



15 December 2016

Committee Secretary  
Senate Standing Committee on Rural and Regional Affairs and Transport  
Department of the Senate  
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Intel Corporation welcomes the opportunity to provide a submission to the Senate Rural and Regional Affairs and Transport Committee Inquiry on Regulatory requirements that impact on the safe use of Remotely Piloted Aircraft Systems (RPAS), Unmanned Aerial Systems (UAS) and associated systems. Intel applauds the leadership of the Government of Australia and the Civil Aviation Safety Authority (CASA) and supports the general risk-based framework set forth in the proposed revised regulations earlier this year. At the same time we think the questions being asked by the Committee are indeed important and timely. As an appendix to this submission, we are including our August comments to CASA on airworthiness.

## **Background**

Harnessing the capability of the cloud, the ubiquity of the Internet of Things, the latest advances in memory and programmable solutions, and the promise of always-on 5G connectivity, Intel is continuously disrupting industries and solving global challenges. Leading on policy, diversity, inclusion, education and sustainability, we create value for our stockholders, customers and society.

As such, Intel Australia has a keen interest in supporting the growth of the ICT ecosystem within Australia. We are in regular discussions with small, medium and large Australian companies about the role that technology plays in growing their business operations. We also interact with key Government agencies to determine what is needed for their current environments and help determine what they might need in the future. We are enthusiastically committed to Australia's competitiveness in an ever-changing information technology landscape.

Intel has been actively investing in global drone companies, such as AirWare, Precision Hawk, Yuneec, and Ascending Technologies, and partnering our computing technology with the ingenuity being created by these early industry leaders. Intel brought a spectacular UAS light show to Australia during Sydney's Vivid light festival this year, where we broke the world's record in a public setting for flying the most UASs simultaneously. Aside from delighting the audience with a beautifully unique lightshow, the event demonstrated the ability of a single pilot to safely operate a computer-based flight of 100 drones at one time in a public venue at night. We have since broken this record by flying 500 drones simultaneously in Germany just last month.

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We have supported CASA's rulemaking processes and have provided input on many occasions based on our experience in other countries, including the United States, where Intel's CEO Brian Krzanich serves as the Chair of the Federal Aviation Administration (FAA) Drone Advisory Committee. Intel also participates in the FAA Advisory Committee working group on collision avoidance.

## **UAS Value to Australia**

It is increasingly clear to Intel that UAS are the computing platform of the future. A myriad of applications and services will result from the development of UAS technology. UAS can be used to inspect infrastructure like bridges and mobile phone towers while keeping workers safely on the ground. They can be used to deliver medicine and diagnostics to remote or rural areas faster and more efficiently than other means. UAS can also map areas affected by natural disasters, allowing first responders to quickly and safely locate survivors, inspect damaged structures, track fires, and survey damage in real-time. In many ways these UAS can help fulfill government services in a much safer and cost efficient way.

UAS are already starting to reshape how organisations and communities in Australia live and do business. Technologies such as UAS can help grow the Australian economy, keep Australia competitive, create the jobs of the future, and improve Australian standards of living. Consider the ability of a drone to inspect commercial aircraft for damage in just thirty minutes, a job that typically takes two hours.

The most important feature of UAS is their ability to save lives. Whether it is tracking bush fires for victims and damage, surveying the coastline for sharks, or inspecting dangerous infrastructure for damage without ever sending a human being into harm's way, this technology is groundbreaking. In the event of weather-related power outages, for example, UAS permit utilities to quickly assess and repair damage, allowing them to restore service more quickly and at less cost than traditional inspection and repair methods.

One example in Australia is a trial currently underway integrating UAS into the emergency services offered by groups such as Surf Life Saving NSW. In this instance, UAS are proving highly cost efficient and effective methods for aerially detecting sharks and pinpointing accurate and safe delivery of lifesaving devices such as electronic shark repellent, defibrillators, floatation devices, and personal survival kits.

## **UAS Safety as a Priority**

Intel recognizes the safety concerns that can come with the adoption of any new technology, including UAS. However, innovation and safety are not mutually exclusive goals. It is indeed possible to keep citizens safe while enabling a conducive environment for UAS technology that creates jobs, saves lives, enhances productivity and improves quality of life. A government approach that is overly prescriptive regarding the deployment of new technology will deter the private sector's ability to invent, invest and compete in the marketplace. For UAS policy, for example, it is important to note that there is a distinction between consumer hobbyists who tend to be novice operators and not be aware of rules and regulations, and commercial UAS operators who are using it to provide a meaningful, tangible service that has social and economic value.

