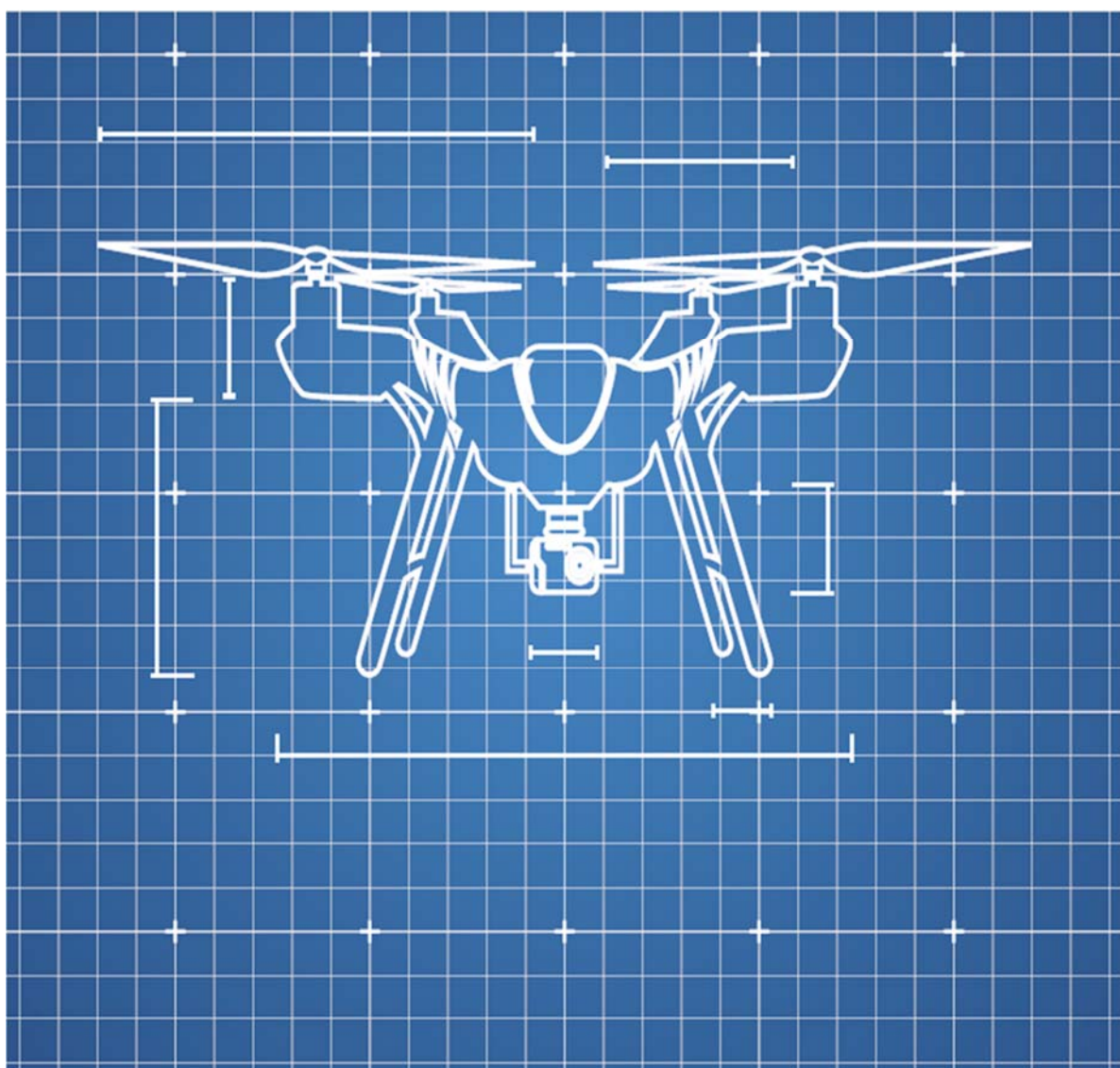# Report of Drone Symposium

## Hibernia Conference Centre, Dublin Castle

## 30 May 2019



An Roinn Iompair,
Turasóireachta agus Spóirt
Department of Transport,
Tourism and Sport

IAA

**Introduction**

This is a report of the key points raised at the Drone Symposium held in the Hibernia Conference Centre, in Dublin Castle, on the 30th May 2019.

