7TH FLORENCE AIR FORUM

"REGULATING DRONES CREATING EUROPEAN REGULATION THAT IS SMART AND PROPORTIONATE"

A SUMMARY OF THE PRESENTATIONS

Florence, 18th September 2015

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■ PROGRAMME

08.30 – 08.40 Introduction
Matthias Finger | Director of FSR-Transport, EUI and of the Chair of Management of Network Industries, EPFL

08.40 – 09.00 Regulating drones and the EU aviation strategy
Jean-Jacques Woeldgen | European Commission

09.00 – 10.30 How to ensure a light-handed but effective regulatory approach that is able to keep up with evolving technology?
Dieter Bambauer | Swiss Post
Francis Schubert | Skyguide
Sjoerd van Dijk | Ministry of Infrastructure and the Environment (NL)

10.30 – 10.45 COFFEE BREAK

10.45 – 12.30 Where can drones fly and where not? Which rules of the air, which air traffic control procedures?
Maria DiPasquantonio | FAA
Iacopo Prissinotti | ENAV
Luc Lallouette | Thales Air Systems

12.30 – 13.30 LUNCH BREAK

13.30 – 15.15 Enforcement – can new rules for drones help to enforce existing regulation on privacy and security on the national and local level?
Luc Tytgat | EASA
Richard Thummel | DSAC
Sjoerd van Dijk
Oliver Pulcher | DFS

15.15 – 15.30 COFFEE BREAK

15.30 – 16.50 Concluding Session - The way forward
Philippe Merlo | Eurocontrol
Olaf Dlugi | ICB
Christian Schleifer-Heingärtner | Eurocae
Jean-Jacques Woeldgen | European Commission

16.50 – 17.00 Final remarks
Matthias Finger

The present document summarises the content of the presentations delivered during the 7th Florence Air Forum. The following paragraphs offer short summaries of each presentation, illustrating the main points made. The thoughts and opinions reported do not necessarily reflect the views of the contributors, as they have been collected by the authors of this Summary.

You can download pdf versions of the presentations on the website of the 7th Florence Air Forum. Presentations are hosted on the FSR website with permission of the authors.

Introduction to the 7th Florence Air Forum

Prof. Matthias Finger, Director of FSR-Transport and of the chair of Management of Network Industries (MIR), École Polytechnique Fédérale Lausanne (EPFL)

In his introduction to the 7th Florence Air Forum, Prof. Finger presented the Florence School of Regulation and the European University Institute. The Transport Area of FSR has the goal of growing as a platform for open discussion among stakeholder who want to take part in the ongoing debates about the current and emerging regulatory challenges in the transport sector.

Prof Finger presented the structure of the day and the main elements to be discussed.

The recent yet rapid proliferation of civil drones poses new challenges for aviation regulation. There is a need for regulation of drones yet this has to:

- take into account the different types of drones, reflecting their different types of uses (inspection, surveillance, transport, etc.);
- be proportionate to the risks that these different types of drones pose;
- define clearly what the regulatory objectives are (safety, security, privacy, others?).

Furthermore the problem of implementation needs to be addressed especially at the local level.

Prof. Finger recalled the proposals for drone regulation that were put forward in the Riga Declaration. On the basis of this this Forum aims to address three questions in particular:

- How to ensure a light-handed but effective regulatory approach that is able to keep up with evolving technology?
- Where can drones fly and where not? Which rules of the air, which air traffic control procedures?
- Enforcement – can new rules for drones help to enforce existing regulation on privacy and security on the national and local level?

Regulating Drones. The EU Vision for a drone services market

Jean-Jacques Woeldgen, Principal Administrator, DG MOVE, European Commission

In his introduction Mr Woeldgen outlined the Commission's view and the current state of play in the regulation of drones.

Some Member States have begun to tackle the emerging drone segment. Currently all unmanned aircraft below 150 kg are excluded from Regulation 216/2008 (laying down the basic EU safety rules and establishing EASA). So far 12 Member States have taken the initiative to adopt regulations for these types of aircraft, yet in the majority of Member States such regulation is still absent. This situation creates a patchwork of rules that is highly undesirable for operators and manufacturers that want to apply their devices across borders. There is an urgent need to act and come up with common rules. The approach of the Riga declaration should be taken further, and the work of EASA in the field should be intensified.

It has to be recognized that the market for drones is rapidly developing. This development is taking place also in absence of regulation. As a consequence, incidents are starting to occur that are highly relevant for aviation safety. At this point there is not yet an official publication on drone accidents and safety relevant incidents in Europe. However, a list that was published by the FAA on occurrences in the USA shows that the numbers are increasing. Europe needs to develop an appropriate and coherent reporting mechanism on drone incidents.

Next to this safety aspect the other main motivation behind the urgent need for regulation of drones is related to the Commission's overall goals and the aviation strategy. The aviation strategy is scheduled to be proposed by the end of the year 2015 and will include drone rules as an element that can provide significant growth in the aviation sector thus contributing to the Commission's overarching goal of creating jobs and growth.

The Commission will put forward a proposal amending Regulation 216/2008 that may include the extension of the scope to all drones, regardless of weight. The regulation of drones will be guided by what has been put forward by EASA, namely the distinction between three categories of drones, an open category (low risk), a specific category (medium risk), and a certified category (high risk). There will not be a centralized process in the regulation of drones and the authorization of operations will remain on the national level.

