

LETTERS

Edited by Jennifer Sills

Biology's drones: Undermined by fear

IN HIS NEWS & ANALYSIS STORY "Drones flying high as new tool for field biologists" (2 May, p. 459), R. Schiffman reports the use of drone technology for conservation law enforcement to combat the surge in elephant and rhino poaching. This rush to deploy such technologies is based on compelling ideas, partly influenced by narratives that describe the current situation in terms of a war between poachers and conservation staff.

The reality of conservation is much more complicated, as many people live in or around protected areas and depend on them for fuel wood, medicines, and food (1). Seen from the ground and through their eyes, drones may be perceived as sinister technologies of surveillance or be associated with warfare and civilian casualties. Such negative perceptions could be seen as a return to fortress conservation, reducing support for protected areas and undermining the relationships on which successful research and conservation projects are built.

Given the rise in poaching activities, one could argue these negative risks are part of a necessary trade-off. However, there are two reasons for doubting the value of such a compromise. First, the long-term cost-effectiveness of drones in deterring poaching remains untested. Second, drone data will only be effective if fed into well-functioning management and legal

systems, which are lacking in many countries. Thus, funding for enforcement may be better spent on increasing park staff numbers, resources, and training; developing intelligence networks to catch poachers in the act and identify corrupt officials; and strengthening the judicial system (2).

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REFERENCES

1. W.M. Adams, J. Hutton, *Conserv. Soc.* **5**, 147 (2007).
2. R. Hilborn *et al.*, *Science* **314**, 1266 (2006).

Biology's drones: New and improved

IN THE NEWS & ANALYSIS STORY "Drones flying high as new tool for field biologists" (2 May, p. 459), R. Schiffman presents a new useful application of unmanned aerial vehicles (UAVs) in the field of monitoring wildlife, but the drones still have some limitations. The quadrotor UAVs that they use to drive elephants out of the woods or monitor tigers can only work for a maximum of 20 minutes and have to fly back to the ground station to recharge. In this case, the supervision time that biologists could get from the UAVs will be quite little.

To provide longer working time and

finish tasks in different flight conditions, scientists and engineers are working to improve the design of UAVs. At the University of Pennsylvania, researchers have added a mechanical claw at the bottom of a quadricopter (1) to allow the UAV to catch a target. At the University of Utah (2) and Tsinghua University, UAVs can land in hazardous terrain or even tree branches thanks to their biomimetic design.

Such improvements that merge bionics and robotics together will let UAVs fly inside caves, claw into tunnels, or perch on tress. Biologists or scientists in other fields will then be able to track their targets more effectively.

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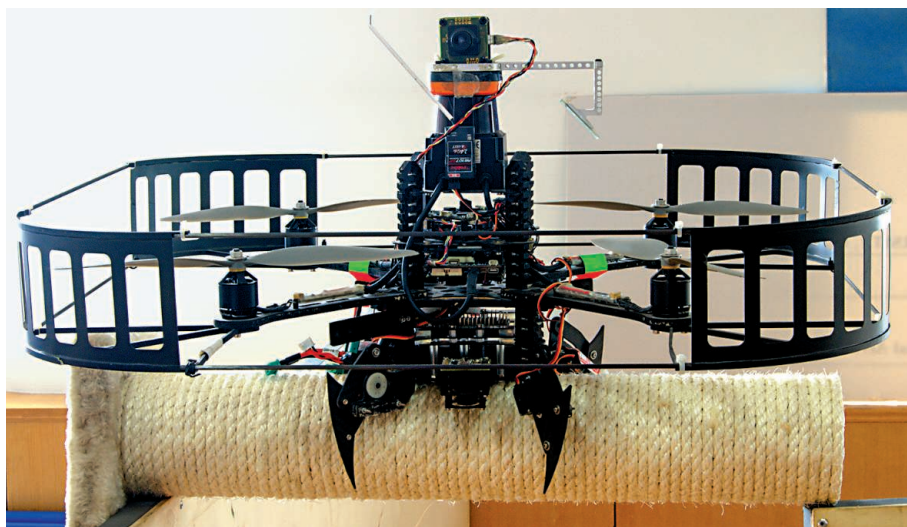
REFERENCES

1. J. Thomas, J. Polin, K. Sreenath, V. Kumar, "Avian-inspired grasping for quadrotor micro UAVs" (IDETC/CIE, Portland, OR, 2013).
2. C. Doyle *et al.*, *IEEE/ASME Trans. Mechatronics* **18**, 506 (2013).

