

INDUSTRIAL-POLITICAL POSITION

10/2020

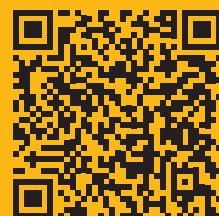
Urban & Regional Air Mobility

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German Aerospace Industries
Association


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EXECUTIVE SUMMARY

Evolving new technologies and business models, respectively, and greater environmental awareness have in recent years dramatically changed the way people want to get around. Ultimately, by the end of the 2020s, aviation will look different from what it did at the beginning of the millennium.

The European Commission's Vision for Aviation "Flightpath 2050" envisages that 90 percent of all travelers in the European Union shall be able to reach their destination in less than four hours. Urban and Regional Air Mobility are key enablers for achieving this goal. However, clear legal frameworks are needed for the strong development of these markets and for the operation of commercial flights. These must be developed and implemented in dialog with industry. Designed for urban and regional use, electric vertical take-off and landing air vehicles (eVTOLs) and hybrid electric aircraft with short take-off capability and landing (STOLs) are promising modes of mobility. Their promotion deserves special importance in Germany, as they will close a gap in the need for seamless transport options.

First positive steps to strengthen the position of Urban & Regional Air Mobility (UAM/RAM) taken by politics and ministries have become apparent. With the federal government's action plan and the emergence of smaller, well-tailored funding initiatives, as well as the increasing search for coordination with industry, the first signs have been set. However, these activities are still quite fragmented. For this reason, this topic deserves higher strategic attention.

As technology representatives we, therefore, request politics to:

- 1. recognize eVTOLs/STOLs as a strategic technology of the future,**
- 2. protect the investment climate and to support the supply industry,**
- 3. expand funding programs and make them more flexible,**
- 4. intensify investment in UAM infrastructure,**
- 5. accelerate planning and approval procedures,**
- 6. exempt non-fossil flights from air transport tax,**
- 7. strengthen societal acceptance.**



CityAirbus ©Photostrie - Die Bildermanufaktur



The Lilium Jet ©Lilium

DETAILED ARGUMENTATION

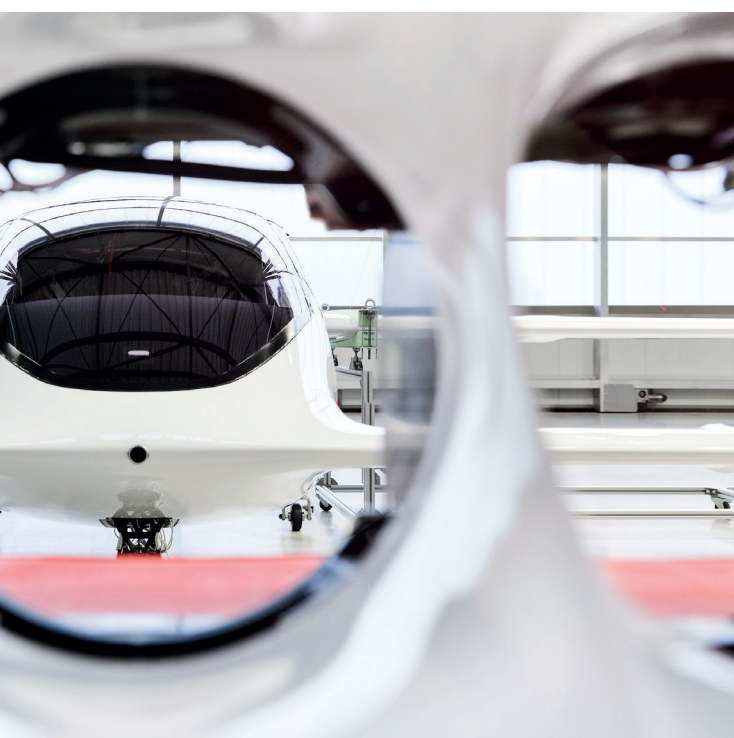
1. Recognize eVTOLs/STOLs as the strategic technology of the future

As in traditional aviation, in the field of Urban & Regional Air Mobility (UAM/RAM) “Made in Germany” stands for inventiveness, precision and quality. In contrast to e.g. digitalization, German industry is a global technological pioneer in the field of electric vertical take-off aircraft thanks to its high density of expertise. By incorporating digital, data-driven business models, the aim is to defend this position. Only if Germany moves forward now, affordable, societally accepted and sustainable individual mobility in the air can be implemented.

Against the backdrop of the European Green Deal, revolutionary, climate-neutral propulsion systems in aviation play a decisive role. Especially in terms of CO₂ and noise emissions, the ecological footprint of eVTOLs and STOLs is smaller in comparison to previous engine generations common in air traffic.

