For discussion
on 12 December 2017

Legislative Council Panel on Economic Development

Regulation of Unmanned Aircraft Systems in Hong Kong
Consultancy Study and Way Forward

PURPOSE

This paper briefs Members on the progress of the consultancy study and the preliminary proposals concerning the regulation of unmanned aircraft systems (UAS).

BACKGROUND

2. The UAS technology evolves rapidly and its application is increasingly versatile in recent years. Governments around the world are actively reviewing how their regulatory regimes can cope with the latest technological development and address the aspirations of the public and commercial operators for different uses of UAS (e.g. for commercial or recreational purposes). Generally speaking, given that each city is unique in its environmental factors such as geography, population density and building heights, and in the absence of international standards[1] on UAS regulation, governments around the world, taking into account local situations, formulate policies and regulatory regimes for UAS which suit their local environments and features well.

Existing Legislation on Regulation of UAS in Hong Kong

3. In Hong Kong, UAS are classified as aircraft and are governed, as far as aviation safety is concerned, by the civil aviation legislation. The Civil Aviation Department (CAD) is committed to ensuring aviation safety, including UAS operations, such that these operations are performed in compliance with flight safety rules. According to the prevailing laws, any

[1] At the moment, the International Civil Aviation Organization (ICAO) only provides online ICAO UAS Toolkits as guidance for Contracting States to formulate their requirements for UAS operations. The ICAO has yet developed any standards and rules for UAS operations. It is anticipated that the ICAO may promulgate safety standards for cross-border flights of larger UAS in 2020.

operator of UAS, regardless of the weight of aircraft, must observe Article 48 of the Air Navigation (Hong Kong) Order (Cap. 448C). Under this provision, a person shall not recklessly or negligently cause or permit an aircraft to endanger any person or property. Articles 3, 7 and 100 of Cap. 448C also provide that an aircraft weighing above 7 kilograms (without fuel) can only fly if it has a Certificate of Registration and a Certificate of Airworthiness issued by the CAD. Furthermore, Regulation 22 of the Air Transport (Licensing of Air Services) Regulations (Cap. 448A) requires that any person using an UAS of any weight for hire or reward must lodge an application with the CAD before operations, and he/she must abide by the conditions of issue of the permit granted by the CAD. Apart from operating in a safe manner in accordance with the applicable civil aviation legislation, operators must also observe other relevant laws of Hong Kong, such as the Telecommunications Ordinance (Cap. 106).

CONSULTANCY STUDY AND RECOMMENDATIONS

4. To assist the Government in reviewing the appropriateness and effectiveness of the existing statutory requirements, and in exploring ways to refine the prevailing regulatory regime with a view to accommodating the technological development and diversified uses of UAS while further safeguarding public safety, CAD commissioned an overseas consultant[2] in March this year to conduct a study on the regulation of UAS. The objectives of the consultancy study are -

(a) to comprehend the regulatory requirements of overseas civil aviation authorities (including those in Asia, Europe and North America) and the International Civil Aviation Organization (ICAO)[3], particularly those with environments similar to Hong Kong's (e.g. with high population and building density); and

(b) to provide feasible recommendations to the CAD on the requirements and approach to the regulation of UAS, including the classification of UAS, registration and/or licensing regimes and the mapping of no-fly zone for UAS, in consideration of the local circumstances, technological development of UAS, and views of operators holding UAS permits issued by the CAD, UAS manufacturers, unmanned or model aircraft

[2] The overseas consultant is the Netherlands Aerospace Centre.

[3] Hong Kong, being part of China which is one of the 192 Contracting States of ICAO, has an obligation to follow the standards and rules promulgated by the ICAO.

associations, airlines representatives and government bureaux/departments etc. The CAD also requested the consultant to provide recommendations that can strike a reasonable balance between facilitating the use of UAS by the public and protecting public safety.

Key Recommendations of the Consultant

5. The consultant commissioned by the CAD has largely completed the study and planned to finalise the report at the end of this year. The consultant observed that, while there are no uniform standards, the international community has generally adopted a risk-based approach to classify and regulate UAS. After evaluating the relevant risk factors and with due consideration of the dense population of Hong Kong, the consultant made six key recommendations on the regulation of UAS in Hong Kong for public deliberation, which are outlined in the ensuing paragraphs: -

Recommendation 1 — Establishment of an UAS Registration System

6. The consultant recommended that the CAD to establish an online registration system for UAS owners and/or operators to make registration and register the serial numbers of their UAS so as to improve safety awareness and sense of responsibility of UAS owners and/or operators. In fact, UAS owners in the Mainland are already required to register and mark their aircraft, while in Europe, the proposal of UAS owner making registration and displaying relevant registration information on their aircraft is under consideration.

