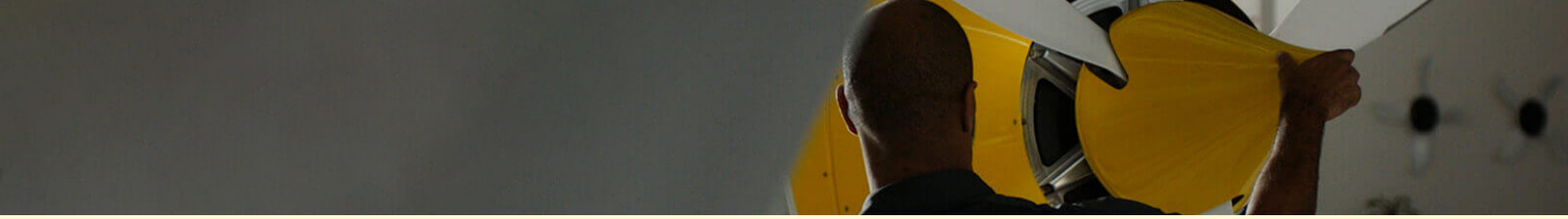
eVTOL Air Taxis

New Opportunities for Equitable Transport



EXECUTIVE SUMMARY

Despite dramatic evolutions in mobility and transportation technology in recent decades, the quality of mobility experiences remains low for many. Public transit systems continue to face considerable challenges in delivering consistent and efficient services. Despite the enactment of the Americans with Disabilities Act (ADA) and the Air Carrier Access Act (ACAA) three decades ago, individuals with disabilities still face significant barriers to mobility across public and private transit.

This white paper, "eVTOL Air Taxis: New Opportunities for Equitable Transport," explores how the emerging field of Advanced Air Mobility (AAM) and electric Vertical Takeoff and Landing (eVTOL) aircraft can revolutionize urban mobility. It outlines initial learnings and a guiding framework for the potential of AAM and eVTOLs to offer safe, fast, and affordable alternatives to long and stressful commutes, with a particular focus on addressing the mobility needs of people with disabilities.

This white paper also represents the topline findings from our discovery process around defining accessible experiences for AAM. Wisk has already identified 100+ detailed opportunity statements to improve accessibility in the AAM aircraft design and airline services, and has initiated the much longer journey of designing for these in consultation, co-creation, and partnership with people with disabilities and community organizations. Wisk is sharing its learnings now to inspire actors and partners across the ecosystem to deliver and build on these learnings – and to invite collaboration with partners and future passengers needed to create an accessible experience from end-to-end.

To build a detailed understanding of the future accessibility challenges in AAM, Wisk partnered with ReD Associates, a strategy consultancy specialized in applying the humanities and social sciences to understand and address the specific needs of people and communities. Together, we conducted a multi-pronged qualitative investigation of the everyday mobility experiences and needs of people with disabilities, to understand what AAM must do to provide an inclusive mobility experience. The findings underscore the need for AAM to reconsider long-standing industry definitions of accessibility, and deliver on five distinct levels:

Access: Ensuring physical and informational access for people with disabilities in mobility spaces and services.

Physical Safety: Addressing concerns related to physical injury, exposure to illness, and discomfort during travel.

Emotional Safety: Mitigating the stress, vulnerability, and unpredictability experienced during travel, including invasive security checks and negative interactions with fellow passengers.

Equal Expenditure & Efficiency: Removing inequities around service availability, waiting times, energy expenditure, and the need for extensive support to navigate transport systems and infrastructure.

Joy & Inclusion: Facilitating positive emotional and social aspects of travel for all passengers, in part by removing experiences likely to create feelings of isolation and marginalization.

AAM aims to create a mobility ecosystem that delivers safety, equitable access, efficiency, connection, and enjoyment, thereby transforming everyday lives and routines. By thinking about accessibility early in their design and development processes, AAM stakeholders can unlock the full potential of this transformative mode of urban mobility — ensuring it serves people both with and without disabilities.

Advanced Air Mobility: A new, transformative mode of urban mobility — for everyone

The mobility industry has progressed in leaps and bounds over the past 15 years, with a proliferation of transportation options, from ride-sharing services to ever-expanding micro-mobility offerings — and significant advancements in autonomous and electric vehicles.

