

Fact sheet on drone noise

Introduction

Unmanned aircraft, or 'drones', are an emerging new form of mobility that is expected to rise quickly. And with that comes a potential future noise and health problem. The EPA Network Interest Group on Noise has investigated this threat and prepared a technical report that explains why a new noise and health problem may indeed be expected from this development. The following factsheet summarizes the main findings of this report.

Use of drones

Current drones are typically suitable for short-distance (< 100 km) and low-weight (< 200 kg) transport of goods and soon also of people, as well as for surveillance and inspection. For delivery of packages and surveillance, drones are already in use, albeit in very small numbers currently. Urban air mobility is expected to increase rapidly in the next few years. It is seen by both industries and governments as a fast, safe and sustainable means of transport that will replace or add on to land-based transport. Use cases include public services, such as medical or emergency transport, but also commercial delivery of goods, such as for shopping and food delivery. First commercial operations of passenger transport by drones (air taxis) are expected by 2025. It may be expected that all Europeans will start seeing and hearing drones regularly in their living area before 2030.

Acoustics & perception of drones

Drones have a distinctive and unusual sound, depending on the model and type, that is shown to be more annoying than other transport sounds, including aircraft noise. Many drones use propellers that make tonal, buzzing or whining sounds that capture people's attention. The fact that the sound is currently unfamiliar, added to people's worries about safety and privacy, is an important factor for annoyance and related health impacts depending on the use case. Research shows that noise and environmental problems, including wildlife, are people's top concerns, although their general attitude towards urban air mobility is positive.

Regulations for drones

Regulations for drones exist on an EU level, both for type approval of the drones themselves and for the operators and operations, which contain some aspects of noise. Current type approval regulations provide sound power level limits for certain categories of drones, and specific measurement methods have been developed. For drone operations, regulations state that operators and pilots should avoid causing annoyance or impact nature, but without quantitative or SMART guidance. In general, it is the responsibility of local authorities to decide where and when drones are allowed to operate, within their local 'U-space'. As with regular aircraft, noise reducing measures are primarily taken at the source or in the form of routing and operational restrictions.

Conclusions

The Interest Group on Noise concludes that due to the expected rise of urban air mobility, combined with the acoustic characteristics of drones, there are justifiable concerns about their considerable future impact on noise and health. Even though there are undeniably positive aspects to drones in terms of economic development, sustainability and benefits from societal applications, this negative impact of drone noise on public health seems to be underrated.

Recommendations

- Noise from drones should be regarded as a serious threat to future public health and well-being. Governmental authorities as well as the drone industry should start discussing and communicating it as such, rather than a mere issue of societal acceptance.
- The Commission should consider and communicate noise from drone transport to be included in their definition of 'transport noise', as meant in the Zero Pollution Action Plan ambition to *reduce the share of people chronically disturbed by transport noise by 30%*. Development of a noise assessment method to enable inclusion of drone transport noise in strategic noise maps needs to continue. Given the acoustic and non-acoustic characteristics, existing exposure-response functions should be considered to be inadequate and updated or expanded for drone noise. Existing common noise indicators may not be representative for the particular sound and psychoacoustic indicators or penalty factors, like those existing for other noise sources, should be considered.
- Cities and local governments should be aware of their key role in the future of drone mobility, as they will need to decide and justify where and when drones may operate within their local airspace. They should familiarise themselves with the topic of drones and start thinking and discussing about local policy. They may expect requests for permissions to operate from drone service providers, as well as requests for prohibiting this from residents. Local citizens must be involved in decisions on where to locate vertiports, how to route drone traffic through the city, and more generally on the trade-off between opportunities and risks for urban air mobility. Cities should work together with other cities, as well as with environmental protection agencies and national authorities.
- Current drone (noise) regulations need to be regularly reviewed and updated as the real issues, including complaints, annoyance and health problems, will start to arise only after the number of drones has already increased beyond a point of no return.
- Further research should be undertaken by acoustic and drone experts together, as well as stimulated and facilitated by the EU and other governments. This includes also research into spatial planning and routing, as well as effective operational boundaries.
- The drone industry and service providers need to be aware of this potential future noise and health problem, should be open to discussion and work together with the noise and health community to prevent this, to develop a long-term stable and sustainable sector.
- Environmental acousticians and health experts must be open for discussion and cooperation with government and industry stakeholders and take an active position, to ensure that they are all well informed and aware of the emerging potential health problem, and actively seeking to prevent this.