The purpose of the symposium was to provide stakeholders with a forum to discuss the growing market and opportunities for the use of drones in Ireland, how the drone market will be regulated in light of new EU level rules on drone operation and the challenges in ensuring that safety, security, environment and privacy issues are effectively addressed.

New common European rules on drones, Commission Delegated Regulation (EU) 2019/945 and Commission Implementing Regulation (EU) 2019/947 were published on 11 June 2019. The rules will help to protect the safety and the privacy of EU citizens while enabling the free circulation of drones and a level playing field within the European Union.

The new European legislation, which has been developed over the past 2 years, is intended to further enhance the safety of drone operations and will introduce a standard approach across Europe to registered drones and their users.

The symposium was divided into 4 thematic sessions.

Session 1, explored the current vision and ideas of how drones can be used in our society.

Session 2 outlined the new European Regulatory structure for drones, highlighting key concepts and differences with existing national rules.

Session 3 explored how existing airspace can be protected against airspace infringement by drones, approaches taken to date and strategies to ensure the safety of airspace.

Session 4 explored how drone usage must be managed in a manner that ensures the safety, security, environmental and privacy obligations to the public.

A synopsis of the presentations given and organisations in attendance at the symposium is set out in the Appendix and presentations can be accessed here [insert link].

The following is a summary of views arising through discussions among the participants at the symposium and do not represent Department policy.

**Key messages from the symposium**

**Session 1** discussed the future of drones. The key points from session 1 included:

- The cost of regulatory compliance and insurance for drone operators is relatively restrictive and may encourage illegal drone operations.
- There is a need for a simplified integrated regulatory system that addresses the issue of multiple permissions and the use of air space.
- In order for the drone industry in Ireland to reach its potential it is essential we figure out how to provide an operator compliance solution at a relative inexpensive cost.
- A balance has to be sought between totally safe drone operation at a major cost versus risk assessment and affordability.
- The slow pace of legislation and enforcement is a risk to new drone businesses.
- There is a need for robust enforcement to prevent the illegal operation of drones, including the possible delegation of responsibilities to delegated entities.
- The establishment of U-Space[1] in Ireland is vital. The availability of airspace, particularly lower airspace is a problem that needs to be solved in order to facilitate the development of U-Space in Ireland.

**Session 2** outlined the new European Regulatory structure for drones being introduced with new common European rules on drones, Commission Delegated Regulation (EU) 2019/945 and Commission Implementing Regulation (EU) 2019/947.

- The new regulations will mean amendment to our current national system of regulating drones.
- Operators of drones over 250g[2] will be required to register as an operator with the IAA.
- Operational restrictions will be defined.
- Model aircraft clubs will be regulated.

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[1] U-Space is an EU concept for a system that connects all drones flying in the air and that makes all drones visible for authorities and citizens. It is a digital system entailing a set of automated functions, services and procedures to keep drone operations safe, secure and green.

[2] Art 14(5)(a) of Regulation (EU) 2019/247 requires registration when operating within the 'open' category any of the following unmanned aircraft:

    i.     with a MTOM of 250 g or more, or, which in the case of an impact can transfer to a human kinetic energy above 80 Joules;

    ii.     that is equipped with a sensor able to capture personal data, unless it complies with Directive 2009/48/EC.

- The EU Commission has set objectives to ensure the free movement of goods within the market, high safety standards for consumers and the protection of the environment.
- Existing regulation and processes are being adopted for the smaller drone products, such as Toys Safety - Directive 2009/48/EC, Electromagnetic Competency - Directive 2004/180/CE and Machinery - Directive 2006/42/EC.
- A notifying authority, which will be designated by the Member States, will notify the Commission concerning Conformity Assessment Bodies who will undertake a conformity assessment before the drone can be placed on the market.

