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## **UNMANNED AERIAL SYSTEMS AND AIRSPACE SAFETY: SHARING A CROWDED AIRSPACE INTO THE FUTURE**

*SYSTÈMES AÉRIENS NON HABITÉS ET ESPACE AÉRIEN SÉCURISÉ: PARTAGE D'ESPACE AÉRIEN*

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**Introduction:** While drone aircraft have been in use for decades, these were tightly controlled for special uses and posed no threat to aviation safety or the flying public. In the past decade, technology has put drones—unmanned aerial systems (UAS)—in the hands of a vastly increased number of users, employing UAS for an ever-increasing range of purposes. The general public can easily afford 'personal' UASs capable of flight out-of-visual range; industry is racing to develop larger UAS for cargo delivery or even air taxi applications; and the military continues to develop new uses for larger and more capable UAS platforms, in solo, team, or swarm applications. The safety implications of these UAS are urgent and challenging.

**Background:** The hazards posed by UAS to aviation safety are principally related to physical contact. Hazards to operators range from minor lacerations from toy UASs to fatal injuries from collisions with larger unmanned aircraft; UAVs can also pose a noise hazard to operators. Studies have documented significant injury risk from collisions with humans, either as operators or bystanders. The risk to larger aircraft in the event of a collision is most problematic, as the urban airspace of the future becomes more and more crowded. Rotary-wing aircraft in particular are at risk due to their low-altitude flying environment and more vulnerable windscreens, exposed rotors, etc. As larger UAS become more common, the control of airspace and cyber-vulnerabilities will become critical.

**Summary:** UAS are increasing in number and practical applications. It is essential that UAS are designed and operated to protect the safety of users, the uninvolved public, and other users of the global airspace system now and in the future.