

ACCIDENT

Aircraft Type and Registration:	Aeryon SkyRanger R60 (UAS, registration n/a)	
No & Type of Engines:	4 electric motors	
Year of Manufacture:	2019 (Serial no: SR 5074049)	
Date & Time (UTC):	17 June 2020 at 0057 hrs	
Location:	Maidenbower Pond, Crawley, West Sussex	
Type of Flight:	Emergency Service Operations	
Persons on Board:	Crew - N/A	Passengers - N/A
Injuries:	Crew - N/A	Passengers - N/A
Nature of Damage:	Destroyed	
Commander's Licence:	Not applicable	
Commander's Age:	33 years	
Commander's Flying Experience:	6 hours (of which 4 were on type) Last 90 days - 2 hours Last 28 days - 0 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

The UA fell from a height of about 70 ft into a pond when the emergency cut-out was accidentally operated by the pilot. The pilot stated he had not recognised the emergency cut-out function icon which had appeared on the flight controller screen. In attempting to clear it he unintentionally activated the function, stopping the UA motors.

History of the flight

The UAS was being used to search for a missing person in the area of a large pond surrounded by trees. The search was being conducted at night and was using a thermal camera to search areas hard to access by foot. The weather at the time was good with only a light breeze.

The UAS pilot reported that during the flight he became aware of a message on the screen of the flight controller which he did not recognise. He did not realise the message was a warning and attempted to clear it but in doing so the aircraft motors cut out, causing the UA to fall from a height of about 70 ft into the pond below.

Aircraft information

The SkyRanger UAS includes a quadcopter UA powered by four electric motors with a maximum takeoff weight of 3.5 kg. Using the DROPS analysis tool¹ a dropped object of this weight is capable of causing fatal injuries to an individual wearing a hard hat from a height of only 4 m.

The UA is controlled remotely by a pilot using a flight controller containing a small screen to input commands and to receive information. A stylus has to be used to make selections on the screen.

The UAS has an emergency cut-out function which cuts power to all four UA motors. It is accessed by holding the stylus over an icon on the flight controller screen showing a white aircraft on a black background. This causes the aircraft shadow under the icon to flash red. By tapping the icon three times within three seconds the emergency cut out function is activated.

Aircraft examination

Data from the UAS was sent to the manufacturer for analysis. This confirmed that the cut-out screen icon had been activated three times within three seconds, causing all four electric motors on the UA to stop.

Organisational information

Two neighbouring police forces had combined the management and oversight of their UAS operations. Between them they operated a number of UAS with about 150 officers being qualified to use them.

In order to qualify as a UAS pilot, personnel were sent on a five-day course with a civilian training company to gain the necessary CAA recognised qualification, during which time they were required to fly a UA for a minimum of two hours. This was followed by further internal training working alongside a more experienced qualified UAS pilot within the relevant police unit for a period of time until the trainee was considered ready for assessment. This assessment was carried out by one of a small number of assessors within the two police forces. The assessment covered various aspects of operating the UAS, including role specific requirements and more general aircraft requirements.

The two police forces used a number of different types of UAS, including the SkyRanger. Pilots operating the SkyRanger were required to undertake a two-day specific course, designed by the manufacturer but run internally. The course included the management of different aircraft warnings and failures, with pilots needing to pass an assessment at the end of the training.

Footnote

¹ See AAIB Bulletin: 7/2020 DJI M600 Pro AAIB-26314. The analysis tool was developed as part of a dropped object prevention scheme (DROPS) introduced as part of a safety initiative by the UK Oil and Gas industry in the 1990s.

Pilots were required to maintain a minimum currency, as required by the CAA, of two hours flying in 90 days. Where they fell below this requirement pilots were required to be re-assessed before they could operate again.

Pilot information

The pilot had completed his initial training in 2018 to gain his UAS pilot's qualification. Due to an unexpected lack of availability of UAS in his police unit he had then not operated further until undertaking a SkyRanger course in February 2020. The pilot had passed his assessment with no apparent issues.

At the time of the accident he had accumulated a total of 6 hours 15 minutes flying time, of which 4 hours 15 minutes were on the SkyRanger.

Analysis

The pilot had not recognised the significance of the icon that he had inadvertently selected on the flight selector and his attempt to clear the message from the screen had the unintended consequence of activating the emergency cut-out function. This had shut down the motors and caused the UA to fall into the pond below.

CAA requirements currently allow a person with no previous experience to gain a commercial UAS pilot's qualification in a relatively short period of time, often in less than a week. The high level of automation available also makes many UAS relatively easy to operate. These points have the benefit of making this important area of aviation more widely available. They however also present the potential for people operating UAS to do so without the benefit of the experience gained over the longer and more extensive training required for more traditional routes into manned aviation. Recent AAIB investigations reveal a lack of understanding by some UAS pilots of fundamental operational factors such as weather limitations and the handling of aircraft warnings and failures.

The potential for such UAs as that involved in this accident to cause serious or fatal injuries when falling from even relatively low heights highlights the need for UAS pilots to be capable of understanding all aspects of their operation. This in itself requires careful management where an operator has a number of different pilots and systems under their control, with a need to carry out effective training and assessments, as well as keeping pilots properly current.

Safety Action

The police forces involved had been increasingly investing in the training and assessment of those officers using UAS. They were already in the process of introducing a new system of pilot assessment which will require pilots to undergo an assessment every six months, incorporating an annual day's training. Since the accident they have also allocated an officer working full time in the training role to compliment the assessors already in place.