**Session 3** revolved around the theme of the risks drones pose to manned aviation and counter-drone technologies[3] that exist to prevent any threats posed. Key points from session 3 included:

- The ease of accessibility to drone technologies creates the biggest risk to aviation.
- The importance of differentiating between a safety event and a security threat by a drone.
- Counter-drone technology is lagging behind drone development. The drone industry is developing so fast that in a sense regulators and legislators are only 'catching up'.
- At present there is no magic bullet in relation to a technological counter drone measure.
- The cost of many of the technological counter drone measures is prohibitive for many airports.
- Airport counter drone strategies should not just involve technology, but should include staff training and interaction with the public and the media.
- Airport management needs to be proactive in promoting safe drone operations in the vicinity of airports. Airport managers should use tools such as occurrence reporting to identify troublesome areas in the vicinity of the airport and then get local Gardaí to work in the community.

**Session 4** focused on public engagement with and perception of drones.

- A societal acceptance of manned aviation already exists; to develop similar levels of support for drones, communication with the general public is key.
- Education of the general public in relation to the regulation and use of drones is key. An informed public can report misuse of drones and reduce the misuse of drones.

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[3] Also referred to as Counter Unmanned Aircraft Systems (C-UAS).

- Untrained operators can have a negative impact on the societal perception of drones, for example when the privacy of the public is not respected by drones filming footage while flying over private residences.
- Drone operators should only collect the minimum amount of personal data that is required to carry out the operation/service.
- Drone operators should carry out Data Protection Impact Assessments (DPIA) for all of their operations.
- Counter-Unmanned Aircraft System (C-UAS) can have a major impact on normal operations at airports, therefore the main objective should be to locate the operator of the drone.
- A list of proposed U-Space services has been developed that includes the tracking and identifying of drones which would facilitate being able to target the drone operator rather than employing the use of C-UAS.
- The proposed U-Space services aim to also make longer distance drone operations possible, for example to enable deliveries. As drone use becomes a more mainstream part of day to day life, society will likely become more and more accepting of them.
- There is a need for increased enforcement, education, and easier to decipher regulations.

# Appendix

## Synopsis of presentations

Symposium presentations can be accessed here [insert link].

**Moderator: Ms Jess Kelly, Newstalk's Technology Correspondent**

**Session 1: Setting the Scene: A future with Drones**

Panellists:
- Ms Julie Garland – Vice-Chair of the Unmanned Aircraft Association of Ireland
- Mr Bobby Healy – CEO, Manna
- Dr Tim McCarthy – Lead of U-Flyte Project, Maynooth University
- Mr Kevin Houston – Technical Officer, Civil Defence
- Mr Steve Flynn - Founder & CEO, Skytango

### Ms Julie Garland – UAAI
Julie Garland provided a brief outline of the establishment of the Unmanned Aircraft Association of Ireland (UAAI) in 2015. UAAI represents stakeholders who promote the positive impact that drones can bring to everyday life. She discussed the limitations of the current legislation but said that Specific Operating Permissions do allow deviations. She highlighted the need for an integrated system including the use of the airspace and the need to address the issue of multiple permissions, each with a cost. The high cost of operation is encouraging illegal operations. She also highlighted the need for robust enforcement and possible delegation of responsibilities to delegated entities.

### Mr Bobby Healy – Manna
Bobby Healy set up Manna, a start-up company that is proposing to use autonomous drones to deliver food. Bobby initially approached the IAA two years ago in relation to regulatory approval for his drone operation. Risks to this new business opportunity include the pace of legislation and enforcement, as well as concerns about job loss, privacy, wildlife and the environment, and safety. While the environmental footprint of food delivery by drone is expected to be less than traditional delivery methods, the wider environmental impact of this drone operation must be considered. Bobby gave the example of the challenge of operating drones in an environmentally responsible way in a Tallaght which is home to 6 protected species of bats.

Safety concerns are easier to address, as the drone design has multiple redundancies. The sole competitor to Manna, Google Alphabet which is currently live in Australia and will be going live in Helsinki next month, use a very noisy drone whereas Manna's drone will be invisible and inaudible at cruise speed. A recent PWC report stated that 1.9% of the UK GDP will be linked to drones by 2030. This will put greater pressure on infrastructure, including regulatory oversight.

