

Tomorrow in Nature: The future of small autonomous drones

Autonomous drones have experienced a surge in popularity, research and media interest in recent years, with multiple groups working on drones that can fly in crowded places for purposes as diverse as search and rescue, agriculture, parcel delivery and environmental protection. In a paper published in *Nature* tomorrow, NCCR Robotics director and head of the LIS at EPFL Dario Floreano and Robert Wood, head of the Microrobotics Lab at Harvard University, take a look at some of the advances that have been made and where drones are headed in the future.

The paper, entitled "Science, technology and the future of small autonomous drones", summarises challenges in design and manufacturing, sensing and control, and future research developments in the field of small drones. With commercial requirements for drones to be portable, more energy efficient and more cost effective, a number of design problems surrounding scalability are seen, including decreased propulsion and reduced power density of electromagnetic motors in smaller models. The authors look at alternatives that have been presented in recent years, especially those techniques, such as multi-modal locomotion and compound eyes, which have been inspired by biological studies, resulting in robots such as the RoboBee (using the bee as inspiration) and the DALER (taking from the vampire bat). Other methods utilise folding as an effective tool to scale down drones, as exemplified in NCCR Robotics' last news release on the self deploying foldable quadrotor.

Along with discussing issues relating to creation and running of small drones, reactive and cognitive autonomy and vision, the paper also neatly summarises some of the current laws surrounding regulation and considers the proximity to market of various types of drone.



References

D. Floreano & R. Wood, "Science, technology and the future of small autonomous drones" *Nature*, 521 (7553), pp. 460-466. doi:10.1038/nature14542 A pdf of the full article can be downloaded from Nature.

For further information please contact:

Linda Seward, Communication Officer at NCCR Robotics: linda.seward@epfl.ch, +41 (0) 21 693 73 16

For links to further reading and videos on NCCR Robotics projects featured in this publication please see:

NCCR Robotics Multimodal flying robots webpage including links to articles about Gimball, DALER, quadrotors and SVO.

NCCR Robotics

The Swiss National Center of Competence in Robotics (NCCR Robotics) is a federally funded programme bringing together robotics laboratories from EPFL, ETH Zurich, University of Zurich and IDSIA to work on wearable, rescue and educational robots.

Keep up to date with NCCR Robotics



CONTACT DETAILS

NCCR Robotics Director

Prof. Dario Floreano

Publisher

NCCR Robotics
Management Team

Editor

Linda Seward

Web Editing

Mayra Lirot / Pascal Briod

Design

Alternative
Communication SA

NCCR Robotics

Office ELG 231, Station 11

EPFL CH-1015 Lausanne

Switzerland

+41 21 693 69 39

nccr-robotics@epfl.ch / nccr-robotics.ch