Yet consumers' mobility experiences have neither transformed nor improved as much as these developments might suggest. Public transit continues to struggle to provide consistent, predictable, and efficient transport across metropolitan areas — and remains chronically underfunded in most cities.[1] Car traffic has worsened worldwide,[2] and extensive time in traffic means increased stress and more time away from the experiences people travel for in the first place. Deadly car crashes hit a 20-year high in 2022,[3] and the proportion of cars and vehicles that are electrified still remains dauntingly low. In 2022, less than 1% of the 250 million personal vehicles on the road in the US were electric.[4] And finally, micro-mobility makes up only a small portion of the journeys most urban citizens take — replacing only around 15% of private car trips.[5]

Some urban populations face even greater challenges. The estimated 61 million adults with disabilities in the United States — approximately 1 out of every 4 American adults[6] — continue to face profound barriers to everyday mobility[7] more than three decades after the Americans with Disabilities Act (ADA)[8] was passed. People with disabilities are twice as likely to live in poverty[9] and less likely than people without disabilities to own or travel in personal vehicles.[10] As a result, people with disabilities tend to rely on public transport and ride-hailing services at disproportionate rates, often exposing them to more challenging and costly commutes.[11] Even these services present major gaps in service for people with disabilities: A study published in 2022 found that nearly 40% of surveyed people with disabilities experienced service denial from rideshare services;[12] only 27% of New York City's subway stations were wheelchair accessible in 2022.[13]

Aircraft and mobility services have traditionally not been built to serve many historically marginalized groups, like people with disabilities, but for narrow definitions of passenger body types and needs.[14] Retrofitting for non-archetypal passengers and accessibility requirements often only happens later, with poor results and at great cost.

As a new addition to the mobility ecosystem, Advanced Air Mobility (AAM) and electric Vertical Takeoff and Landing (eVTOL) aircraft offer the potential of safer, faster, and affordable alternatives to long and stressful commutes. AAM and eVTOLs also importantly provide an opportunity to reimagine urban mobility from the ground up, building an urban transport system that can better serve passengers with and without disabilities. So, what then should this new urban transport system provide within the broader mobility ecosystem?

Wisk, a leading Advanced Air Mobility company, and ReD Associates, a strategy consultancy specialized in applying the humanities and social sciences to understand and address the specific needs of people and communities, partnered in 2023 to begin to define a path forward for Wisk and AAM to provide a ground- (and air-breaking) experience for passengers with disabilities. This work had the dual aim of:

Ensuring that AAM and its broader mobility ecosystem is specifically designed for the needs of people with disabilities from the outset;

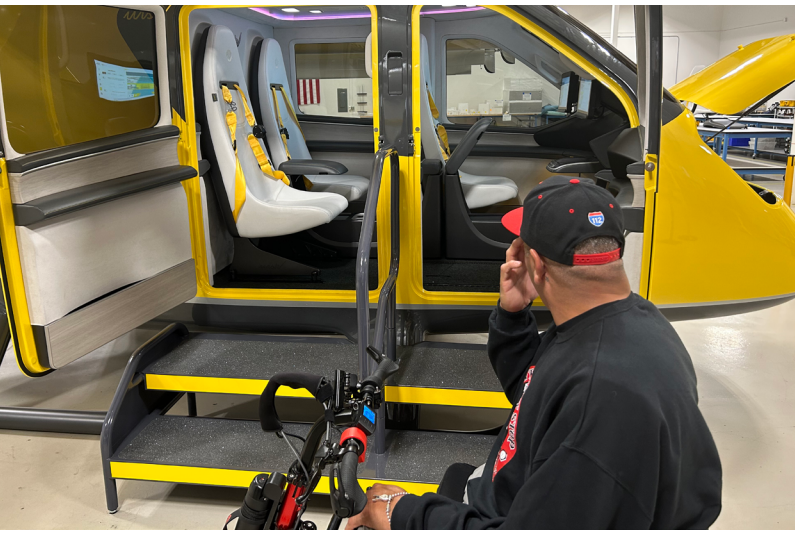
Learning from the needs of people with disabilities to identify opportunities to improve mobility for passengers with and without disabilities — in line with the Wisk mission to deliver 'safer everyday flight for everyone.'