### Dr Tim McCarthy – Maynooth University
Tim McCarthy spoke of his project, U-Flyte which is a partnership between Maynooth University and Airbus and is supported by the IAA. The objective of the project is to research innovative solutions for drone operations and applications, including U-

Space. U-Space is an EU concept for a system that connects all drones flying in the air and that makes all drones visible for authorities and citizens. It is a digital system entailing a set of automated functions, services and procedures to keep drone operations safe, secure and green. It is a 4 dimensional real-time problem that needs to be addressed with Artificial Intelligence. The crux of the problem is the availability of airspace in Ireland, particularly lower airspace. He stressed the need to figure out how to open up drone corridors, suggesting that possibly we could use wind farms. He also suggested that a drone cargo air bridge between the UK and Ireland could be created. In relation to BVLOS (beyond the visual line of sight of the operator) drone flights, he stated that Ireland should already have test corridors at this stage.

### Kevin Houston – Civil Defence
The Civil Defence started using drones in 2013 for the primary function of searching for missing people, coastal searches, forest fire situational awareness and route reconnaissance post severe weather event. The Civil Defence has 60 – 70 trained pilots. Challenges faced by the Civil Defence in using drones include a limited budget to buy suitable drone platforms, maintaining the drones and the skill levels of the operators. Drones come with limited information on checks inspections, so the Civil Defence has developed its own schedules. It uses 'type ratings' for each of the different drones. Built in redundancies are needed in the key system such as the C2 link, a battery back-up, the monitoring of motors and in-built parachutes. Costs increase due to drone regulation and certification and the addition of multiple redundancies must also be kept in mind. A balance has to be sought between totally safe drone operation at a major cost versus risk assessment and affordability.

### Steve Flynn – Skytango
Steve Flynn was the 10th licenced drone operator in Ireland. Steve set up Skytango with Susan Talbot in 2015. Skytango is a global drone services marketplace for drone operators, their clients and the landowners they fly over. Skytango has developed software that addresses the three key constituents (landowners, pilots and customers). The drone incident at Gatwick changed the perception of regulation and it helped to drive compliant operations. Steve believes that any regulation must be enforceable and that it is unfair to ask the IAA to be the sole enforcer. For the local community to buy into drones there must be trust, so the operations of drone pilots must be transparent to the community. The cost of being compliant with regulation must be inexpensive for drone operators and being compliant must be seen to add value to their business.

Digital rights management (DRM), which is software that aims to prevent unauthorised redistribution of digital media, looks at the licensed envelope of the drone operator and highlights any data that is collected outside their legal envelope. Steve stated that the industry must get to a point where the customer is responsible for the data gathered on their behalf. Skytango is currently working with Dublin local authorities and the Smart City Project to engage with smart technology providers, researchers and citizens to solve challenges and improve city life.

**Session 2: A regulatory Framework for Europe**

Panellists:
• Mr Gerard Lawlor – Manager Air Operations and General Aviation Airworthiness, Irish Aviation Authority
• Mr Wayne Tyrrell – Legal Officer, Irish Aviation Authority

**Mr Gerard Lawlor & Mr Wayne Tyrrell – IAA**
Gerard Lawlor and Wayne Tyrrell outlined the new regulatory structure being introduced in EU regulation 2019/947 available here. New regulations will mean amendment to our current national system of regulating drones. Including the registration of all drones over 1KG, operational restrictions to be defined and the regulation of model aircraft clubs.

The implementing act details requirements related to operation and registration, whereas the delegated act details requirements related to CE marking, technical requirements and third-country operators. These acts need to be consistent with each other as together they implement the operations-centric concept.