7. The consultant also recommended that the registration requirement for UAS could be based on the risks of UAS operations under a risk-based approach. For instance, no registration is required for an UAS that weighs less than 250 grams and operates within the specified operating limits (Category A1, see paragraph 9 for details). However, it is still subject to the relevant provision under the Air Navigation (Hong Kong) Order 1995 that a person shall not recklessly or negligently cause or permit an aircraft, including unmanned aircraft, to endanger any person or property.

Recommendation 2 — Risk-based Classification of UAS Operations

8. Taking into account ICAO's recommendation for a three-category risk-based model and approach to regulate the operational risks of UAS,

the consultant considered that the model is applicable to the circumstances of Hong Kong. Furthermore, the consultant is of the view that the CAD should no longer maintain the regulatory requirements tailored for different purposes of UAS operation[4] but should instead develop separate regulatory requirements based on the risk categories of UAS operations. We learn that the public also prefers the risk-based classification approach.

9. The proposed classification approach and key operating standards and requirements are as follows. Details about the categories of the proposed classification, operating requirements and limits are set out at **Annex**.

(I) Category A — "Low-Risk" Operations: "Category A" comprises sub-categories of "Category A1" (UAS below 250 grams) and "Category A2" (UAS weighing between 250 grams to 7 kilograms). "Category A" UAS are allowed to be operated within specified limits, for instance, flights are to be operated during daytime, within visual range, and away from no-fly zones. These requirements are similar to those promulgated by the CAD in the existing safety guidance for UAS operations. No registration is required for "Category A1"; however, owners of "Category A2" must complete online registration for their UAS prior to operations.

(II) Category B — "Regulated, Lower Risk" Operations: "Category B" UAS should weigh below 25 kilograms, and should be subject to different operating limits from "Category A". If a "Category A" UAS exceeds its specified operating limits (e.g. in terms of height above ground or distance from the operator etc.), it will fall into "Category B", and should abide by the requirements of "Category B". Operators of "Category B" operations are subject to more stringent safety requirements and the UAS operations are subject to CAD's safety assessment and authorisation.

(III) Category C — "Regulated, Higher Risk" Operations: "Category C" covers UAS that weigh over 25 kilograms, which mainly include cross-border flights operated by larger UAS. As the ICAO would stipulate safety standards for such kind of UAS in 2020, which are expected to be similar to those set for manned aircraft for civil aviation operations, the consultant suggested that the CAD may, based on ICAO's standards upon their publication, formulate operating

[4] According to Article 22 of the Air Transport (Licensing of Air Services) Regulations, a person must obtain a permit from CAD before using an aircraft for hire or reward, regardless of weight, for the provision of air service and abide by the conditions stipulated in the permit.

requirements and conditions for this category with reference to local circumstances.

Recommendation 3 — Training and Assessment Requirements

10. Suitable training helps improve safety awareness and knowledge of UAS operators, thereby reducing the likelihood of accidents. In this connection, the consultant proposed that appropriate training and/or assessment requirements should be prescribed for different risk categories. For instance, any person operating a "Category A2" UAS should undergo at least 1 to 2 hours of basic training, and be subject to a simple assessment for the grant of a certificate; for "Category B" operations, an operator should undertake more advanced assessment on his/her competence. Both the Mainland and European authorities have stipulated training or licensing requirements for UAS operations being classified as higher risk.

11. Noting that training organisation or course on the use of UAS in Hong Kong does not currently require CAD's approval, the consultant advised that the CAD may consider devising learning objectives with established organisations, and authorise qualified organisations (including, for example, manufacturers) to conduct assessments for operators under the supervision of the CAD. Certain web-based training and assessment, where appropriate, may be administered (say for "Category A" UAS) so as to facilitate learning.

Recommendation 4 — Drone Maps for UAS Operators

12. The consultant is aware that the CAD now publicises information about the regions and areas where UAS operations are prohibited in textual format. Drawing on the experience of Singapore and Macao, the consultant considers that providing drone maps with visual images for UAS operators, with clear delineation of no-fly zones etc., via internet or mobile applications will further facilitate operators' access to relevant safety information.

Recommendation 5 — Prescribing Insurance Requirements for UAS

13. At present, UAS operators applying for permits to use UAS for commercial purposes are required to purchase third-party insurance for every single operation, similar to the existing practice of the United Kingdom. The European authority also requires operators to observe the applicable insurance law. The consultant noted the feedback from the public that it is not easy to purchase insurance for UAS operations in Hong

Kong, as well as diverging views on requirements of insurance coverage among different types of UAS operators. In view of the fact that potential risks may be posed to the public or other airspace users (e.g. manned aircraft for civil aviation purpose) by certain UAS operations, the consultant proposed that UAS operations of higher risk (e.g. "Category B" operations), whether for commercial or non-commercial use, must be covered by insurance. As for UAS operations of lower risk (i.e. "Category A" operations), since the UAS are lighter and are subject to operating limits, the consultant does not see any practical needs for mandating operators to purchase third-party insurance. It is expected that, with the increasing use of UAS, operators may purchase insurance on a voluntary basis in order to secure insurance coverage.