Over the last decades, the worldwide passenger volume has steadily been growing in all major modes of transport. For several years now, the demand for direct point-to-point connections has increased notably, and the desire for individualized mobility has increased. The COVID-19 pandemic has even reinforced this tendency. By 2050, two-thirds of the population will live in cities, thus further increasing the pressure on the mobility infrastructure and the environmental impact of the transport sector, which accounts for almost a quarter of Europe’s greenhouse gas emissions. Moreover, it is the only sector, in which emissions have risen continuously in absolute terms over the last 30 years. Thus, the transport sector will play a decisive role in achieving the ambitious goal of climate neutrality by 2050 in line with the European Green Deal.


Currently, the eVTOL and STOL industries develop rapidly. eVTOLs offer completely new opportunities for fast, plannable, CO₂-free and congestion-free transport connections. What is more, prices are comparable to today’s cab tariffs. For that reason, eVTOL operators consider themselves not as competition to public transport, but rather a sustainable supplement to the existing mobility system, enabling citizens to travel seamlessly and in a climate-friendly manner. The expansion of roads and railways generates costs in the billions and requires decades of planning and construction. With the creation of vertiports for eVTOLs, which could be built at public transport hubs as well as decentralized at local airfields for STOLs, a completely new mode of mobility will be created - and this at a low percentage of the cost incurred by classical infrastructure projects.



eVTOLs are electrically powered and offer a major advantage compared to traditional aviation that uses fossil fuels, which despite significant efficiency gains is burdened by high emissions from kerosene consumption.

Like electric vehicles, eVTOLs’ greenhouse gas emissions mainly stem from battery production and the use of electrical energy while in operation. At present, the basis for this still is the average EU electricity mix, which, however, contains a steadily increasing share of renewable energies.

However, eVTOLs in operation should undercut electric vehicles in terms of greenhouse gas emissions in the future: In comparison to electric vehicles, an eVTOL’s energy consumption is four to six times higher and the life cycle of its battery will be shorter. Yet, private cars have an average load of only one and a half passengers and an annual mileage that corresponds to approximately two per cent of the expected annual flight kilometers of eVTOLs.



In addition, the direct, optimized routing in airspace also results in possible efficiency gains of about 20 per cent compared to the road-bound car. Moreover, the use of pure green energy in eVTOLs' production and operation will further improve the environmental balance and thus pave the way to "green flying".

Not to be neglected is the fact that this new technology will create thousands of new jobs in the development of the vehicle and the corresponding ecosystem (software, platforms etc.) as well as in the fields of operations, maintenance and repair.

German policy is expected to recognize Urban & Regional Air Mobility as a vital field of strategic technological leadership and to promote it accordingly. The development of new UAM/RAM concepts, e.g. in the field of electrical propulsion concepts, is an important intermediate step in technology development and will also boost the further development of climate-neutral engines of larger aircraft in the medium term.

2. Protect the investment climate and support the supply industry

The German eVTOL and STOL manufacturers that only recently have entered the market have raised capital in several financing rounds, which originates from globally active investors and, in particular, also from investment companies of German groups. Consequently, large parts of this financing will continuously be invested in German companies along the supply chain for the production of individual components. With a weakening of the investment climate in new technologies in the wake of the COVID-19 pandemic, there is a risk of increased dependence on foreign investors and a redirection of investments to foreign suppliers.

The investment climate could be protected by certain measures, which would provide vital support, e.g. active promotion of this future sector through targeted (equity) investments by the German government and European institutions or special promotion of private investment, for example by opening up KfW-Bank's "Corona Matching Facility" (CMF) also to start-ups with strategic investors.

The German aerospace supply industry has gained recognition for decades and is a fundamental component of technological sovereignty in Europe. The emerging market around Urban & Regional Air Mobility is creating a new sales market for German suppliers, first examples of successful co-operations bear proof of this. Particularly, against the background of the business slump triggered by the COVID-19 pandemic and even more competitive markets, this diversification of the product portfolio would spark new sales opportunities in the future, thus, creating and maintaining promising jobs in Germany.

3. Expand funding programs and make them more flexible

Especially, after the sharp decline in economic output because of the COVID-19 pandemic, economic policy voices are also calling for more attention to future technologies after the crisis. In its recently published economic stimulus package, the German government has set the first priorities in this respect, for example in the field of battery technology (2.5 billion euro) or in the overall hydrogen strategy (7 billion euro). Existing federal funding lines, such as the aviation research program or mFund, already gave important impetus to research and development in the field of eVTOL/STOL at an early stage.

In spite of mostly solid financing by private capital, future eVTOL/STOL manufacturers and operators expect no sales at present, as they are still in the development and approval phase. Therefore, also national promotion programs are suitable, in order to strengthen the German technology leadership in both ranges - fixed-wing aircraft and multi-copter.

