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Committee Secretary
Senate Standing Committees on Rural and Regional Affairs and Transport
Department of the Senate
Email: rrat.sen@aph.gov.au

Dear Senators

SENATE COMMITTEE INQUIRY INTO REGULATORY REQUIREMENTS IMPACTING ON SAFE USE OF DRONES

The Australian Industry Group (Ai Group) welcomes the opportunity to make a submission to the Senate Rural and Regional Affairs and Transport References Committee inquiry into regulatory requirements that impact on the safe use of Remotely Piloted Aircraft Systems (RPAS), Unmanned Aerial Systems (UAS) and associated systems.

Ai Group's membership comes from a broad range of industries and includes businesses of all sizes. This inquiry will likely impact on our members who provide technology solutions, transport and logistics, and end users including those involved in development and maintenance of substantial infrastructure.

This submission does not propose specific amendments to existing regulatory arrangements such as *Civil Aviation Safety Regulation 1998* (Cth) Part 101. However, we would like to provide some context and highlight the benefits from use of and investment in RPAS, UAS and associated systems for industry (generally referred to in this submission as drone technology, but excluding model aircraft and military weapons), which can sometimes be overshadowed by negative perceptions around these technologies. This includes an outline of the emerging drone market, our views on the role of drone regulation, and a brief discussion on overseas lessons in drone regulation.

The emerging drone market

Drone technology is becoming more ubiquitous in society. It has moved beyond mature military applications, and is now become more accessible to the commercial and consumer arena. This is not a unique experience in Australia – it is a growing global trend.

At the World Economic Forum (WEF) Annual Meeting in Davos earlier this year, its founder and chair Professor Klaus Schwab heralded the fourth industrial revolution and its significance today. Schwab identifies three reasons for this revolutionary change in technology: the velocity of change is exponential; the breadth and depth of change is leading to paradigm shifts across the economy and society; and systems are transforming across countries and societies.¹ Government has an important role to play, including to support industry advancement in this globally competitive environment. As the WEF says, “new technologies are driving winner-takes-all dynamics for an increasing number of industries, getting there first matters”.²

Drone technology is certainly one of those contributing to the fourth industrial revolution. Gartner identifies smart machine technologies, including drones, as being one of the most disruptive classes of technologies over the next 10 years, and estimates these are between five to 10 years away from reaching mainstream adoption.³ (See Figure 1 below)

¹ Klaus Schwab, *The Fourth Industrial Revolution* (WEF Forum, January 2016), p. 3.

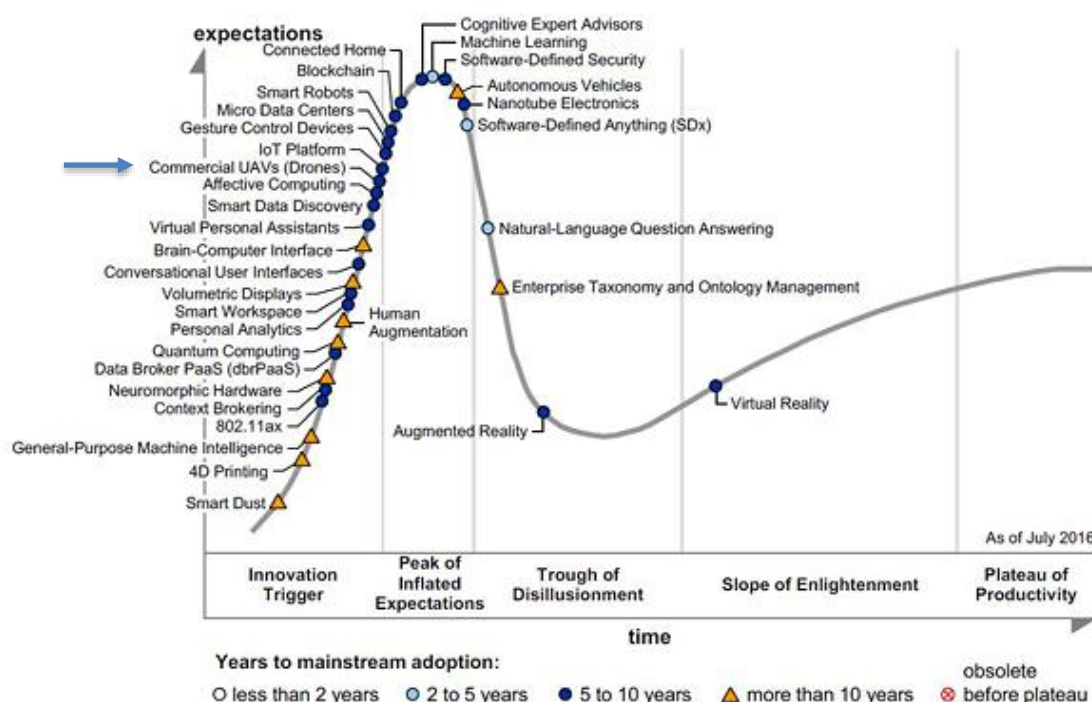
² World Economic Forum (WEF), “Report Highlights” (July 2016), <http://reports.weforum.org/global-information-technology-report-2016/report-highlights/>.