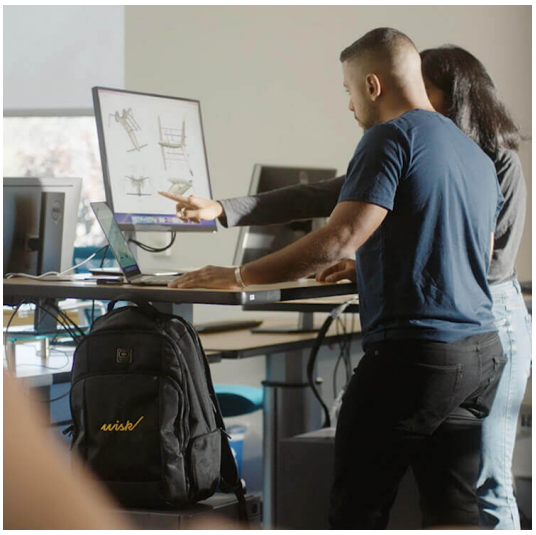
This paper aims to synthesize the most significant challenges for AAM around creating a valuable and equitable travel experience for everyone, and to provide a call to action to mobility providers to place accessibility at the center of the industry as we pursue the next generation of mobility. Importantly, our findings point to the following:

To fulfill its potential, the AAM ecosystem will need to design in line with a much more expansive definition of accessibility than mobility has pursued previously, delivering not just access to mobility experiences, but also the opportunity for people with disabilities to participate equally in them.

Accessibility in AAM creates new opportunities to better serve passengers with and without disabilities — and to drive innovation in the air travel experience more generally.

Collaboration and innovation across the AAM ecosystem — especially with multi-modal and vertiport partners — is essential to deliver better mobility experiences.





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METHODOLOGY

To begin charting its path towards a more accessible vision for AAM, Wisk and ReD undertook a multi-pronged qualitative research study of the mobility challenges and unmet needs of people with disabilities in and around cities. Primary research consisted of ethnographic research into the mobility experiences of people with disabilities — including semi-structured interviews and participant observation of current mobility practices — and semi-structured expert interviews with leading thinkers and practitioners in disability and mobility. Ethnographic research consisted of multi-day, in-home immersions with a small sample of eight San Francisco Bay Area residents with a wide range of physical, sensory, cognitive, and dexterity-related disabilities. During these immersions, researchers consulted participants directly on their experiences and expertise, while also meeting with their broader social ecologies (family and friends) and joining them in everyday transit. A subset of these ethnographic participants participated in a moderated walk-through of the Wisk Generation 6 cabin prototype and future travel experience.

Secondary research consisted of a review of existing academic research in mobility and accessibility, contextual research on current pain points for people with disabilities in urban mobility and aviation, and review of ReD Associates' ethnographic database on mobility, consisting of over 4000+ hours of observational data on mobility across many global markets.

Further to the initial research, ethnographic participants have since returned for additional consultation and co-creation around cabin features and ground equipment prototypes; a subset of experts has also been consulted on the final results.

While not statistically representative due to its small sample size, the ethnographic and qualitative approaches that formed the core of our research have become commonplace across many industries — including automotive and mobility — for their ability to surface unmet needs, discover emerging challenges, and identify causalities behind observed user behaviors. While a small sample size cannot fully represent the diversity of identities, relationships to disability, and mobility experiences present, the multi-pronged research and analysis enabled identification of strong patterns across data streams — and triangulation across broader communities and quantitative data. This enabled us to develop an initial perspective on how mobility experiences most commonly fall short for people with disabilities and pointed to 100+ granular opportunity statements for Wisk to act on in aircraft and service design across the AAM ecosystem.

This initial perspective represents only the beginning of a longer journey: Wisk is committed to consulting, co-creating, and partnering with people with disabilities, experts, advocacy groups, and other AAM ecosystem actors throughout its design and development process.

