

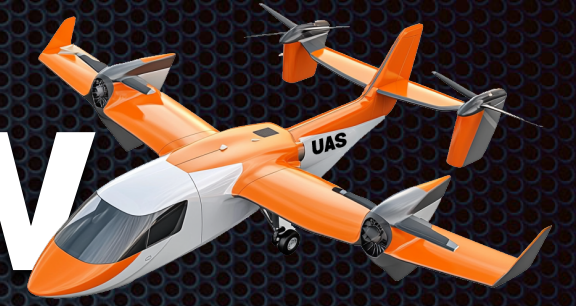
UAS Safety and Integration Task Force Meeting
November 2024

Vertiport Systems & Charging



Jaime A. Castro, PE, LEED AP (O+M), CEM, PMP
Aviation Practice Manager - Henderson Engineers

Vertiport Facilities, an Overview



- ✦ FAA Brief #105
- ✦ Limitations of Current Standards - Battery, Fire
- ✦ Emerging Importance of Passenger Experience
- ✦ Early concepts include:
 - ✦ Parking Garages
 - ✦ Stand Alone
 - ✦ Existing Facilities
 - ✦ Airports



Vertiports - Beyond the Passenger

- ✦ Maintenance Buildings
- ✦ Storage
- ✦ Passenger Amenities: Retail, Ride-Share, Public Transportation
- ✦ Data Centers
- ✦ Flight and Training Centers
- ✦ Manufacturing
- ✦ Recycling and Disposal Centers




Vertiports - Cargo Industry



- ✦ Fulfillment Centers
- ✦ Transport and Staging
- ✦ Warehouse Operations
- ✦ Proximity of Delivery
- ✦ Efficiencies in Logistics



Vertiports - Passenger Experience

- Mechanical Systems: HVAC, Ventilation, Smoke Evacuation
- Plumbing Systems: Bathrooms, water to remove bugs from eVTOL :)
- Electrical Systems: Power, Lights, Charging, Wayfinding, FIDS
- Fire Protection Systems: Alarms, Sprinklers, Foam?
- People Movers: elevators, escalators, ADA
- Technology: Data Centers, Telemetry, Security, AI

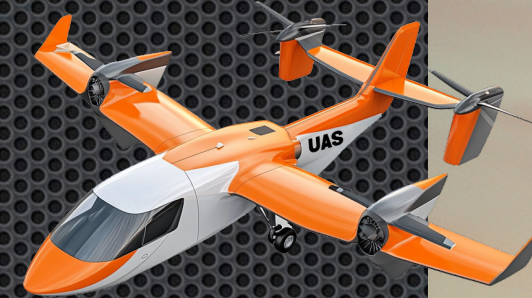
Electrical Infrastructure

- ✦ Atlanta (ATL) Incident in 2017
 - ✦ Lost Power for 11 hours
 - ✦ Stranded passengers
 - ✦ Cancelations and Delays
 - ✦ Aging Infrastructure
 - ✦ Increasing Energy Demands
 - ✦ Net-Zero Initiatives



Electrification: Transforming Energy Use

- Transition from fossil fuel-based systems to electric energy systems.
- Key to reducing carbon emissions
- More efficient than fossil fuel counterparts.
- Grid modernization and capacity expansion.
- High upfront costs
- Ensure stability, increased demand, and integration of renewable energy sources.
- Microgrids



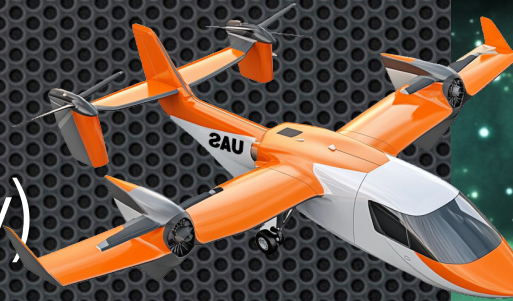
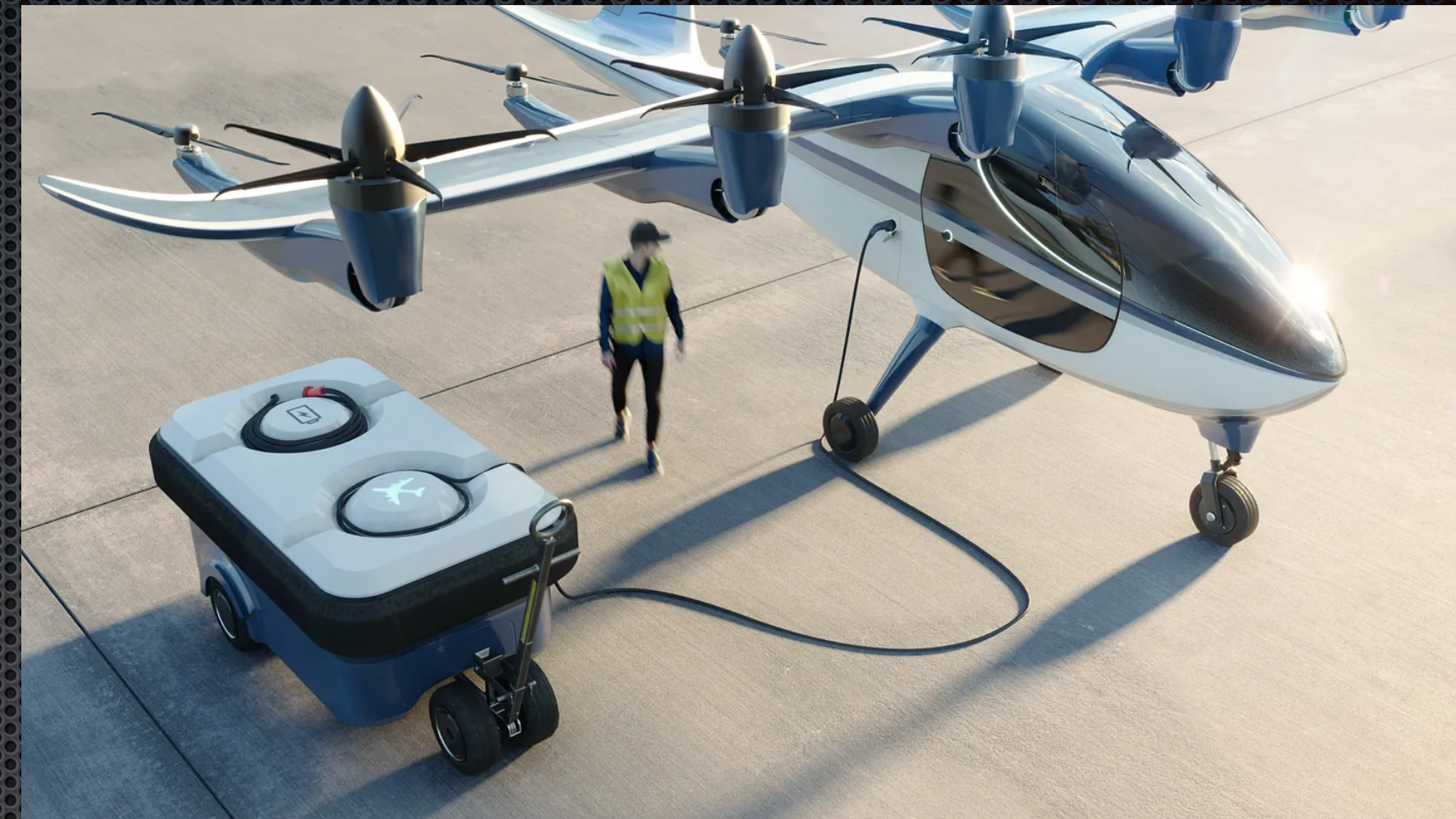
Battery Charging