In addition, the Commission will adopt implementing rules defining the more detailed substantial technical requirements on the basis of an opinion delivered by EASA, which in turn takes into considerations the deliverables produced by JARUS, a body which represents the national civil aviation authorities around the globe. Also, in parallel industry has to develop the standards describing the technical solutions for meeting the regulatory requirements. Focusing on the principles of necessity and proportionality there will also be a stronger focus on regulatory impact assessments.

As part of the reform of Regulation 216/2008, EASA will turn the prescriptive rules into more risk

based rulemaking. In addition, Agency decisions (Acceptable Means of Compliance, Guidance Material etc.), which are binding rules in practice, should be substituted wherever possible by references to industry standards. This, in turn, will increase the burden of standardization bodies, which will also need to improve their coordination.

Finally, Mr Woeldgen noticed the importance of relationships with third countries; as the emerging drone market is a truly global one, there is a strong need to work in the international community to establishing global standards – cf. Reliance on JARUS work.

Application of Drone Technology in Postal Logistics. Benefits & Regulatory Prerequisites

Dr. Dieter Bambauer, Member of Swiss Post Executive Management, CEO of PostLogistics

At the 7th Florence Air Forum Mr Bambauer provided an insight on why and how Swiss Post is taking into consideration the possibility to apply the drone technology to their regular business.

At the beginning of his presentation, Mr Bambauer presented Swiss Post, the main postal organization in Switzerland with 75-80% market share for postal business on the entire supply chain. To respond to new customer needs and to cope with market developments generated by e-commerce, nowadays Swiss Post offers online and offline solutions. However, innovation will not stop: similarly to what happened in other sectors, new technologies and actors entering the logistics sector will soon have a disruptive effect on the system. This, Mr Bambauer stated clearly, is simply a matter of time and regulation cannot stop it. Namely, the physical delivery of parcels will never stop, however the traditional business model that generates profits out of this activity is already challenged by players from outside the sector (such as Google, Amazon, eBay, Alibaba) that combine their core competencies with logistics services and do not need to achieve any profits from their logistics operations. To face these new competitors, postal operators have to come up with new solutions, and drone technology is one of these, especially when it comes to very dedicated transportation solutions.

In partnership with Swiss WorldCargo (the cargo department of Swiss Airlines) and a small California-based startup in the drone business, SwissPost is currently testing the drone technology for their operation. The outcome of the first tests conducted in July 2015 in Seeland region, where flights went up to 9.5km, was very successful, namely with no incidents and no drone crashes. The second test phase that will be characterized by more difficult parameters such as higher mountains and drones sent up in higher altitude will start in autumn 2015. In terms of compliance with existing rules, Mr Bambauer recalled some of the current regulatory restrictions that had to be respected also in this testing phase, such as early announcement for the planned region to the Federal Office for Civil Aviation (FOCA), no fly zone above an area with a population density over 5p/ha, vehicle certification by the FOCA. Based on their testing, Swiss Post's expectations from regulation and rules on drones: first of all, it is fundamental to agree on a dedicated corridor and altitude layer for commercial, autonomous, drone flights (for example 70-100 meters above ground level); secondly, each drone has to communicate its position to a centralized information system, and everybody (FOCA, Air Force, civilian air navigation service, drone operators, rescue services) has to have access to the information system; thirdly, to be realistic and meet possible business requirements, there is the need to define technical and organizational prerequisites to pass areas with a population density beyond 5 p/ha.

To conclude, Mr Bambauer recognized that for Swiss Post there is currently no big business case behind the use of drones. However, this is seen as a means to innovate, and research in this direction will continue. The focus will be on uses in special situations or for transporting special items. A realistic timeline to meet the same standards of quality that have always characterized Swiss Post would be between 5 and 10 years.

How to ensure a light-handed but effective regulatory approach that is able to keep up with evolving technology?

Sjoerd van Dijk, Head Aviation Safety Division, Ministry of Infrastructure and the Environment

Mr van Dijk presented some considerations from the view of the Dutch government. For the incoming Dutch Council presidency developing a regulatory framework for drones is a priority. It is, however, also important to look at what could jeopardize the success of the process. In fact on this point Mr van Dijk objected to the optimistic notion that by the end of 2016 all important rules would be in place. There are in fact some controversial aspects over which conflict may arise:

The role of the European Parliament.

EASA wants to extend the Basic Regulation to all drones (namely also to those below 150 kg). This would put EASA in charge of a large scope of decisions which would then be made only by EASA or the Commission. Mr van Dijk recalled the debates in the European Parliament (EP) about the flight time directive: the EP had disagreed in many points and felt excluded from the process. A similar behavior should be expected when it comes to drone regulation: Members of the European Parliament (MEP) will not easily agree to delegating sensitive issues to EASA. In fact the EP will look very closely how the important distinction between big and small drones will be made. MEPs will also look at privacy issues very closely and also the airline sector will bring forwards several concerns through the EP. For instance allowing rather heavy drones in the open category will not be acceptable for many important actors.

Drone operators are not part of the aviation community.