Public-private research collaborations, such as the one between the U.S. National Aeronautics and Space Administration (NASA) and the private space company SpaceX, are common practice in the United States. Recently, considerable financial resources of the US military have also been flowing into R&D projects of the national eVTOL industry. When it comes to fostering space initiatives, also Germany has already taken appropriate steps to encourage the further development of technologies

through governmental contract research. This tested and proven method to strengthen technological leadership should be expanded to include the UAM/RAM sector too.

It is particularly vital that existing funding lines should inspire the formation of viable consortia, including among others young start-ups, and support knowledge transfer between the German aviation research community and industry aiming at strengthening Germany's competitiveness on the global market.

A great challenge, also in view of the permanent technological change, is especially the determined development and airborne validation and certification of energy storage systems for UAM and RAM. Separate public funding of these technologies, which are also important to other industries, is a key component that will be able to provide a particularly sustainable impetus for the aviation industry in Germany as a whole.

4. Intensify investment in UAM infrastructure

A functioning infrastructure, undoubtedly, is a core element not only to develop high technology, but also to put it into operation. There is a strong recommendation for greater advancement in a UAM system solution through the further development and financial support of first vertiports (small take-off and landing sites for eVTOL aircraft) and test-fields, such as real laboratories or drone centers. They provide the needed environment to bring these new technologies to product maturity and approval - often in direct interaction with the development of the corresponding regulatory systems. The National Test Center for Unmanned Aerial Systems in Cochstedt or the German UAM model regions are existing vital components of a test field network. They care for coordinating and bundling of test capabilities as well as the opportunity to exchange within the network.



VoloCity ©Volocopter

The respective state aviation authorities are responsible for the approval of landing fields. Until the publication of new regulations for eVTOL airfields by EASA, the existing General Administrative Regulation for the approval of the construction and operation of helicopter airfields (“AVV Helicopter”) in connection with § 6 of the Air Traffic Act (LuftVG) are considered to be the starting point. Moreover, some special features of eVTOL aircraft must be encountered (quieter approach, smaller area dimensions, higher maneuverability, etc.). This is due to a largely similar behavior of helicopters and eVTOLs in approach and departure. The German government has also positioned itself in this sense in its recently published action plan “Unmanned Aerial Systems and Innovative Aviation Concepts”.

5. Accelerate planning and approval procedures

On several occasions, most recently in the action plan “Unmanned Aerial Systems and Innovative Aviation Concepts”, the German government has expressed its strong interest in fully commercial passenger operations during the first phase of market entry. This presupposes that the approval procedures for the construction of corresponding landing sites will start at short notice, followed by a rapid subsequent implementation.

There have been repeated calls in the political arena for a fundamental modernization of the participation, planning and approval processes. Core elements should be in particular the consistent digitalization and streamlining of processes, early integration of cities and regions as well as the information and participation of citizens. In view of the strong global competition on the market launch of commercial eVTOL flights, this would be most welcome.

Furthermore, procedures and airspace structures for flying in the airspace close to the ground are supposed to be created. To this end, the relevant authorities and organizations, in particular the Federal Supervisory Authority for Air Navigation Services (BAF), German Air Traffic Control (DFS) and the state aviation authorities, are expected to set-up relevant capacities to ensure that concrete projects can be implemented as quickly as possible.



Silent Air Taxi ©e.SAT GmbH

6. Exempt non-fossil flights from air traffic tax

According to the current legislation, commercial passenger operations with new types of aircraft based on non-fossil propulsion systems are subject to air traffic tax. This is the case, although the explanatory memorandum to the law clearly states that the air traffic tax is supposed to have a steering effect on fossil-fueled flights. Passenger flights using aircraft whose operation does not use fossil fuels should, therefore, be exempt from air traffic tax. The revenues from the air traffic tax should rather be used to promote non-fossil propulsion systems as well as renewable electricity and fuels in aviation.

7. Strengthen societal acceptance

With the introduction of new technologies and services around Urban & Regional Air Mobility, public acceptance deserves special attention. There might be such things as “citizens’ offices”, where exhibitions, lectures and discussions on Urban & Regional Air Mobility can take place to raise awareness. This is where the public may hands-on experience “showcases for new technologies” or flight demonstrations, eVTOLs and their applications. The German model cities and regions of the European UAM Initiative - Aachen, Hamburg, Ingolstadt and Northern Hesse - can serve as real laboratories here. In addition, the involvement of local research institutions and universities is recommendable to launch accompanying surveys that analyze public perception and influencing factors, e.g. noise and CO₂ emissions. In this context, the advantages of electric flying and the associated more environmentally friendly mode of transportation should specifically be highlighted. In order to strengthen acceptance, the societal benefits of technically safe and reliable Urban Air Mobility should be showcased in a visible and tangible way: especially in the field of air rescue (EMS) and medical care, the aim of which is to improve rescue and supply chains. UAVs, as small and unmanned automated aircraft, could help to understand the benefits of Urban Air Mobility and dispel fears among the population, by using them for professional applications and in the public interest.



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