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October 30, 2020

Department of Infrastructure, Transportation, Regional Development and Communications

RE: Joby Aviation Comments on Emerging Aviation Technologies National Aviation Policy Issues Paper

Sent via E-mail: drones@infrastructure.gov.au

Joby Aviation (Joby) is pleased to respond to the Australian Government's Department of Infrastructure, Transport, Regional Development and Communications Emerging Aviation Technologies paper on National Aviation Policy Issues (whitepaper). As the paper notes, "this...is the first step towards development of a national policy for the management of drones and other emerging aviation technologies".¹

INTRODUCTION

Joby is actively working towards the development of a piloted all-electric aeroplane that can also take-off and land vertically; the program is on track for FAA certification and commercial operations in the U.S. in late 2023. Joby will be the airplane manufacturer and operator, which makes us extremely qualified to respond to the portions of the whitepaper that apply to electric vertical take-off and landing (eVTOL) operations.

The Australian government has been and continues to be one of the most forward leaning governments in the world regarding the integration of emerging aviation platforms into their airspace. Joby applauds the Australian government for this work and recognizes that the practical approach being taken will enable Australia to be one of the earliest adopters of eVTOLs. While these technologies and the sustainable transportation they enable have the

¹ See, National Aviation Policy Issues Paper on Emerging Aviation Technologies, page. 2



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ability to create thousands of jobs and provide millions in economic activity, it is critical that the right regulatory framework is in place to enable these operations.

Joby applauds the whitepaper's intent and believes that it lays the foundation for a strong national strategy to allow for the integration of emerging aviation technologies into their airspace. However, we believe that the paper could be strengthened to adequately address the ability and benefits of using the existing regulatory environment for initial eVTOL operations.

EMERGING AVIATION PLATFORMS ARE ALL NOT THE SAME, AND NEED TO BE LOOKED AT BASED ON THEIR INDIVIDUAL CHARACTERISTICS

The whitepaper correctly identifies that there are multiple types of emerging aviation technologies being considered, including many types of small Unmanned Aircraft Systems (sUAS) and a wide range of manned eVTOL concepts. The design considerations and the operational characteristics of unmanned and manned aircraft differ dramatically, and Australia should use caution in addressing the needs of these operating communities; additionally, within emerging manned and unmanned communities there are dramatic differences. For example, at Joby we are bringing to market a piloted, electric aeroplane which fits into the existing air traffic and aviation operational system without need for many adaptations from today's system. Just as it is important to understand and plan for new technologies it is of key importance to assure that this process doesn't delay or overly complicate the ability for designs such as Joby's to seamlessly integrate into the existing system.

eVTOL will carry passengers in urban and rural areas at similar altitudes to those traditionally used by similarly sized general aviation aircraft. The leading eVTOL



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manufacturers plan to certify their vehicles as airplanes that have the ability to takeoff and land vertically. For many, if not most eVTOL platforms, the airplane will fit into the existing regulations, perform and operate much as existing aircraft do today. By contrast, sUAS will operate largely under 400 feet, weigh less than 55 pounds and perform missions such as package delivery or infrastructure inspection. Based on their operational characteristics sUAS require new regulations around the world to operate.

Despite these distinctions, the whitepaper at times attempts to treat the two platforms as largely as one which could lead to unintended safety risks in the airspace. Specifically, the sUAS industry has long identified UAS Traffic Management (UTM) and Remote ID as key enablers of their most economically valuable operations since many nation's Air Navigation Service Providers (ANSPs) have announced that they do not intend to provide services under 400 feet where sUAS will mostly be operating. The eVTOL industry, however, can and will operate in airspace relying only on traditional Air Traffic Control (ATC) services and procedures and should be required to meet the same equipment requirements of the aircraft operating around them.

Given the realities of the individual aircraft's operational environments, the safety of the airspace could be put at risk if eVTOL were required to utilize different traffic management services and have different equipment than the rest of aircraft operating around them. UTM and Remote ID are important steps to enable low level operations for UAS, but their need for initial eVTOL operations are less clear.



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Joby believes that it is important to recognize the differences amongst the platforms and to put policies in place that make sense for that individual platform--not a one size fits all solution for all emerging aviation technologies.