Another consideration is that the aviation community needs to become aware that the drone sector is to a large part not an element of aviation. In fact many drone users would not consider their activity as aviation but rather as a hobby or recreational activity. Among this community of drone users there is no primary focus on safety and there is no such thing as a "reporting culture" that is taken for granted in the aviation sector. For instance the idea to oblige drone operators to issue NOTAMs is not realistic looking at the extent of small drone operations. Furthermore instead of focussing on the airspace one should rather look at the safety risks on the ground: for instance cars being distracted by passing drones.

Could useful drone operations end up being banned if only traditional stakeholders are consulted?

Finally Mr van Dijk presented some considerations from the Dutch national experience. The Netherlands is one of the Member States that has created regulation for medium sized drones: in short there needs to be an operator who has to describe the nature of his operation to an authority and has to prove that he is capable of carrying it out in a safe way. If this can be guaranteed operations may even be carried out in Controlled Airspace (e.g. Airports). Air Traffic Control stakeholders however want to principally forbid any drone operations near airports. But this is not appropriate if operations can be carried out in a safe way and would bring benefits. For example there is a project on bird control over airports using "artificial hawks"; also, KLM wants to inspect their airplanes using drones on airports.

Another example for rules proposed by the aviation community that may not be the best option for drones is pilots advocating the distinction between recreational and professional use – this is something well established in civil aviation yet it doesn't necessarily have to be the right approach for drones.

Discussions with the European Parliament will be very important – in light of the described issues the process may be more difficult than currently expected.

Application of Drone Technology in Postal Logistics Benefits & Regulatory Prerequisites

Francis Schubert, Skyguide

Mr Schubert focused his presentation on the ANSP perspective on the regulation of the drone sector. The importance of it is illustrated by the rapidly increasing number of drones and drone applications. From a general perspective drones will clearly become "the next big thing in aviation", and regulators currently seem to be to some extent overwhelmed by the rapid development of the sector.

Mr Schubert pointed out two positive elements of the current situation: firstly, there is a unique chance to do get regulation right from the start as rules to a large extent will be designed from scratch. Secondly, EASA has already picked up a sensible approach by introducing the three categories of drones in their proposal.

The current regulatory situation for aviation safety is already overly complex both in terms of the scope of regulation and operational requirements. Therefore an additional layer of regulation is hardly thinkable. Instead the issue of drones needs to be dealt with in an evolutionary way in which drones are slowly integrated into the system of air navigation - as technology becomes available. Importantly for ANSPs this is a technological issue rather than a regulatory one.

When seen in the context of the proposed three categories by EASA the "open category" will pose least problems for ANS practices, except for a few low flying helicopters. In a first step, the safety of drones operations will be achieved by the means of airspace segregation and pilot based separation, and as a second step in a fully automated way.

In the certified category drones need to be treated to the furthest extent possible like normal aircraft both in terms of equipment and processes. Yet several specific complications need to be addressed: new types of devices will pose specific challenges, such as devices that will fly at extremely slow speeds and remain in the air for very long time. Another technological issue to be overcome will be how to deal with a possible failure of c2 link, which would render the drone uncontrollable from the ground.

Mr Schubert then warned against the temptation to export practices from the existing ANS system to create the new framework for drones. The reverse approach should be followed. The open sector offers the opportunity to design and validate methods than cannot be tested in the airspace open to civil aviation. These methods can be imported back into the legacy ANS system in order to improve its performance.

The drones sector offers new business opportunities for ANSPs, but not through the replication of classical ANS processes. They are to be found namely in the validation of integration models and the deployment and management of an infrastructure based on technical services.

In conclusion, Mr Schubert stressed that there is a unique opportunity to make it right from the beginning. From an ANSP this is not about regulation but about technology as the systems that would allow the integration of drones into the air navigation system still need to develop.

FAA Unmanned Aircraft Systems

Maria A. Di Pasquantonio, FAA
Senior Air Traffic International Rep
Brussels, Belgium

At the 7th Florence Air Forum Ms Di Pasquantonio presented the FAA perspective on Unmanned Aircraft Systems (UAS). To begin with, she highlighted some of the differences in terminology: the terminology mostly used by the FAA still refers to UAS, yet this is changing towards the most widely used ICAO definition of Remotely Piloted Aircraft Systems (RPAS), while also the word drones is used as in the context of this conference.

To answer the questions on where drones can fly and where not, and which rules of the air and which ATC procedures should apply, Ms Di Pasquantonio stated that there cannot be one single answer, as this depends on the type of UAS operations. Namely, the answers are different depending on which category of operations is referred to: public (governmental) operations are different from civil (non-governmental) operations and from model aircraft (hobby or recreational purposes, which are covered under a separate set of rules in the US).

Focusing on the civil pieces and the small UAS, Ms Di Pasquantonio presented two aspects of FAA activities.

First of all, as part of the Agency's regulatory function, she presented some details of the proposed Small UAS Rule that was published last February. FAA expects to have a final decision on the rule within the next year. It refers to non-recreational vehicles of less than 25kg, which have to comply with the following major provisions: vehicles are for daylight operations only; they must discontinue flight when they present a hazard to other aircraft, people or property; they must be capable of responding to risks resulting from weather conditions, airspace restrictions and location of people, given that they may not fly over people (except those directly involved with the operation). Flights are limited to 154.2m (500 feet) altitude and 160.93km/h (100mph) speed; they must avoid airport flight paths and restricted airspace areas and obey any FAA Temporary Flight Restrictions (TFRs).

