

Griffith University

Contributors:

Emma Whittlesea

Paresh Pant

Bruno Alencar Pereira

Guido Carim Junior

Bojana Spasojevic

The sky's the limit for the electric age of aviation

1. Do you agree with the proposed core principles for the National Emerging Aviation Technologies policy?

Yes, the core principles are covering the main concerns and drivers to the future of Remotely Piloted Aircraft Systems (RPAS) or Unmanned Aerial Systems (UAS) in Australia. Primary related to “Drones”, We could not notice a more in-depth discussion on eVTOL. However, it is very understandable because it is still an emerging technology and “Drones” are a current reality raising many issues and opportunities with the adoption and diffusion of this technology.

Some further detail on the high-level principles is needed to understand if relevant components are included or not, for example does ‘safe and secure operations’ include considerations to privacy and data protection? Does ‘consideration of the environment’ embed greenhouse gas emissions and noise abatement? Does ‘encourage best practice operations’ incorporate circular economic and lifecycle analysis? Does ‘support industry growth’ target Australian owned and produced industry development and manufacture (not overseas)? Some further clarity is needed and supporting narrative for each principle, this is a high level summary at present.

The market management approach should incorporate and demonstrate Australian benefits - economically, socially and environmentally. Managing the market to deliver sustainable solutions for Australia that have longevity, co-creating the industry.

It is recognised that there is a specific need to develop national policy for the management of drones, so the title of the discussion paper and subsequent policy should be edited to reflect the drone and eVTOL focus. The proposed ‘National Emerging Aviation Technologies Policy’ would seem far too broad a title for such a specific policy area.

It would however be timely to also develop national policy that considers opportunities and risks associated with emerging aviation technologies more broadly, for example considering and covering a broader context and remit of new industries and concepts such as new fuels (hydrogen, e-fuels, electrification etc.), emerging plane designs, ground fleet technologies and aviation responses for crises such as COVID-19. Griffith institute for Tourism ran a webinar series earlier this year for example on Aviation Reimagined that explored emerging technologies, but there appeared to be little engagement from the national level or policy space: <https://www.griffith.edu.au/institute-tourism/news-events/aviation-reimagined>

Electrification and a move towards a low-carbon aviation sector and renewable energy is critical to the development of new aviation technologies, and to meet national and global climate change commitments (government and industry). There is very little mention of these commitments, aviation's emissions impact, and the opportunity new technologies and electrification present to transition the industry. Aviation is entering a period of significant technological disruption and electrification is already extending to short haul fixed wing aircraft.

Consider consequences on the broader aviation sector, for example it is noted that larger eVTOL vessels that transit international airspace are not really included, but where will they be if not here? How will this policy development feed into and align with the broader rethink of aviation and the changing nature of flying – especially post COVID-19. Broader consideration of the impact of COVID-19 is required, including existing aviation infrastructure and operations (which is significant and currently severely impacted by COVID-19).

2. Will the proposed approach to policy development adequately allow for the future direction, operations and investments of your business/organisation?

Australia is a vast continent that is dependent on reliable connectivity for patrols/surveillance, delivery of essential services and protecting assets/infrastructure. Drone/eVTOL will play a critical role in improving the effectiveness of these services at a lower overall cost (economic), through lower carbon impact (fuel), and deliver better outcome for community. From an educational sector perspective, benefits are to be had in measuring the effectiveness of drone/eVTOL vs other methods, product development improvements and open up new support/ancillary industries – battery tech, AI tech and more.

For sure. I am a researcher on innovation in the aviation sector at Griffith University. Educational approach and Science advancements on these technologies are totally related to my organisation. The adoption and diffusion of emerging technologies in the context of Quadruple Helix (Governments-Universities-Industries and Society) is clearly noticed in this proposal.

The only policy that I disagree with is regarding the airspace. The proposal is to have unified airspace that would oversee aircraft as well as drones and eVTOL. Given the expected number of these vehicles operating simultaneously, it is unfeasible to use the same air traffic system structure. A separated self-regulated traffic management model would overcome this problem while maintaining safety. In this system, drones would have to avoid collision by a vehicle-to-vehicle communication system. This system, though, will heavily rely on onboard technology, which can be an impediment at this stage of development.

The social component and dimensions alluded to in the core principle which states 'considerate of the community' seems to be missing in the proposed approach to policy development. For example, consideration around impact on the community is important, and is not just associated with noise and privacy. Ethical considerations need to be incorporated.

Community and stakeholder consultation and engagement should feature as a component of any approach to policy development.

Arguably there could be considerable disruption from drones and eVTOL vehicles across a wide range of other policy domains, the policy development approach should **apply systems-thinking** and identify (and look more broadly at) **sectoral and policy inter-dependencies** – refer to your diagram on p3 that begins to identify some of these. Please note 'tourism, recreation and leisure' reflect industry areas currently missing from the diagram on p3 although it is clearly identified as an

‘application’ on p9. Suggest ‘delivery of goods’ should be extended to also include ‘services’, many government services alone could benefit and/or experience disruption or negative impacts.