Currently, Intel is actively engineering the silicon architecture and computing power that will create an onboard UAS platform that has outstanding speed, performance, safety and functionality. Intel's 'RealSense' technology is an onboard sensor application that is at the cutting edge of collision avoidance. It features several attributes for collision avoidance with real-time on board computing: it is intuitive, self-aware, adaptable and self-guided. It provides real time depth sensing capability for a flying UAS, and combined with GPS, altitude and other onboard sensors, can also avoid no-fly areas and comply with regulatory limits. Along with RealSense, Intel is working with our Intel Capital portfolio companies such as Precision Hawk to create other safety technologies. We will never stop thinking about safety as we continue to develop new and enhance existing technologies.

## **Privacy**

Respecting individual privacy is of paramount importance for the public's acceptance and understanding of widespread UAS operations in all environments. Protection of privacy has always been built into the fabric of Intel. Intel has embraced the Fair Information Privacy Principles (FIPPs) as the global foundation for privacy protection to foster technological innovation.

Intel has long supported comprehensive technology-neutral privacy legislation based on the FIPP and we have recently issued a white paper on how to apply the FIPPs to new technologies. With respect to UAS, the FIPPs can be applied to the vehicle's platform and the collection, usage, and distribution of data. Intel's technology can enable UAS operators to meet their privacy commitments to consumers and the general public. One example of this application of the FIPPs is Intel's decision to only have the RealSense sensor collect the *minimum data necessary* for collision avoidance collected by RealSense sensors, instead of using the sensors for other purposes. Over time, there may be other uses for these sensors, and the FIPPs will guide how to implement those uses and to make their data collection practices transparent to consumers, regulators and the general public.

Intel also takes a "best practices" approach to privacy. In the U.S., for example, we have been engaged in an effort within the Department of Commerce's National Telecommunications Infrastructure Agency (NTIA), to recommend best practices for the protection of privacy while operating UAS. These best practices can be consistent with existing privacy laws. We will continue to lead privacy solutions in a way that helps innovation keep pace with demand. We would be happy to share our findings with policy makers in Australia.

## **Risk-Based Regulatory Framework**

Intel supports a regulatory framework that is risk-based and flexible enough to change as technology evolves so that it does not hinder innovation and economic growth. This flexibility can be achieved for the UAS ecosystem through government adopting a streamlined certification and approval process, issuing exemptions, waivers, and other approvals for different UAS technologies, models, and operations without having to complete a protracted rulemaking process.

A flexible regulatory framework should recognise that there are a wide variety of devices that fall under the definition of UAS. A hobbyist's small quad copter should not be governed by the same regulations as transport category size platforms used for business purposes.

The Government should recognise that the nature and extent of regulation of UAS will vary based on their weight, size, and functionality. The Government's efforts to integrate UAS operations into the national airspace should begin with smaller UAS, operated both for recreational and business purposes, and build on the data and experience collected from these operations to expand operational parameters for these UAS as well as inform regulation of larger devices. Last year, for example, CASA relaxed licensing rules for lightweight drones weighing less than 2kg, encouraging Australian businesses to adopt UAS technology. Intel applauds this flexible, risk-based regulatory approach.

Regulations should also encourage the use of computing to meet the key challenges involved in safely integrating UAS into modern life. The Government should encourage the development of sense and avoidance technology, collision avoidance, secure geo fencing and command and control technology. As Intel and others innovate and then integrate these innovations onto UAS platforms, it will be critical to have a seamless and effective regulatory structure in places that supports such innovation.

As mentioned, Intel's RealSense technology provides collision avoidance and connectivity to ensure the safety of beyond visual line of sight (BVLOS) operations. Intel's technology allows for safe operation of swarms of drones by a single pilot.

Intel also supports the development and implementation of an unmanned traffic management system (UTM) that will enable safe and efficient beyond visual line of sight (BVLOS) operations in low altitude airspace by multiple UAS operations in the same airspace. While this Inquiry does not specifically look at the UTM concept, Intel encourages research and development and enlisting of companies that have worked on UTM design under the auspices of the U.S. National Aeronautics and Space Administration (NASA).

