



Air Taxi Readiness Index 2023

Assessing the preparedness of 60 territories in the race for vertical take-off and landing air mobility

Aviation 2030 Series



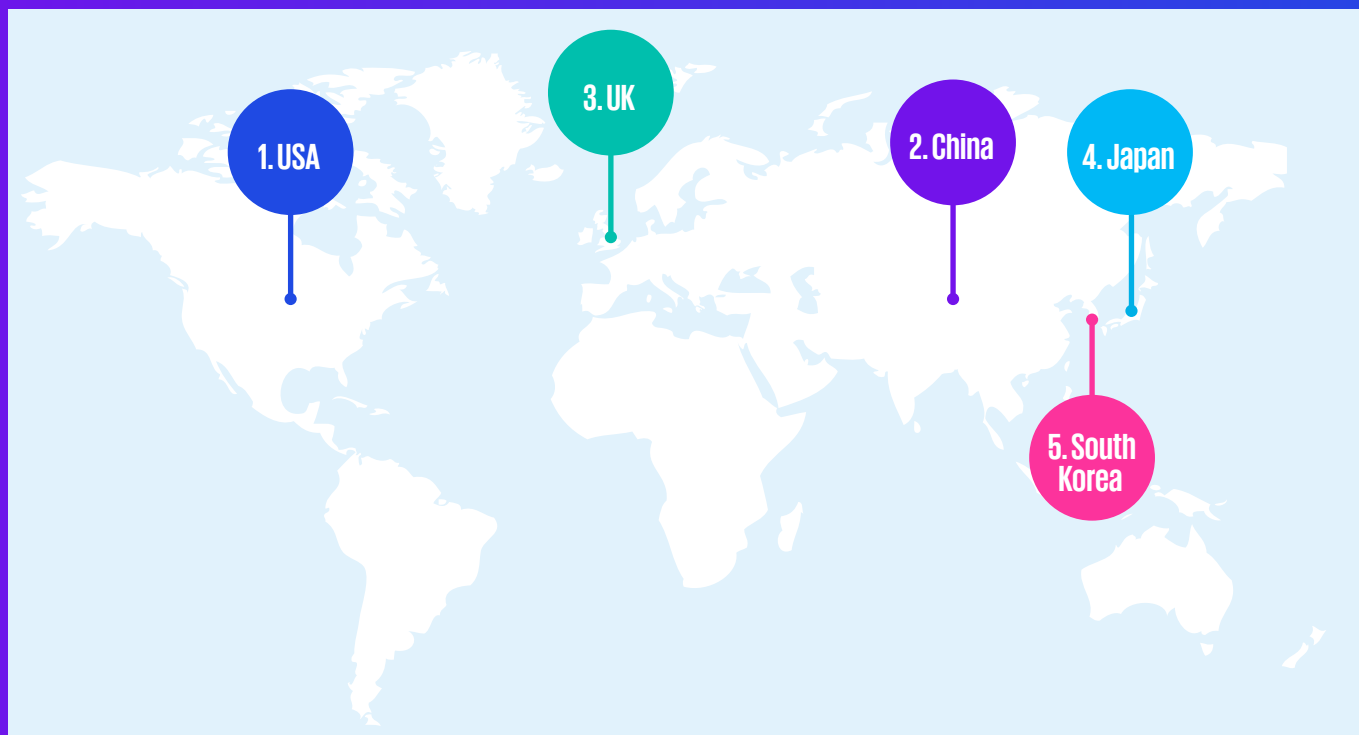
Reader guide

The Air Taxi Readiness Index (ATRI), now in its third iteration, is a tool to help measure the level of preparedness for the upcoming generation of passenger- and cargo-carrying Vertical Take-off and Landing (VTOL) vehicles in 60 selected territories. It is a composite index that combines nearly 50 individual, existing metrics from a range of sources into a single score. The metrics are arranged across five pillars: consumer acceptance; infrastructure; policy & legislation; technology & innovation; and business opportunity. Scores are based on normalised results from pre-existing KPMG and third-party secondary sources (end noted), with weighting applied to reflect metric relevance as a proxy. Each territory receives a score for each pillar, and these are aggregated into totals at the national level, which we then convert to relative rankings among the 60 territories.¹

The index is to be used to form comparisons between countries' preparedness levels for regional air mobility adoption and to stimulate thought and debate. It is not meant to be exhaustive or definitive in terms of predicting air taxi or logistics adoption rates. Its intended audience is public and private bodies alike looking to understand the benefits of early adoption of this technology, and the suitability of different territories for relevant pilots and commercial investment. We use short / vertical take-off and landing' (S/VTOL) and 'air taxi' interchangeably throughout, referring to vehicles capable of short-haul airspace passenger or cargo transportation, piloted or unpiloted. The ATRI 2023 is an update of the ATRI 2022, with updated sources for 14 metrics as well as one new metric of terrain ruggedness, to reflect the fact that more rugged terrain implies a better business case to use Advanced Air Mobility (AAM), due to the higher costs of road construction relative to scalable air mobility infrastructure.

¹ While urban centres will be one driver in air mobility, and we will therefore see intra-national disparities in market development, we think a national lens most relevant. This reflects the importance of national policies, national aviation authorities and air traffic management, as well as the potential for air mobility to go beyond intra-urban transport and be integrated airside as a regional connection network for traditional domestic and international aviation.

Index Results



Amongst many interesting points, we highlight the following for comment:

- The first three countries (US, China, UK) remain unchanged
- Japan rose by two places, from 6th to 4th
- South Korea jumped six places, from 11th to 5th
- The UAE jumped nine places, from 21st to 12th

