Benefits in the use of drone spraying technology in the management of railway infrastructure.

Background

Railscape Ltd and their drone division, RUAS, have developed and patented an unmanned aerial precision sprayer (UAPS), designed to deliver pesticides and herbicides in areas that are considered difficult or hazardous to reach using conventional working at height methods. While UAPS was originally designed to operate in the railway environment, the utility of the sprayer allows for wider commercial applications in equally challenging environments. Matched with a commercially available downward sprayer, the combination of both platforms and the skills and experience of the operators, allows previously untreated areas of vegetation to be correctly managed.

Development

To spray chemicals from a drone in the UK you require authorisation from multiple stakeholder agencies, and it takes considerable time and financial resource. The nature of this innovative solution has provided Railscape the opportunity to develop and shape regulatory policy with the HSE (Chemical Regulations Division) and the Civil Aviation Authority (CAA) to set the conditions for wider industry success. To operationally deploy a downward sprayer in the UK, Railscape will use the existing approval pathway. The one essential piece of science to support any future approval is to provide a drift study specific to the airframe. Without this, the operation is not viable. Alongside the existing aerial surveying service including a developed AI vegetation recognition programme, Railscape are leading the industry in the use of drones and the only company in the UK permitted to spray herbicide with an active ingredient.

Benefits

Safety. Drone spraying reduces or removes the need to work at height or close to hazardous areas. Pilot and spray operator are clear of treatment areas reducing the chance of exposure to the spray product. Both technology platforms remove the human factor or endurance and load carrying associated with traditional knapsack sprayer use.

Efficiency. Site access is one of the restricting factors in why many existing areas are not being managed. Drone spraying can provide the answer to this by simply flying over the access problems. The time on task and resources required can be reduced using this novel approach. Data and imagery collected during the flying operation can also support different business needs in one task.

Environmental. Chemical from the UAPS applied directly and precisely to a plant or target area reducing excess application and run off. Automated spray settings allow for greater consistency and more accurate delivery resulting in less chemical being used when compared to other application methods. Accurate data is recorded as part of the operation to support any required record keeping.

Operating environment. Railway infrastructure provides a challenging environment to manage non-native invasive species of weeds. Drone spraying can be used across much of the railway infrastructure with UAPS best suited to bridges, tunnel portals and viaducts while the downward sprayer is best suited to cuttings, embankments, protective rock faces and blocks of Japanese Knotweed. Evidence suggests that many of the hard to reach or difficult sites are simply not being mananged increasing operational risk and the chance of accidents or further lineside damage. The flexibility of both technologies could allow multiple sites to be treated.

Upskilling the workforce. Upskilling the workforce in the use of drone technology while ensuring the safety of workers by removing them from the danger areas are key benefits.

Award Winning. UAPS is award winning technology as recognised at the Robotics and Automation Awards on 2023.

Railscape UAPS on DJI M300

DJI T16 Downward sprayer