It was highlighted that the implementing regulation for operations details requirements for:

• Operation of Unmanned Aircraft Systems(UAS) (Art 7)
• Competency of remote pilots (Art 8)
• Minimum age for remote pilots (Art 9)
• National Flexibility (Policy required)
• Airworthiness of UAS (Art 10)
• Conducting an operational risk assessment (Art 11)
• Authorising operations in the 'specific' category (Art 12)
• Cross-border operations or operations outside the state of registration (Art 13)
• Registration of UAS operators and 'certified' UAS (Art 14)
• Operational conditions for UAS geographical zones (Art 15)
• Authorising in framework of model aircraft club (Art 16)
• Designation of the competent authority (Art 17)
• Tasks of the competent authority (Art 18)
• Safety Information (Art 19)

In the introduction of drones onto the European market, the EU Commission set objectives to ensure the free movement of goods within the market, to set high safety standards for consumers and the protection of the environment was highlighted. To that end, it was explained that existing regulation and processes are being adopted for drone products such as:

• Radio Equipment - Directive 2014/53/EU
• Electromagnetic Competency - Directive 2004/180/CE
• Low Voltage - Directive 2014/35/EU
• Machinery – Directive 2006/42/EC
• Restriction of the Use of Certain Hazardous Substances in Electronic and Electrical Equipment - Directive 2011/65/CE
• General product safety directive 2001/95/CE

- Toys Safety - Directive 2009/48/EC

A notifying authority, which is designated by the Member States, notifies the Commission of Conformity Assessment Bodies who undertakes a conformity assessment before the drone is placed on the market. There are 3 subcategories of the open category of drone operation, based on the area of operation (i.e. where the drone can fly, the remote pilot competency, the maximum take-off mass). For the specific category of drone operation, operational risk assessments are key, with requirements for security and privacy risks added.


## Session 3: Protecting Existing Airspace and its Users

Panellists:
- Mr Richard Rose – Head of Domestic Aviation Security Policy and Regulation, Department for Transport, UK
- Mr Declan Collins –  Head of Operational Safety, Dublin Airport
- Mr Nathan Wall – Safety and Training Manager, Cork Airport
- Mr Jim Gavin – Assistant Director, Irish Aviation Authority

### Mr Richard Rose – Department of Transport UK
Richard Rose outlined the sequence of events of the drone incident in December 2018 at Gatwick Airport. The incident was a malicious attempt to disrupt the airport and cause economic damage. Richard's presentation included a detailed timeline of the incident. Over 900 flights were cancelled and 164,000 passengers were unable to fly, many more faced long delays – nothing like this had been seen before, and the human cost had not been foreseen. Risks to aviation from drones are based on the easy accessibility of drones, and countermeasures lagging behind drone development. There are 2 types of drone threat – terrorist, in 2018 drones carried improvised explosive devices (IEDs) and were used for surveillance; and civilian or non-terrorist – drones being used to disrupt political and economic situations. In the coming years we can expect a steady increase in both types of threat. Richard emphasised that there is no magic bullet counter drone technological measure currently available and many airports simply cannot afford counter-drone technology. Counter drone strategies will not just involve technology, but will be about training staff and interacting with the public and the media. Legislation is being developed in the UK which will be primarily based on enforcement measures, providing police with greater powers - a twin track approach alongside technological solutions. There must be a better understanding of current and future threats. He said there was a fine line to walk between preventing threats and disruption, and allowing the drone industry to develop, in all its positive aspects.

### Mr Nathan Wall – Cork Airport & Mr Declan Collins – Dublin Airport
Nathan Wall outlined the threats that drones pose to aircraft, airports, infrastructures, facilities, and also to passengers, pilots and cabin crew. He said that no technology was currently available that can fully counter drones. He summarised the threats - hobbyists, disrupters, protestors, surveillance, spying, terrorism and swarms. He also emphasised that drones could provide great benefits to airports and society in general, despite the risks. Rogue drone operators are primarily hobbyists who don't realise the impact of their actions and pose a very low threat. In general the majority

of 'near misses' in and around the vicinity of airports were not malicious. Airports need to be proactive in promoting safe drone operations in their vicinity.

Cork Airport was shut down twice in April 2017 due to drone incursions. Over the subsequent 3 months 16 companies approached the airport with 'solutions' but none were deemed acceptable. Communication is key, use occurrence reports to identify troublesome areas and then get local Gardaí to work in the community. Nathan hopes to see drones operating at Cork airport in the next number of years in a positive manner. There are many potential beneficial uses of drones, including runway inspections, wildlife patrols, airfield patrols and aircraft maintenance checks.

