

## RPAS Airworthiness Considerations

1 **Purpose.** The purpose of this paper is to describe an outline approach to structure airworthiness considerations in the context of RPAS.

### 2 **Introduction.**

2.1 RPAS, as a subset of UAS, have been chosen as the initial focus since there is already widespread, concerted regulatory action to cater for RPAS. It is appreciated that in some circumstances, insisting on the requirement for a RP to be able to intervene to exercise full responsibility for safe flight at all times might, for example, increase risk or reduce airspace capacity. There is a need for early consideration of fully automatic flight.

2.2 The definitions of Urban Air Mobility (UAM) and Advanced Air Mobility (AAM) do not appear to be fully clear. For the purpose of this paper, UAM refers to intra-urban operations and AAM to inter-urban operations or those with a minimum flight distance of, say, 20km. UAM can assume continuous operations in a dense, cluttered environment with higher ground and air risk but with the possibility of a rich UTM ecosystem. AAM can assume dense and cluttered environments at terminal areas (as for UAM) but the converse (depending on traffic lane management) for rural and maritime transit.

2.3 The move towards a reduction in voice ATM with increased use of data services in the current, evolving ATM regime indicates options for convergence with the current vision of highly automated, data-driven UTM.

### 3 **Structured Approach.**

#### 3.1 Current RPAS in current ATM regime.

- 3.1.1 No human life on board the RPA
- 3.1.2 Primary risk/mitigation focus on third parties in air and on surface
- 3.1.3 Airworthiness consideration is based on a total RPAS 'system approach'
- 3.1.4 RPAS have to integrate with and be interoperable with current ATM regime
- 3.1.5 'Intrinsic risk' of any operational scenario/environment a major factor – the lower the intrinsic risk, the lower the need for RPAS mitigation

#### 3.2 Current RPAS in emerging ATM/UTM environment

- 3.2.1 No human life on board the RPA
- 3.2.2 Primary risk/mitigation focus on third parties in air and on surface
- 3.2.3 Airworthiness consideration is based on a total RPAS 'system approach'
- 3.2.4 RPAS have to integrate with and be interoperable with current ATM regime as altered by emerging UTM 'ecosystem' and with UTM
- 3.2.5 If the safe operation of the RPAS relies on the provision of UTM data services, what is the impact on RPAS airworthiness and how is the QoS of the data services assured? (NB legal and insurance aspects)
- 3.2.6 'Intrinsic risk' of any operational scenario/environment a major factor – the lower the intrinsic risk, the lower the need for RPAS mitigation

#### 3.3 AAM/UAM in current ATM regime – human pilot (**therefore not RPAS**)

- 3.3.1 Human pilot and passengers on board the aircraft
- 3.3.2 Primary risk/mitigation focus on safety of life on board
- 3.3.3 Airworthiness consideration is based on traditional parameters, such as for helicopter passenger transport, general and commercial aviation
- 3.3.4 Aircraft (systems) have to integrate with and be interoperable with current ATM regime

#### 3.4 AAM/UAM in current ATM regime – no human pilot (RPAS)

- 3.4.1 Human passengers on board the aircraft

- 3.4.2 Primary risk/mitigation focus on safety of life on board
- 3.4.3 Airworthiness consideration is based on a total RPAS 'system approach' to meet standards as for helicopter passenger transport, general and commercial aviation
- 3.4.4 RPAS have to integrate with and be interoperable with current ATM regime
- 3.5 AAM/UAM in emerging ATM/UTM environment – human pilot (**therefore not RPAS**)
  - 3.5.1 Human pilot and passengers on board the aircraft
  - 3.5.2 Primary risk/mitigation focus on safety of life on board
  - 3.5.3 Airworthiness consideration is based on traditional parameters, such as for helicopter passenger transport, general and commercial aviation
  - 3.5.4 Aircraft (systems) have to integrate with and be interoperable with current ATM regime as altered by emerging UTM 'ecosystem'. For human-piloted aviation this may be a very different environment, in some circumstances, from the current ATM regime
  - 3.5.5 If safe RPAS operation relies on the provision of UTM data services, what is the impact on airworthiness and how is the QoS of the data services assured? (NB legal and insurance aspects)
- 3.6 AAM/UAM in emerging ATM/UTM environment – no human pilot (RPAS)
  - 3.6.1 Human pilot and passengers on board the aircraft
  - 3.6.2 Primary risk/mitigation focus on safety of life on board
  - 3.6.3 Airworthiness consideration is based on a total RPAS 'system approach' to meet standards as for helicopter passenger transport, general and commercial aviation
  - 3.6.4 RPAS have to integrate with and be interoperable with current ATM regime as altered by emerging UTM 'ecosystem' and with UTM
  - 3.6.5 If safe RPAS operation relies on the provision of UTM data services, what is the impact on airworthiness and how is the QoS of the data services assured? (NB legal and insurance aspects)