Along with this, from the operations' side, FAA has a number of operator certifications and responsibilities, which can be summarized as follows: RPAS' pilots must be at least 17 years old and they have to pass an initial aeronautical knowledge test and recurrent tests every two years; they have to be vetted by and successfully complete a security threat assessment; their aircraft has to be registered, marked and pass a preflight inspection; pilots have to obtain a FAA unmanned aircraft operator certificate with a UAS rating; upon request by FAA, they must make the UAS available for inspection or testing; they have to report an accident that resulted in injury or property damage to FAA within 10 days of any operation. Until the rule becomes effective, FAA instituted a process to streamline the process and guarantee exemptions to users.

FAA invested a lot is education and outreach with the aim of addressing the issue of high numbers of people with no aviation background entering the field. Ms Di Pasquantonio presented several examples where FAA partnered with industry associations to raise awareness. Among others, FAA promoted "Know Before You Fly" (www.knowbeforeyoufly.org), a campaign to

educate the public about their responsibilities when operating a drone. Also, FAA started a "No Drone Zone Campaign" (www.faa.gov/uas/no_drone_zone), different types of logos and slogans to educate about federal rules prohibiting aircraft from operating in the Flight Restricted Zone.

To conclude, Ms Di Pasquantonio underlined the high importance FAA dedicates to R&D: the FAA Center of Excellence (COE) team led by Mississippi State University has 15 universities under its umbrella and is expected to begin research by September 2015 and be fully operational by January 2016. The focus of the COE is on research, education and training in areas critical to safe and successful integration of UAS into the national airspace system.

Where can drones can fly and where not? Which rules of the air, which air traffic control procedures?

Cristiano Baldoni, ENAV
International Strategies,
SESAR Unit

Mr Cristiano Baldoni presented to the Forum the position of ENAV, the Italian Air Navigation Service Provider, on the current situation of drone regulation. ENAV is strongly motivated to support the advent of drones, provided that there will be no compromise for the safety of all other airspace users.

ENAV's primary task is to contribute to the efficiency of the national transport system guaranteeing the safety and regularity of circulation within the Italian airspace. With regard to this, Mr Baldoni stressed that ENAV has an institutional mandate to guarantee access to the Italian airspace to all categories of users, provided that they comply with the applicable rules. In particular, ENAV is designated for the provision of air navigation services from ground (GND) to unlimited (ULM) in the Italian airspace. In light of this, it makes no sense to distinguish between lower and higher space. Of course the level and the kind of services provided to different airspace categories are different.

Mr Baldoni focused his presentation on two relevant themes: 1) the integration of "big drones" (or RPAS) that are interacting with ATM; 2) the control of the exponential growth of "small drones" which operate mainly in the lower airspace (the so called uncontrolled airspace). With regard to this distinction, Mr Baldoni stressed that, while the first theme is considered in the European ATM R&D Agenda (SESAR), this is not the case of the second.

As far as the RPAS integration in ATM is concerned, in March 2015 ICAO published the first edition of the RPAS Manual, with the purpose to provide some definition on the RPAS categories and guidance on technical and operational issues applicable to the integration of RPAS in non-segregated airspace and at aerodromes. The tendency is to "mandate" RPAS to comply with minimum CNS equipment requirements that are normally used for other aircrafts. From the ATCO (Air Traffic Controller) point of view, ideally it should be completely transparent whether ATC interactions are conducted with a piloted aircraft, a remotely piloted aircraft or an autonomous aircraft. ENAV is involved with a primary role in EU funded demonstration activities, and its R&D goals in this sense are: first of all, to accommodate RPAS with minimum impact on technologies and on-going investments as ENAV does not want to make the users redesign their technologies within the next 5-10 years; also, minimum impact on ATCOs workload is targeted; then ENAV is keen on having no impact on overall safety records and minimum application of special procedures, which would negatively affect the regularity of the traffic flow; on the other hand, ENAV understands the needs of RPAS and aims at building an environment where RPAS have to bear a minimum impact in terms of ATM related airborne equipment in order to comply with the safety standards and security measures.

Mr Baldoni then turned to the small drones' issue, praising EASA, which recently published a Concept of Operations for drones, introducing a risk based approach to regulation of unmanned

aircraft. Mr Baldoni stressed that each State is currently developing rules at national level, and these rules are not always using the same approach. Currently, national regulations are putting two limitations to drones: first, the constraint to maintain the drone under direct observation/control by the operator (within line of sight); and second the fact that there has to be a pilot operating the drone. However, this goes against most of the business models that are envisaging the use of RPAS to offer new types of services: in order to exploit the full innovative potential of drones, current limitation have to be overcome eventually allowing fully autonomous beyond line of sight drone operations. The European R&D Agenda does not yet have a mandate to address this issue, yet in the US the problem has already been tackled: NASA has been mandated to coordinate Unmanned Aerial Vehicle Traffic Management (UTM) development. In ENAV's view, UTM is the key enabler to remove the current regulatory limitations, thus allowing the full exploitation of the new markets and services built upon an intensive use of (small) drones.

To conclude, Mr Baldoni stressed that the regulator should focus on the real business case, which is represented by small drones' traffic in the uncontrolled airspace. Therefore, a rapid development and deployment on an UTM service is urgent.