Declan Collins said that Dublin Airport had updated its Standard Operating Procedure (SOP) with the IAA following lessons learned after the drone incident at Gatwick. Procedures are constantly evolving. Defined critical areas are 300m from boundary fence of the airport. When a drone incident is confirmed Air Traffic Control (ATC) issues a zero flow rate. The clock starts and after 30 minutes without sighting the flow rate is resumed. Gardaí are on site throughout.

Declan gave a summary of the drone incident at Dublin Airport on 21 February 2019 including showing video footage that captured the drone in flight. The SOP was put into practice and it was possible to get the airport back up and running within 30 minutes of sighting. Valuable lessons were learned to deal with any future incidents. A drone incident checklist was introduced in Dublin Airport to make sure everything is checked off during SOP, a resumption of operations protocol drawn up, and a follow up procedure implemented.

**Mr Jim Gavin – IAA**
Jim Gavin outlined the different safety and security roles and considerations, from International Civil Aviation Organization (ICAO) annexes through to national bodies responsible, and EU common rules in the field of civil aviation security. He outlined the aviation security framework, incorporating ICAO, European Aviation Safety Agency (EASA), DTTAS and the IAA. He highlighted the need to understand the difference between a safety event and a security threat. The drone industry is developing so fast that in a sense regulators and legislators were only 'catching up'. EASA could be described as the co-ordinator, but Member States were the 'main actors'. He provided an update on the EASA counter-drone taskforce. The action plan detailed articulates five main objectives, for which specific actions are proposed:

1) Educate the public to reduce misuse of drones around airports
2) Prepare Airports to mitigate risk from unauthorised drones use
3) Support the assessment of the safety risk of drones to manned aircraft with scientific data
4) Ensure that Counter-Unmanned Aircraft System measures are considered from a global safety perspective
5) Support adequate occurrence reporting

**Session 4: Challenges to Societal Acceptance of Drones**

Panellists:
• Mr Serge Potapov – Supervisory Air Marshal in Charge, Law Enforcement /Federal Air Marshal Service, Transport Security Administration, US
• Ms Siobhan Brown – Regulatory Investigator, Data Protection Commission
• Mr Paul Kennedy – ATS Inspector, Safety Regulation Division, Irish Aviation Authority
• Mr Cathal Mac Criostail – ATM Operations & Strategy Manager Airspace and Navigation, Irish Aviation Authority
• Mr Paddy Evans – CEO Flight Survey
• Mr Oisín Mc Grath – Head of Training, FlyRyte Drone Academy

**Mr Serge Potapov – US TSA**
Serge Potapov spoke about the Counter-Unmanned Aircraft System (C-UAS) efforts undertaken by the Science & Technology team at the Department of Homeland Security (DHS), including 3D modelling and simulations using Department of Defence (DoD) technology. Part of the US programme involves identifying areas within the airport that are most vulnerable to drone threats. They take the aggressors perspective, i.e. they look for likely launch areas and what types of systems would be launched from that area. The TSA are looking at the feasibility of including C-UAS into their Joint Vulnerability Assessment (JVA) process. He noted that the Gatwick incident has increased the urgency around C-UAS. Many C-UAS technologies are very dangerous to use at airports, therefore the main objective currently is to get to the operator of the drone.

**Ms Siobhan Brown – Data Protection Commission**
Siobhan Brown spoke of the unique challenge that drones present to Data Protection. Her presentation aimed to give drone operators a roadmap to compliance with data protection. General Data Protection Regulation (GDPR) was introduced last year and was immediately enforceable. It gives individuals more control over their data and increased transparency and accountability around data protection. GDPR in relation to drones could apply to an individual's image or location or even their behaviour. She advised that drone operators should take time to understand their current data processing activities. For example, what 'personal data' do they process? Where is it stored? How long is it being kept for? Drone operators should stick to the principle of only collecting the minimum amount of personal data that they need. She recommended that operators carry out Data Protection Impact Assessments (DPIA) for all of their operations. She listed 5 key takeaways for drone operators:

• Shift in mind set about people's data privacy.
• Individuals have stronger rights.
• Demonstrate accountability.
• Data Protection by design and default.
• Increased regulatory sanctions and powers.

