

Position Paper

Civil Drones

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A. Background

The commercial as well as the private operation of so-called "drones" has been steadily increasing for years. Drones are quite enticing with their versatile deployment possibilities, their simple handling compared to other conventional model aircraft and due to their relatively low price – at least in the private sector.

1. Economic Benefits

The commercial use of drones has already opened up a world of possibilities, carrying out tasks in various areas more efficiently and safely. Discussions on possible future applications have been developing more dynamically than ever before: in addition to military use of drones, there are possibilities of use in civilian areas such as agriculture, disaster control, logistics, research, media, environmental protection, homeland security or monitoring, inspection and also including surveying of critical infrastructures. The aviation industry also sees advantages in the use of drones, for example, in the visual inspection of aircraft, security fences, movement areas and many others.

2. Safety and Security

The illegal use of drones, meaning without ascent permission in the Terminal Control Area (TCA) and especially in the approach and departure areas, leads to impairment of the air transport process. For example, approaches between passenger aircraft and drones were reported on 7 December 2014 in London and on 20 July 2015 in Warsaw. Some similar events have also been recorded at various German airports around the country in 2014 and 2015, all of which are criminal offenses to air traffic. Transportable drones question the effectiveness of security border or of the security inspections carried out. Even if, in the known cases, no targeted attacks on air traffic were triggered, this still cannot be excluded. Thus, a drone without a permit carries a risk to aviation safety and security, in particular near airports and in controlled airspace.

B. Regulation of Civil Drone Use in Germany

1. Current Law

In Germany there are already regulations for the usage of drones. The problem is that users are often unaware of any rules for the use of drones. BMVI and DFS have created info brochures for this purpose:

https://www.dfs.de/dfs_homepage/de/Services/Luftsport%20&%20Freizeit/Flugmodelle%20|%20%22Drohnen%22/.

With particular focus concerning drone operations around airports:

- a) The use of drones is prohibited within a distance of 1.5 km from the airport fence. However, the Länder (state) aviation authority may permit the approval for industrial use.

- b) In addition, there is a controlled airspace around international airports - the so-called controlled traffic region. Each manned or unmanned aeronautical vehicle requires the release of the air traffic control to fly in the controlled traffic region.

In the case of infringements, the police have the task of locating the illegal operators and supplying them to the judiciary or to initiate administrative offenses.

2. Planned New Regulations

In order to make both the economic potential of this new technology usable and to provide a high degree of safety between manned and unmanned aeronautical vehicle, (new) regulations for the operation of drones are currently being worked on at not only the international (ICAO) and European (EU Commission, EASA) levels, but at a national level (BMVI) as well.

2.1. National Level

On 8 November 2015, the BMVI (Federal Ministry of Transport and Digital Infrastructure) informed the public for the first time about the content of the new regulations for the use of civil drones.

- a) Commercial and private use: Drones 0.5 kg and up shall be subject to label in the future in order to be able to identify the user in the case of misuse or accidents.
- b) Commercial use: To enhance opportunities for use in agriculture or traffic monitoring, the scope of application should be extended. In the future, Länder (state) aviation authorities will be able to permit flights outside the visibility of the user; however, only if it can be proven to be operated in a safe manner. Until now, the operation is generally prohibited outside the visual range. There will be a user's license for commercial use of drones. Knowledge of aviation and aviation regulations must be demonstrated in a test. The license is issued by the LBA (Federal Aviation Office).
- c) Private use: To avoid dangers in airspace or to prevent injuries to persons on the ground, the private use of drones needs to be re-regulated. Private drone flights shall be prohibited at an altitude of more than 100 meters, beyond the visibility of the controller, over industrial installations, above prisons and military installations, prohibited around large crowds, disasters or disaster areas and places of deployment of police or other security authorities or organizations, and near facilities in the energy production and distribution sector as well as federal roadways and railway lines.