³ Gartner, “Gartner’s 2016 Hype Cycle for Emerging Technologies Identifies Three Key Trends That Organizations Must Track to Gain Competitive Advantage” (Press release, 16 August 2016), <http://www.gartner.com/newsroom/id/3412017>.



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Figure 1: Gartner’s Hype Cycle for Emerging Technologies, 2016



Source: Gartner (July 2016)

Source: Gartner (2016)

Goldman Sachs estimates that the market opportunity in terms of total global spending on drones for commercial applications will be \$100 billion (USD) in the next five years (FY2017-FY2021), with \$11.2 billion (USD) in the construction and \$5.9 billion (USD) in agriculture industries.⁴ Other industries identified include insurance claims, emergency services, offshore oil/gas and refining, journalism, real estate, utilities, pipelines, mining, clean energy and cinematography. In the case of Australia, Goldman Sachs estimates \$3.9 billion (USD) in spending for the next five years.⁵ (See Figure 2)

Related spending is only one element of the economic impact of drone technology: improved productivity and the potential for new products and services enabled by drone technology are more important, but market growth is a proxy for the speed with which these benefits may be realised. The global potential of drone technology means that Australia needs to ensure that it does not miss out on this opportunity.

In a WEF report on the impact of drones on the logistics industry, the plummeting cost of drones has enabled logistics companies to make cheaper (25%) and faster last-mile deliveries to consumers especially in rural and urban areas, leading to a potential reduction in the carbon footprint (90%) from traditional last mile deliveries.⁶ Trials for these types of deliveries are currently being done overseas including in the US, Germany, China and Switzerland.⁷ This report estimates that drones currently make up 0.5% of all logistics delivery globally, and suggests it could be worth \$20 billion in operating profits over the next 10 years.⁸ While the current public focus on drones is in regard to its negative

⁴ Goldman Sachs, “Drones: Reporting for Work” (2016), <http://www.goldmansachs.com/our-thinking/technology-driving-innovation/drones/>; MarketWatch, “This is how most of the world’s businesses will use drones” (18 March 2016), <http://www.marketwatch.com/story/this-is-how-most-of-the-worlds-businesses-will-use-drones-2016-03-18>.

⁵ Ibid.

⁶ WEF (in collaboration with Accenture), “Digital Transformation of Industries: Logistics Industry” (White Paper, January 2016), pp. 17-18.

⁷ Ibid.

⁸ Ibid.