Finally, a critical element in a regulatory framework is that spectrum must be available to ensure safe and secure ground platform-to-vehicle and vehicle-to-vehicle communication. Government policy should consider the suitability and adequacy of existing wireless LTE technology and resolve any concerns arising from such consideration. Intel is widely supportive of this effort throughout the world and stands ready to assist policymakers here in Australia.

## **Global Frameworks**

With respect to the global standards on UAS technology, the work of the International Civil Aviation Organization (ICAO) has no existing standards or recommended practices (SARPs) for unmanned or remotely pilot aircraft systems. The Joint Authorities for Rulemaking on Unmanned Aircraft Systems (JARUS) is a non-governmental international body comprised of government aviation officials, assisted by a Stakeholder Consultative Body (SCB), which is from industry. JARUS aims to achieve a harmonized system of aviation regulation by developing a concept of operations and performance standards and presenting papers to local aviation authorities. It is important to note that JARUS is moving at a pace behind the U.S., Europe, and Australia.

Intel suggests that Australia participate in both the ICAO and JARUS in order to help shape an international framework for UAS regulations that are consistent with CASA regulations. However, it is critical that Australia continue to lead on this front and not take a “wait and see” approach with respect to developments from global standards bodies.

Australia should also continue to monitor developments in both Europe and United States and consider changes to its regulations based on the experience in these countries, to the extent that they apply to the Australian market and society.

## **Conclusion**

Governments and regulatory authorities have already demonstrated their ability to adapt to the changing UAS environment, and Australia has been highly regarded as a global leader when it comes to creating a thoughtful UAS framework. Intel hopes that Australia continues this leadership role in establishing a risk-based regulatory framework that broadly authorizes UAS operations for a wide variety of purposes, resulting in enormous economic and social benefits.

Intel welcomes future opportunities to discuss these developments. For further information regarding this input, please do not hesitate to contact me at [Jennifer.a.mulveny@intel.com](mailto:Jennifer.a.mulveny@intel.com).

Yours sincerely,

Jennifer A. Mulveny  
Director, Global Public Policy  
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**ATTACHMENT:**



19 August 2016

Mr. Tom Putland  
Standards Division  
Civil Aviation Safety Authority  
Roger Weeks  
A/g Executive Manager  
Standards Division  
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Re: Intel Corporation Comments on Discussion Paper (DP) 1529US (June 2016)

Dear Mr. Putland,

Intel Corporation welcomes the opportunity to provide comments on Discussion Paper (DP) 1529US (June 2016) entitled "UAS airworthiness framework." Intel applauds the leadership of the Government of Australia and its Civil Aviation Safety Authority (CASA) and supports the general risk-based framework set forth in the revised regulations effective September 2016 and in the discussion paper. We are also grateful for the substantial assistance CASA provided Intel in support of Intel's light shows over five nights during Vivid Sydney this past June.

**General comments**

We note that CASA developed this discussion paper in consideration of the regulatory framework proposed by the European Aviation Safety Agency (EASA) and the U.S. FAA's proposed rule on small unmanned aircraft systems. While Intel believes that international harmonization of drone regulations is a worthy objective, Australia should continue its world leadership role in establishing a risk-based regulatory framework that broadly authorizes highly automated UAS operations for a wide variety of purposes that will result in enormous economic and social benefits.

Intel is a global technology leader that has innovation at the heart of its business. We are proud to have developed the universal serial bus (USB), the world's first microprocessor (sometimes called a CPU), the first commercially dynamic random access memory (DRAM) chips, the first electrically programmable read-only memory (EPROM) chips, and many other products that are essential to today's digital economy. Intel has driven computing innovation to the highest performing servers that speed discoveries in science and medicine, to low power computing sensors that are always on and connected to make devices, homes and cities smarter in the future. Currently, Intel is actively engineering the silicon architecture and computing power that will create an onboard drone platform that has outstanding speed, performance, safety and functionality. In particular, Intel is currently working on 'RealSense' – an onboard sensor application that is at the cutting edge of

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collision avoidance. It features several attributes for collision avoidance with real-time on board computing: it is intuitive, self-aware, adaptable and self-guided. It provides real time depth sensing capability for a flying drone and combined with GPS, altitude and other onboard sensors, can also avoid no-fly areas and comply with regulatory limits.