According to the BMVI, the following regulations LuftVZO, LuftVO, and LuftKostV are affected. The drafts for their revisions are currently being consolidated.

2.2. European Level

On 7 December 2015, the EU Commission presented its strategy for air transport (the so-called "aviation package"). It is intended to ensure the safe operation of drones. This is based on the so-called "risk-based approach". The safety requirements are to determine the size of a drone, in which airspace does it move and how it is deployed. The amendment proposed by the EU Commission to the so-called "basic regulation", Regulation (EC) 216/2008, must be dealt with as a legislative proposal in the European Parliament and Council.

Thus, the above-mentioned German push for regulation can be quickly overtaken, and or added to, in some parts by the introduction of a regulatory framework for the operation of drones within Europe. The EU Commission has assigned the EASA to draw up appropriate proposals. The commentary on the proposals (A-NPA 2015-10) was completed on 29 September 2015. After analyzing the comments, the EASA published on 18 December 2015 the "Technical Opinion *Introduction of a regulatory framework for the operation of unmanned aircraft*":

<http://easa.europa.eu/system/files/dfu/Introduction%20of%20a%20regulatory%20framework%20for%20the%20operation%20of%20unmanned%20aircraft.pdf>.

It recommends basic principles for an EU-wide regulation for drones, building regulations, flight ban zones, competences of drone pilots and much more.

Based on the Technical Opinion and even if the Regulation (EC) 216/2008 does not yet cover a European competence on drones, the EASA has already developed a "'Prototype' Commission Regulation on Unmanned Aircraft Operations", which was published on 22 August 2016:

<https://www.easa.europa.eu/system/files/dfu/UAS%20Prototype%20Regulation%20final.pdf>.

2.3. International Level

A panel at the ICAO is currently developing standards and recommendations in the field of airworthiness, operation, and certification of operators and licensing of pilots, which are to be adopted by the Council in 2018. Standards and recommendations that are later brought forth or eluded are to follow in 2020. The ICAO's previous publications provide information on all aspects related to the topic of drones, and are a good way to deal with technical and operational issues, such as integration into airspace and airports:

- Cir 328 *Unmanned Aircraft Systems (UAS)*, 2011
- Doc 10019 *Manual on Remotely Piloted Aircraft Systems (RPAS)*, First edition 2015.

C. Demands of the German Air Transport Industry

The German air transport industry welcomes efforts to create uniform rules for the operation of drones on an international, European and national level. The operation of drones offers a potential for growth and job creation. It is therefore all the more important to identify and limit risks to the safety of civilian manned aviation.

There are numerous areas where drones are being operated in, many of which should be given special attention to, e.g. data protection, violation of privacy, disruption of rescue operations, transport of dangerous payloads, flying above critical infrastructure, smuggling, prevention of illegally operated drones, etc. The German air transport industry sees a potential in the use of drones, which is mainly used for commercial purposes. It is also important to ensure a safe handling of this technology. The objective of future regulations must therefore be that manned and unmanned aeronautical vehicles have a secure coexistence. Hence the following points are of particular importance for the German air transport industry:

- a) Legislation: In the interest to maximum harmonization, the current legislative activities should be closely coordinated at the global, European and national levels.
The draft regulation at national level is to be strictly based on the content of the EASA Technical Opinion. All national activities must be compatible with the expected European rules. Since the operators of civil aviation are directly affected by the use of the same airspace and the risks of the operation of drones, they should be involved in all relevant legal procedures and institutions, including the "European RPAS Steering Group", as well as in the development of an action plan for the standardization of drones.
- b) Registration and Certification Obligation: Registration of drones in a state central register (with address verification) is required. In order to enable the device and its pilot to be tracked, or for the allocation of responsibility and liability, all drones should be subject to registration. In addition to registration, a marking similar to model airplanes over 5 kg can be carried out with a fire-resistant plaque with name and address or in conjunction with a registration number / insurance number / insurance sticker or in another appropriate manner. In the USA a registration requirement was introduced as of 21 December 2015. Such an obligation to register according to the example of the USA should also be pursued.
Furthermore, certification requirements are required for the drone along the product cycle to disposal. Small drones, in particular, which are marketed in the retail trade or on the internet, and which are acquired and operated by hobby pilots for recreational purposes, have to meet a minimum of requirements, so that they guarantee safety as a product per se and also through their use by laymen. Safety features should cover, for example, flight characteristics, performance, kinetic energy, behavior during loss of connection, etc. These essential requirements should be defined (e.g. in standards) and examined and confirmed by manufacturers / possibly importers (see CE marking).
- c) Obligation to give way: Since small drones fly within sight of their user, and since manned aircraft cannot detect these drones in time to avoid collision, it is necessary that these drones be subject to a basic duty of obligation to give way to manned aircraft.