Overall rankings

Territory	2023	2022	Change	Territory	2023	2022	Change	Territory	2023	2022	Change
	Rank	Rank			Rank	Rank			Rank	Rank	
US	1	1	0	Italy	21	23	+2	Philippines	41	41	0
China	2	2	0	Finland	22	18	-4	Romania	42	42	0
UK	3	3	0	India	23	26	+3	Vietnam	43	43	0
Japan	4	6	+2	Israel	24	29	+5	Uruguay	44	44	0
South Korea	5	11	+6	Denmark	25	19	-6	Bulgaria	45	47	+2
France	6	4	-2	Turkey	26	30	+4	Peru	46	46	0
Germany	7	5	-2	Mexico	27	25	-2	Morocco	47	48	+1
Canada	8	7	-1	Russia	28	24	-4	Egypt	48	49	+1
Australia	9	9	0	Belgium	29	28	-1	Ukraine	49	45	-4
Switzerland	10	15	+5	Saudi Arabia	30	27	-3	Kenya	50	50	0
Brazil	11	8	-3	Portugal	31	34	+3	Pakistan	51	52	+1
UAE	12	21	+9	Greece	32	35	+3	Bangladesh	52	53	+1
Spain	13	16	+3	Poland	33	31	-2	Algeria	53	51	-2
New Zealand	14	17	+3	Luxembourg	34	36	+2	Ecuador	54	55	+1
Norway	15	14	-1	Chile	35	33	-2	Nigeria	55	56	+1
Singapore	16	10	-6	Czechia	36	32	-4	Paraguay	56	54	-2
Netherlands	17	12	-5	South Africa	37	37	0	Guatemala	57	58	+1
Sweden	18	13	-5	Colombia	38	40	+2	Bolivia	58	57	-1
Ireland	19	20	+1	Hungary	39	38	-1	Angola	59	60	+1
Austria	20	22	+2	Argentina	40	39	-1	Ethiopia	60	59	-1

Introduction: the aerial mobility revolution

After several years of breathless hype surrounding the predicted new age of aerial mobility, the coming few years will test operators' abilities to successfully convert concept to reality and commercialize their early propositions. The struggle is on to gain mission-critical regulatory approvals and to deploy assets into early use cases. Major public commitments, such as Volocopter's commitment to services at the 2024 Olympic games, are set to make or break, presenting a major test not only of their own but of the sector's broader credibility.

Whilst the air taxi vision remains as exciting as ever, we think it always pays to scrutinize the hype. There's still a long way to go before we see on-demand air taxis as a mainstream mobility option. AAM will need to evolve through multiple use cases, including scheduled regional connectivity, helicopter displacement, and cargo transport, before it reaches the maturity across all readiness metrics required for mass deployment.

Realistic evolution



Important readiness criteria differences exist for air taxis intending to operate in these and other discrete market segments (e.g. intra vs inter-city, urban vs rural), and certain readiness criteria may well prove to have greater salience for some countries than others. Operational barriers are significantly lower for air mobility at the regional level versus the urban one, where safe operation will be far more contingent on novel physical and regulatory infrastructure. And, as recent research from Australia's RMIT has pointed out, climatological factors may yet prove to be bigger obstacles than thought.² Indeed some countries with otherwise high degrees of readiness are likely to see their deployment of early AAM models hampered for as long as they are only permitted to fly under visual flight rules.

² <https://thedriven.io/2023/06/20/air-taxis-might-fail-to-take-off-study-warns-if-wind-gust-threat-keeps-them-grounded/>



At Wisk, we see the global pull for AAM over the past year. Interest has grown and autonomous eVTOL flight is becoming more familiar and will be a reality in the eyes of cities we are talking to. Our autonomous approach provides cities with extreme congestion and mobility friction to think much longer term as autonomy with human oversight is the sustainable solution for scaling AAM. Reports such as KPMG's readiness index provide the insights needed at Wisk to validate global expansion plans."

Becky Tanner, CMO, Wisk



Countries like Switzerland or Norway as a whole are more likely to face weather conditions that will potentially impact eVTOL services, in comparison to the likes of Germany, France or Italy. At single urban-suburban level connections around cities, however, specific eVTOLs specs prove to be more serviceable in cities like Zurich, than Hamburg or Munich. Hence the need for route-specific and hyper local weather planning within prioritized countries."

Dario Milani, CEO, DM-Airtech

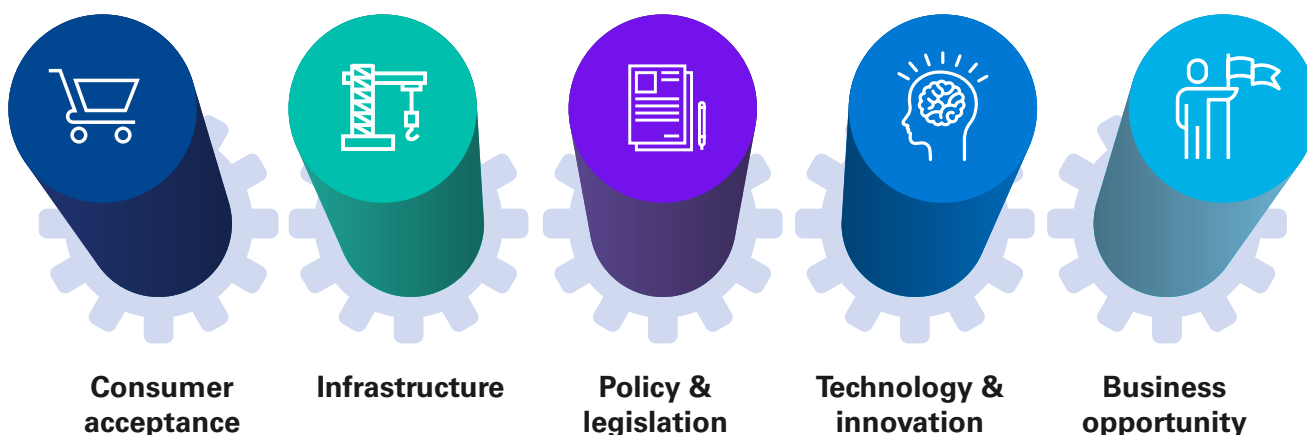


One bottleneck is local grid capacity for the required charging stations. This is where battery energy storage systems can serve a need many would-be operators have yet to realize they have. In most cases, these battery energy storage systems must be uniquely tailored for aviation in order to deliver the high voltage, high current throughput needed to supply reliable, high speed aircraft charging."

Richard Charlton, CEO & Co-Founder, electro.aero

Given the huge complexity inherent in such a global technological, social and regulatory evolution, understanding the air taxi readiness of particular jurisdictions is of value to all stakeholders. We now outline the 5 pillars used to score territories, and follow this with a number of case studies representing the territories of KPMG's own Future of Flight core community.