Energy and consideration of new fuels and associated technologies should expand on, or be integrated into point 7 on electrification. Recognising the links here to other policy agendas that could be met, such as reducing greenhouse gas emissions, pollution and noise levels.

Monitoring and evaluation through robust research and development of a suite of performance measures that reflect each individual policy development theme and cuts across them will be critically important for policy development and successful outcomes and delivery.

3. Are there any other approaches that could benefit the sector?

More integration with industries and government to improved approaches related to educational processes and research on these technologies and impact on economics, environments and society.

It would be timely to develop national policy that considers opportunities and risks associated with emerging aviation technologies more broadly, for example considering and covering a broader context and remit of new industries and concepts such as new fuels (hydrogen, e-fuels, electrification etc.), emerging plane designs, ground fleet technologies and aviation responses for crises such as COVID-19.

A whole-of-government framework to manage new aviation technologies and National Policy on Emerging Aviation Technologies, shouldn’t only be about drones and eVTOL vehicles. It is recognised that there is a specific need to develop national policy for the management of drones, so the title of any subsequent policy should be edited to reflect the drone and eVTOL focus if it only looks at that, perhaps sitting within a broader framework and policy series.

Perhaps the policy for drones and VTOL vessels needs to be a subcomponent of a larger strategy and policy development about emerging aviation technologies and subsequent integration, investment and manufacturing in Australia.

Cost savings are critical to cover too – efficiency and cost effectiveness of technological and low-carbon transition, lower maintenance and lower fuel costs help create a more economically sustainable industry.

4. What level of service and regulation do you expect from the Government?

Tricky one to respond to. Are we talking State or Commonwealth? Given the recent issues during Covid around State and Commonwealth “working together” it is clear that after a honeymoon period, the discussions were split along party lines. Ideally there should only be one law applied. Otherwise we get into a situation where there are “too many Chiefs and no enough Indians – to paraphrase”

Noise, hours of operations, paths (similar to flight paths, no-go zones), licensing needs to identify the qualified operator as well as the company with whom the operator is with, and

renewed online every 12 months, with change of employer or other circumstances reported immediately and no later than 20 working days.

The frameworks proposed to each core principles are very suitable and useful. However, further regulations relating to these frameworks still need to detail procedures, rules and clear penalties related, even integrating them to existing regulations. In this sense, the Government has a critical role, to establish adequate rules, but into a balance to avoid blocking the potential benefits of these technologies into diverse industries, markets and other benefits to society.

One that ensures benefits and risk minimisation for the Australian community, business and environment. These should include licencing, safety requirements and enforcement on conditions of operation and use.

5. What are your expectations of the Government's role and responsibilities in the management of drones and eVTOL vehicles?

Regulatory use of these crafts – regulated paths, height, speed, acceptable noise levels
Regulatory design of crafts – standards of build, operational reliability (akin to how aircrafts are certified)

Skin deep environmental credentials – components that power the craft needs to be environmentally sustainable. E.g. most batteries in hybrid cars are seen as environmentally friendly. However only the Lithium-ion is friendlier and kinder from a sustainability perspective compared to the nickel and acid versions that power Prius cars in Australia even today.

I hope the Government can support and stimulate the growth of this sector, establishing all control regarding safety, security and privacy issues, but, in the same time understand the potential of drones and eVTOL to support and release all benefits of these technologies such as described at the technology landscape section.

- Collecting and analysing sufficient data and information
- Monitoring use and operation.
- Ensuring adequate safety and ethical standards.
- Undertaking counter-drone research and technology development.
- Understanding and managing policy and sectoral inter-dependencies.
- Apply a system thinking approach

6. What are the key opportunities that these new technologies could deliver for Australia?

Broadly speaking, increased productivity in the metro regions. Australian Productivity Commission is awash with statistics on the economic value “lost in transit”, both in terms of productivity lost by humans and productivity lost by the delays in getting outputs from A to B.

Safer tourism message to visitors through increased beach patrols and around regions frequented by sharks.

Equally the safe tourism message can be applied in instances where drones can act as “range extenders” to cover communications in bush regions or black spot regions without the expensive infrastructure costs. More visitors can explore the bush based on their current communications 4G/5G without resorting to expensive satellite comms.

Accessibility of key services in remote regions: medical supplies etc.

Accurate tracking of unpredictable paths of events such as post cyclone damage surveys (added benefit of not having emissions), accurately tracking bushfires and better co-ordination of land/air operations.

Monitoring of environmental standards – deforestation, monitoring cruise ship’s effluent discharge within Australian waters. Depending on the capability of future eVTOLs, sampling from places such as Great Barrier Reef to monitor reef health.