- d) Identifiable in Airspace: For recognizability and traceability by aviation authorities and aircraft operators, drones placed above 30 m should be equipped with a transponder in a controlled airspace. In the airport area, a transponder obligation for certain geographic regions should be identified and asserted. In the case of drones that are used in uncontrolled airspace, the recognizability should be possible via electronic chips or SIM cards.
- e) Improved Visibility: In order to give pilots of manned aircraft a chance to detect drones, all drones operated should be equipped with a flashing anti-collision light (identification light with a prescribed, clearly identifiable and assignable luminous frequency and color). The radar detectability of drones in the TCA must be ensured, e.g. by transponder obligation.
- f) Safety Information: Mandatory leaflets should be introduced which inform the user of the rights, duties and risks involved in the operation of drones, including the obligation to provide information on existing airspace structures. The sale of drones should only be carried out in the certified specialist trade. In addition, the registration of the licensed controller should be done with its drone, e.g. on an online platform.
- g) Operation only within visual range of the controller: It must be ensured that the use of drones for private purposes is only allowed within the visual range of the controller (without the use of technical equipment such as binoculars, on-board cameras, night vision equipment). In the TCA, this should initially also apply to commercial uses, as long as an adequate level of technical and operational safety requirements is not ensured. For flights outside the visual range of the drone user, it is generally necessary to have more stringent requirements on the operation of drones and the operators.
- h) Spatial Operating Restrictions: The operation of drones without special permission takes place in Germany at a distance of at least 1.5 km from the fence of an airfield. In view of the fact that other national regulations and projects envisage unauthorized drones at a greater distance from airfields, the basis for the current requirement should be verified. Otherwise, a greater distance would be logical (5 km according to the EASA Technical Opinion). Electromagnetic interference of the air traffic control infrastructure due to the operation of drones must be excluded. For commercial purposes, ascent permits should also be possible within the current spatial limit of 1.5 km from the fence of an airfield, all while maintaining necessary operational, technological, company and pilot-related safety precautions.
- i) Ascent Permission: The ascent of drones above 30 m outside of model aircraft fields over densely populated areas shall only be permitted with ascent permission. The authorities need to report the drone ascent permission within the TCA. The airport operator and the air navigation service must give their consent before granting the authorization to ascend in the controlled traffic region. This consent may be subject to operational requirements. The costs are borne by the drone operator.