**Mr Paul Kennedy – IAA**
Paul Kennedy presented on the topic of U-Space. He noted that there is already societal acceptance of manned aviation; to develop similar levels of support for

drones, all stakeholders will need to be engaged as part of the U-Space Process. A timeline up to 2030 and a list of proposed U-Space services have been developed. It would track and identify drones and make longer distance drone operations (for example, deliveries) possible. There will be changes including the integration of manned aviation into U-Space and how to handle State aircraft in U-Space. However, effective implementation of U-Space can overcome these and other challenges. He also stated that geofencing should be used for safe and autonomous flight in Europe.

**Mr Cathal Mac Criostail – IAA & Mr Paddy Evans – Flight Ltd**
Cathal MacCriostail began by affirming his support for licensed drone operations. He sees himself and the IAA Air Navigation Service Provider (ANSP) as a service provider, working closely with IAA Safety Regulation Division (SRD). He advocated for a performance based approach. They have started to automate the system and how they will inform the Air Traffic Control (ATC) of drone operations within their control area. It was noted that ATC moves slowly and is conservative when it comes to change, but this is because it is based on experience and rules.

Paddy Evans presented his Flight Survey application, which is software that allows drone operators to make flight plans and check whether there are limitations in the airspace. It also provides other situational information such as weather, sun location, sunset, etc. to aid in decision making.  A close encounter between his own drone and some RAF jets inspired him to produce the app. He explained that a flight plan is a declaration of intent; it promotes safe operation, mitigates risk, exercises due diligence and is demonstrated.

**Mr Oisín Mc Grath – FlyRyte Drone Academy**
Oisin McGrath explained that, for the most part, the general public are indifferent to drones. Whatever opinions they do have on drones are influenced by the media. He spoke of the negative impact that untrained operators can have on societal perception of drones. Conversely, trained operators are good actors and generally enjoy a good relationship with the public. He noted the importance of facilitating trained operators from the regulatory side, on applications and certifications. He emphasized the need for increased enforcement, education, and easier to decipher regulations. This would help to reduce the number of untrained operators.

# Organisations in attendance

2RN

Aer Lingus

Air Accident Investigation Unit, Dept of Transport, Tourism & Sport

AirMap

An Garda Síochána

An Post

Art Altitudes Droneworks

Civil Defence

Commission for Communications Regulation (Com Reg)

Commission for Aviation Regulation

Competition and Consumer Protection Commission (CCPC)

Cork Airport

Customs and Excise

Cyberhawk Innovations

D4 Films

DAA

Data Protection Commission

Department of Defence

Department of Foreign Affairs and Trade

Dept of Transport UK

Drone Consultants Ireland

Drone Services Ireland

DroneScape

Dublin City Council

Dun Laoghaire Rathdown County Council

Elkstone Ventures

Environmental Protection Agency

Fingal County Council

Flight Ltd

Gatwick Airport

GeoAerospace Ltd.

IAA

IALPA

Iarnród Éireann

Impact GIS Ltd

Inspire Group

Irelandia Aviation

Irish Air Corps

Irish Coast Guard

Irish Prison Service

JJ Rhatigan & Co

Kbphoto

Kerry County Council

Kestrel Drone Ltd

KH Drone Services

Kilkenny County Council

KR Wind Turbine Ltd / KRV Drone Services Ltd

Lafayette Photography

Limerick City and County Council

Manna

Meath County Council

Met Éireann

Murphy Surveys Ltd.

National University of Ireland Maynooth

Norwegian Air International

National Standards Authority of Ireland (NSAI)

Radio Telefis Eireann (RTE)

Railway Accident Investigation Unit, Dept of Transport, Tourism & Sport

Revenue Commissioners

Rohde-Schwarz

Roscommon County Council

Ryanair

Safe Drone Academy

Shannon Airport Authority

Shannon Group

Single Cell Films

Skyfab

Skytango

SkyTec Ireland

Survey Drones Ireland

The Irish Sun

The Irish Times

Thunder Tiger Aviation Training

Tiny Ark

TVM

U.S. Transportation Security Administration, Federal Air Marshal Service

Unmanned Aircraft Association of Ireland

Virgin Media

Western Aerial Survey

William R. Keane Productions