- ✦ Three Levels to Battery Charging
 - ✦ Level 1 & 2: Residential Charging
 - ✦ Level 3 (Fast-Charging): eVTOL charging
- ✦ eVTOL batteries are estimated to be 2.5x denser (stored energy) than advanced EV batteries (Supercharged Tesla)
- ✦ Service for 1 fast-charge could be around 320KW, 420-Amps (Equivalent of running an mid-size retail box)
- ✦ Larger voltages could reduce infrastructure sizes but would require utility coordination



Battery Charging

- ✦ eVTOL Battery Obstacles:
 - ✦ Weight
 - ✦ Thermal Runoff
 - ✦ Fast Charging - Charge to only 80%
 - ✦ Electrical Infrastructure Upgrades (Building and Utility)
 - ✦ Politics and Lobbyists
 - ✦ Technology
 - ✦ Losses due to Takeoff, Hover, Landing, and Weather (150m is more like 97m)



Demand Response

- ✦ Overnight Charging - Non-Fast Charge
- ✦ Flight Scheduling and Frequency
- ✦ Aircraft or Battery Swap-out
- ✦ Traffic Demand Studies to determine essential and non-essential routes
- ✦ Research shows there is a point of no return (no round trip)



Infrastructure Considerations

- ✦ Location
 - ✦ At Airports - secured vs. unsecured
 - ✦ Emergency Centers - Hospitals, Search and Rescue, Police/Fire
 - ✦ Entertainment Centers
 - ✦ Downtown Areas
 - ✦ Cargo Facilities



Infrastructure Considerations

- ✦ Electrical Infrastructure
 - ✦ Charging at both home base and destination
 - ✦ Utility Coordination
- ✦ Passenger Amenities
- ✦ Aircraft Maintenance and Parking



Increasing Interest in AAM in the US...





The Advanced Air Mobility Planning Software Solution

Custom Software, R&D and Training



Electric Air Mobility (Air Taxi) is here.

Our mission is to empower AEC (Architecture, Engineering & Construction)

And AAM (Advanced Air Mobility) sectors with innovative tools
to enhance early-stage design decisions, streamline real
estate projects and foster collaboration.



Rasha Alshami
Chief Executive Officer



Infrastructure, Product & Programming

Vertiport Specialist at **Lilium**, Project Architectural Designer at **Zaha Hadid Architects**, Robotic Programming Teacher at the **London Architectural Association School of Architecture**.



Gonzalo Velasco
Chief Commercial Officer



Commercial

20+ years of experience in aviation, Board member of **Heathrow and other global airports**, Innovation Director at Ferrovial Airports and founder of **Ferrovial Vertiports**.



Michael Dennis
VP Business Development



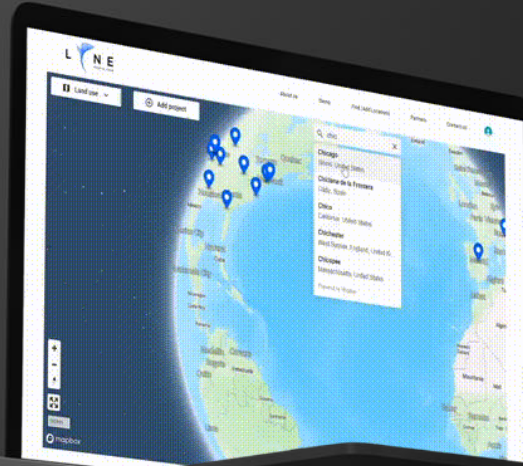
North America Business Development

20+ years of experience in FBO and infrastructure development, Managing Partner at **Aviation Resource Group International (ARGI)**, CEO and Cofounder of **Magi Aviation**.

Value of LYNEports to Top-Tier Business

Simulations and Infrastructure Planning

LYNEports geospatial software helps align infrastructure requirements with various regulatory frameworks and adapts to site and aircraft needs.



Compliance and Safety Solutions

Assessing environmental impact, noise simulations, and downwash (DWOW) studies, all critical for ensuring that AAM infrastructure complies with safety regulations.

Platform Capabilities

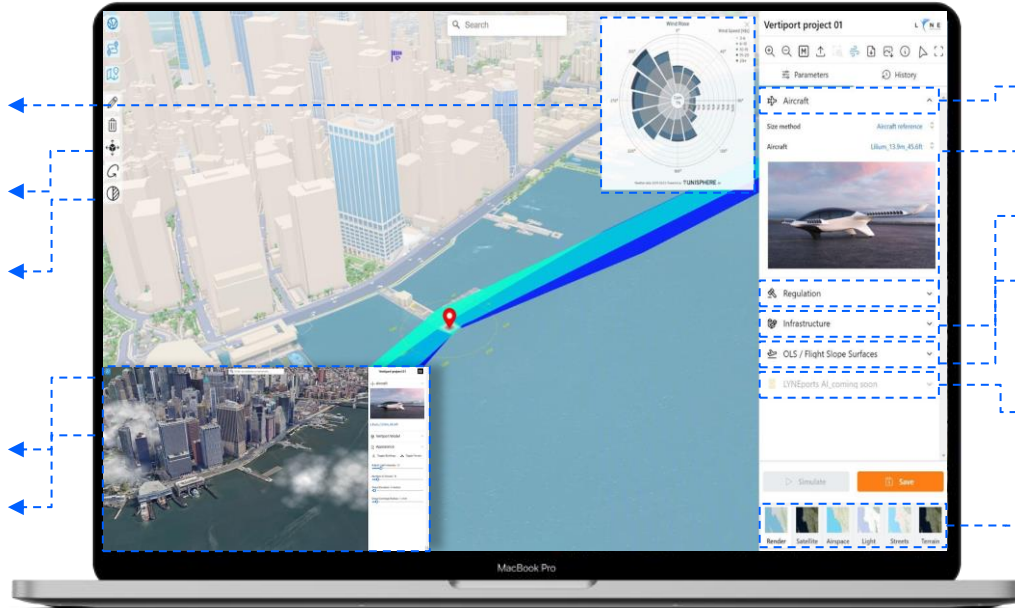
- Weather & Wind Roses

- Multiple Land use Data

- Detailed Airspace Data

- Real Time view

- Create Flight Simulation



Range of eVTOL Aircrafts

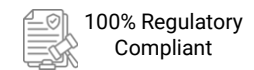
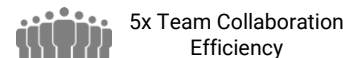
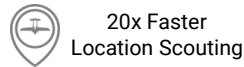
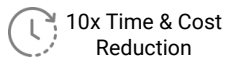
Select Regulatory Framework