Recommendation 6 — Indoor Operations of UAS

14. The consultant also stated that indoor operations of UAS have become increasingly popular, such as first person view (FPV) drone racing, UAS training, indoor maintenance inspection and security patrol, etc. Earlier this year, a UAS was operated in close proximity to the crowd in a large shopping mall, which generated public safety concerns. Indoor UAS flights are bound by Article 48 of the Air Navigation (Hong Kong) Order 1995, i.e. a person shall not recklessly or negligently cause or permit an aircraft, including UAS, to endanger any person or property. However, it is arguable whether this provision and requirement is adequate, whereas most countries do not have a ready answer to the regulatory approach to indoor UAS activities yet. The consultant recommended that the CAD should conduct further study on indoor UAS activities and the associated safety considerations while keeping in view overseas practices, before formulating relevant standards and requirements that are suitable for local circumstances.

Proposed Implementation Timeframe

15. With regard to the above recommendations on enhancing the regulatory regime for UAS, the consultant considered that the CAD could develop a strategic framework of implementation measures in both short-term (2017-20) and medium/long-term (2020 onwards) approaches, so that the Government and stakeholders could consider the feasibility, priority and resource allocation in respect of the recommended measures as a whole.

16. In the short run (2017-20), the CAD may first formulate relevant requirements for Category A "Low Risk" Operations and Category B

"Regulated, Lower Risk" Operations, such as establishing a registration system as mentioned above, risk classifications and associated operating requirements, production of drone maps, laying down requirements for authorising UAS training organisations, qualified institutions etc. to deliver UAS training and assessment. In the longer run, the CAD should, based on the safety requirements to be promulgated by the ICAO in 2020 in respect of "Category C" operations, as well as local circumstances, impose appropriate requirements on UAS operations under this category. In parallel, study should be conducted as to whether the regulation of indoor UAS operations should be stepped up. Prior to that, the CAD could set out general safety guidelines for indoor UAS operations for reference of operators, and property owners or managers.

WAY FORWARD

17. The CAD considers that the findings and preliminary recommendations of the consultancy study provided a good foundation for the formulation of policy and regulatory blueprint for UAS operations. In the light of the fact that the operations and regulation of UAS involve a myriad of considerations, such as the enforcement and monitoring angles, and may affect various stakeholders, including operators of UAS for recreational or commercial uses, UAS manufacturers, unmanned/model aircraft associations, and government bureaux/departments, CAD will, together with relevant policy bureaux and departments, study the recommendations of the consultancy study in-depth, and put forward a regulatory proposal for UAS operations that suits local environment and circumstances well with due regard to the unique circumstances of Hong Kong and relevant policies and resources involved.

18. When the Government receives the final study report and summary from the consultant, the CAD will publicise the report and consult the public on the final recommendations made by the consultant. CAD's current plan is to commence public consultation in the first quarter of 2018 which shall be completed by mid-2018.

ADVICE SOUGHT

19. Members are invited to note the content of this paper and give their views.

Transport and Housing Bureau
Civil Aviation Department
December 2017

Annex

Operating Requirements and Limits recommended by the Consultant

1. Prescribing **risk-based operating requirements**, i.e. the higher the operational risks of UAS, the more stringent the control and requirements for the persons concerned. Some examples are:

	Category A1 (≤ 250 g and operations)	Category A2 (250 g -7kg and operations)	Category B (0 - 25kg and operations)
Registration of UAS and owners	-	√	√
Registration of operators	-	-	√
Operations manual	-	-	√
Operating limits	√	√	√
Safety risk assessment	-	-	√
Accident or incident reporting	-	√	√
Enhancing operators' safety awareness	-	-	√
Basic training	-	√	N/A (See advanced training)
Advanced training	-	-	√

2. Prescribing risk-based **operating limits** according to the operational categories of UAS. Examples are as follows :

	Category A1	Category A2	Existing Requirements
Weight	< 250g	250g – 7kg	7kg
Registration	-	✓	-
Distance from other persons or buildings	> 10m	> 50m	> 50m
Distance from aerodrome	> 5km	> 5km	> 5km
Distance from the operator	< 50m	Visual line of sight or < 500m	Visual line of sight
Height above ground	< 100ft	< 300ft	< 300ft
Performance limitation	High speed prohibited	< 80km/hr	-
Visibility	> 1km	> 5km	> 5km