The 5 pillars

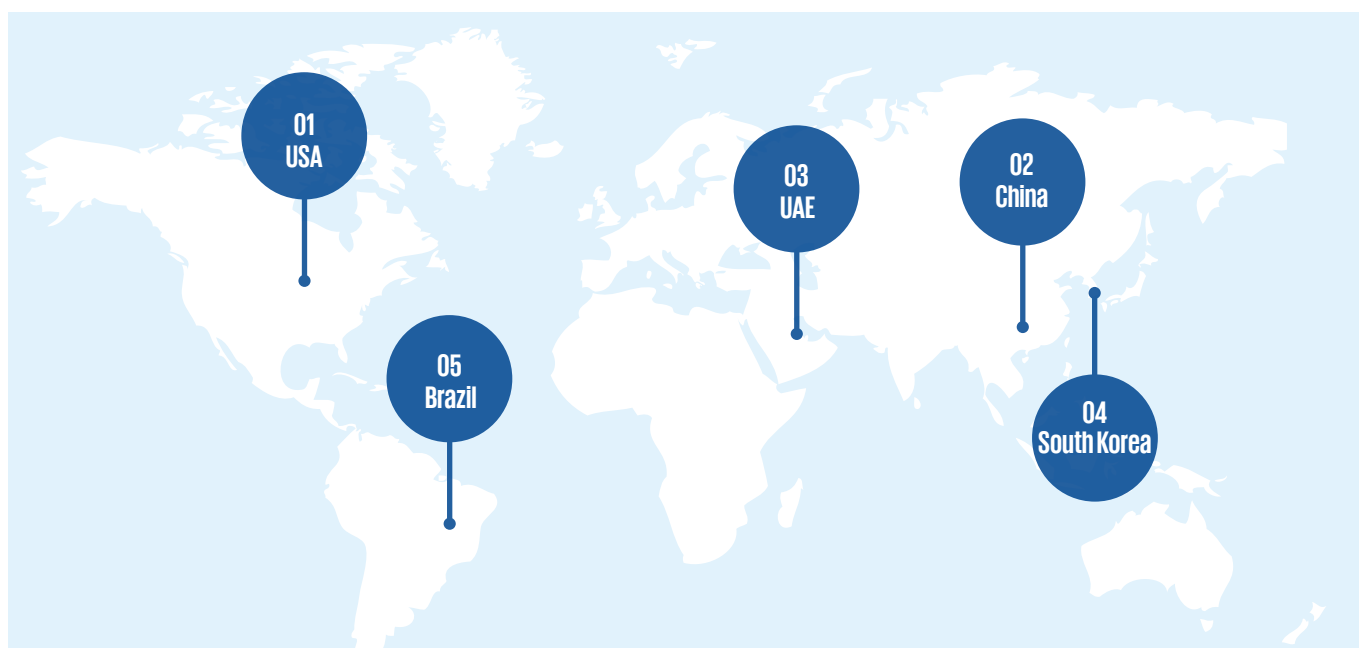


01 Consumer acceptance

Populations differ markedly in their willingness to accept VTOL technology. The consumer acceptance pillar aims to measure those differences through readily available proxies, aggregating data across eight internationally available measures for:

- Civil technology use³
- Individual readiness to use technology⁴
- Digital skills⁵
- Market size⁶
- AAM launch cities⁷
- Consumer ICT adoption rates⁸
- Ride hailing & taxi market penetration⁹
- Passenger air traffic volumes per capita¹⁰

As in 2022, the US leads this pillar, with China in 2nd place. The UK slips from 6th to 9th, with the UAE taking the 3rd slot, rising four places from 7th.



Rankings

US	1	Canada	16	Turkey	31	Morocco	46
China	2	Russia	17	Chile	32	Algeria	47
UAE	3	Austria	18	Argentina	33	South Africa	48
South Korea	4	Luxembourg	19	Poland	34	Paraguay	49
Brazil	5	Japan	20	Greece	35	Ecuador	50
Germany	6	Australia	21	Belgium	36	Philippines	51
Singapore	7	Israel	22	Peru	37	Ukraine	52
Finland	8	Netherlands	23	Colombia	38	Bolivia	53
UK	9	Switzerland	24	Czechia	39	Pakistan	54
Saudi Arabia	10	Mexico	25	Italy	40	Kenya	55
Norway	11	India	26	Uruguay	41	Nigeria	56
Sweden	12	New Zealand	27	Vietnam	42	Bangladesh	57
Ireland	13	Denmark	28	Romania	43	Guatemala	58
France	14	Portugal	29	Bulgaria	44	Angola	59
Spain	15	Hungary	30	Egypt	45	Ethiopia	60

3 International Telecommunication Union (ITU) World

4 Network Readiness Index 2022

5 The Digital Skills Gap Index (DSGI), 2021

6 World Bank, GDP PPP 2023

7 Count of launch cities, 2023

8 IMD World Digital Competitiveness Ranking, 2022

9 Statista (shared mobility services), 2022

10 World Bank, volume of air traffic / population, 2022

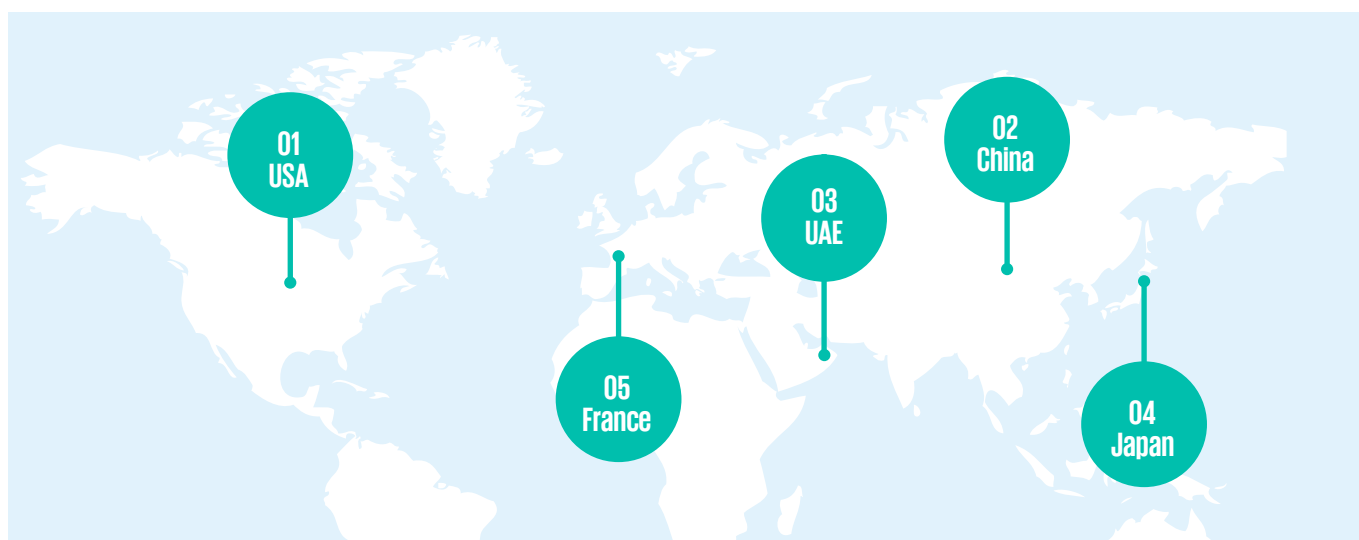


02 Infrastructure

An extensive range of infrastructure is necessary to support widespread use of S/VTOL vehicles in urban environments in particular. The infrastructure pillar incorporates metrics for:

- EV charging stations (as a proxy for ability to roll-out required charging and grid investment)¹¹
- 4G coverage¹²
- Quantity of air traffic¹³
- Technology infrastructure change readiness¹⁴
- Mobile connection speed¹⁵
- Broadband¹⁶
- Climate suitability¹⁷ (with 18-30 degrees Celsius, sunny with low rain and humidity levels considered idea for VTOL use)
- Ground congestion¹⁸
- Skyscraper density (as a proxy for downtown landing sites)¹⁹

The US has moved to the top of the pillar, China down to second, with France, UAE and Japan making up the top five. With Brazil further down, this demonstrates that an existing commercial network of heliports in itself only helps part of the way.



Rankings

US	1	Mexico	16	Colombia	31	Vietnam	46
China	2	Saudi Arabia	17	Philippines	32	Egypt	47
UAE	3	Turkey	18	Sweden	33	Kenya	48
Japan	4	Singapore	19	Hungary	34	Morocco	49
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Ireland	15	Poland	30	Luxembourg	45	Angola	60

11 Global EV Outlook, 2021

12 GSMA (average of 4G and 5G), 2022

13 World Bank, Air Traffic Quantity, 2022

14 Government AI Readiness, data and infrastructure pillar, 2022

15 Speedtest Global Index: Global Median Speeds: mobile, 2023

16 Speedtest Global Index: Global Median Speeds: fixed broadband, 2023

17 STC Climate Index 2021, Global Residence Index, 2021

18 TomTom Global Traffic Index, 2023

19 Countries by number of 150m+ buildings, Council on Tall Buildings and Urban Habitat, 2022



03 Policy and legislation

This pillar comprises nine metrics:

- Transparency²⁰
- Energy efficiency regulation²¹
- Government readiness for change²²
- Future orientation of government²³
- Data sharing environment²⁴
- Cybersecurity regulation²⁵
- Efficiency of legal system²⁶
- Ease of doing business²⁷
- Startup business environment²⁸

On this metric, European states perform notably better than elsewhere, making up three of the top five and six of the top ten, with the UK leading overall. The US takes a close 2nd, with Germany, Sweden, and Canada making up the top five.



Rankings

UK	1	Ireland	16	Greece	31	Kenya	46
US	2	Norway	17	Mexico	32	Saudi Arabia	47
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South Korea	15	China	30	Vietnam	45	Angola	60

20 'Corruption Perceptions Index', Transparency International, 2022

21 The Network Readiness Index, Affordable and Clean Energy, 2022

22 The Network Readiness Index, Regulation 2022

23 Network Readiness Index, Government promotion of investment in emerging technologies, 2022

24 The Network Readiness Index, Publication and use of open data, 2022

25 WJP Rule of law Index, Constraints on Government Powers, 2022

26 Global Startup Ecosystem Index, 2023

27 World Bank, Doing Business 2023

28 Global Startup Ecosystem Index 2023

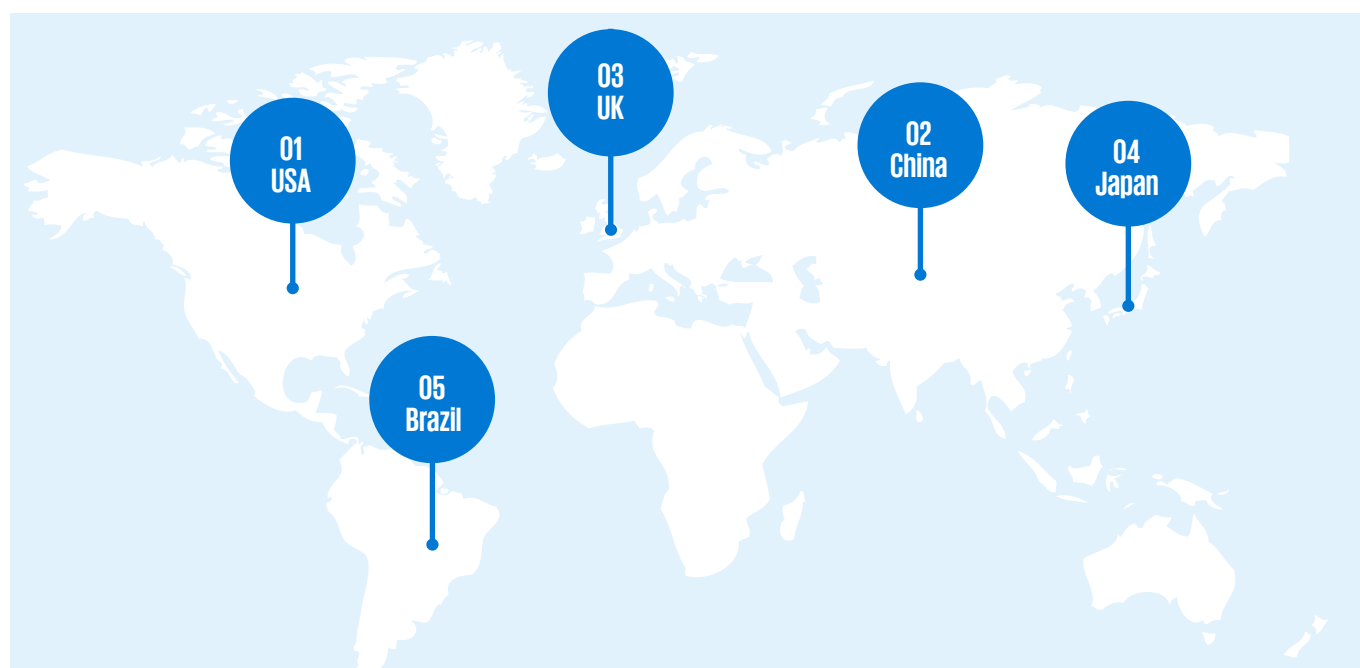


04 Technology and innovation

The technology and innovation pillar comprises ten metrics:

- Availability of latest technology²⁹
- Innovation capability³⁰
- Cybersecurity³¹
- AV-related patents³²
- Assessment of cloud computing, AI³³
- Industry investment in drone technology³⁴
- Drone technology firm HQs³⁵
- Drone-related patents³⁶
- Drone market share³⁷
- AAM orders³⁸

None of the top five placings have changed in this metric. As in 2022, the US remains dominant, with China in 2nd and the UK staying static at 3rd, followed by Japan and Brazil.