Create Airside Infrastructure

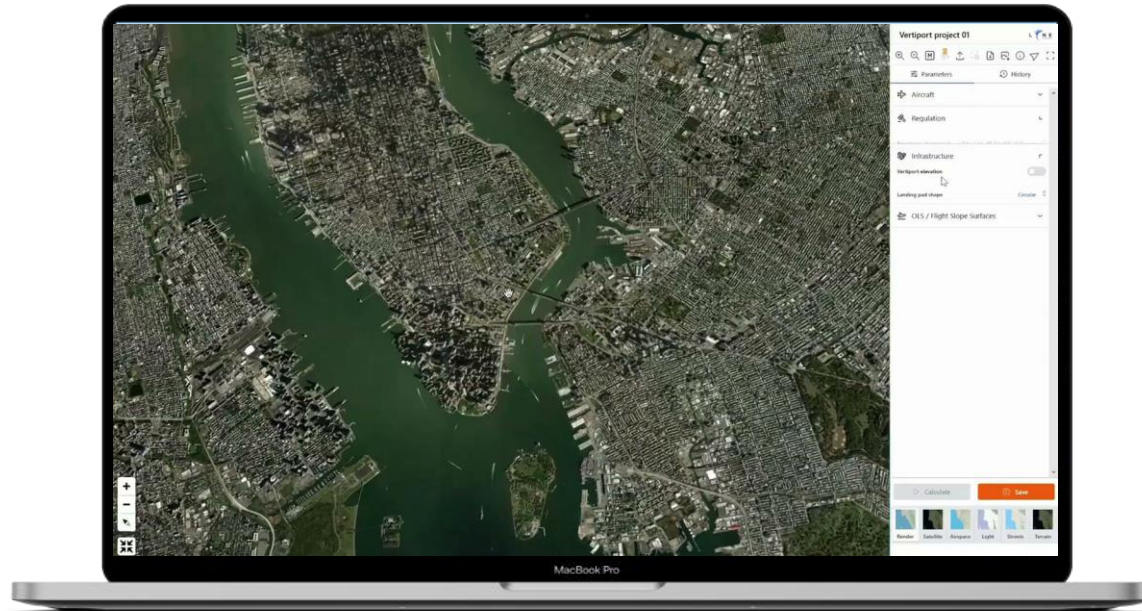
Design Flight Corridors


AI Planning Assistant


View Extensive Map Data





The Advanced Air Mobility Planning Software Solution



 10x Time & Cost Reduction

 20x Faster Location Scouting

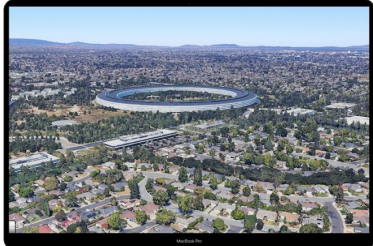
 5x Team Collaboration Efficiency

 100% Regulatory Compliant

The Advanced Air Mobility **Planning Software Solution**

Custom Data Integration & Decision-Making

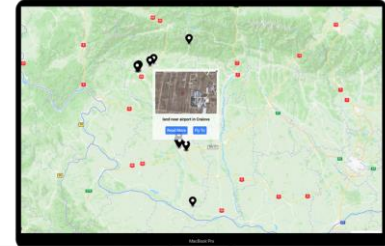
- Different Map Styles Visualization



- Custom Layer Data (airspace & land use)



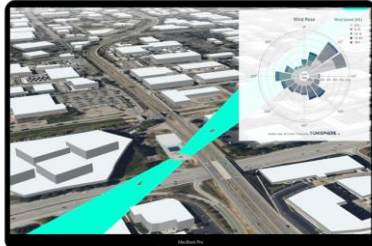
- Marketplace Access (scout available properties)



- OLS/Flight Slope & Infrastructure Planning



- Best-in-class Weather Data Intelligence



- Network Visualization (connect multiple locations)

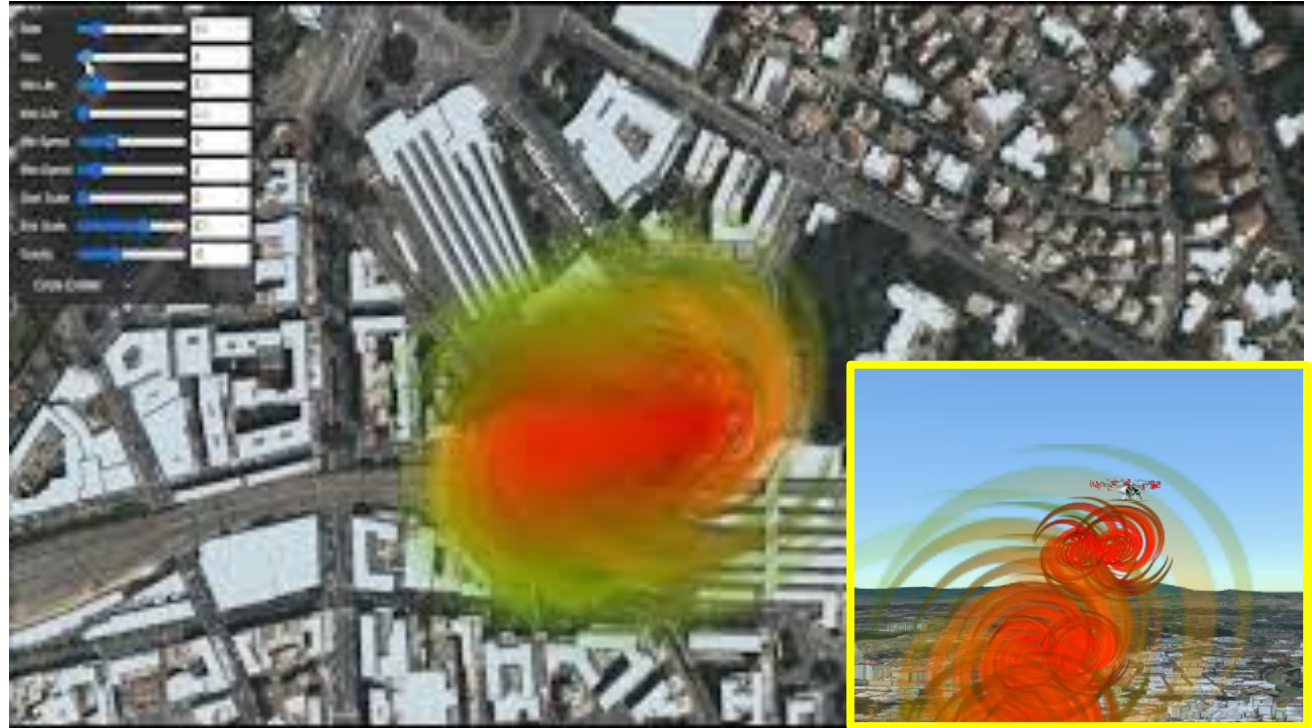




R&D Projects & Use Cases



Custom software solutions for simulation studies of Noise and acoustic impact on material degradation