Where can drones fly and where not? Which rules of the air, which air traffic control procedures?

Luc Lallouette, Thales

Mr Lallouette started his presentation by stressing his key message that more money is needed, in particular through SESAR2020, to develop the technologies necessary to enable safe operation of RPAS in unsegregated airspace.

He presented considerations from the perspective of a manufacturer that is active in developing mainly bigger drones for military purposes. His observations are therefore more concerned with drones for industry applications and not very light weight drones for recreational use.

In general RPAS have to comply with the ICAO requirements for civil aviation. Yet while for normal aviation people on board the aircraft are the principle objective people on the ground become the main concern for RPAS.

The most important thing is to see that applying the rules of the air to drones has several repercussions. Most importantly integrating them in into the ATC system has a lot of technological consequences as they need to be enabled to operate as safely as manned aviation in the absence of an on board pilot. Currently such technology is not mature enough that drone operations could be considered normal operations form an ATC perspective. In the current situation only a few Member States allow civil commercial operations under certain requirements.

Turning to SESAR2020 he noted that a lot of work still needs to be done on the technical solutions most importantly airborne detect and avoidance systems. These systems need to become capable of replicating human pilots in their ability of detecting other objects that may cross their flight path and to carry out maneuverers to avoid them. Unfortunately available funds and the pace of the SESAR program are not proportionate to the level of ambition expressed towards the future development of the drone sector.

For collision avoidance systems the current validation activity is focussed on a system that builds on limited RFA (Radio Frequency Assembly) integration and would allow collision avoidance systems for cooperative traffic.

The next step and the focus of future validation activity will be to further develop this system to make it capable of dealing also with non-cooperative traffic.

Most attention needs to be paid to the Data Link system, which is the critical component of all RPAS. Required Communication Performance and operational and safety requirements need to be defined. In order to deal with contingency situations the systems needs to be able to replace decisions of a pilot also in the event of system failures. Emergency situations can occur in the event of a loss of data link, a degradation of the Detect and Avoid system or any other system failure.

Summing up Mr Lallouette pointed out that the timely availability of Detect and Avoidance technology that is crucial to support RPAS integration into non segregated airspace depends on standardization, regulation and certification. These processes need to be coordinated on a European and a global level including the standardization bodies and the regulatory authorities. Funding needs to become available to develop and validate the systems.

Future of drones for EASA

Luc Tytgat, Strategy and Safety Management Director, EASA

Mr Tytgat presented the current work of EASA on Drone regulation.

Having passed the 'idea phase' the Agency is currently carrying out a consultation process with all stakeholders the results of which are going to be included in the regulatory framework.

As drones are proliferating at an impressive pace there is need to address several important issues, most importantly clear definitions of what a drone is. Drawing up the regulatory framework for drones is a process EASA is not working on in isolation, and large parts of the responsibility will lay with national authorities. It has to be borne in mind that other EU policies apply and need to be integrated in the drone regulation: privacy of citizens, the internal market rule and industrial policy. The general question EASA needs to deal with is how to integrate "the new airspace users" into the existing aviation system. The novelty of this task for EASA is that it is now addressing "regular citizens" that are not aviation experts. The consultation was therefore also translated into several languages, which is not usual practice for EASA.

Mr Tytgat then laid out the approach EASA applied when drawing up the proposal. Three features define the approach: firstly, it is an operations cantered approach, secondly, it is a risk based approach, and thirdly, it is an approach that distinguishes between commercial and non-commercial application (in line with EASA basic regulation and the approach of the Chicago convention).

The risk based approach implies that first of all a categorization is needed to differentiate the ever increasing group of different types of devices and operations. EASA therefore proposed to distinguish three categories that are based on the risk entailed by each category:

- Low risk → open category
- Medium risk → specific category
- High risk → certified category

The risk will be determined according to safety reports carried out by the Member States.

Open category: EASA sees no need to involve aviation authorities in the regulation of the low risk category of drones as this would add a completely new task that has not been within their scope of activities before. It has to be ensured that the product can technically guarantee the requirements that are formulated: staying within line of sight and keeping distance to restricted airspace.

However "low" it is important that the risks posed by smaller drones are addressed: safety relevant features such as weight and range of the devices need to be taken into consideration when drawing up specific rules. EASA will recommend to local authorities to impose mandatory registration of drones in this category. Furthermore it will be suggested to forbid them from flying over groups of people bigger than 12. Drones also have to comply with the EU product safety

directive.

Specific Category: Operators need to be certified that they are capable of carrying out their operations in a safe way and have to undergo a risk assessment procedure. Member States will be principally in charge for this.

For this category there is a list of elements of which Member States need to make sure that they are verified: qualification of operators, maintenance procedures, oversight of suppliers and occurrence reporting.

Certified Category: Here a regulatory regime needs to be established that is equal to the one in place for civil aviation. Issues such as weight, missions and liabilities need to be addressed yet this can build on the existing legal basis for authorization and certification.

It was an important step that the EASA proposal was reflected in the Riga declaration. The Riga declaration saw the involvement of all important stakeholders from the emerging drone sector.

Enforcement – can new rules for drones help to enforce existing regulation on privacy and security on the national and local level?