Profile: Alex

A snapshot of the mobility experiences of one participant in the ethnographic research

A curious and energetic engineer living with her partner in the Bay Area, Alex is Deaf, communicates with sign language and a keyboard, and lives with chronic conditions that limit her mobility and lead to chronic pain. For the past three years, she has required a wheelchair to get around. Access to transportation is critical for her physical health and her emotional well-being: Alex relies on ride-share services to make trips to regular doctor appointments and work, to visit friends and family in the area, and to go to the grocery store so she and her partner can cook together. Despite her finding Bay Area public transport inconvenient and largely inaccessible, Alex has figured out mobility routines that generally she describes as 'working' for her.

Yet when we accompanied Alex on one of her regular rideshare journeys, we saw how suboptimal even 'working' experiences can be in practice. Alex has had countless negative service experiences with drivers, as well as aggressive interactions with strangers due to difficulties communicating. She feels vulnerable in transit and fears her mobility aids being damaged or even being physically harmed herself.

Every journey requires extra effort to avoid these risks. As we waited for the ride, Alex wrote a detailed message to her driver explaining that she was Deaf and a wheelchair user, sharing instructions for where to pull up to the curb, and how to take apart her wheelchair and assist her into the vehicle. When the driver arrived, it appeared they had not internalized Alex's instructions: the vehicle was parked too far from the curb, and after lifting her wheelchair into the vehicle, the driver stood and waited. Rather than risk angering the driver through attempting to re-communicate, she elected to instead crawl on the pavement to transfer from the ground to the rideshare vehicle. When we met Alex several days later, she showed us that the transfer left large bruises on both legs. Alex shared that this was not the first time this had happened to her — and in fact, it tends to happen a few times per month.

While Alex's experience is singular, it brings to life an example of clear short-comings in service delivery for people with disabilities — shortcomings that many of the people, experts, and existing research we consulted say are common.

Mobility: End-to-End Challenges Exist for an Equitable Experience

Stories like Alex's show the extra lengths that people with disabilities are often required to go through in order to meet basic mobility needs. Across our research, we observed how moving from A to B costs people with disabilities more time, physical and emotional energy, independence, and money than average — making getting around significantly more demanding than for people without disabilities.

Our research revealed many negative experiences of mobility and air travel. Many challenges stemmed from reasons beyond mere access — from fear of (or having previously experienced) injury at the hands of service workers; to the discomfort of interacting with unpredictable, often condescending strangers; to the burden of advocating for accommodations from service staff; to feeling excluded from announcements and standard boarding procedures. Add to this the time and energy required for connections during multi-modal journeys — like taking a bus to a train to another bus — and traveling to far-flung destinations in particular can become prohibitively draining. This can prompt people with disabilities to pay high premiums for less exhausting and time-consuming options like rideshares: one woman in our sample spent an average of $1,300 per month on rideshares, and even then, lacked access to consistent wheelchair-accessible options.

The challenges of navigating inaccessible transit options all too often result in trips going untaken, as people with disabilities may cut down on non-essential journeys, or journeys to places too far or complicated to visit. Most commonly we observed that this means deprioritizing visits with friends and family or to leisure and nature destinations. In the midst of a loneliness crisis for all Americans — with people with disabilities experiencing loneliness, low-perceived social support, and social isolation at significantly higher rates than people without disabilities[15] — cutting down on such trips is far from trivial. For AAM operators and ecosystem partners, this also means money left on the table: Wisk and ReD believe there are many more potential riders and flyers waiting to be served if providers can deliver an equitable and affordable AAM experience.

Delivering accessible mobility options does not exclusively mean developing unique solutions for one segment of the population. While people with disabilities' mobility challenges are often more pronounced than those of people without disabilities, many solutions to these challenges hold the potential to benefit all passengers.

Past mobility research has shown how draining public and private commutes can be for people with and without disabilities — for example, longer commute times are associated with lower job and leisure time satisfaction[16] — as well as how stressful and alienating urban transport can be. Complicated transfers and long travel times change urban citizens' willingness to explore difficult-to-reach locations, especially without access to private transport; even people with private cars report that coordinating and driving on long outings often takes a toll on energy and enjoyment.[17] While there are areas where accessibility needs and solutions are unique to people with disabilities — such as wheelchair boarding aids — delivering on others, for example less energy-intensive transfers during multi-modal journeys, has clear potential to benefit all passengers.

