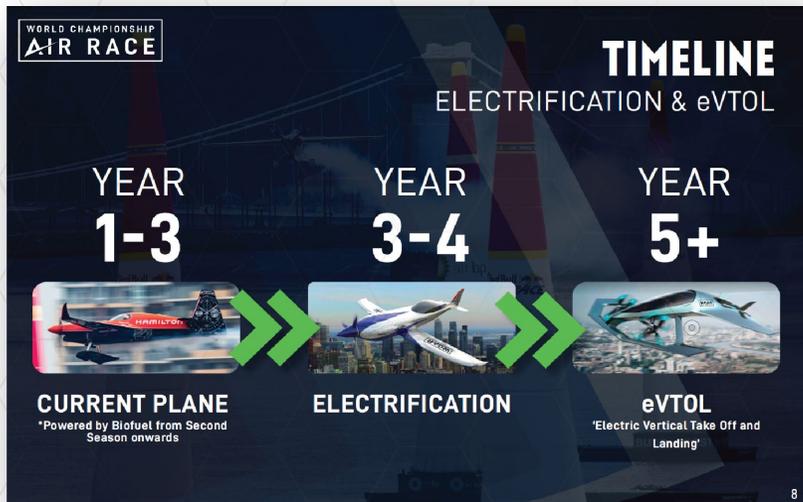
Propulsion Commercialization Unit

# WORLD CHAMPIONSHIP AIR RACE



**Official EVTOL Developer of the World Championship Air Race**

# Performance Oriented



# Progressive Development



# A Global Impact







Thank You.