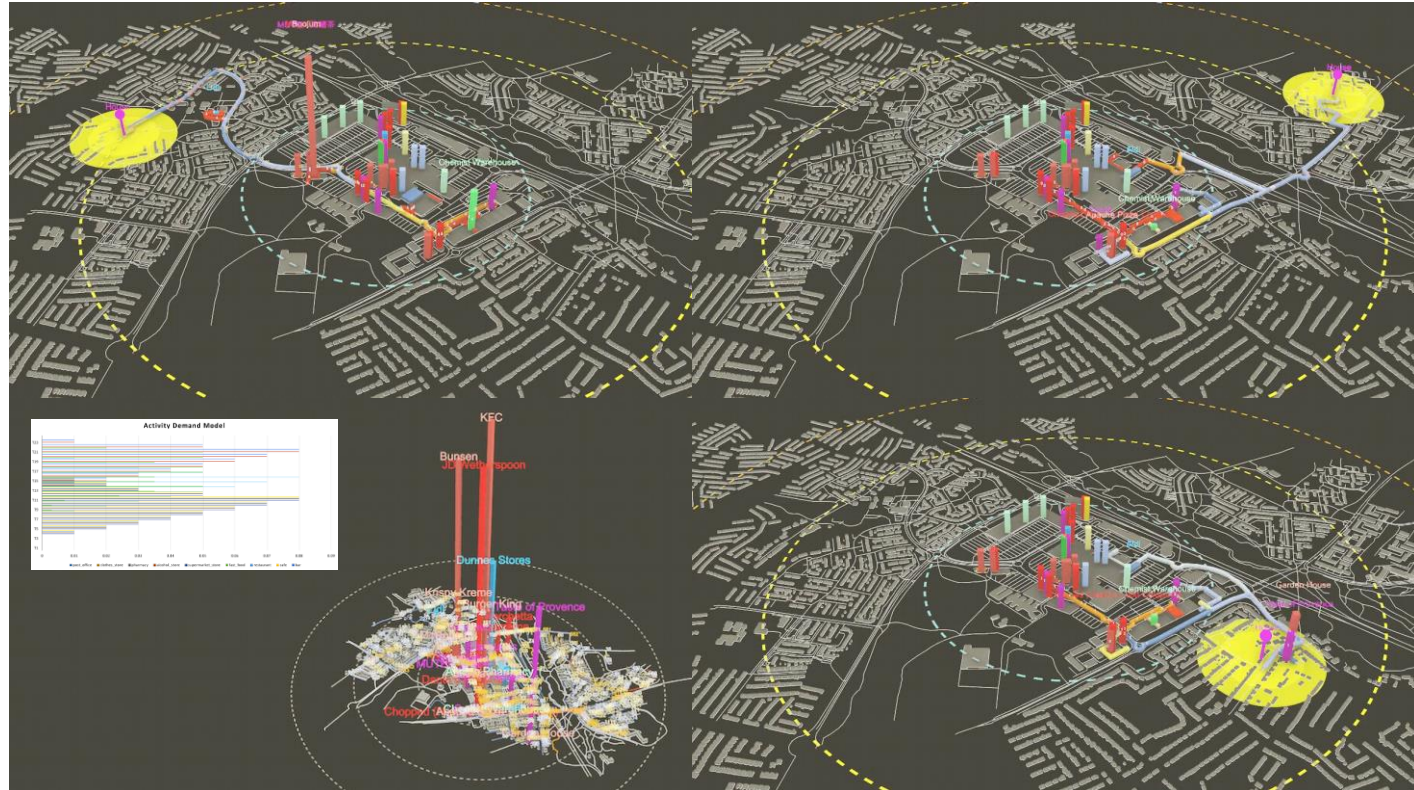


Real estate
vertiport
integration:
analyzing location
feasibility and
availability to
propose better
ROI for vertiport
investments.

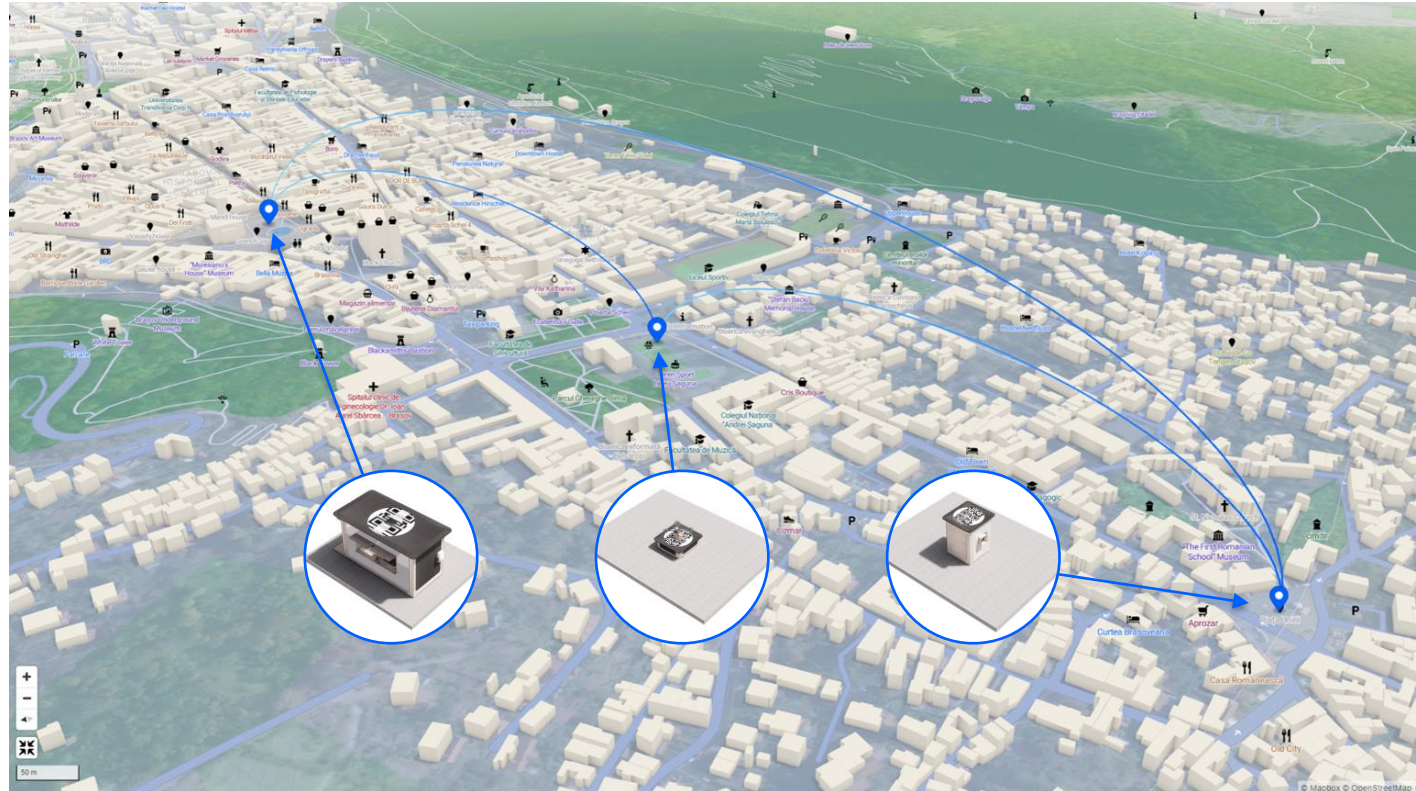


Mapping behavioral dataset location to better understand vendor and brand demand per location and distance.

Reduces risk on ROI and operations, drone delivery and vendors demand.



Drone as First Response (DFR) project: Evaluating drone landing network in mountainous areas for police monitoring, assessing airspace restrictions and ground obstacles.



Our Journey Companions

Sponsors:



Regulatory Bodies:



Awards & Recognitions:



Supporting Communities:



Partners:



- Aerospace Xelerated (backed by **Boeing**)
- Partnership with **Unisphere**, Germany
- Partnership with **Berkeley** University
- Sponsorship by **Microsoft** Founder's Hub
- Sponsorship by **Stripe** Financial Services
- **DarE Ventures Investment Grant**
- **LAX airport (RFIC)** by Los Angeles World Airports
- **Innovation Recognition Award** at the Airport Innovation Days 2024
- Top 50 **European PropTech** Startup & Scale-Up Awards
- Partnership with **SkyScape**, Japan
- **Cesium** Certified Developer
- TOP 50 at the **Expo Real Impact Awards**.
- **UK CAA Vertipoint Working Group** Expert.
- Member of the Alliance for **Zero-Emission Aviation**
- Successful training & workshops.

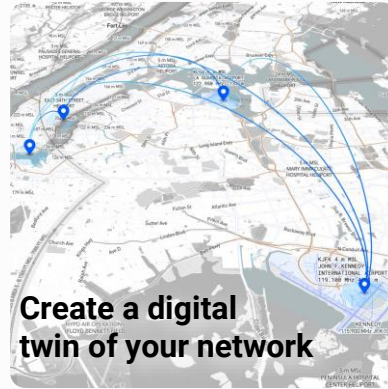
Our Competitive Advantage

LYNEports is
**the only planning
software created for
Advanced Air Mobility**
bringing a unique edge
compared to any
similar software:



- **Innovative Advanced Air Mobility & Aviation Planning Approach:**
Cutting-edge software for seamless, efficient, 3D planning and better early-stage design decisions.
- **Collaborative Creation & Comprehensive Services**
Urban Air Mobility ecosystem, offering a full suite of customizable solutions, consulting services, and R&D projects.
- **Regulatory Integration & Compliance**
Born in parallel with regulation definition, regulatory navigation, integration and compliance is part of our founding algorithm (ensuring the development of landing sites is in line with aviation & local authorities).
- **Agile & User-Centric Approach**
Software designed to delivering tailored solutions very rapidly and low-cost.
- **Our Unique Team**
A rare combination of emerging new skill talent and experienced professionals with expertise in such a young emerging aviation sector.

