POSITION PAPER

Unmanned Aircraft Systems

Proposals for a regulatory framework and standards
for the further development of unmanned aircraft systems

A. Background: Unmanned aircraft systems are changing the world

The future of air traffic is networked and increasingly automated. Rapid progress in digitalisation and automation are changing the requirements for the existing air traffic system. In the future, airspace will be used by both manned and unmanned aircraft systems (UAS). The rapid development of UAS – known to the general public as drones – is a technological quantum leap that will profoundly change the commercial use of our airspace. The most promising commercial applications of UAS are manifold and lead to the development of new business fields across all industries. They provide a macroeconomic impetus for the creation of new jobs in the service sector and in the high-tech sector.

Binding legal and structural frameworks must be created in order to realise this substantial economic value-creation potential. The pressure for national and European policymakers to act arises primarily in the areas of legislation and the application of law, as well as in the establishment of standards for the licensing and integration of drones into the airspace. A large number of structural questions in dealing with this completely new technology can be answered in a joint effort between the public sector and representatives of the private sector. Aside from social acceptance, the basic prerequisites for the future development of the drone market are above all the sustainable and safe integration of drones into air traffic.

1. Applications of unmanned aircraft systems

The economically reasonable development of a civilian, commercial drone market depends on the possibility of operating UAS economically, simply and safely in our airspace in the future, in which the requirements of unmanned and manned aviation must be taken into account. If this possibility exists, there are numerous commercial use cases. These include the following uses, among others:

- In the *aviation industry*, drones can be used at airports, for example for site and construction surveys, inspections of take-off, landing and taxiing areas, securing the area (monitoring of fences) and aircraft maintenance.

- In *agriculture*, the use of drones allows areas to be managed more individually and more precisely, which leads to increased yields.

- In the *energy sector*, the use of drones in the inspection of high-voltage power lines, wind turbines and other infrastructures reduces the risks for maintenance personnel and minimises downtimes.

- In the *logistics industry*, services and efficiency can be improved through the use of drones.

- In the *construction industry*, mining and geology, the use of drones allows precise geographic data to be collected, which serve as a basis for volume calculations, stockpile measurements, and documentation of construction sites, terrain and in open pit mines.

- Many governmental tasks can also be performed more efficiently through the use of drones in *traffic management*, environmental protection, the monitoring of maritime traffic and border control.

- In the area of *development cooperation*, drone technology can ensure the logistical supply to crisis and earthquake areas, protect nature and wildlife reserves from deforestation and poaching as well as ensure better provision of a mobile network infrastructure in structurally weak areas.

- In the *insurance industry*, drones can be used for quick and efficient damage assessment after accidents and natural disasters, generating valuable data for the processing of claims.

In civil protection, unmanned aircraft systems are also increasingly being used to fulfil sovereign tasks. Authorities and organisations with security tasks use drones to better assess hazards and prepare logistics support.

2.   Ensuring operational safety

Air traffic safety requires compliance with operational and technical safety standards in order to avoid personal injuries and property damages. With the rapid spread of drones and their increasing commercial use, the integrity of persons and property in the air and on the ground must therefore be ensured.

In particular, risks to the safety of civil manned aviation must be identified and preempted at an early stage. To this end, technical solutions (including a UAS traffic management system, UTM) and a harmonised, binding set of rules within the European framework are indispensable. The safe coexistence of manned and unmanned aviation is the primary objective. The efficient integration of UAS traffic is pursued at the European level by the EU Commission's U-Space concept.

In order to avert adverse effects on safety, industry and research are developing new methods for collision avoidance and the resolution of critical flight situations.

3.   Protection against the misuse of drones

Aviation security measures provide protection against the dangers arising from the misuse of UAS.

German manufacturers of drone technology and the German aviation industry are therefore preparing for various threat scenarios and are developing highly engineered solutions that include the detection and monitoring of drones and defence against them.

4.   German technological competence

With its declared goal of innovation and technology leadership, Germany can play a leading role in Europe as a pioneer in the high-tech field of unmanned systems and play a decisive role in shaping the further market development.

German manufacturers of unmanned aircraft systems, their suppliers and the aviation industry are already investing heavily in research and development for high-performance drones and their integration into airspace.

This commitment has made a decisive contribution to the achievement of German competence in drone

technology. Today, Germany is a leader in the development of high-performance flight control systems, autonomous mission control, "sense and avoid" mechanisms and UTM solutions. Germany can contribute technical solutions, know-how and corresponding data transmission services (satellite communication) to the operation of drones beyond the visual line of sight.

New business models and their operational application of UAS, especially beyond the visual line of sight, are the central objective. Acceptance of this can only be achieved in the political-public sphere if one can prove that the systems can be operated safely and in an environmentally sustainable way. In principle, test areas offer adequate possibilities for commercial testing. To this end, these areas must allow the infrastructure for operational use as well as the infrastructure for application technology to be tested under real conditions of later use. In particular, the testing of flights beyond the visual line of sight is necessary.

As a technology of the future, unmanned aviation should be part of a broad research strategy and play an important role. Active promotion of demonstrator projects would significantly support both the development of new UAS technologies and their commercialisation.

The growth market for drones is global. In order to secure Germany's innovation leadership, the possibilities for export must be developed in a dialogue between legislators and industry.

B. The proposals: Setting the right course by establishing a regulatory framework and standards

The VERBAND UNBEMANNTE LUFTFAHRT (engl. German Unmanned Aviation Association) supports the current efforts at the national, European and international levels to create standards for the production and certification of UAS and to come up with comprehensive legislation for the integration of UAS into airspace. This increases legal certainty for commercial developers and operators. In particular, the commercial operation of UAS must be possible over wide areas in the future. A decisive factor for this is the prevention of personal injury and property damage. In concrete terms, we demand the following:

- *Technology promotion:* UAS technologies are key industrial technologies of strategic importance. What is needed to maintain and promote them is to give them an appropriate status within the framework of the Luftfahrtforschungsprogramm (national aviation research program) as well as a targeted industrial policy and export support.

