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Notice of Proposed Amendment 2020-07
UAS BVLOS operations over populated areas or assemblies of people in the specific category
Drone Alliance Europe comments

DAE appreciates the vital role that EASA and Member State regulators play in ensuring the safe operation of UAS. DAE encourages EASA to move swiftly to clarify the regulatory framework to enable beyond visual line of sight (BVLOS) operations over populated areas. It is essential that any approval framework for these operations is risk-based and performance-based. DAE believes that arbitrary or overly prescriptive requirements may compromise safety, limit innovation, and stifle the development of the UAS industry in Europe.

DAE believes that actual air and ground risk, and their mitigations, should be considered in determining the requirements for operational or airworthiness approval. Airworthiness certification should be required only if the risks cannot be adequately mitigated without such certification. For many BVLOS operations over populated areas, the Specific Operations Risk Assessment (SORA) model developed by JARUS provides a robust and evidence-based framework for assessing and mitigating these risks. DAE encourages EASA to adopt SORA 2.0 in full (Option 1)as an acceptable means of compliance for these operations, and reserve certification for operators and operations for which SORA dictates certification.

DAE is concerned the Notice of Proposed Amendment (NPA) is proposing, as a general concept, that BVLOS operations over people will require type and airworthiness certification and that applicants will received no credit for any mitigation measures. This is not consistent with the SORA methodology and it would discourage applicants from applying non-traditional airworthiness mitigations, which may result in a reduction in safety.

In these comments, DAE provides its views on how EASA should address safety, complexity, and innovation considerations relevant to BVLOS operations over people.

1. **Safety.** SORA incentivizes a range of new and effective mitigation measures for UAS design and operation, many of which are not possible with traditional manned aviation. It imposes a target level of safety that is equal to or better than the target level of safety for manned aviation. Abandoning SORA for these operations would mean that designers and operators are no longer incentivized to adopt these effective but non-traditional mitigations.

2. **Complexity.** The proposed alternatives would mean that operators must work with multiple entities – both NAAs and EASA – to obtain operational and airworthiness approval under different frameworks. For small operators or new entrants, that complexity is likely neither time- nor cost-effective and may make approval to operate impractical if not impossible.

3. **Innovation.** Unduly onerous requirements and complex processes may limit the growth of an innovative and evolving UAS industry in Europe, particularly among smaller 'homegrown' operators who intend to fly in a single Member State, or other new entrants.

The JARUS SORA 2.0 model should be adopted

The SORA model 2.0 developed by JARUS reflects a consensus of regulatory and industry leaders (including significant representation by representatives of EASA and EU Member States). DAE believes that there needs to be a clear and persuasive reason to justify divergence from the JARUS guidelines, which already scales aircraft and operator requirements as risk grows, and does not believe the NPA provides such justification. The JARUS SORA is a risk-based, performance-based, and operations-centric approach that provides a consistent evidence-based review and approval framework for operations in the specific category.

- **SORA is risk-based.** SORA imposes requirements that reflect the specific ground risks and air risks applicable to a UAS in its specific CONOPS and operating environment. SORA avoids "one size fits all" requirements that may not be appropriate for particular operations or systems.
- **SORA is performance-based.** SORA defines the target level of safety, and recognizes different mitigation measures to achieve the desired performance, including design or operational mitigations. Under SORA, operators must demonstrate that they meet or exceed the same overall target level of safety, regardless of the CONOPS or operating environment. That target level of safety is equivalent to, or exceeds, the target levels of safety for other forms of transportation.
- **SORA is adaptable.** SORA acknowledges that UAS designs may change rapidly in response to improved technology, or new considerations, such as community feedback and public acceptance. The safety impact of any changes can be assessed quickly against the desired performance, and improvements can be incorporated without a lengthy recertification process.

If the EASA approach is indeed risk based, it should provide applicants the ability to apply for approval of specific category operations based on mitigation measures provided through design as well as operational safety mitigations. A certification requirement, compounded with the absence of a defined UAS specific certification standard, will stifle the development and application of future BVLOS operations.