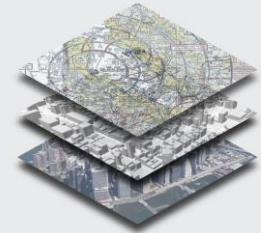
Craft a Vertiport.
Plan a Network.



Create a digital
twin of your network



Approach funnels
for flight obstacle
assessment



Multiple layers include
aeronautical charts



Layout, take-off and
landing area, and
taxiway customization



Worldwide
geospatial
simulation



Responsive
to regulation
updates



Reimagining the world of instant delivery

A faster, cleaner, quieter delivery system


November 2024





Our Mission

Create the first logistics system that serves all humans equally.



Can drone delivery change the world?

Zipline Saves Lives and Money

51%

fewer maternal deaths due to postpartum hemorrhaging



67%

fewer blood products wasted

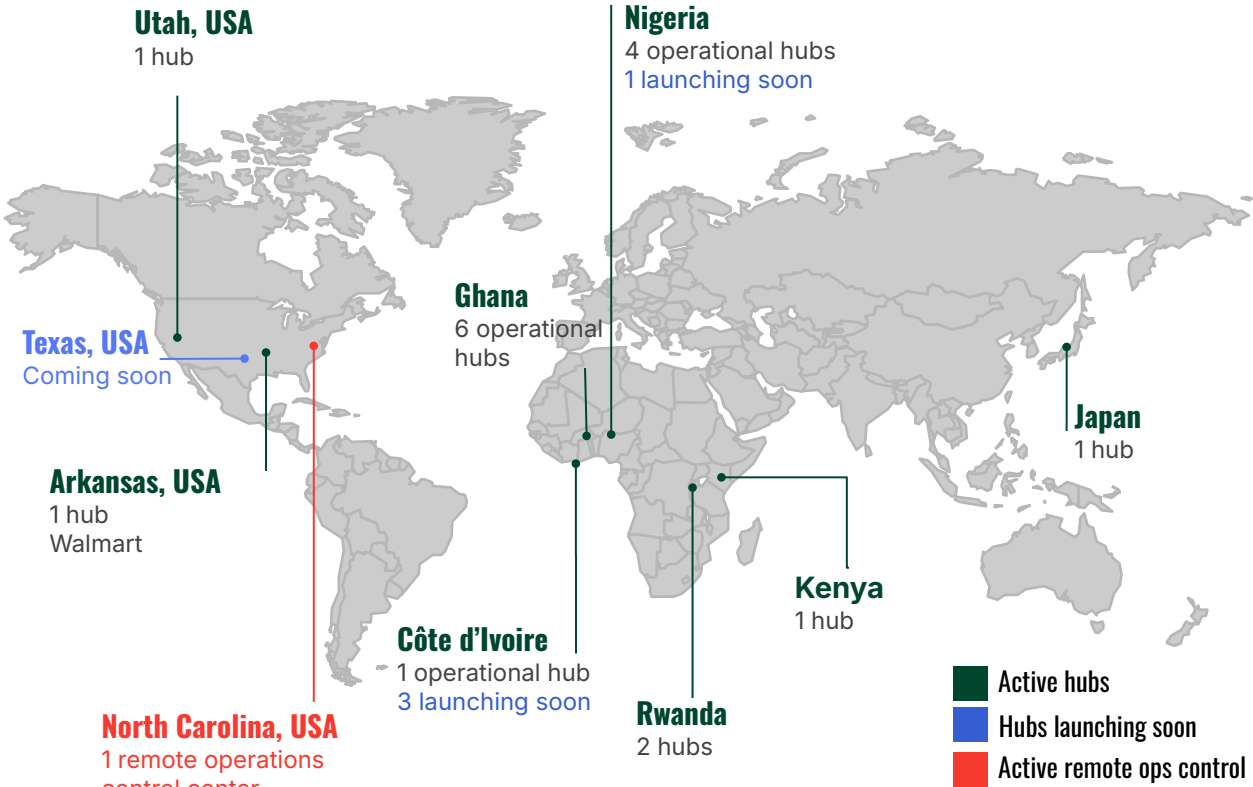
THE LANCET

42%

less likely that patients miss a vaccination

BILL & MELINDA
GATES foundation

Zipline: 8 years of operational experience spanning 3 continents



More than **1,200,000** commercial deliveries
3,300+ health facilities
+ 45M people served



Complete **1,500+** deliveries per day; one every **70 seconds**



Serving over 45 million people in Africa, Asia and America

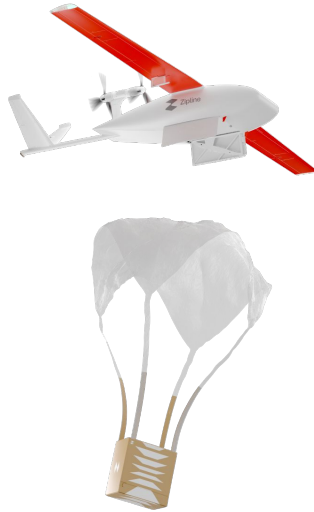
- Active hubs
- Hubs launching soon
- Active remote ops control center



Zipline Has Two Solutions

Platform 1

Long-range delivery



- **Delivery:** P1 Zip + floating delivery package
- **Loading:** Orders packed by Zipline staff at distribution hubs
- **Integration:** Hub-and-spoke, stand-alone hubs

Platform 2

Hyper-precise delivery

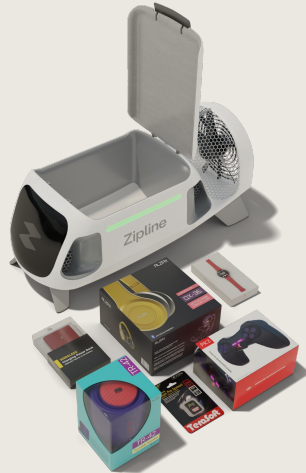


- **Delivery:** P2 Zip + ultra-precise delivery droid
- **Loading:** Easy-to-use loading portals to send orders
- **Integration:** Mesh network of docking stations

A cute but mighty delivery droid



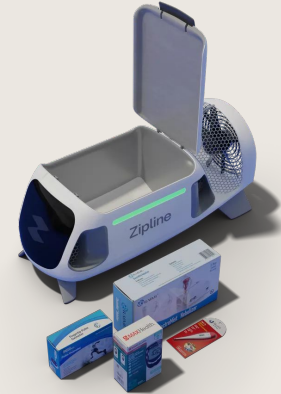
Food



Electronics



Grocery



Health & Wellness

Site Infrastructure





TESTING FOOTAGE

How Zipline delivers with Platform 2

We look at our crews and aircraft no differently than a major air carrier



June 2022: Zipline Receives FAA Part 135 Air Carrier Certification

Safe Airspace Integration



Strategic route design: involving detailed area surveys and a route design process considering air & ground and air risks



Technology - Detect and Avoid: providing airborne traffic detection and automatic avoidance, using ADS-B, acoustic, and vision sensing sources



Uncrewed Traffic Management (UTM): eventually provide seamless deconfliction of other UAS providers



Community Engagement: conducting outreach to the aviation community in the vicinity of operations

