

# Falcon-inspired drone has legs, will perch and land

January 29 2014, by Nancy Owano

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(Phys.org) —Adding legs to drones targeted for observation is the pursuit of a company with roots at MIT Media Lab and NASA. Bhargav Gajjar of Vishwa Robotics in Brighton, Massachusetts, designed the legs for small drones.

A report in *New Scientist* said Gajjar, like so many roboticists exploring the workings of nature, studied dozens of bird species looking for inspiration. Using a high-speed camera, he recorded how they land. His

design of the [drone](#)'s legs are based on those of the American kestrel. A drone for reconnaissance has much to [learn](#) from this bird, a small falcon often seen perched on power lines. They are sit-and-wait predators. They keep watch for food, insects and small mammals, and the birds drop rapidly when prey appears, make their capture, and return to the perch to eat.

Like the kestrel, the drone can be made to get into the right position for landing. A remote computer uses footage from a camera fitted to the drone to get the drone into the correct landing position. The bird-like drone brakes above its landing site and performs a controlled stall in order to touch down. Extremely sharp claws give the drone a grip that, [said](#) *New Scientist*, is difficult to break.

New Scientist's piece presents the key advantages of effectiveness and power savings in this type of drone: "A perching drone can occupy any convenient vantage point, making it stealthier and giving a closer view than one circling overhead. Perching uses no power, and a perching drone recharging from solar cells could operate indefinitely."

According to a video from Vishwa Robotics, the research is sponsored by the US Air Force Research Laboratory. The company's site states that their work is "inspired by biology and with a tendency to improve and demystify the very fundamental workings of nature." Their projects are funded by the US Air Force, Defense Advanced Research Projects Agency (DARPA), and the US Army and also by private companies.

Writing about their research in the past, on a government website for Small Business Innovation Research, Small Business Technology Transfer (SBIR/STTR), they said current MAV platforms suffer from not having landing gear to enable perching and ground mobility, to support recharging (energy harvesting) and/or surveillance and reconnaissance. "We plan to build several experimental lightweight

prototype mechanisms with claws and appendages, with small servo actuators, or bistable solenoids, or springs, or a combination of these technologies, to enable different modalities. For perching, we propose concepts to land on ledges and on branches and other cylindrical objects like wires."

Reacting to Vishwa Robotics' drone, Justin Thomas of the University of Pennsylvania's General Robotics, Automation, Sensing and Perception (GRASP) Laboratory said in *New Scientist* that the drone could be of benefit in situations involving environmental monitoring, and establishing temporary communication networks in natural disasters. He also noted: "Such a biomimetic approach would have advantages in extending the working time of an aerial robot by allowing it to perch and save energy."

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Citation: Falcon-inspired drone has legs, will perch and land (2014, January 29) retrieved 16 September 2025 from

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