UAVs are the computing platform of the future with wide-reaching applications. Australian society, consumers and businesses stand to benefit in profound ways if the nascent drone ecosystem can develop safely, quickly, and in a manner where governments and the private sector work cooperatively and expeditiously across a range of statutory, regulatory and policy matters. UAVs are already starting to reshape how organisations and communities in Australia live and do business. It is important that governments continue to adapt to this changing reality through policy and regulatory frameworks.

Intel supports a regulatory framework that is risk-based and flexible enough to change as technology evolves so that it does not hinder innovation and economic growth. This flexibility can be achieved by governments adopting a streamlined certification and approval process, issuing exemptions, waivers, and other approvals for different UAV technologies, models, and operations.

Intel's technology provides collision avoidance and connectivity to ensure the safety of beyond visual line of sight (BVLOS) operations. As shown during Vivid Sydney this past June, Intel's technology allows for safe operation of swarms of drones by a single pilot.

Intel also supports the development and implementation of an unmanned traffic management system (UTM) that will enable safe and efficient BVLOS operations in low altitude airspace by multiple UAS operations in the same airspace. While the discussion paper does not address the UTM concept, Intel encourages CASA to conduct research and development and to enlist companies that have worked on UTM design under the auspices of the U.S. National Aeronautics and Space Administration (NASA).

### **Specific comments**

As a general matter, Intel supports categorizing airworthiness requirements based not only by weight but also by intended use. The Open Category covers UAS that weigh no more than 25 kg ("small" and "very small"), which corresponds to the 55 pound ceiling in the FAA's final UAS rule, Part 107. The Specific Category covers UAS weighing more than 25 kg and also small UAS operations outside the operational parameters of the Open Category, i.e., BLVOS operations, operations over persons, night time operations, operations above 400 ft. AGL and autonomous operations. These parameters are similar to the provisions in Part 107, from which the FAA may grant a waiver upon an appropriate safety determination. CASA proposes that an operator perform a safety risk assessment to consider the safety risks and determine that such risks will be mitigated through technology and/or operational limitations. Intel supports such risk assessments, provided that they are scalable to the risks involved, and need not be performed before every flight unless the risk profile is different from what has previously been assessed.

The discussion paper seeks comments on three approaches to the Specific Category. Option 1, an operational permission system, would require an operator to conduct a safety risk assessment and obtain "airworthiness approval" as part of the case-by-case consideration of whether to issue an Unmanned Operator Certificate (UOC).

Option 2, a certificate of authorization (COA) system, would involve the issuance of a COA by CASA or an authorized industry organization applying "accepted standards and procedures. Authorized industry organizations would certify the design and airworthiness by applying airworthiness standards "acceptable" to CASA, or by relying on a satisfactory history of safe operations.

Option 3, an operational permission system that formally incorporates certification of airworthiness, is a hybrid of Options 1 and 2.

The discussion paper does not elucidate the practical advantages and disadvantages of these three options, and Intel believes the industry would benefit from a more expansive explanation of these options. As an initial matter, however, Intel supports the development of performance standards by industry or by the government based on industry input. In either situation, we would presume CASA would adopt or accept such performance standards. Intel also supports the concept of authorized industry organizations to provide the certification or approval of a particular operation by a particular operator. The FAA developed the concept of Organization Designation Authority (ODA), in which companies are authorized to self-certify for purposes of type, amended, supplemental, and airworthiness certification. This may serve as a suitable model for CASA.

Intel also believes that experience may serve to buttress the case for approval or, depending on the amount of experience and completeness of the data provided, to provide the basis for approval.

In determining the safety of a UAS operation, the proper focus should be on the vehicle and platform (UAS), the operation (including the operational environment), and the operator. The discussion paper is focused on airworthiness, which for manned aircraft concerns primarily the aircraft. Airworthiness certificates come in normal, utility, commuter, transport, restricted, and experimental categories. UAS airworthiness could similarly be categorized with respect to nighttime operations, operations over people, BVLOS operations, and autonomous operations. We would expect approval of such operations would also examine the operational environment and the qualifications of the remote pilot or operator.

Regardless of the form or process of approval, CASA should provide an avenue to authorize such operations upon an appropriate safety showing.

Yours sincerely,



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