> *What I wasn't prepared for when I made the decision to cut down on travel costs was losing the ability to see my friends who live in the East Bay. I used to see them all the time, and now I see only one of them.*
>
> **ANITA**, WHO USES A WHEELCHAIR, AND ONLY TRAVELS VIA UBER DUE TO ACCESSIBILITY CHALLENGES AND SAFETY CONCERNS AROUND PUBLIC TRANSPORT

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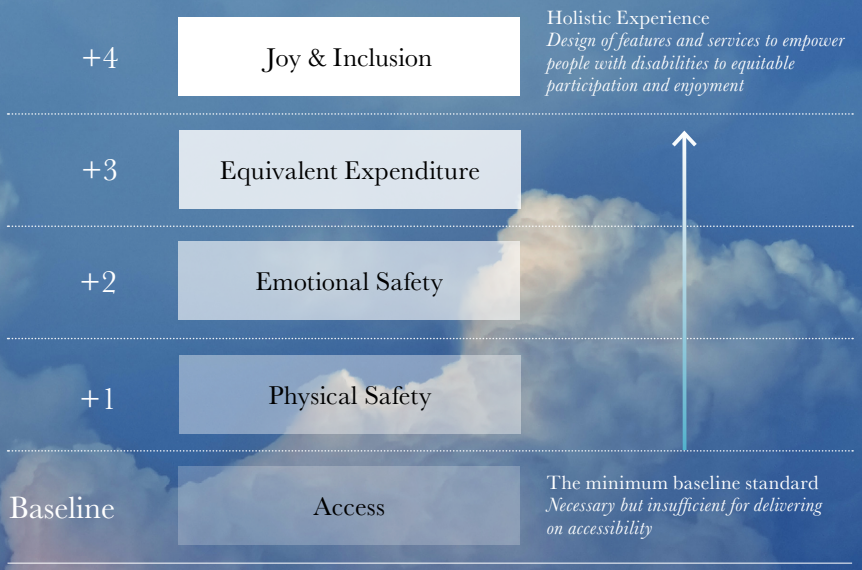
Setting Higher Ambitions for AAM

Current approaches in accessibility in the mobility industry focus on ensuring that all passengers are able to access aircraft, vehicles, and infrastructure equally — closely in line with the Americans with Disabilities Act (ADA) and Air Carrier Access Act (AACA). There is still considerable room to improve physical access for people with disabilities to many public transit and mobility systems. However, our research highlights that access is necessary but insufficient for truly delivering on accessibility.

Even when people with disabilities are able to access urban mobility services and infrastructure, their experience of mobility is often diminished in quality; it is often more time-consuming, physically and emotionally draining or harmful, less independent, and more costly than for people without disabilities.

In contrast to common definitions, our research points to five levels of accessibility, which collectively enable equitable mobility experiences for people with disabilities. In distinguishing these levels of accessibility, this new framework aims to both elevate the ambition level for accessibility within the AAM ecosystem and offer a framework of the different types of accessibility challenges where AAM can have a meaningful impact on the urban mobility ecosystem.

The Five Levels of Accessibility



Throughout our research, we heard and observed that mobility experiences regularly fail to deliver on five distinct levels of accessibility. While independently valuable, each level is a prerequisite for delivering on the next — i.e. it is not possible to solve for emotional safety before physical safety is sufficiently supported.

Access - People with disabilities still face physical and informational access limitations in mobility spaces and services. Limited or broken elevators, high curb heights or steep ramps, lack of accommodation for service animals, and websites that aren't screen reader-enabled are all examples of areas where access is regularly limited for people with disabilities.

Physical Safety - People with disabilities can fear for their physical safety during travel. Our research revealed pervasive instances of physical injury, exposure to illness, or overwhelming physical discomfort during travel. Many examples involved poor handling or support by operations staff during wheelchair transfers.

Emotional Safety - Travel can be a stressful, burdensome, and even degrading experience for people with disabilities. They may feel vulnerable during travel, as they can be separated from their mobility and comfort aids, forced to rely on support from service or security staff, experience invasive security checks or handling, and/or subjected to crowded spaces and overwhelming stimuli. These challenges are redoubled by the unpredictable provision and quality of services, even those requested in advance, leading to additional effort, like calling ahead to confirm accommodations.