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impact to public safety, a counter-view is that it may improve public safety by reducing 15 million metric tons in emissions, and up to 4,000 deaths from road-related accidents globally.⁹

Figure 2: Total global spending on commercial drones for FY 2017 to FY 2021

End Market	Average Price	US		Global	
		Units	TAM (\$mn)	Units	TAM (\$mn)
Construction	\$30,000	44,300	\$1,329	372,120	\$11,164
Agriculture	\$30,000	47,000	\$1,410	197,400	\$5,922
Insurance Claims	\$1,500	315,000	\$473	945,000	\$1,418
Offshore O&G and refining	\$50,000	2,465	\$123	22,204	\$1,110
Journalism	\$50,000	2,400	\$120	9,600	\$480
Real Estate	\$1,000	67,600	\$68	264,860	\$265
Utilities	\$50,000	350	\$18	1,855	\$93
Pipelines	\$80,000	259	\$21	518	\$41
Mining	\$40,000	--	--	1,000	\$40
Clean Energy	\$10,000	1,467	\$4	8,213	\$25
Cinematography	\$30,000	452	\$14	707	\$21
Delivery	--	--	--	--	--
Total Commercial Manufacturing Opportunity:		481,293	\$3,580	1,823,477	\$20,579

Source: MarketWatch (2016) and Goldman Sachs (2016)

In another report, the WEF examines the future of construction which includes the impact of drones.¹⁰ Integrated with other technologies, drones can help companies refine their monitoring of projects through real time communication and tracking of people, assets, construction processes, and project progress.¹¹ Full-scale digitalisation in non-residential construction, which includes drones as part of this integrated system, is estimated to produce annual global cost savings of \$0.7-1.2 trillion (13-21%) on engineering and construction, and \$0.3-0.5 trillion (10-17%) in the operations phase.¹²

The role of regulation

Regulation of drones may serve a legitimate role to ensure protection of public safety, privacy, security and the environment. This should not lead to overregulation and stasis. The last thing industry would want to see is a system that creates additional red tape and regulatory cost, leading to adverse outcomes that stifle innovation and investment, inhibit business productivity and efficiencies, and create barriers to new industries and jobs in a globally competitive market. Such an outcome would also be inconsistent with the objectives of the Australian Government's National Innovation and Science Agenda. Overall, we support a regulatory framework that is well-balanced and will benefit both industry and the general public in the long term.

Given the potential commercial value and growing presence of drones that benefit both industry and the public, it is therefore no surprise that Civil Aviation Safety Authority (CASA) recently reviewed and amended regulations around drones for commercial applications. CASA recognised that this was a necessary decision that reflects a modernisation of outdated regulations to keep up with the exponential advances in drone technology. This is a challenge not only limited to the regulation of drones, but also for other old regulations and legislation that need to keep up with other disruptively innovative technologies.

But like any other technological advance, drones pose social and regulatory questions, whether they relate to security, safety, privacy or environmental issues. This was the case with automobiles, telephones and cameras, for example.¹³ As history and experience has shown with these technologies, as the public became more exposed to their presence and practicality, they not only accepted it, but embraced the positive impact that these technologies have had to their lives. Many initial concerns

⁹ Ibid.

¹⁰ WEF (in collaboration with The Boston Consulting Group), "Shaping the Future of Construction: A Breakthrough in Mindset and Technology" (May 2016).

¹¹ Ibid, p. 24, 32

¹² Ibid, p. 24.

¹³ Mark Mills (Forbes), "Drone Disruption: The Stakes, The Players, And The Opportunities" (23 March 2016),

<http://www.forbes.com/sites/markmills/2016/03/23/drone-disruption-the-stakes-the-players-and-the-opportunities/>.



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and fears were resolved or proved groundless, and regulation focussed on specific genuine and continuing risks, such as traffic safety or interception of telecommunications.

Drones are yet to reach that full public comfort. In the meantime, there appear to be negative perceptions of drones, especially evident in the context of the recent CASA regulatory amendments. Part of the anecdotal evidence being cited relates to drone incidents including sightings reported by pilots and air traffic controllers.¹⁴ It is important to understand the context in which they are reported. It is not clear whether the incidents reported actually include an expert assessment of the level of actual or potential safety risk and impact to the public.¹⁵ Such evidence would assist in determining the materiality to public safety rather than based on perception.