Rankings

US	1	Israel	16	Vietnam	31	Colombia	46
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Ireland	14	Turkey	29	Egypt	44	Bolivia	59
Spain	15	Portugal	30	Ukraine	45	Angola	60

29 The Technology And Innovation Report, UNCTAD, 2023

30 Global Innovation Index, World Intellectual Property Organization, 2022

31 GSMA, 2022

32 WIPO, 2023

33 Government AI Readiness Index, 2022

34 PitchBook, 2023

35 PitchBook, 2023

36 WIPO, 2023

37 Statista, market share of drones, 2023

38 SMG Consulting, AAM Reality Index, no. of orders

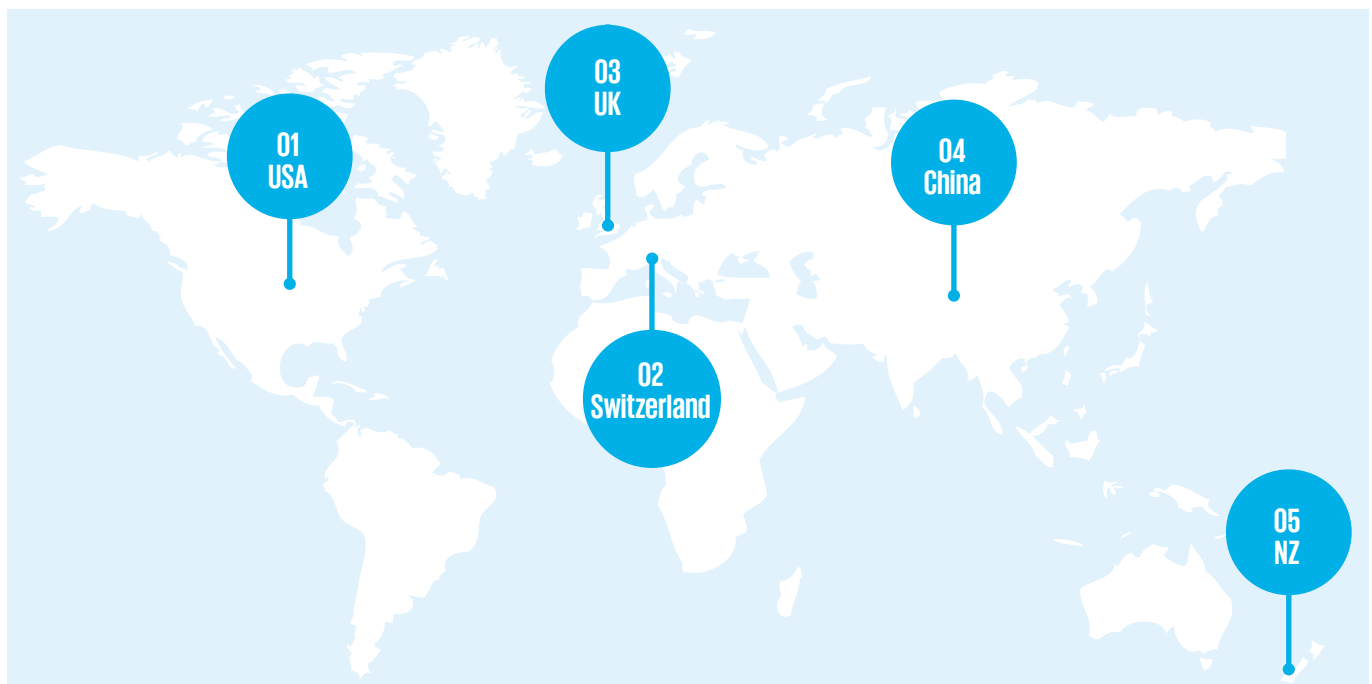


05 Business opportunity

The business opportunity pillar comprises the following eleven metrics in order to gauge the overall commercial potential of each territory as a VTOL marketplace:

- Adjusted net national income³⁹
- Urbanization⁴⁰
- Tourism⁴¹
- Helicopter market maturity⁴²
- Helicopter deal size⁴³
- Population density⁴⁴
- Passenger traffic⁴⁵
- LOPA (as proxy for premium air ticket demand)⁴⁶
- Country's propensity to fly⁴⁷
- Country's propensity to fly - per capita⁴⁸
- Terrain ruggedness⁴⁹

The US dominates again in this pillar, with Switzerland climbing from 6th to 2nd, and the UK slipping one place to 3rd. China leaps from 15th to 4th, with New Zealand climbing from 8th to 5th.



Rankings

US	1	Brazil	16	Finland	31	Bangladesh	46
Switzerland	2	Turkey	17	Czechia	32	Peru	47
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39 World Bank, per capita ANNI, 2021
40 World Bank, urban population %, 2022
41 UNWTO, 2021

42 KPMG Analysis, 2023
43 PitchBook, 2023
44 Demographia World Urban Areas, 2022

45 Airline passenger traffic into/from largest city, various sources
46 Fleet March, 2023

47 Airbus, 2023
48 Airbus, 2023
49 Terrain Ruggedness Index (TRI), 2020



Select national profiles

Here we profile the top 3 territories in our ranking, with a sample of others in the wider index.



View from Lawrence Spinetta, KPMG in the US:

- As in 2021 and 2022, the US dominates the ATRI, finishing top in four out of five pillars, and placing 2nd in policy and legislation, where it narrowed the gap between itself and the metric leader (the UK).
- In 2023, the FAA published its comprehensive proposal for training and certifying eVTOL aircraft pilots, and officially greenlit Joby Aviation to flight test its e-air taxi, while Archer signed contracts with the DoD worth up to USD142m.
- In May 2023, the White House announced the formation of an interagency team for the development of a national strategy for AAM, including air taxis.
- September 2022 saw Boeing and Wisk unveil a US-focused UAM CONOPs.
- As better proxies for consumer acceptance emerge, we may well see other territories leapfrog the US on this metric, but the scale of the US market overall means that only a portion of the population need to be regular AAM users for a market to flourish.