The NPA's SAIL assessment should be reconsidered

The NPA states on pages 9 and 15 that BVLOS operations over a populated area using a UAS over 4 kg or over an assembly of people having kinetic energy over 80 joules are considered to be high-risk for third parties on the ground, and therefore Steps 2 and 3 in the AMC do not apply. SORA already accounts for the change in population density, and DAE believes the SORA process should apply throughout the risk assessment process, without limitation. The proposal to make Steps 2 and 3 inapplicable removes the possibility of benefiting from risk mitigations such as contingency systems (parachute), flying over less populated areas, and other mitigation measures.

DAE believes that requiring all BVLOS operations using a UAS over 4 kg over a populated area or a UAS with a kinetic energy more than 80 joules over an assembly of people to be SAIL VI (NPA page 6) would dramatically reduce the incentive for operators and drone manufacturers to implement mitigation measures that are shown to improve the safety of the operation, including flying over less populated areas, reducing the impact area, and reducing the impact dynamics of the drone via parachute or other means (M2). This requirement would create negative unintended consequences on safety outcomes, contrary to the intent of the NPA. For example, a manufacturer or operator of a 3.99 kg drone would be disincentivised from incorporating redundancy, a parachute, or other features that would increase safety as it would push the mass above this arbitrary 4 kg threshold and impose a greater regulatory burden.

Citing a single incident (Matternet) as prompting the need for EASA to revisit the specific assurance and integrity level (SAIL) (NPA page 4), is not, in DAE's view, a fair representation of the overall risk picture posed by UAS operations. DAE adds that the investigation of this incident to did not identify any flaw in the SORA methodology. The NPA uses this one data point to justify its assessment that BLVOS operations pose an elevated risk level, when in fact there is no inherent difference between the intrinsic ground risk between a VLOS and BVLOS operation. Further, the NPA does not recognise the many examples where drones have supplemented and in some cases replaced the use of manned aircraft for elevated risk operations (e.g., infrastructure inspection, surveillance, and search and rescue). The net result of these UAS operations is a lower societal ground and air risk associated with executing those operations. This should be taken into account when evaluating risk in the context of future projected BVLOS operations. Under the NPA's Option 3, a similar BVLOS operation in the future over a populated area would no longer be incentivized to adopt mitigation measures (such as a parachute) or fly over lower-density areas, increasing the risk to the people on the ground.

From a risk assessment standpoint, drawing an arbitrary distinction between VLOS and BVLOS operations as the basis for whether a restricted category type certificate (TC) or should be mandatory or optional disregards the underlying reason for specific category operations in the first place, which is to make a safety assessment specific to each applicant's operations. Advances in technology and automation enable BVLOS operations to be conducted as safely or more safely than having to rely on human visual

observers. Therefore, there should be no distinction between the certification requirement over 4 kg.

Relying on durability and reliability means of compliance before development of special conditions

DAE agrees with the statement that there are not yet airworthiness certification standards for UAS, and thus EASA must develop "technical specifications" that are "special conditions." DAE supports EASA's development of a Delegated Regulation to address continuing airworthiness as part of the certified category, and to allow certified UAS to be operated in the specific category with a commensurately adapted set of continuing airworthiness requirements.

The NPA adds that, "In the absence of certification specifications (CS) for the type certification of this type of product, EASA will develop a complete set of dedicated technical specifications in the form of special conditions." Because there are no special conditions established for a restricted category UAS certification, in the absence of that standard, a flight test and safety analysis means of demonstrating airworthiness (e.g. the FAA's Durability and Reliability means of compliance) should be a suitable interim substitute for a restricted TC. If the restricted TC is the only accepted means of satisfying airworthiness requirements, it could have the net effect of shutting down specific category operations achieved through the SORA process. Until such time, EASA will require the issuance of a "permit to fly." DAE asks for clarification that such approval would be based on a suitable demonstration of the durability and reliability of the UAS, and that in the interim, the permit to fly would obviate airworthiness certification.