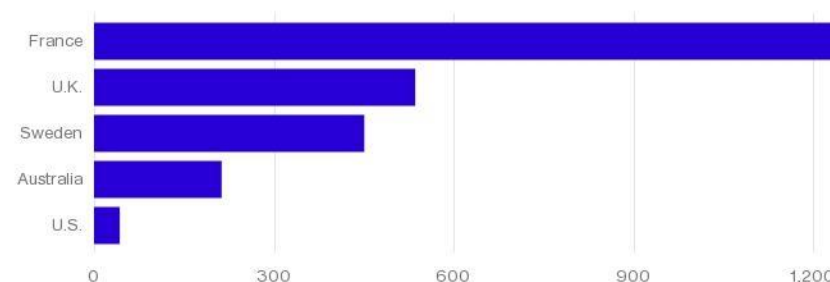
Overseas lessons on drone regulation

While regulations have a role in addressing reasonable public concerns around security, safety, privacy and environmental issues, alternative approaches to regulation may be possible (e.g. technology-based responses such as geo-fencing and collision avoidance) as opposed to automatically reaching for regulatory “sticks”. Regulatory barriers should only be introduced where there are clear net community benefits. Such approaches will need to be explored further and overseas approaches could offer pragmatic solutions and lessons.

Figure 3: Number of registered commercial drone operators as at March 2015

Vive Le Drone

Registered commercial drone operators



Source: Government Data

In the U.S., companies need exemptions from laws banning commercial drone use



Source: Bloomberg (2015)

For instance, some may regard the regulatory approach in France workable, credited for supporting a thriving drone manufacturing industry.¹⁶ The French regulatory approach has included making drone regulations early in 2012, making amendments to regulations based on 18-month implementation drone trials, differentiation between drone uses (i.e. hobby and competition flying, flying for experimental and testing purposes, and particular activities including commercial use of drones), setting basic rules for civilian use, and requiring licencing only for out-of-sight commercial flights.¹⁷

¹⁴ ABC News, “Senator Nick Xenophon moves to bring down ‘dangerous’ drone rules recently introduced by CASA” (6 October 2016), <http://www.abc.net.au/news/2016-10-06/xenophon-moves-to-bring-down-dangerous-drone-rules/7908070>.

¹⁵ John Goglia (Forbes), “FAA List Of Reported Drone Incidents Indicates A Problem. But It’s Not What You Think.” (27 November 2014), <http://www.forbes.com/sites/johngoglia/2014/11/27/faa-list-of-reported-drone-incidents-indicates-a-problem-but-its-not-what-you-think/>.

¹⁶ Miriam McNabb (Dronelife), “Where is the Top Country for Drone Investment? You’ll Be Surprised.” (6 May 2016), <http://dronelife.com/2016/05/06/1-country-drone-investment-will-surprise/>; Rudy Ruitenberg (Bloomberg), “What the French Know About Drones That Americans Don’t” (16 March 2015), <https://www.bloomberg.com/news/articles/2015-03-16/what-the-french-know-about-drones-that-americans-don-t>.

¹⁷ Mary-Ann Russon (WEF), “Why we need a clear legal framework for flying drones” (29 June 2015), <https://www.weforum.org/agenda/2015/06/why-we-need-a-clear-legal-framework-for-flying-drones/>; Miriam McNabb



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While France is now looking at adopting a bill to strengthen the security of the use of civilian drones, the French Government has confirmed its commitment to industrial success of the drone industry and legal modernisation of the sector.¹⁸ This is an important overarching objective that the Australian Government should consider.