- *Legal framework:* In addition to the technical possibilities that have been developed, and in order to exploit the full macroeconomic market and utilisation potential, a clear and forward-looking legal framework is crucial for drones. Such a framework must be discussed and introduced primarily at the European level. The European Aviation Safety Agency (EASA) has a decisive role to play here. Germany must take an active role in these discussions in order to make a decisive contribution to shaping norms and standards and to support the preservation of national competencies. To ensure safety and prevent misuse, the competent authorities must be urgently provided with the human and technical resources that are required to meet the needs.

- *Take-off permissions:* The existing procedures that regulate applications for and approval of take-off permissionsin the respective German federal states must be simplified and harmonised. In general, take-off permissions for unmanned aircraft systems issued in one federal state should be recognised throughout the whole of Germany. In the medium term, both the general conditions governing applications take-off permissions and the approval thereof must be harmonised at the European level.

- *Integration:* The integration of UAS into the air traffic system is a central challenge. In pursuing an integrated technical and regulatory approach, further development of the existing air-traffic management system must be expedited in a timely manner. The safe and fair integration of drones into uncontrolled and controlled airspace therefore requires clear regulation of the responsibilities and procedures of the competent authorities. Achieving this goal will require several efforts:

  - Drones must be *registered* in a central registry that includes identity verification under state supervision. To hold the owner accountable and liable, one must ensure that the device and its owner can be traced. To this end, all drones with a take-off weight of more than 250 g and their owners should be subject to registration.

  - Clear *certification requirements* for the drone throughout the product cycle up to disposal must be established. In particular, small drones that are purchased at retail outlets or via the internet and operated for recreational purposes must demonstrate a minimum level of safety. Basic requirements should be defined as a standard and be tested and confirmed by manufacturers.

  - Commercial drones are generally used responsibly. Nevertheless, recreational drone pilots must be *made aware* that there are regulations that everyone must adhere to. Such awareness would be created if the customer was handed an obligatory *instruction* by the dealer when purchasing drones for sport and recreational purposes in order to inform him orher about applicable regulations and risks.

  - In order to reach a level of acceptance in the political-public sphere, the safe operation of drones must be proven. For this reason, practical *test areas* should be set up on which unmanned aircraft systems can be easily tested and integrated into the airspace in order to prove, among other things, compliance with operational requirements for certification. Significant importance should be attached to *research* in the field of unmanned aviation.

  - Drones inside a controlled airspace must be identifiable by air traffic control authorities and other air carriers or aircraft. In the vicinity of airports, electronic identification of the drones (e.g. by transponders or other signalling technology recognisable by air traffic control) should be mandatory and asserted in certain geographical regions. In addition, new flight restriction mechanisms (e.g. geo-fencing) should be further developed. Drones that are used in uncontrolled airspace could be made *detectable* by means of an electronic chip. We recommend that airports and national air traffic control service providers establish common intervention thresholds and measures in the event of disruptions, as all types of

re-routing and temporary closures are usually at the expense of manned aviation and incur considerable costs.

- All drone operators should be required to demonstrate basic aeronautical skills and sufficient safety awareness. If a drone application exceeds a certain risk potential to be defined, drone pilots should receive professional instruction prior to commissioning. The instructors should be authorised persons, and the drone pilot must subsequently prove to be sufficiently *qualified* in theory and practice, after which the pilot receives a certificate attesting to his/her skills. Violations should be sanctioned by fines and penalties and should also result in the loss of the licence. In addition to a "drone licence", there should also be a regulatory framework for instructors and training companies.

- *Protective measures:* Clear rules and responsibilities are needed to avert dangers. Therefore, rules on procedures for safe defence against drones should be established, including the definition of reporting channels in the event of violations of laws and regulations. The misuse of UAS and criminally relevant intrusion into critical airspaces, for example for spying and espionage, smuggling or terrorist purposes, is another aspect that needs to be redefined from a legal point of view. In order to enable criminal prosecution in the event a UAS is misused, the localisation of the pilot is also an important aspect in addition to the localisation of the unmanned aerial vehicle.

- Airport operators are involved in the approval of flights at the airport. In future, this must also apply to *drone flights at airport grounds*. A standard scenario for such flights should be developed at the European level.

The VERBAND UNBEMANNTE LUFTFAHRT (engl. German Unmanned Aviation Association) is ready to provide active support.

Contact

Verband Unbemannte Luftfahrt
- German Unmanned Aviation Association -

– Haus der Luftfahrt –
Friedrichstraße 79
D-10117 Berlin
Germany

Your contact persons:

Mr Robert Friebe
friebe@verband-unbemannte-luftfahrt.de

Mr Marian Kortas
kortas@verband-unbemannte-luftfahrt.de

The VERBAND UNBEMANNTE LUFTFAHRT was founded as a joint initiative of the Bundesverband der Deutschen Luftverkehrswirtschaft e.V. (German Aviation Association – BDL) and the Bundesverband der Deutschen Luft- und Raumfahrtindustrie e.V (German Aerospace Industries Association – BDLI). As the VERBAND UNBEMANNTE LUFTFAHRT, we are committed to the interests of German industries in the field of unmanned aircraft systems and the German aviation industry. Together, we are pushing for the development of the commercial drone market and the safe integration of drones into our airspace. We strongly believe that the increasing use of these innovative future technologies will have a positive effect on industrial value creation and economic growth in Germany and Europe.