

20-09-2022

Urban Air Mobility Vertiports within the Metaverse



Urban Air Mobility

The Urban Air Mobility (UAM) air transport market seeks to provide automated small low altitude and efficient aircraft for logistics and passengers within urban areas. It may not be the panacea for urban congestion and pollution but is part of the developing ecosystem seeking more efficient transport solutions reducing the reliance on carbon-based fuel. Generally, the term eVTOL is used when describing the passenger transport. eVTOL is an electric based vehicle, which is either autonomous or manned, which Vertically Takes Off and Lands from a Vertiport or other ground-based infrastructure such as an existing airport. Logistics (demand fulfilment) typically uses drones of various weight-load capacity and travel distance. One of the main challenges is the economics for passengers, logistics companies and vertiport infrastructure operators.

The Metaverse

The 'metaverse', so coined by Neal Stephenson in his book Snow Crash, 1993, is a cyberspace home to avatars using a virtual reality based decentralised internet facilitated by Virtual Reality (VR) and Augmented Reality (AR). Metaverse socially connected worlds already exist through digital-twins and video games such as Roblox, Fortnite and Minecraft. Metaverse worlds use cryptocurrencies, secured by blockchain technology, as currencies to buy and sell goods called non fungible tokens (NFTs). Crypto is stored in a digital wallet such as Metamask.





Image: Fornite Gameplay



Image: Meta Quest Headset

Vertiport Property in Metaverse

Metaverse worlds such as Decentraland, Sandbox and Somnium allow users to purchase blocks or estates of virtual land. Upon this land the owner can create, transfer, or buy NFTs such as a house, boat, art, furnishings and so on. These may be transferred across worlds. So, for instance Airport-in-a-Box (AIB) can purchase blocks of land in key areas such as virtual train stations, airports, metros, concert halls etc. These can be used to build out a vertiport network which mimics the real-world demand for travel between locations but without the real-world restrictions of high cost per mile travel, pollution, depreciating infrastructure and systems maintenance.



Decentraland



SOMNIUM SPACE

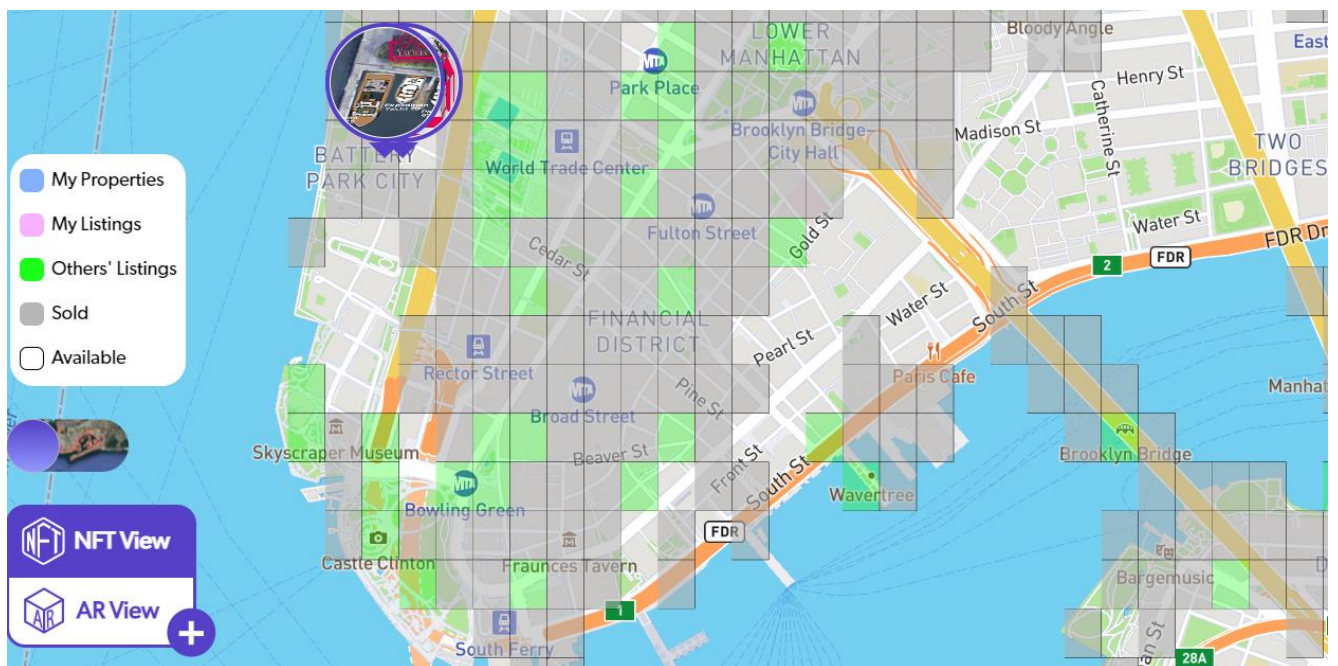


Image: Property sold (Grey) and for sale (Green) in New York using Superworld

Opportunities for UAM and vertiport within Metaverse

The metaverse world presents an opportunity for companies to monetise services, trial new services and products virtually before implementation in the real world or sell/trade directly within the virtual world itself.

For instance, in the metaverse avatars move at walking speed. To enable your avatar to move quickly from Battery Park in Manhattan to Central Park, New York the avatar/user may buy tokens for the UAM service. Revenue would be collected by both the vertiport and VTOL operators. Just like the real world the UAM service can integrate with other mobility options such as airport, metro, rail, bus, Ebike, Escooter. Data is a valuable commodity in the metaverse. The UAM service provider will collate data on the users profiles and habits to be able to offer additional services and potentially through third party providers. Vertiport infrastructures can be used for media advertising sites and retail agreements can be formed with product providers to display their wares for sale, either for virtual delivery or real-world delivery. Logistics tracking of real-world parcels can take place using the metaverse.