TIME HORIZONS MUST BE ACCURATE TO DEVELOPMENT A PROPER REGULATORY FRAMEWORK

The whitepaper correctly notes, there will be multiple time horizons for full scale operations that are referred to as “Horizon 1” which encompasses the next 5 years, “Horizon 2” which encompasses years 5-10, and “Horizon 3” which encompasses years 15-30.² Joby fully agrees with the whitepaper’s use of these horizons and recognizes that initial operations can and should be handled differently than operations once fully scaled. As the whitepaper correctly states, “the first eVTOL vehicles are expected to enter service in Australia around 2023-2025 and will initially include a pilot”³ thus taking place in Horizon 1.

That being said, as noted above, eVTOLs are on track to be type certified as airplanes, initially piloted, and operate in the same airspace as general aviation and helicopter operations today. This includes taking advantage of the existing services and equipage in use today such as receiving air traffic control services and utilizing ADS-B in/out. These vehicle characteristics therefore enable use of the existing regulatory environment to allow eVTOLs to integrate into the airspace safely and effectively, as well as give manufacturers certainty.

To enable a safe and efficient airspace, these aircraft all must be working together, using the same services and rules. Over time, as operations and autonomy scale, the volume

² iBid., p. 14

³ iBid., p. 10



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of new users and vehicle types in the airspace may require regulatory changes that will enable new services and procedures including the implementation of new traffic management platforms like UTM. If a new traffic management system is instituted too soon, it risks the safety of the airspace and/or over burdening new eVTOL operators with redundant equipage requirements.

This need was recognized by the United States' Federal Aviation Administration in their recently released Urban Air Mobility CONOPs 1.0 which focuses on initial eVTOL operations.⁴ In the CONOPs eVTOL operators use standard aircraft equipage and communicate with existing ATC services as necessary. This approach is complementary to the work of the National Aeronautics and Space Administration (NASA) which is looking at building a CONOPs around hundreds of simultaneous operations in one location,⁵ which reflects scaled operations and thus the potential need for a new traffic management system.

Joby believes that the Australian government should work with industry to produce a proper timeline for when a new UAS Traffic Management (UTM) system is needed for eVTOL operations which aligns with operational realities and volume projections.

PILOT PROGRAMS RISK INNOVATION AND ECONOMIC BENEFIT

The whitepaper references the formation of an “initial pilot program to be undertaken, in close consultation with industry, to gain an understanding of the technology capability”⁶.

⁴ See, Federal Aviation Administration Concepts of Operations v1.0, Urban Air Mobility, https://nari.arc.nasa.gov/sites/default/files/attachments/UAM_ConOps_v1.0.pdf

⁵ See, National Aeronautics and Space Administration's UAM Maturity Level Definitions (slide 3), https://evtol.news/_media/PDFs/eVTOL_NASA_Hackenberg.pdf

⁶ See, National Aviation Policy Issues Paper on Emerging Aviation Technologies, p. 19



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Pilot programs have been utilized by governments around the world in order to gain an understanding of new technologies.

In 2017, the United States launched the Integrated Pilot Program (IPP) for sUAS.⁷ The program, which formally concluded on October 25, 2020, has been instrumental in the development of sUAS to perform operations such as package delivery, pipeline inspection and more. However, this program was necessary given the new regulations necessary to perform the majority of sUAS' intended missions. For example, sUAS package delivery, flying beyond visual line of sight, and flying at night all require new regulations. In contrast, the initial eVTOL manufacturers are building vehicles intended to be certified, piloted, and operated under today's rules. Any use of a pilot program could directly impact the development of eVTOL, as well as limit the economic and societal benefits that will accompany it.

It is critical that governments around the world work with industry on integrating eVTOL into the airspace using these existing regulations. In the place of a pilot program, Joby would recommend that the Australian government works with industry to learn from initial operations and then utilize those learnings for the development of any Flight Information Management System (FIMS) that will be necessary for the eventual eVTOL operations that will be managed by a UTM system.

CONCLUSION

⁷ See, FAA UAS Integration Pilot Program information, https://www.faa.gov/uas/programs_partnerships/integration_pilot_program/



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The Australian government is taking a very measured and calculated approach when it comes to the integration of emerging aviation technologies into their airspace. Joby is committed to working with all relevant stakeholders as the Australian government continues to develop their national strategy around emerging technologies.

Respectfully Submitted,

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