Maritime patrol of Australian EEZ.

Criminal surveillance in a similar manner or better to police helicopters of today. Less risk – can operate in inclement weather, not bound by matters such as fatigue (remote operator fatigue is something to consider).

Farm application: herd control especially in the Northern Territory and Central/Northern Queensland regions; frost control for wineries?

A lot of...

Drones are one of the most promising and versatile innovation to be adopted to many purposes such as: rescue operations and healthcare, geographic mapping, law enforcement, safety inspections, agriculture, wildlife monitoring, weather forecasting, aerial photography bomb detection, surveillance, air strikes, filming and journalism, shipping and delivery disaster management, etc.[]

eVTOL: rapid urbanization and urban mobility, multi-mode travel, medical assistance, personal use, advanced aerial mobility operations, delivery use, military use and many others.

7. What are the most significant barriers to realising these opportunities?

Public perceptions – a lot of education around protecting privacy is needed. The education will need to focus on explaining regulations, penalties for perpetrators against the potential benefit that drone and eVTOL brings to commerce, sustainability and better delivery of services, particularly in regional areas and for activities where drones and eVTOL replaces humans in dangerous operations – evacuation, rescue services.

The “noise” issue will need further discussion – the model in the policy paper takes into account the key concerns but the greater public will need to be educated and convinced of the greater benefits vs any perceived negatives.

Range – advances in improving range or having the ability to have redundant power on board. Future advances could consider rapid charging solar options to charge more than one source of battery power.

Clear policies, procedures and education processes to encourage massive use of these technologies by observing issues primarily related to safety, security and privacy issues. In my opinion and because my expertise I understand that most of innovations emerge to help the society and industries, the problems related to the use of these new technologies are not inherent to them, these issues are intrinsic to how and what intention the "human being" is using them.

Even though we have a chance to push these technologies forward in the next few years, the excess of regulation can be a hurdle. The right amount of regulation, just enough to make the system safe and secure is paramount.

8. What issues or actions should the government prioritise to facilitate the growth of emerging aviation technologies?

More research overall into the effectiveness of the roll-out of the technologies. Review the application and effectiveness of proposed regulations in relation to speed, flight paths etc through trials.

R&D into Big Data and AI in the context of eVTOL and drones should be another area – how can we develop technologies that talk to each other to optimise the outcomes whether it be for the drone/eVTOL itself or for other support/backup aircraft e.g. optimising fuel and fire retardant for a bushfire mission.

Define and detail policies and procedures related to the frameworks proposed in the core principles. In addition, work together with drones manufactures to follow new advances and integrations towards safety, security and possible tracking measures.

Climate change and the need for cleaner low-carbon fuels and new technologies such as electrification.

Understanding the impact of COVID-19 on aviation as an industry and consumers, it won't be the same again.

9. To what extent should Australia's approach be harmonised with approaches taken in other countries?

Craft standards (whether it be passenger or cargo or lighter drone versions) needs to have some global standards of build and operational standards to allow similar like for like comparison and minimise compatibility issues. It also paves way for new industries to be set-up in Australia to make component parts for the craft for export or providing inputs towards standardised technologies that power and share information for the craft operations. Common approaches allow for greater adoption, uptake and learnings from new aviation technologies.

- Europe and the UK to look to for their policy work (government and industry) especially in supporting new fuels, new cleaner technologies and supporting aviation towards a low-carbon transition.
- For example see:
 - <https://researchbriefings.files.parliament.uk/documents/POST-PN-0615/POST-PN-0615.pdf>
 - <https://researchbriefings.files.parliament.uk/documents/POST-PN-0616/POST-PN-0616.pdf>
 - https://www.sustainableaviation.co.uk/wp-content/uploads/2020/02/SustainableAviation_CarbonReport_20200203.pdf

10. Are there other issues that the Australian Government should consider?

- Protecting the craft from operational hackers.
- Having adequate resources to have back-ups to deal with malfunctions, power generation and power supply reliability.
- Responsible approach to future planning and development for the roll-out of craft that balances social, economic and environmental pursuits.
- Security around data warehousing and data sharing.
- Operations can be automated and/or remote controlled in real time. Concerns around operator fatigue, system-maintenance/reliability

Potentially, more concerns on terrorism threats. Overall, the main concerns are comprehensively discussed with relevant measures addressing and covering primary points. This is an excellent issues paper. I am sure this can contribute a lot to drones and eVTOL adoption and diffusion around Australia.

It would be timely to develop national policy that considers opportunities and risks associated with emerging aviation technologies more broadly, for example considering and covering a broader context and remit of new industries and concepts such as new fuels (hydrogen, e-fuels, electrification etc.), emerging plane designs, ground fleet technologies and aviation responses for crises such as COVID-19.