View from Juhi Verma, KPMG in the UK:

- The UK government has stated its aim to be a world leader in the development and deployment of autonomous systems, including aerial taxis. The UK retains its 3rd place position, with strong performances across policy and legislation, business opportunity, and technology and innovation. The UK's best opportunities for improvement continue to be in infrastructure, which has fallen four places to 14th, as well as consumer acceptance, where the UK has slipped for a second year running, from 6th to 9th.
- The UK is again top in policy and legislation, reflecting mature regulatory functions and significant government investment in the sector. Stakeholders are being actively encouraged to work together to create viable and sustainable concepts of operation.
- Despite this, the UK's Civil Aviation Authority has announced this year that it will adopt the European Aviation Safety Agency's certification standards for next-generation eVTOL aircraft (SC-VTOL).
- The UK government has invested GBP125 million in the Future Flight Challenge, enabling SMEs to trial and test their solutions in areas of data driven aviation, smart airports, and advanced air mobility, running from 2019 to 2024. The challenge is working towards demonstrating the safe integration and operation of drones, advanced air mobility and regional aircraft and advancements in electrification and autonomy.
- In February 2023, the UK government also announced an investment of GBP110 million through the Aerospace Technology Institute (ATI) Programme to unlock zero-emission flights enabling the development of electric flying taxis to be developed in the UK.
- In March 2023, trade association body the ADS set out five key priorities for the successful rollout of AAM in the UK, including policy and infrastructure requirements to ensure the appropriate groundwork is in place by 2025 for the sector. ADS recommendations included, ensuring a pragmatic set of requirements and guidelines in established in the UK for the design and operation of vertiports, clear planning policies and foster public engagement to showcase the exciting opportunities offer by eVTOL.
- December 2022 saw the release of a study identifying up to 390 potential routes for AAM services in the UK, based out of 32 smaller and regional airports.⁵⁰



Whilst most market attention is on large urban centers, our research shows there may be an easier regulatory route with wider economic and social benefits. This is from a focus on B2B just-in-time logistics and tourism routes."

**Kelly Murphy, Sector Development,
Invest Northern Ireland**



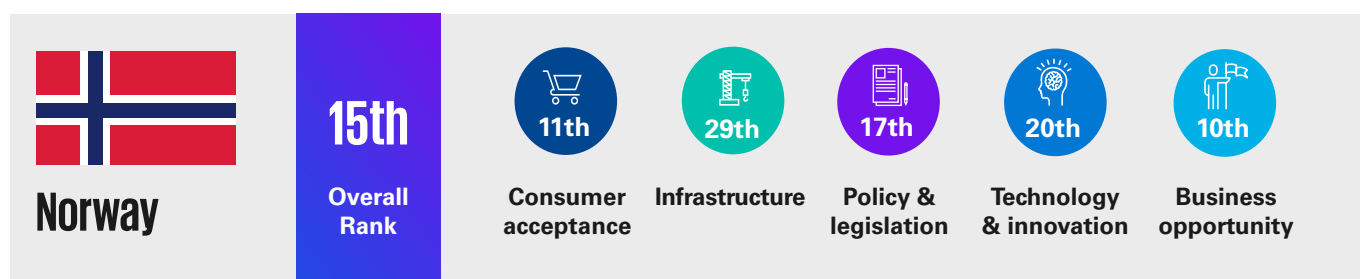
View from Elisha Edwin, KPMG in Australia:

- Australia remains in 9th position, unchanged from 2022, with falls in consumer acceptance, infrastructure, and business opportunity counterbalanced by slight improvements in technology and innovation, and policy and legislation.
- In March 2023, Pelligra Group, a major private developer, announced a deal with aviation infrastructure group Skyportz to allow vertiport building across its portfolio of sites.
- Swinburne University of Technology, through funding from the Victorian Government, partnered with Latrobe City council in March 2023 to explore future technology for AAM operations, including aerostructures and propulsion systems.
- July 2023 saw Australia's aviation regulator, the Civil Aviation Safety Authority, announce Vertiport design guidelines.
- The South East Queensland Council of Mayors (COMSEQ) and Wisk Aero continue to work towards eVTOL flights in South East Queensland.
- Australia's ANSP, Airservices Australia, established the Uncrewed Services Advisory Network (USAN) in June 2023 as a primary advisory body to engage with uncrewed and AAM customers.



View from Camila Andersen, KPMG in Brazil:

- Brazil drops out of the top ten, falling from 8th to 11th since 2022, a fall largely driven by its business opportunity score slipping from 9th to 16th. However, Brazil continues to perform strongly on consumer acceptance and technology and innovation, and is the regional leader for LatAm, with its developed helicopter market, high levels of air traffic, and numerous sprawling and congested cities.
- June 2023 saw the European Union Aviation Safety Agency (EASA) announce its intention to coordinate closely with work closely with ANAC Brazil's national civil aviation agency, on the development of certification for air taxi craft.
- Brazilian electric plane maker Eve announced its completion of wind tunnel testing for an air taxi prototype early in 2023, and has announced its intention to launch in 2026.
- In July 2023, it announced the construction and location of its first air taxi manufacturing plant, in Sao Paulo state.
- Eve has also developed a number of important partnerships or sales. For example, DHL and Eve will design a supply chain concept for eVTOL support - spare parts, batteries, reverse logistics, etc. Eve LOIs include Voar Aviation for a number of locations in Brazil, while it also includes aircraft for Widerøe in Scandinavia.



View from Celia Brekkan, KPMG in Norway:

- Norway sits just within the top 25% of countries in the index, at 15th. Business opportunity is its strongest metric, at 10th, with infrastructure its worst performance by some way at 29th. Policy and legislation was Norway's only metric to substantially change, slipping from 17th to 13th.
- June 2023 saw Embraer company Eve sign a letter of intent with Nordic regional airline Widerøe Zero for 50eVTOL aircraft.