Richard Thummel, DSAC

At the beginning of his presentation, Mr Thummel mentioned occurrences of the past year when unmanned aerial vehicles flying over French nuclear power plants and over Paris have been subject to considerable media attention.

Starting from this, he made some considerations on regulation and enforcement especially with regard to security.

First of all, drones imply risks. These risks can be of varying forms, such as damages to the image of the State and spying of facilities. Cases where drones came near public figures explain why major official events raise concerns about the risk of malevolent use of RPAS.

Secondly, people manoeuvring drones do often not know the rules of the air, and they cause false alarms. In fact large majority were "false alarms" caused by drone users with no malevolent intention (alarms were often caused by journalists, tourists or drone users not knowing the rules).

Thirdly, despite these examples, the risk cannot be underestimated. In the past few months there has been intense inter-ministerial work in France in order to draft reports and legislative proposals (risk assessment, legal framework and new measures) that will soon be sent to the Parliament.

As far as the situation in France is concerned, Mr Thummel recalled that a special dedicated police force (Gendarmerie des transports aériens - GTA) exists within the Home Ministry that is functionally connected with the Direction of Civilian Aviation of the Transportation Ministry. The GTA is in charge of all the enquiries on illegal flights and illegal use of drones. The GTA has already conducted more than 100 enquiries, which led to 2 prison sentences, several penalties often including drones confiscation and many formal reprimands.

Given these considerations, Mr Thummel brought forward some open issues related to drones regulation that are quite prominent in France:

- It is clear that regulation must address these risks and must therefore be strengthened. But is the ultimate objective of a more stringent regulatory framework always borne in mind by the regulator? And what is it? With regard to this, in their discussion with stakeholders, DSAC always insists on the need to have proportionate rules that take into consideration both costs and benefits. As barriers can be circumvented, it appears that the objective of the rule is not only to build a defence in depth but also to make people better aware of the rules and reduce false alarms. Recreational users might be especially targeted by such measures.
- Should CAA have to care with those aspects, and should safety and security be addressed separately? Is it EASA's role to include security issues in its proposed approach of regulatory framework for drones?

Whatever the answer, both aspects must be managed in a consistent way.

It would be meaningless to promote the development of drone operations on the one hand, and to strengthen the rules for security reasons, in a way that would hamper those efforts on the other hand. Besides, not to speak about real malevolent acts, deliberate violation of rules that prohibits flights near airports cause the same risks than unintended acts, and might be mitigated by same barriers.

- Can there be technological answers to safety and security? Should regulation in a highly

innovative sector be technology-based? Obviously, the answer is yes, but not exclusively. Design may help to reduce the "false alarms" rate, but, unlike the "privacy by design concept", a "security by design concept" would obviously not make sense in regard of the objective to prevent malevolent acts. Technologies like geo fencing have to be developed further to be a basis for secure drones; they are not yet mature and raise issues in terms of responsibility and data administration.

- Should security oriented rules be defined at national or EU level? As far as the technical requirements are concerned, there is for sure the need for common European standards. However, even if cooperation is needed the EU level does not have competences in security matters. Also, differences between national rules for instance on "no-drone-zones" might make the definition of too strict European rules inefficient.

Mr Thummel turned out to the question of enforcement of rules concerning drones and pointed out, based on the experience gained by the Gendarmerie de Transports Aériens, the importance of special training of police forces.

To conclude, he stressed the fact that drones' identification is a key issue. In this regard he considered the choice of standards, the definition of the category of drones concerned by electronic Id and more broadly the precise definition of an Open category as subjects to debate.

Rules and regulations for drones in Germany

Oliver Pulcher, Director of Corporate Development, DFS

At the 7th Florence Air Forum Mr Pulcher shared DFS' views on drones and regulation addressing two fundamental questions: firstly, what challenges about drones does DFS see? and secondly, what kind of regulatory framework is needed to face these challenges?

To begin with, Mr Pulcher recalled the famous quotes "I think there is a world market for maybe five computers" by Thomas Watson, founder and CEO of IBM in 1943, and "There is no reason anyone would want a computer in their home" by Ken Olsen, founder of Digital Equipment Corporation in 1977. Today we know that these managers were wrong, and new markets can develop in a way we did not imagine until they become reality. From DFS' point of view, this holds true for the emerging market of drones: on the streets, railways, water and in the air, new technologies in the form of unmanned aerial systems are going to revolutionize each mode of transport within the next couple of decades. On the one hand, drones will replace current machines and methodologies (to do inspections, survey, security, transport, and logistics), and on the other hand the use of drones will allow new activities.

As an aviation organization, DFS is facing special challenges not only because of the direct impact of drones on safety and security, but also because the drones are going to substitute activities that have always been done manually. Moreover, the German airspace is one of the busiest and most complex in the world with a very high number of descends, crossings, and landings every day. So the challenge pertains to how the new type of airspace users can be integrated within the existing system without restricting the performance of manned and unmanned flights. Currently DFS manages an airspace that is already regulated, yet with the integration of drones new areas of activity may be added in fields that are without service provision today (because they fly outside the regulated space).