Zipline launched our first ROCC in 2023

ROCC = Remote Ops Control Center

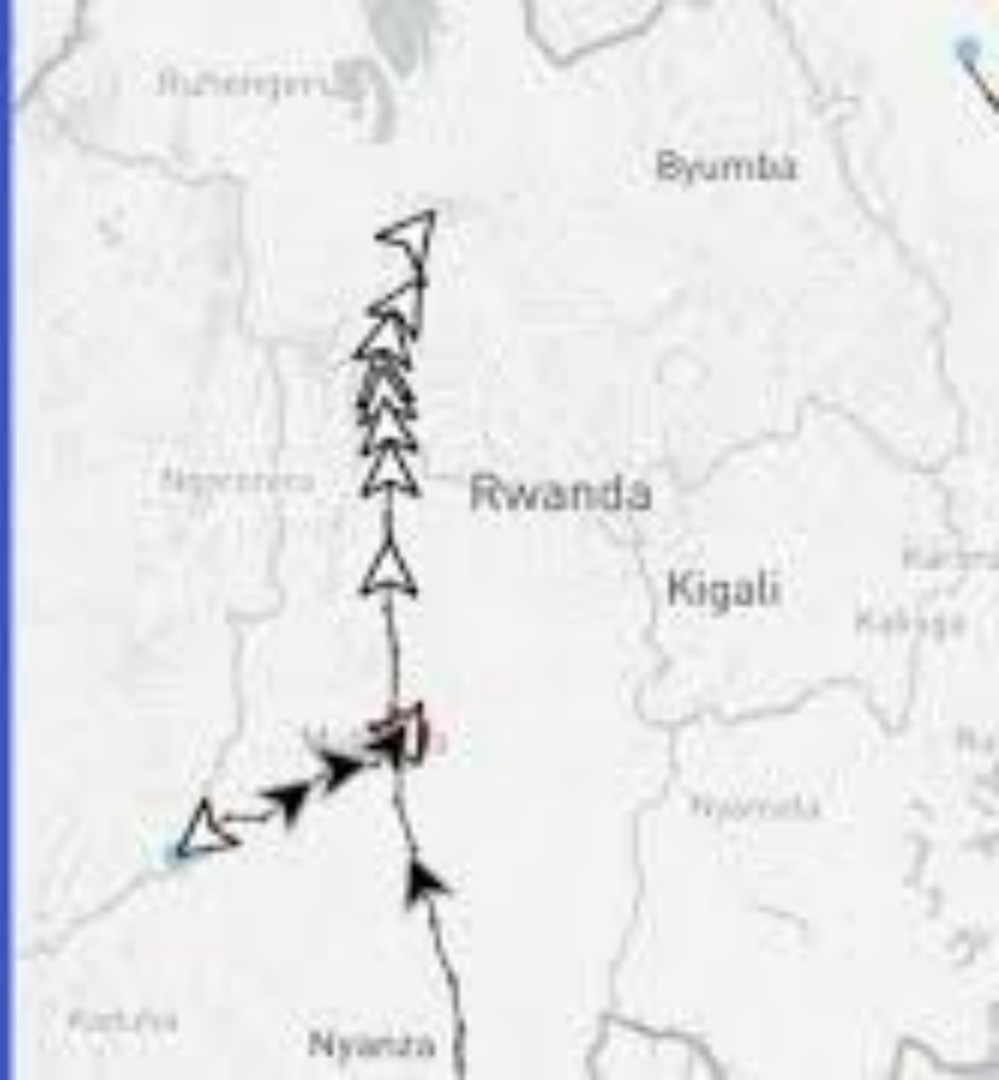
Charlotte, North Carolina
ROCC-1
Launched March 2023



