Dispatches

FAA gives approval to pesticide-spraying drone

Alison Gillespie

In May, the Federal Aviation Administration (FAA) announced approval for use of the Yamaha Corporation's RMAX, a remotely piloted helicopter that can apply pesticides in hard-to-reach agricultural locations such as hilly vineyards. Even though this is the first time that a drone has been granted approval for pesticide application in the US, the RMAX is already being put to work elsewhere. "It's so common in Japan, it's looked at just like a tractor in the field", says Steve Markofski, Yamaha spokesperson (Cypress, CA).

The RMAX, which weighs ~94 kg when full of liquid, is smaller than the average helicopter but larger than the drones often used for gathering video footage. Grape growers in California have been anxiously waiting for information about its costs. Rather than being sold to individuals, the RMAX will be leased through a franchise arrangement and will probably be operated mostly by technicians already trained and licensed for pesticide application, according to Markofski.

Yahama Corporation

The Yahama RMAX has been approved for the spraying of pesticides in the US.

Although there is little data available, many think that drone usage could reduce chemical treatments. "The technology allows targeted application of pesticides, which can help us avoid the use of more chemicals later on", explains Ken Giles, Professor of Biological and Agricultural Engineering at the University of California–Davis. He thinks of drones as a new tool for Integrated Pest Management.

But that versatility is also giving some pause. "My concern is that this might actually increase the agro-industrial footprint", warns Keith Bildstein, Director of Conservation Science at Hawk Mountain Sanctuary (Kempton, PA). "Areas not now being treated might become open to development." The impact of drones on birds of prey is not well understood, but when footage of a hawk attacking a small drone was posted to YouTube last year, the video became enormously popular with those concerned about wildlife conservation, demonstrating the public's interest in the issue.

David Bird, editor of the *Journal of Unmanned Vehicle Systems* and Professor Emeritus at McGill University (Victoria, Canada) points out that smaller drones burn less fuel than their existing counterparts and in numerous other ways can be "greener". Many people have developed negative attitudes about drones due to portrayals in movies and other media, but the vehicles can also be operated in ways that could minimize potential harm to wildlife. Industry and agricultural development are likely to incorporate them into daily work, one way or another. "Unmanned aerial vehicles are a game-changing technology", Bird concludes. ■

China redesigns cities for flood control and water conservation

Ganlin Huang

A recent survey of 351 Chinese cities, conducted by the Ministry of Housing and Urban–Rural Development and released in early May, indicated that 62% had experienced at least one flooding event between 2008 and 2010. Meanwhile, two-thirds of the country's municipalities are facing serious water shortages. In response to these issues, China has now launched a "Sponge City" project – sponge cities are those that use green roofs, pervious surfaces, and redesigned water systems to absorb, store, and reuse rainwater more efficiently. Previously, all the rain that fell onto a city's impermeable surfaces (including roofs, roads, and sidewalks) flowed into nearby rivers via an underground sewage system, speeding up the urban water cycle and reducing the amount of water available for use in times of water scarcity. Conversely, deluges from rainstorms would overwhelm the sewage system and cause inner-city flooding.

The Sponge City concept aims to improve urban-runoff control by 70–75% by 2020. Sixteen cities of varying sizes and in different regions have been selected for a 3-year pilot project. Each city will design its own plan, and will receive a US$200–300-million grant from the Central Government, which local government agencies and private enterprises are expected to match.

"We used to locate green space on elevated ground within residential areas, so that people could get a better view of it and its aesthetic value was maximized", says urban designer Wei Zhang (UA Design, Beijing, China), "but now most green spaces need to be situated in depressions to catch runoff more efficiently". One pilot project, in the Guangming district of Shenzhen City, successfully captured and reused 70% of runoff by installing green roofs and permeable pavements, and by moving green space to low-lying areas. The Olympic Forest Park in Beijing – a mixture of sports facilities (soccer, basketball, and tennis) and walking trails – is another pilot project for "sponge" technologies. The park is able to maximize runoff collection through the use of its green spaces, permeable pavements, and a water filtration system that passes the captured runoff through wetlands and ponds and reuses it for irrigation. Due to the filtration system's 4700-m^3 storage capacity, very little water accumulated on the park's road surfaces even during severe rainstorms. ■