> *I use glasses and earplugs on planes because the fluorescent light and sound of being on a plane is very uncomfortable and overwhelming for me — almost physically painful.*
>
> DIANE, WHO SUFFERED A TRAUMATIC BRAIN INJURY

Equal Expenditure & Efficiency - Extra processes, longer waits, and limited availability of support staff or equipment often add to travel time, while physical transfers and discomfort sap energy and can require extensive support from friends, family, and others. With limited efficient public or shared transportation options, costs for private mobility quickly accumulate.

Joy & Inclusion - Accessibility gaps can drain the physical and emotional surplus needed to tap into some of the more joyful aspects of travel — for example, taking the ferry instead of a train to unwind. At the same time, people with disabilities can regularly feel singled out or set apart from other passengers, especially when following different boarding procedures or physically being put to the side. Many receive unwanted attention while in transit and are ignored or belittled by service workers and fellow passengers.

These levels of accessibility point to several serious potential breaking points in the future experience of AAM, and highlight that innovating mobility for everyone will demand significant improvements to the AAM ecosystem. Wisk is committed to working with its ecosystem partners to enable an experience of AAM that can deliver:

Greater personalization: The accessibility accommodations needed by people with disabilities when they travel are highly individual, highlighting the tremendous diversity within this population. Accommodating these needs and preferences will require systematically capturing and catering to them with personalized options and flexible operations. These capabilities in turn benefit all passengers, for example by also enabling mobility providers to better cater to the unique travel preferences of frequent flyers.

Greater predictability & consistency: Lack of predictability and reliability around travel experiences can be a major source of stress for people with disabilities. Guaranteeing high quality and timely services, proactive confirmations and reassurances around accommodations, and opportunities to preview travel experiences in detail has the potential to greatly improve the experiences of people with disabilities, as well as many passengers without disabilities.

Quality operations staff: Current operations staff are perceived as lacking skills for appropriate care. Providing higher quality, trained operations staff will increase satisfaction of people with disabilities, while also lifting the experience for other passengers who request assistance, like families with children.

Multi-modal integration: Given the added difficulty and stress of multi-modal journeys, making eVTOL journeys feasible for people with disabilities will require stronger connections and integration between mobility providers — a natural value-add for all passengers.

Supporting social and leisure use cases: Many leisure destinations — like natural wonders or regional attractions — remain impractical or impossible for people with disabilities to visit, even with private transportation. Moreover, many social destinations — like visits with friends or families spread throughout the Bay Area — can become too difficult on top of the costs and energy expenditure needed for everyday travel. To support people with disabilities, eVTOLs and vertiport infrastructure must enable access to a broader set of destinations and experiences, enabling easier access to the most meaningful journeys for all.

> *I want [companies and experiences] to go beyond compliance — I want to feel like I can belong … For example: A bar can be ADA-compliant and have some low-top tables for wheelchair users, but I can't fully participate or be social … while everyone else sits and talks on the high-top chairs.*
>
> ANITA, WHO USES A WHEELCHAIR

A Call to Action

Wisk is committed to maximizing the enjoyment of its services by everyone, through paying attention to the needs and everyday realities of passengers who face the most severe barriers to mobility. We see this study and its findings as the first step in a long and iterative process, and share it as an invitation for other ecosystem actors to learn from, build upon and act on in collaboration with us.

While building a truly accessible AAM ecosystem is no small task, we already see a number of areas where AAM players can collaborate to lift travel experiences for all passengers:

Consult and co-create solutions with people with disabilities for the AAM ecosystem to ensure a strong fit with their needs.

Collaboratively design vertiport infrastructure and networks to ensure end-to-end accessibility and expanded access to valuable destinations and various transport modes.

Co-develop routes, schedules, data, and services to enable reliable multi-modal journeys end-to-end.

Develop shared industry standards for operations staff and services to guarantee minimum standards of service for all.

Track the subjective qualities of passengers' journeys — going beyond objective data like time in transit — to ensure progress towards equitable travel experiences.

A mobility ecosystem that delivers equal access, physical and emotional safety, efficiency, connection, and enjoyment will be one that succeeds in finally transforming passengers' everyday lives and routines. As an industry, we should aim for these principles.

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