Investigative bioethics

IN HIS PLENARY ADDRESS at the 2009 annual meeting of the American Society for Bioethics and Humanities, Carl Elliott challenged attendees to take up the role of the investigative reporter. Many past research scandals, he noted, were not brought to light by traditional scholarship of professional bioethicists. Rather, they were discovered through the diligent efforts of investigative journalists who followed evidence wherever it led and then shared their findings in a way that grabbed the attention of the American public. As newspapers continue to downsize or go bankrupt, Elliott argued, it should be the goal of the bioethics community to fill that role in the realms of clinical research and medicine. J. Couzin-Frankel's Feature "A lonely crusade" (23 May, p. 793) details Elliott's efforts to live by his own words.

I commend Couzin-Frankel for helping to shine a light into those "odd, interesting corners" of psychiatric drug trials of the kind Elliott is investigating. Serious questions remain unsettled about such research, not just the CAFE study in which Dan Markingson, who committed suicide 10 years ago, was a participant: questions of conflicts of interest, the distinctions between research and therapy, standards for assessing competency to provide informed consent, and the adequacy of the



A new, biomimetic design for flying robots allows them to land on a convex cylindrical structure.

regulatory framework under which this research takes place. As bioethics is still trying to sort out its features as a discipline, I hope it heeds the example of Elliott and his allies. Otherwise, these issues will not receive the critical examination they warrant and Markingson's story will be, sadly, one of many.

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Deep-sea protection: Coordinate efforts

THE PLIGHT OF deep-sea ecosystems in areas beyond national jurisdiction (ABNJ) has been persistently overlooked. As a consequence, they remain very poorly protected despite calls for action dating back more than a decade. In 2002, the United Nations General Assembly called upon intergovernmental organizations including the Food and Agriculture Organization, the Convention on Biological Diversity, and the UN Secretariat itself to urgently consider

means to reduce risks to the biodiversity of seamounts and other vulnerable deep-sea habitats within the framework of the United Nations Convention on the Law of the Sea (UNCLOS) (1). Since then, various international and regional bodies such as the International Maritime Organization (IMO), the International Seabed Authority (ISA), and Regional Fisheries Management Organizations (RFMOs) began exploring measures and regulations pertaining to shipment; oil, gas, and mineral extraction; and fishing and trawling (2). However, these efforts have been slow to materialize, in addition to lacking effective coordination. Therefore, we praise the call by K. J. Mengerink *et al.* ("A call for deep-ocean stewardship," Policy Forum, 16 May, p. 696) for the UN General Assembly to consider the resolution of governance issues of the ABNJ as a priority in its 2015 deliberations.

States agreed during the Rio+20 Conference to address the issue of conservation and sustainable use of marine biological diversity of ABNJ (3). This includes a call for the UN General Assembly to consider the wisdom of establishing an international instrument under the UNCLOS to overcome the lack

of coordination between different inter-governmental organizations and their respective mandates. Such an instrument could become more effective in promoting comprehensive oceans governance reform within the framework of an already established convention, together with fostering complementarity among relevant organizations.

We also recognize the paucity of funding to generate baseline, protection, and mitigation actions. At the same time, we question whether the multiplication of funding mechanisms would be practical or even desirable. We believe that the finance question should complement the resolution of the key governance issues, while building on existing platforms.

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REFERENCES

1. United Nations, A/RES/57/141 (www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/57/141&Lang=E).
2. E. B. Barbier *et al.*, *Nature* **505**, 475 (2014).
3. United Nations, The Future We Want (www.unccd2012.org/thefuturewewant.html).



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