- j) Risk Assessment and Approval: All drones with a maximum takeoff mass of 1 kg or more, or are flying at an altitude of 20 m or higher, should be the subject of a formal risk assessment and an approval procedure.
- k) Qualification of Drone Pilots: From a risk potential point of view of drone applications, drone users should receive instruction / theoretical training before operating a drone. This is to be carried out only by authorized persons and the drone user must demonstrate a sufficient qualification in both theory and practice. They then receive a certificate of approval and completion. The administrative authority for drone licensing should be the Länder (state) aviation authorities; similar to the responsibility of the PPL (private pilot license). Proof of sufficient qualification must be renewed every 10 years. Every three years, knowledge must be refreshed to obtain validity of the certification. Infringements of the relevant regulation should be punishable by fines and penalties and may also result in the loss of the authorization to use drones. Fundamental aviation knowledge and adequate safety awareness should be prescribed and demonstrated to all drone operators; this means practical training, testing, basic aviation know-how, safety management, human factors, etc.). In addition to a “drone pilot license” there also needs to be regulations concerning trainers and training companies.
- l) Reliability Test: Users of larger drones should be checked for their reliability according to the Aviation Security Act before using them. Furthermore, it is to be verified whether this is also necessary for the operation of many small drones in a swarm.
- m) Insurance: A risk-adequate insurance obligation should supplement the legal framework for the use of drones.
- n) Costs: As usual for civilian airspace users, operators of drones also should bear the costs of their authorization, supervision and administration as well as the additional costs resulting from the sharing of the airspace (User Pays Principle).
- o) Protective Measures: Clear rules and competences are required to prevent hazards. Rules on procedures for the safe defense from drones should be laid down, including the establishment of the reporting rules in the case of violations of air operation regulations (LuftVO) and other laws and regulations.

D. Further Information

Information on Measures taken against the Illegal Use of Drones:

There are current technologies in development for defense against drones, however, at a very early market stage. The following methods are being focused on:

- a) Jamming (interference of radio frequency, GPS modules, remote control, sensors or motors)
- b) Procedures for manipulating the GPS-defined course
- c) Procedures for the "capture" of micro drones with nets or parachutes deployed by means of rebound drones or with trained birds of prey
- d) Destruction of the drone by shooting with conventional firearms or so-called net guns.

Examples of recent development:

- a) The BKA is leading an EU working group that is part of the "European Network for the Protection of Public Figures" (ENPPF). The aim is the development of procedures for the detection and defense of micro drones. A procedure for the "jamming" of radio control systems has already been tested with the Landeszentrale (regional authority) for police services in North Rhine-Westphalia. The BKA is also interested in procedures for the so-called "controlled forced landing".
- b) Mobile apps can be used to plan stationary flights with drones, for example. You will receive a statement on how to fly there at any selected location in Germany.
- c) Since the last year, the drone manufacturer DJI has been installing a so-called "geofencing" system in all of its drones sold in the USA, with which the drone constantly detects its position by GPS and automatically evades closed air spaces. This equipment is to become compulsory in the USA.
- d) In connection to this, the responsibility for the interception of drones, including liability issues connected with the possible destruction of a drone, needs to be clarified.

Note on the Terminology of "drones":

The term "drone" originated from the unmanned military aviation and is not only used in the media today, but also in the external communication of the EU Commission and EASA, concerning unmanned commercial aviation as well as private civil aviation. In the international context, e.g. ICAO, the term "Remotely Piloted Aircraft Systems" (RPAS) was defined. The terms UAS ("Unmanned Aircraft Systems") or "flight model" are technically correct in Germany. If the use of the device is for the purpose of sport or recreation, the regulations on flight models apply. If, on the other hand, the usage is connected to another use, in particular a commercial purpose, it is an UAS which consists of the aircraft, the ground control station and the data-link.

Contact

Bundesverband der Deutschen Luftverkehrswirtschaft e. V. (BDL) / *German Aviation Association*
Marian S. Kortas | Leiter Flugbetrieb, Technik & Safety / *Head of Operations, Engineering & Safety*

– Haus der Luftfahrt –
Friedrichstraße 79, 10117 Berlin

E-Mail: Marian.Kortas@bdl.aero

Telephone: +49 30 520077-170

The German Aviation Association (BDL) was founded in 2010 as a joint representation of the interests of the German air transport industry. Members of the association are airlines, airports, German air traffic control and aviation service providers. These companies employ more than 180,000 employees. Air transport in Germany enables mobility for more than 200 million passengers a year and contributes to the transport of goods worth more than EUR 200 billion to strengthen the business location Germany.