Probably the most recognisable image of future urban mobility is encapsulated by Ridley Scott's direction of the film Blade Runner released in 1982 and the subsequently sequel released in 2017. These hovercrafts require no take-off or landing zones.



Image: Blade Runner 2017 – ‘Spinner’ Flying Car

Urban planners can use the metaverse or digital-twin world to assess the impact of air mobility in urban areas before implementation. Some virtual worlds are based on the mapped geography of the real world which enables software developers to mimic real world conditions. At the present time the metaverse is a long way off from reaching the cyberpunk dystopian future imagined by the authors Philip. K. Dick and Neal Stephenson. There are huge efforts by Apple and Meta to create the dominant metaverse and monetise the service as soon as possible. Some readers may recall the Betamax versus VHS wars of the 1980's and that the lowest price won the day.

The Future is Now

The digital infrastructure already exists to buy/sell land and to build out that land in any way the software developer wishes and to provide monetised services. Already there are vehicles available in the metaverse which can be bought for faster travel. The Falcon, in the Netvrk was issued for public sale circa \$20,000. The owners can teleport users onboard for travel to other parts of the Netvrk metaverse.



Image: X Falcon Transport from the Netvrk Metaverse

Joining an exploring a land based metaverse is relatively easy however the exploration is generally laggy with low-definition geometric shapes and blocky moving graphics. This is because the land based requires software developers to create their build outs using the limited toolsets available from the metaverses own library dataset. Developing is time consuming and costly. The game based metaverses are well funded, high-definition and very fast moving. Therefore, the near future of the metaverse will likely be based around gameplay and experiences were the gamers play to earn NFT as rewards.

How Airport in a Box Visualises Metaverse

AIB has created visual renderings of how the VR vertiport/UAM may look within the metaverse. We have visualised cyberpunk style world were vertiports are located not in major mobility interchange hubs but are available in urban back-streets and accessible to all at low cost. We worked with Felipe Falcao, a virtual 3D designer from Brazil. Over the course of September & October 2022 we will be releasing 3D videos of AIB vertiport in the metaverse.





Considerations for UAM in the Metaverse

UAM in the metaverse takes some real-world problems out of the equation. Pilot workload/fatigue, passenger/cargo safety, weather, ground-to-air communications, noise/pollution, aircraft proximity/congestion and air traffic management are greatly simplified or eliminated altogether however there are some similarities which are constant in both worlds. These will be the careful selection of siting of vertiports in populated areas, defining the price per mile, intermobility with other forms of transport, load factors, return on investment periods, scaling a business model etc. Real world flight rules using visual and even digital rules will be replaced by rules voted upon by the metaverse users themselves, these will become the new ‘virtual flying protocols’. A concept of operations may be similar for vertiports but altered for each metaverse, again it may be up to the users not the software developers how the operations are created, managed and how flexible they will need to be to change to keep the experience fresh, competitive with competing mobility vehicles.

Are Metaverse and Digital Twins the same?

The technology behind the metaverse and digital twins may be the same for software developers using applications to build assets and represent them digitally however there are some manifold differences. A digital twin represents the real physical world, generally it is a representation of physical assets with data which has been gained from Internet of Thing (IoT) sensors such as environmental statistics, production rates. The metaverse is not constrained by the physics of the real world and the assets within it may be changed to suit the purpose of the metaverse world itself. Generally, the metaverse allows users to game, buy/sell real estate, buy/sell NFTs, stake development in applications, build and create from within the world using Web3 and is crypto currency and blockchain based. The digital twin use case is typically found in urban planners visualisations of new cities and how they are planned, predictive behaviours of people, transport, environment. It is becoming widely used in Industry 4.0 (the future of automation based in production environments). The digital twin is not a decentralised widely available application which anyone can join but is typically a company/city based paid for application for a particular purpose.

Which services may we see airline and airport also sell in the metaverse?

Movement of avatars in the metaverse is not the only aspect of the virtual world upon which services can be monetised. Any of the services which require a financial transaction in the real world will also become available in the metaverse. First, airlines and airports may make the transition to allowing financial transactions using crypto before creating on-line worlds. For an airline this will be passenger and cargo ticket sales, seat upgrades, car hire, holiday packages, tours, baggage, in-flight services, Wi-Fi, comfort packs, insurance, Duty Free, meals and beverages. Airports will similarly follow with car-parking, Forex, hotels, entertainment, retail, fast-track services, lounges. Then second once people are familiar with digital wallets and crypto transactions the airlines and airports will be able to sell their services within a metaverse world for use in the real world. This offers another sales channel and point-of-sale.

Third party companies may be the bridge between the multiple airlines and airports in that they can offer cross-company services such as airline vouchers and airport lounge vouchers.

About Airport In a Box Limited

Airport in A Box (AIB) provides systems integration design and management consultancy for vertiports & Digital applications to support the operators, logistics and passenger booking/travel processes.

It is part of the Origin Group of companies. Origin specialises in major airport systems integration design and management. We also provide expert witness services in arbitration cases. Origin have provided services worldwide on some of the largest and most prestigious airports.

AIB intends to continue to explore the future possibilities of monetising mobility solutions within the metaverse. More information is available at airportinabox.com and originprojectsgroup.com

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