After having illustrated the main challenges, Mr Pulcher addressed the question of what is needed in terms of regulatory or legal framework. The operation of drones raises new questions and demands to rethink a number of existing air transport related issues such as the air transport value chain, privacy and data protection issues, the risks related to the human factor, the management of critical incidents and the airspace management. Therefore, he stated that existing rules and regulations in Germany will have to be amended due to the rise of new technologies: existing rules are sufficient for now, but once the market will develop further a newly harmonised regulatory framework will be necessary. As for now, DFS has identified four different key activities: firstly, increasing public awareness; secondly, better understanding drone technology and the market, to develop new approaches switching DFS' traditional perspective from ATM system towards the business models of the new actors; thirdly, supporting the development of harmonised rules and regulations at all levels; and lastly, close cooperation with

national regulatory bodies.

To conclude, Mr Pulcher recalled the main aspects of DFS' proposal to the legislator: for large RPAS, such as cargo aircraft, the same procedures should be applied to both manned and unmanned aircraft: standardised emergency procedures need to be developed as well as right-of-way rules and avoidance procedures; mandatory registration for smaller unmanned aircraft systems and model aircraft; mandatory lighting; training for operators; mandatory transponder carriage (at least for certain categories).

The drone industry is very diverse with enormous potential of growth: bearing this in mind, a new regulatory framework (that continues where EASA already started) will be necessary.

Regulating Drones. Creating European Regulation that is smart and proportionate. The way forward.

Philippe Merlo, Eurocontrol

At the 7th Florence Air Forum Mr Philippe Merlo shared some ideas of Eurocontrol on the RPAS issue and looked into three dimensions where most urgent actions are needed: research and development (R&D), the economical dimension and the security dimension.

First of all, Mr Merlo praised the results of the regulatory work done on RPAS so far. In his view, the preliminary framework with the current categorization is very valuable and can be a basis for future work. However, regulation is not enough, and there is now the need to support it with stronger R&D work.

In particular, RPAS involve a safety issue for the ATM world that cannot be ignored: detailed safety cases for each specific operational situation involving RPAS are necessary. So, a robust roadmap on RPAS R&D is now necessary. The SESAR2020 programme is a unique opportunity for this and it should be ensured that the roadmap on RPAS R&D is well taken into account.

Mr Merlo pointed out that it is absolutely necessary to finalize the technical specifications soon. However, R&D is also necessary for operational issues: today there is still scepticism on the side of traditional airspace users towards the emergence of RPAS as they have a strong safety concern about the integration of RPAS in controlled airspace together with manned aircrafts. There is a real need to establish trust between the RPAS world and the other players of manned aviation, for example the air traffic controllers because, at the end of the day, safety is based on mutual trust. Mr Merlo conceded that the perception of the safety issue within the RPAS world is still far from that of the ATC, and they still have to increase their level of safety culture and awareness. RPAS R&D roadmap should help RPAS in doing so.

On the huge diversity of types of RPAS, Mr Merlo delivered a specific message "Don't forget big RPAS in controlled airspace". Despite the big excitement and attention on the RPAS in the open category, a strong request for governmental RPAS is emerging and this should not be forgotten as they will entail a significant economical challenge. As for the small RPAS in non-controlled airspace, Mr Merlo highlighted the need to catch up on UTM with what already exists in the US, and this should be another objective of the RPAS R&D roadmap.

Beside the R&D dimension, Mr Merlo looked into two other key dimensions for the future of RPAS: the economical dimension (and related new business opportunities) and the security dimension.

As for the economical side, Mr Merlo highlighted that the level of turnover behind the RPAS activity should be clarified as it could be an important indicator to help defining the access to airspace together or against other type of activities. Also one important question is: who is going to pay for the costs linked with RPAS integration in the Air Traffic Management system? For instance, the division of the costs for the maintenance and development of infrastructure should be addressed. Furthermore, insurance costs are an ever more important economical aspect that should be taken into consideration. Moreover, the issue of competition for the airspace should be analysed (some level of segregation might become necessary).

Finally, Mr Merlo presented the importance of the security dimension. In fact, the concern for security has the potential to slow down the RPAS development and therefore R&D should address it.

To conclude, Mr Merlo stated that a lot of crucial work still needs to be done for having RPAS fully integrated in the airspace.

Regulating Drones Creating European Regulation that is smart and proportionate

Olaf Dlugi, ICB, Chairman

Beginning his presentation Mr Dlugi stressed that the opinion of the ICB on Drone Regulation is still work in progress. Therefore his remarks were based exclusively on his personal considerations.

With the Riga Declaration the Drone Regulation has become a political topic. A recent press declaration by the European Regional Airline Association (ERA) has furthermore underlined that drones pose a significant threat to the airspace.

To illustrate the risk Mr Dlugi referred to an example of a helicopter firefighting mission in California in June this year that had to be interrupted for over a day because of unregistered flying objects in the closed airspace where the operation was carried out.

This is one example and the FAA published a report showing that 765 possible encounters by civil aviation with drones were reported in the past 9 months only.

Turning to the question of how to categorize drones Mr Dlugi stated that it could be a relatively straightforward task because ICAO is very clear on one thing: the introduction of drones does not change the existing distinction between model and regular aircraft. On the other hand the rules of the air apply to both manned and unmanned aircraft. Additionally ICAO requires its Member States to prosecute those that break these rules. Accordingly the legal frame for those aircraft falling under the ICAO aviation rules (operations, identification etc.) does not actually pose a problem. The real problem is connected to the recreational drone activities. These are, if at all, regulated by national rules that are not harmonized on a global level.