The current experience in the US with drones regulated by the Federal Aviation Administration (FAA) may offer some insight for Australia. Taking a different regulatory approach to France, the US was well behind other countries including France and Australia in terms of registered commercial drone operators last year.¹⁹ (See Figure 3) Strong criticism against the US regulatory system included that the FAA was slow to implement rules to enable use of commercial drones (as well as accommodating for other new technologies), and the FAA's decision-making process for regulating drones was not sufficiently balanced to support innovation.²⁰

As stated by a co-founder of a venture-backed drone software company at a US Senate Committee on Small Business and Entrepreneurship hearing in March this year: "American entrepreneurs, students and educators, journalists, and volunteers are ready to use unmanned aircraft to save lives and generate significant economic activity, yet they have been held back."²¹ Then in August this year, in a trend similar to Australia, the FAA decided to relax its drone regulations, which it regarded as an impediment to innovation, while still protecting public safety.²²

In summary, the potential value of the emerging drone market, as well as lessons learnt from the overseas experience, suggest there is an opportunity for Australia to take the lead in driving a globally competitive drone industry. The modernisation of drone regulation that supports industry development should not be misinterpreted by the public as an exclusion or diminishing of public safety. There is also an opportunity for drones to enhance public safety through use by police and emergency services and in many civilian applications such as property inspection and maintenance. These benefits to society are often lost amongst the negative hype.

Should the Senate Standing Committee be interested in discussing our submission further, please contact Charles Hoang (02 9466 5462, charles.hoang@aigroup.com.au).

Yours sincerely,

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(Dronelife), "Where is the Top Country for Drone Investment? You'll Be Surprised." (6 May 2016), <http://dronelife.com/2016/05/06/1-country-drone-investment-will-surprise/>; Nicolas Boring (Law Library of Congress), "Regulation of Drones: France" (April 2016), <https://www.loc.gov/law/help/regulation-of-drones/france.php>.

¹⁸ French Ministry of Environment, Energy and the Sea, "Adoption of the bill strengthening the security of the use of civilian drones" (Press release, 13 October 2016), <http://www.developpement-durable.gouv.fr/Adoption-de-la-proposition-de-loi.html>.

¹⁹ Rudy Ruitenber (Bloomberg), "What the French Know About Drones That Americans Don't" (16 March 2015), <https://www.bloomberg.com/news/articles/2015-03-16/what-the-french-know-about-drones-that-americans-don-t>.

²⁰ Ibid; [Eli Dourado \(Mercatus Center, George Mason University\)](https://www.mercatus.org/expert-commentary/faa-constantly-thwarting-innovation), "The FAA Is Constantly Thwarting Innovation" (17 February 2016), <https://www.mercatus.org/expert-commentary/faa-constantly-thwarting-innovation>; [International Center for Law & Economics](https://www.laweconcenter.org/home/120-the-faas-proposed-drone-rules-fail-under-both-economic-and-first-amendment-scrutiny.html), "The FAA's Proposed Drone Rules Fail under Both Economic and First Amendment Scrutiny" (April 2015), [http://www.laweconcenter.org/home/120-the-faas-proposed-drone-rules-fail-under-both-economic-and-first-amendment-scrutiny.html](https://www.laweconcenter.org/home/120-the-faas-proposed-drone-rules-fail-under-both-economic-and-first-amendment-scrutiny.html); Mark Mills (Forbes), "Drone Disruption: The Stakes, The Players, And The Opportunities" (23 March 2016), <http://www.forbes.com/sites/markpmills/2016/03/23/drone-disruption-the-stakes-the-players-and-the-opportunities/>.

²¹ Mark Mills (Forbes), "Drone Disruption: The Stakes, The Players, And The Opportunities" (23 March 2016), <http://www.forbes.com/sites/markpmills/2016/03/23/drone-disruption-the-stakes-the-players-and-the-opportunities/>.

²² Dave Lee (BBC News), "Drone industry delight at new US rules" (22 June 2016), <http://www.bbc.com/news/technology-36584515>; Federal Aviation Administration, "New FAA Rules for Small Unmanned Aircraft Systems Go Into Effect" (29 August 2016), https://www.faa.gov/news/press-releases/news_story.cfm?newsId=20734.