24 hours of drone delivery in Rwanda



Zipline



Thank you

AT&T Digital Airspace

Enhancing Drone Operations through Technology
Innovation



Syed Kashif Zahid – Head of Products, Emerging Solutions
sz2938@att.com

November 2024

130M+

Connected IOT Devices

70M+

Connected Cars

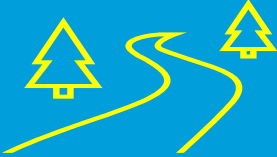
60M+

Infrastructure Devices

80%+

Connected Cars Share

AT&T covers more roads than any other carrier



\$14B+

Open RAN Investment

28M+

Fiber Locations

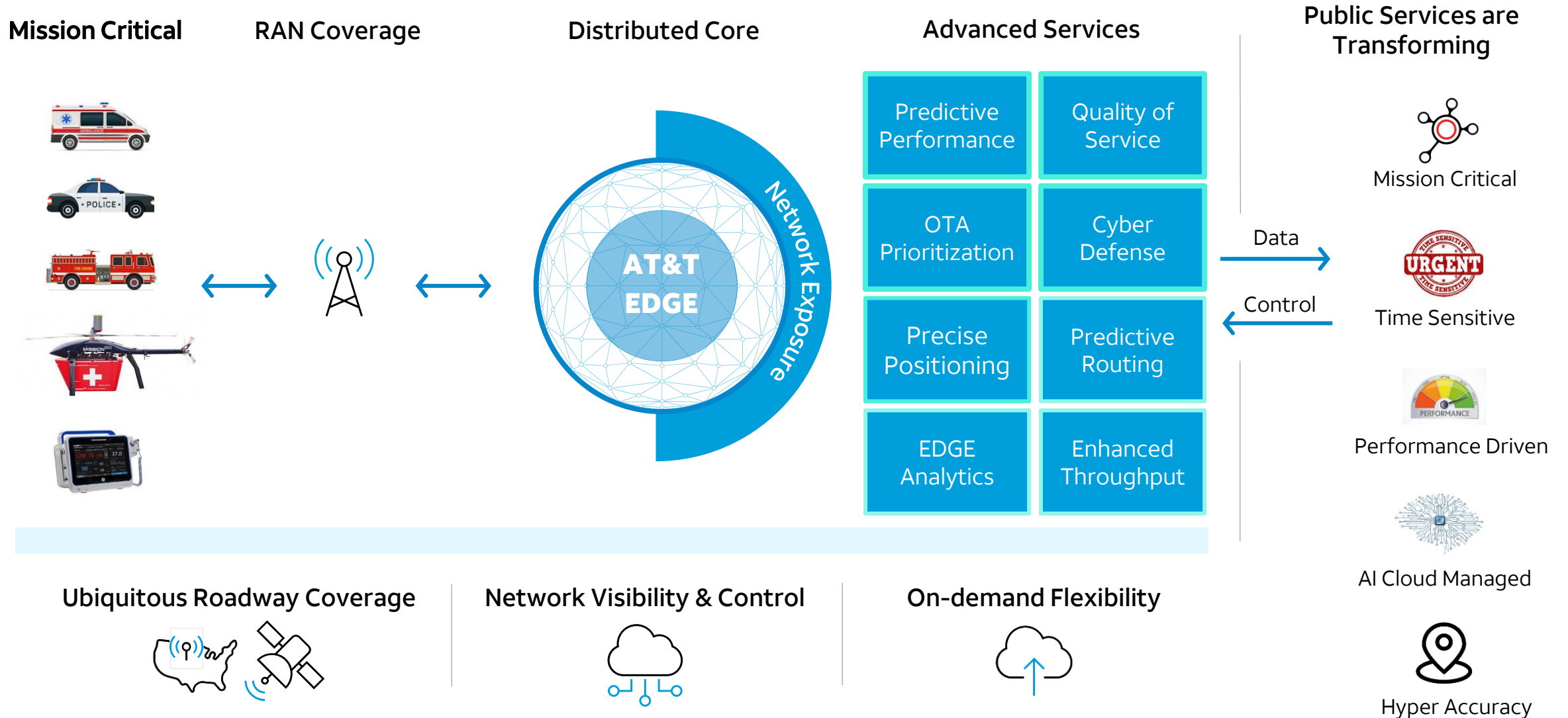
7M+

FirstNet Connections

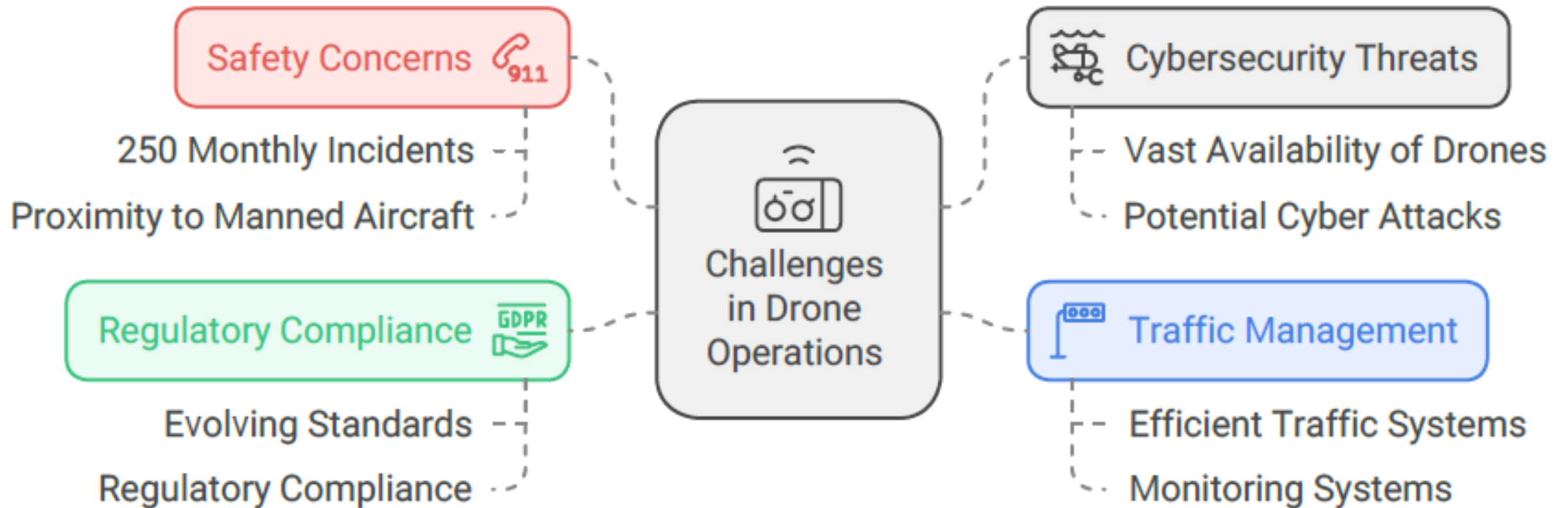
700+

Petabytes Avg. Daily Data

AT&T Connected Solutions | Enabling Safety & Mission Critical Services

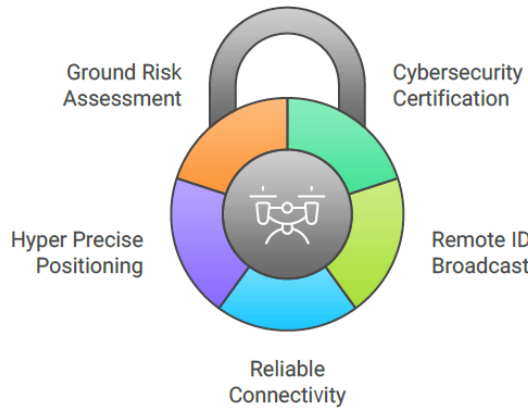


Challenges in the Airspace: Safety, Security, and Traffic Management

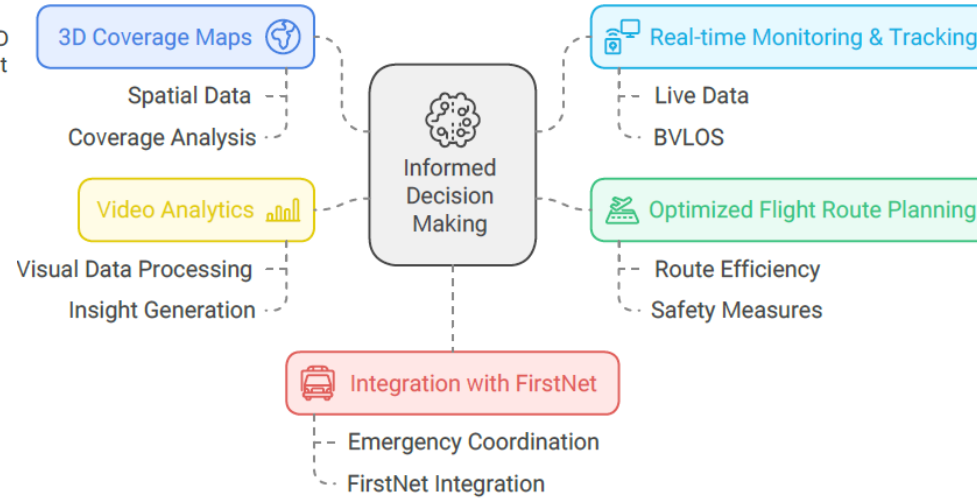


AT&T Digital Airspace: Enhancing Drones Operations