View from Chris Brown, KPMG in Ireland:

- Ireland sits above the middle of the rankings, having climbed a place to 19th. Its strongest performance is again in consumer acceptance, which represents a drop from 8th in 2022 to 13th in 2023, leaving Ireland without a top ten placing for any metric. Business opportunity has climbed nine places but remains its weakest metric, due to relatively low passenger traffic, population density, and helicopter market maturity.
- Ireland's own domestic market scale is however eclipsed by its disproportionately large role in

aviation's value chain, suggesting it will play a major role in the development of AAM operator, traffic management and financing business models.

- Work continues at Shannon's Future Mobility Campus Ireland to develop an operational vertiport and unmanned flight ecosystem for AAM. There is a stated ambition for air taxis to be available for Ireland's hosting of the Ryder Cup in the wider Shannon region in 2027.



Ireland has a strong track record attracting FDI in emerging sectors of the economy and mobility – ground and air – will follow that trend. While there are multiple local market use cases, Ireland's real strength on the European platform and beyond is its ability to foster talent, innovation and IP. Both ancillary services and financing will be essential in developing AAM ecosystems across Europe, and this plays well to Ireland's strengths as a global center for technology and aviation finance."

**Ian O'Hora, Head Engineering
Green Economy, IDA Ireland**



The race for aircraft certification seems to be the current marker of "success" but we need all the pieces of the jigsaw to come together for a successful industry. The regulatory environment, OEMs, pilot training, operator certification, vertiport infrastructure, communication and navigation systems, charging facilities, airspace management, ground and passenger handling along with international, national and local policy makers who all need to come together with a coordinated approach on how we facilitate and fund the exponential growth in the sector. On this front, Ireland's scale is a comparative advantage for the required collaboration."

Julie Garland, CEO, Avtrain



The view of Erez Henig, KPMG in Israel:

- Israel improves five places from 29th to 24th, driven by a strong improvement in technology and innovation from 32nd to 16th, and an improvement in business opportunity from 33rd to 28th. Nonetheless, business opportunity remains Israel's lowest ranking metric due to relatively low levels of passenger traffic, tourism, and helicopter activity.
- In June 2023, Israel began the second round of air taxi test flights under the Israel National Drone Initiative (INDI) project, a joint initiative of the Israel Innovation Authority, Ayalon Highways, Civil Aviation Authority of Israel, Israel Ministry of

Transportation, and Israel Center for the Fourth Industrial Revolution (C4IR) with the support of the World Economic Forum.

- In total, eleven drone operating and delivery companies were involved in the tests, including Pardes-Hanna-based AIR, Dronery, and Airwayz Drones. Flight tests have included heavier and larger platforms such as the EHang EH216 eVTOL.
- Israel has a busy airspace, with a developed ecosystem of UAV operators suggesting a relatively high degree of maturity for air taxi deployment.



The view of Ozturk Taspinar, KPMG in Belgium:

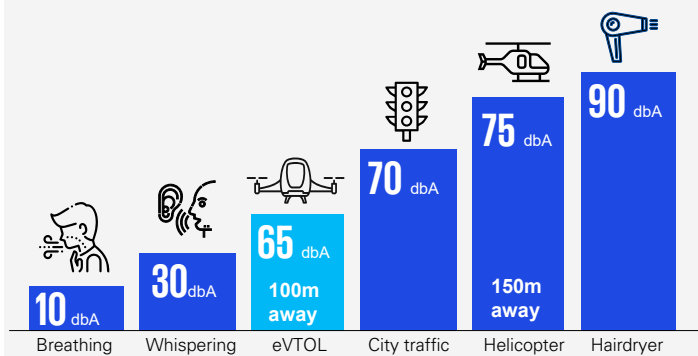
- Belgium falls to 29th in the overall ranking, down one place from 2022. Technology and Innovation remains its strongest metric, whilst Infrastructure continues to be a drag on its overall score, and Consumer Acceptance fell seven places from 29th to 36th.
- Nonetheless, Belgium enjoys unique features likely to bolster its air taxi readiness, including high population density, deep infrastructure networks, a rich and active ecosystem of entrepreneurs in Aviation, a federated governance system, and its unique position as host of the EU legislative capital. All of these features have both upsides and downsides for its air taxi adoption. Compared with previous years, Belgium has again progressed relatively slow on all of these domains, compared with the front runners. The slow progress mainly driven by the absence of a centralized strategy and funding and consequently the dependence on multiple scattered initiatives and investments.
- The D-Hive project (previously 6th Network) was the first in Europe to realize daily automated BVLOS flights in the complex environment of a port. The risk mitigation framework applied can be seen as the pre-cursor of tomorrow's U-space services.
- In Feb 2023, Belgian solid-state lithium battery technology company, Solithor, and aerospace company Sonaca, announced a development partnership for battery systems for urban air mobility.
- In March 2023, Brussels Airport Company announced its acquisition of a 30% stake in DronePort, a research and innovation hub for UAVs. We are expecting a fruitful impact of this decision on Belgium's ranking in the coming years.
- On July 25th a large two-seat passenger drone transported heavy medical cargo through European airspace for the first time, adjacent to populated area. The drone flight, a completely unmanned and automated mission, transported ten blood bags over more than 1 kilometer distance, by Helicus. Safir-Ready is one of the local programs that is leaning on EASA's proposed rules for the safety operations of VTOL.
- SkeyDrone's drone detection system (offered as a service) is monitoring Belgium's lower airspace (inside and outside several geozones). The effective use of it by several authorities (e.g., during summer festivals) has increased the safety & security awareness and consumer acceptance scores.
- Policy and legislation remain a key driver of the Belgium's mid-ranking. A critical success factor for the Belgian U-space implementation is the active participation of the Belgian Civil Aviation Authority and the timely certification of Belgian U-space actors (CISP, USSPs). Even though we see some slight improvement with the recent designation of a national U-space Competent Authority, the structural lack of resources within the national aviation administration remains a key improvement area.
- Considering the above, the Belgian air mobility value chain still has it what it takes to become a global air taxi front runner, if there is a coalition for this ambition. Central coordination, an efficient governance with the scattered initiatives and resolving some of its key administrative hurdles for this community will make a significant difference for the Belgian air mobility value chain.

Concluding thoughts

The race to commercialize the first generation of air taxis is well under way. However, we still see many of the same questions arising when stakeholders come up the learning curve.

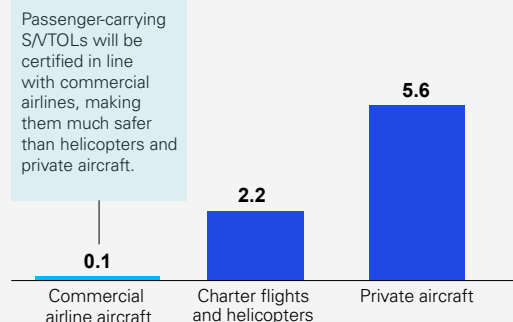
Common questions that we see, and how we think AAM can present itself for wider acceptance:

Noisy?