Mr Dlugi stressed that those insisting on the potential economic benefits of a prospering drone sector should not underestimate the risk created by "crowded skies".

Summing up what drone regulation needs to achieve Mr Dlugi stated that drones need a regulatory framework that will allow for safe, secure and environmentally friendly drone operations and at the same time respect the citizens' concerns about privacy and data protection.

The FAA has introduced categories for drones distinguishing between those for recreational and those for professional operation (public and civil). Europe, on the other hand, has introduced a different approach based on risk categories. Mr Dlugi's proposed to use the US categorisation and refine it with the risk assessment developed by EASA.

ICAO is itself also working on a regulatory approach, so called recommended practices. These however will not be presented before 2018. It has to be borne in mind by regulators that regulation may have to be updated at that point.

Turning to the safety issue Mr Dlugi expressed his support for the FAA "know before you fly" campaign. Taking this approach further it should be considered to introduce a mandatory training

for recreational drone users.

For professional users there is no doubt that operators need to be licensed as well as the pilots. Furthermore also the security screening should be an essential part given the potential thread by terrorists planning to use drones.

On data protection Mr Dlugi referred to the EU data protection supervisor who recommended introducing "privacy by design" for drones. This means that manufacturers will be called to consider privacy implications when designing their products.

Identification of drones should be easily feasible from a technical point of view without creating major additional costs. Identification will furthermore be an indispensable feature for insurance companies if they want to insure drones.

Commenting on the level of regulation Mr Dlugi noted that there should be a single rulemaking process in Europe carried out exclusively by EASA with strong stakeholder involvement. EASA should also be responsible for overall safety oversight in cooperation with national authorities.

EUROCAE standards for RPAS

Christian Schleifer-Heingärtner

Mr Schleifer-Heingärtner presented the working of EUROCAE (European Organisation for Civil Aviation Equipment) and illustrated the role of the standardization body in particular in the field of RPAS.

Mr Schleifer Heingärtner started his presentation by illustrating the working structure of EUROCAE.

It currently has 172 members including industry organisations, service providers (including ANSPs) and also EASA. 1400 experts are working in 33 active voluntary working groups on a range of topics. Initially EUROCAE was mostly active in avionics but moved into the field of ATM and airport systems later on. Currently there are working groups for instance on SWIM and security, fuel cells and on RPAS.

EUROCAE has a Governing structure, consisting of the President and an annual general assembly in which important strategic decisions are taken. Decisions are made by the Council advised by the Technical Advisory Committee TAC and supported by the General Secretariat which is also in charge of the daily management of the association.

Mr Schleifer-Heingärtner recalled that standardization bodies are currently called to play a stronger role. This is linked to the turn to performance based regulation both in Europe and on the global level. Standardization bodies are needed to support the framework created by performance based regulation.

EUROCAE is carrying out its work not in isolation but with strong links to other regional and international bodies. EUROCAE is an independent industry organisation that has links to regulators. The link to the regulator is however not as strong as in the case of its US counterpart organisation RTCA (Radio Technical Commission for Aeronautic). RTCA is linked directly to the US regulator (FAA) whereas in Europe EASA is one of the 172 EUROCAE members. The links with the ATM system in particular with SESAR are important because standardisation is needed for the deployment of the targeted technological innovations.

Turning to EUROCAE's work on drones Mr Schleifer-Heingärtner described the activities of two Working Groups currently addressing this topic: one is working on the standards required to integrate RPAS into all types of airspace. This group focuses on the "Beyond Visual Line of Sight - BVLOS" operations and is elaborating on airworthiness, certification, C3 (command, control, communication systems) and Detect and Avoid (DAA) systems. The other works on "Visual Line of Sight - VLOS" operations which are usually carried out by light drones (hence the name of the group). Furthermore there are other working group activities related to drones, such as those on ACAS Xu, a collision avoidance system for RPAS and its interoperability with existing Collision Avoidance Systems.

On the international level EURCAE is recognized as an international organization and is

represented as a member in the ICAO RPAS Panel. It uses this seat to connect the European development with the international level.

In his final remarks Mr Schleifer-Heingärtner illustrated the importance of standardization bodies by presenting lessons learned from past innovations. A comparable situation was faced by the international community with the introduction of helicopters. As a result of an isolated regulatory approach by the helicopter community a different term for an already existing technical device (the artificial horizon) was introduced and is still being used today creating problems for legal consistency. Another lesson was learned when dealing with the challenge of certifying software which started to become ubiquitous in aviation from the 1980s onwards. Seeing the rapid pace of software development EUROCAE decided to switch from the usual product certification to a process certification.

FSR-Transport: Events 2015

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Date	Title
6 February 2015	FSR-Conference: Smart Cities, Smart Regulation?
23 February 2015	Executive Seminar: Aviation Safety
9 March 2015	3rd Florence Intermodal Forum
18 May 2015	10th Florence Rail Forum: Rail Freight in Europe: How to Improve Capacity and Usage of the Network?
12 June 2015	4th Annual Conference on the Regulation of Infrastructures
18 September 2015	7th Florence Air Forum: Regulating Drones
27 November 2015	11th Florence Rail Forum: Digital Single European Railway Area: how do we get there?

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