SORA is adaptable and flexible enough to perform ground risk analysis of operations over critical infrastructure

Additional amendments are proposed to address potential risks involved with operations over "critical infrastructure" (NPA pages 9 and 12). While there are EU initiatives to protect critical infrastructure, DAE does not know why the current SORA model is not sufficient to address these particular risks, while respecting regulatory airspace prohibitions and restrictions. SORA is adaptable and flexible enough to factor any such risks into the process (e.g., by reviewing flight routes in light of critical infrastructure as part of the M1 mitigation).

Concerns with proposed ground risk analysis

The ground risk analysis proposed by the NPA is too binary: the regulation needs a more granular approach in assessing the geographical density of population. Villages and industrial areas are not taken into account but are more relevant to real commercial situations than the concepts of "sparsely populated areas," "populated areas." An area of operation is to be considered "populated" when it does not match the definitions of "controlled ground area," "sparsely populated," or "assembly of people." (NPA at page 5.) Consequently, a description of "populated area" is proposed in the new GM2 to AMC1,

Article 11, (NPA page 23), but an area still may be considered “sparsely populated” provided that the UAS operation within the portion with a higher population density lasts less than 5% of the operational time. This is a confusing and unwieldly concept to determine the ground risk. The ground risk assessment should be based on the actual estimate of the amount of uninvolved persons being overflown during the operation. The use of static census data is an overly generic data point; the use of a percentage of operational time does not address the more relevant density of population being overflown at the time of the operation. The soundest approach is for the applicant to provide data that clarifies how many unsheltered individuals are estimated to be within a specific area of operations and use that data as the basis for the required safety mitigations.

This is another matter in which DAE recommends that EASA work with JARUS to develop a harmonized standardized and evidence-based approach to assessing ground risk. The SORA model can be adapted to consider a continuum of risk from operations in remote, sparsely populated areas to highly populated areas, including intermediate configurations such as suburban areas or industrial areas. This would allow a step-by-step approach for both applicants and authorities that would be better for both. DAE supports the principle to start from the quantitative approach being addressed by JARUS WG 6 in the upcoming Appendix F.

The NPA’s Impact Assessment underestimates certification costs

The NPA recognizes that EASA’s preferred Option 3 would impose significant costs on manufacturers and operators (NPA page 29). Even so, DAE believes the NPA underestimates the economic impact of certification. Certification costs include crew training and maintenance, but also involve several years’ involvement of a full certification team. The very high price of this certification will thus not be compatible with the economic model of drones operations. This economic impact would discourage many European manufacturers. Similarly, will EASA have sufficient resources for this workload, or will EASA mandate national authorities, notified bodies, or qualified entities to take over some of the responsibilities in the application and approval processes?

In addition, many newer drone technologies do not currently have standards or the ability to be certified using traditional aircraft certification processes. Option 3 risks adding substantial costs and time delays in the certification of these new technologies, disincentivising their development, especially for smaller companies.

DAE prefers Option 1

Option 1 – using the JARUS SORA for specific category BVLOS operations over people – is the most viable starting point. As noted, SORA accounts for the relative risk of UAS in different operating environments, including BVLOS in populated areas. SORA encourages manufacturers and operators to incorporate effective M2 (impact characteristics) and M3 (emergency response plan) mitigation measures. Other alternatives, such as Option 3, would mean that operators cannot claim credit

for these mitigations and may be less incentivized to incorporate them. That could have significant negative consequences, since these mitigations can positively improve safety (e.g. safer airframe design) and social acceptance (e.g. engaging first responders).

Option 1 adheres to the JARUS SORA framework and provides for the inclusion of emergent airworthiness standards through the introduction of the special conditions TC, which could be a required safety mitigation needed to satisfy a safety case for flight over certain population areas that dictate rigorous aircraft design and performance.

Options 2 and 3 are predicated on a certification standard that does not yet exist, make assumptions about populations being overflown that are overly generic and not very accurate, and are too prescriptive at this point in the evolution of the industry.

If it is indeed EASA's purpose to promote a risk- and performance-based approach to UAS development and deployment, DAE recommends EASA adopt Option 1.

These comments were submitted to EASA using the EASA Comment Response Tool format.