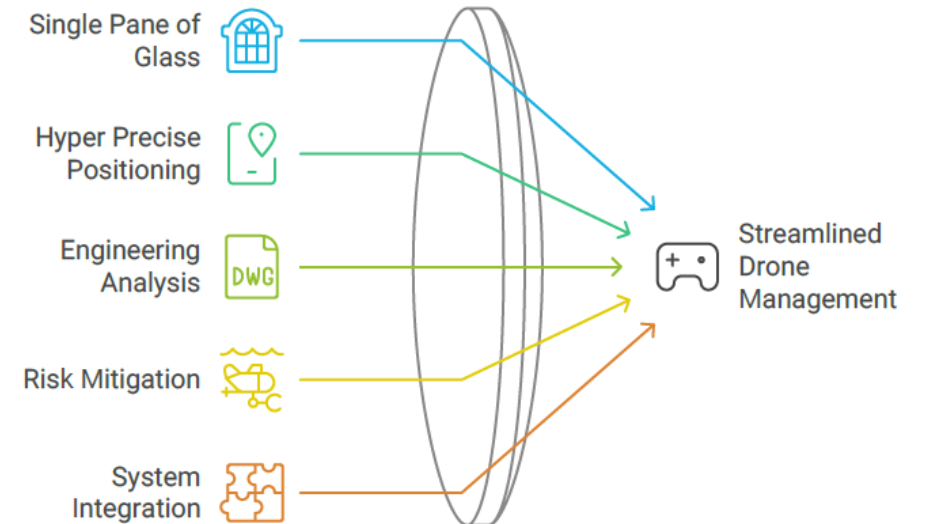
1. Safety



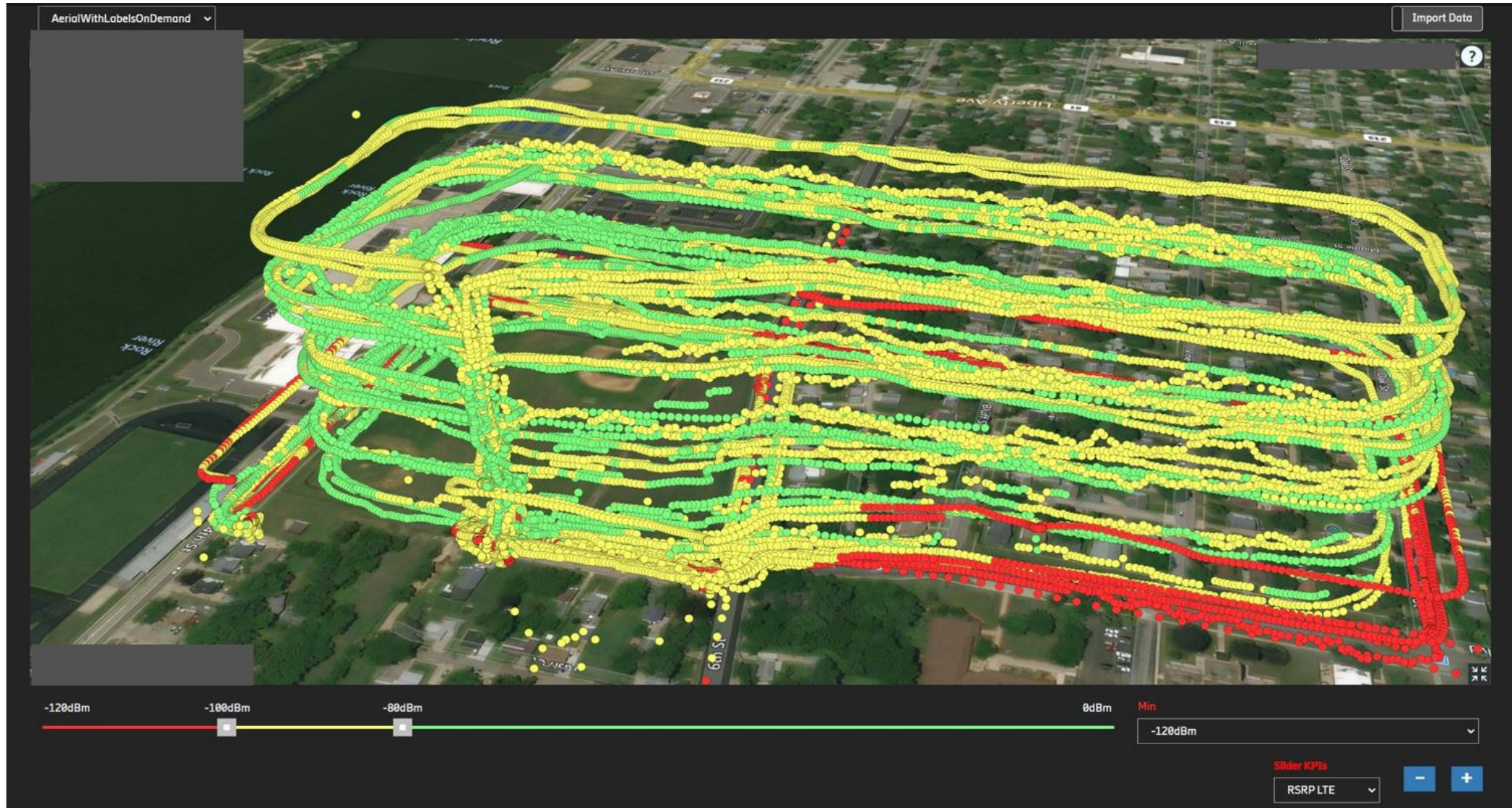
2. Control



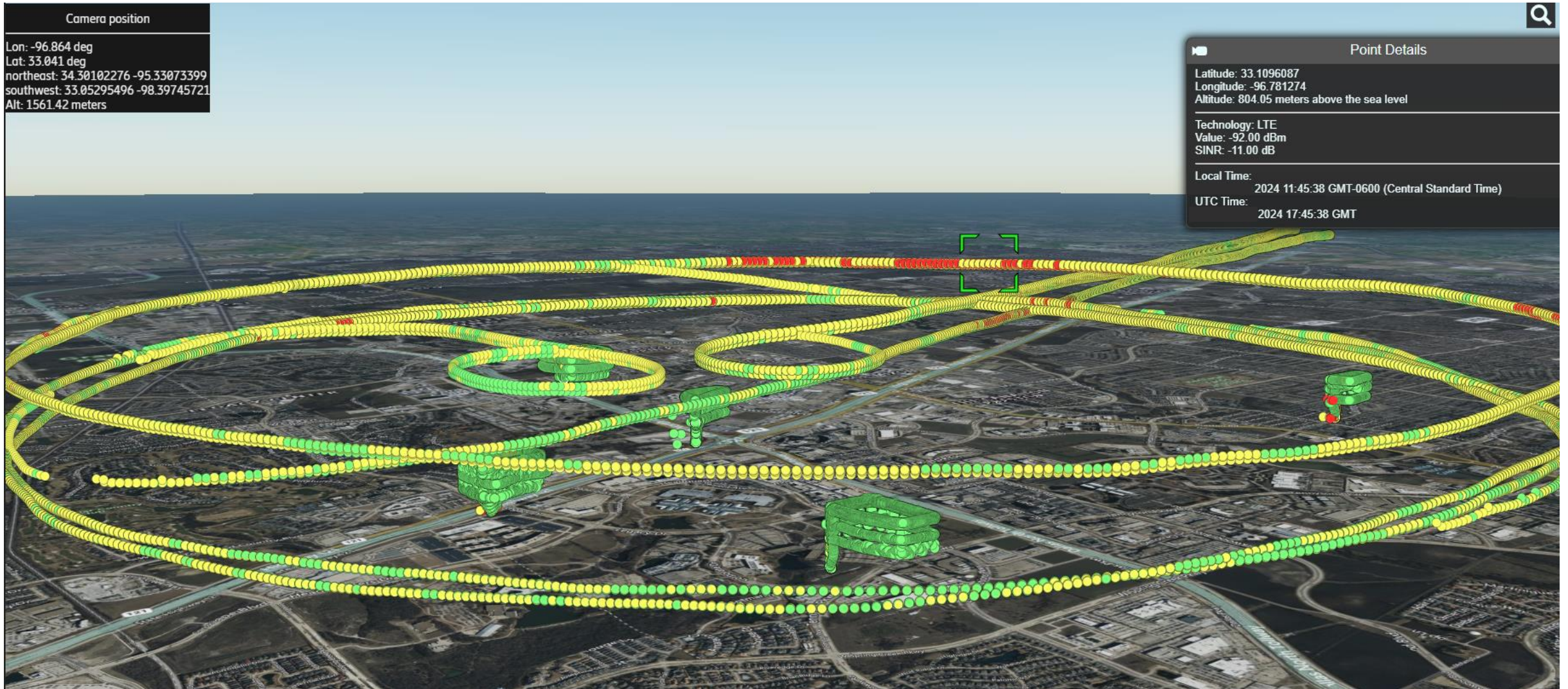
3. Operations



AT&T Digital Airspace: Comprehensive 3D Route Planning

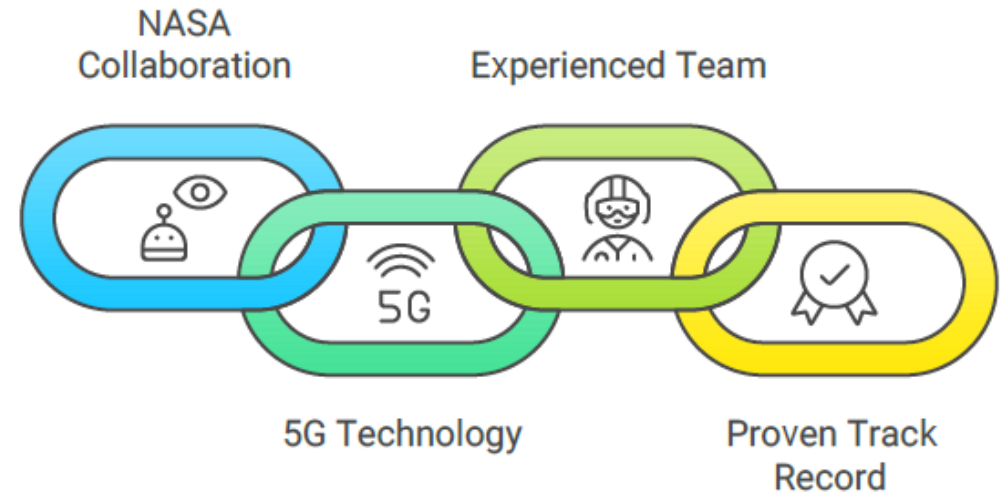


AT&T Digital Airspace: Real time 3D Operational Dashboard



AT&T Drone Engagements: Thought Leadership and Innovation

- **Collaboration with NASA** on Unmanned Aircraft System Traffic Management (UTM)
- **AT&T's 5G Flying COW** (Cell on Wings) technology
- **Experienced team of 50+** drone pilots led by former FAA and NASA specialists
- **Public Sector Trials** for First responder agencies
- **Private Sector Partnerships** for media and delivery services



Ready to Engage with NCTCOG Advanced Air Mobility....

Syed Kashif Zahid

Head of Products, Emerging Solutions

sz2938@att.com

AT&T
ConnectedSolutions