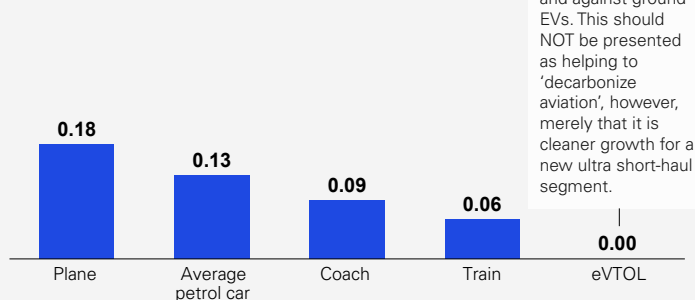
Safe?

Accidents per 100,000 flight hours in the US (2020)



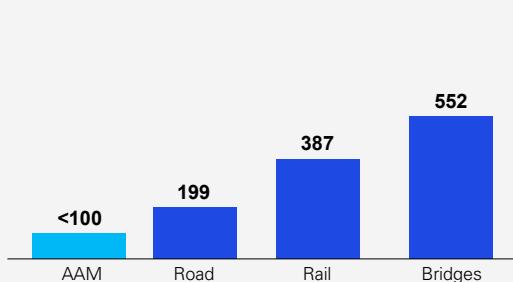
Polluting?

Tailpipe CO2 per passenger km (kg)



Cost?

Construction cost per mile comparison (USD million)



Sources: Joby, Airbus, Archer, National Transport Safety Board, VerticalMag.com, aef.org.uk

Major OEMs are now under pressure to secure certifications and deliver on announced launch timetables, whilst other sector stakeholders are looking increasingly at underpinning infrastructure, airspace architecture and regulatory regimes.

Readiness for deployment of air taxis is of course a highly complex and dynamic quality, which can only be imperfectly captured by this or any other attempt. We have focused on readiness factors that are common and applicable to all AAM aircraft, whilst acknowledging that different market segments will inevitably have differing readiness needs and that not all jurisdictions will treat all metrics with equal salience. To conclude, we consider some implications by stakeholder type.



OEMs & supply chain

- The battle for hearts and minds is far from won, and hype including claims around how eVTOLs decarbonize aviation is not the answer. All players will need to work hard to communicate AAM's clear benefits versus other transport modes on emissions, safety, cost, and noise. Early use cases that conspicuously serve only the privileged few risk delaying, rather than advancing, public acceptance.
- With the AAM market likely to evolve through multiple stages based on different use cases, be clear about where exactly your models can successfully play, and target accordingly. For example, cargo and emergency evacuation versions will likely allow for earlier revenue ramp-ups than passenger.
- Whilst generic readiness metrics will play a key part in any assessment of target markets, it will also be critical to understand unique business intelligence factors beyond these, e.g. the presence of your assembly and after-sales sites and your mix of local suppliers.

Investors & lessors

- Given that different segments of the AAM market will mature on very different time horizons, investors with particular investment timelines in mind should seek to match these with players targeting the most relevant segments.
- As competition intensifies and the most advanced players begin to deploy into the first real-world use cases, the currently crowded field of well-financed startups, tech companies and car manufacturers is likely to consolidate as access to capital tightens.

Operators & Mobility as a Service providers

- We expect AAM to cannibalize regional routes by the 2040s, due to its greater energy cost efficiency and superior door-to-door travel times. For this reason, we expect AAM fleets to become commonplace for commercial airlines.
- AAM will require the creation of a new ecosystem of supporting software, for the management of flight schedules, the monitoring and management of a fleet's batteries, predictive maintenance, demand forecasting, meteorological forecasting, etc. creating opportunities for app and software providers.

Infrastructure including airports, energy providers and public transport bodies

- Given the likely regulatory restrictions around VTOL mobility in the urban environment, mass adoption will require extensive bespoke vertiport infrastructure. Existing infrastructure providers (including airports, coach terminals, railway stations) should seek opportunities to partner with VTOL players to service that need.
- Demand is likely to outstrip supply for workable inner-city VTOL sites, meaning a significant need for asset repurposing, which will create a range of engineering opportunities (particularly in high-density, built heritage zones, like European cities).
- One overlooked bottleneck is local grid capacity for the required charging stations. This is where battery bank providers can serve a need many would-be operators have yet to realize they have.



National policy makers

- Some geographies have an opportunity to leapfrog expensive ground-based mobility infrastructure programmes. Whether facilitated or led by governments, AAM presents an opportunity to get more ‘bang for buck’ than high-speed rail and other infrastructure.
- Policy makers with an eye on early participation in the air taxi market need to understand the lead times for building or implementing key readiness pillars, such as airspace changes, regulatory frameworks, and upgrades to physical infrastructure.
- With widely divergent degrees of public acceptance and knowledge, policymakers in different jurisdictions will in many cases need to actively promote public acceptance if they wish to facilitate VTOL adoption. Our analysis suggests that concerns over noise, environmental impact and safety are superable. However, our surveys also suggest unrealistic expectations are being created about AAM’s ability to help decarbonize aviation more generally.

Air Navigation Service Providers & regulators

- With the technology advancing rapidly and major players now actively moving to the test flight stage, the development of the regulatory foundation is likely to prove the major brake on widespread air taxi adoption, especially for manned flight. There remains much to be done to develop a workable ATM framework for eVTOL aircraft, especially in the urban environment, and the need for regulators to engage is urgent in many jurisdictions.
- Outside of key markets in the US and Europe, jurisdictions adopting a policy of regulatory alignment with these leaders are likely to achieve maturity more quickly than those developing bespoke rule sets.
- The seamlessness of the customer experience will be critical to AAM sector success. Now is the time to resolve looming compatibility issues between different manufacturer models and competing infrastructure providers, including batteries, charging infrastructure, vertiports and even air navigation services. This is an area where regulators and industry bodies are well positioned to provide coordination and harmonization.
- As expected, we are seeing new players from non-aviation backgrounds (e.g. tech, space) enter the Unmanned Aircraft System Traffic Management (UTM) market. Further opportunities exist in airspace designs, systems integration and operations.

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