

ACCIDENT

Aircraft Type and Registration:	3DR Solo (UAS)	
No & Type of Engines:	4 3DR 22x16 mm 880 kv electric motors	
Year of Manufacture:	2016 (Serial no: VUE003)	
Date & Time (UTC):	13 June 2017 at 0930 hrs	
Location:	Kemsley Mill, Kent	
Type of Flight:	Aerial Work	
Persons on Board:	Crew - None	Passengers - None
Injuries:	Crew - N/A	Passengers - N/A
Nature of Damage:	Propeller and motor damage, fuselage cracked, gimbal snapped off	
Commander's Licence:	BNUC-S	
Commander's Age:	43 years	
Commander's Flying Experience:	112 hours (of which 26 were on UAS types) Last 90 days - 5 hours UAS Last 28 days - 3 hours UAS	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

The unmanned aircraft struck a crane during an autonomous flight to survey a construction site. The pilot, who had previously flown the pre-programmed mission at the site, had not taken into account the addition of a new crane.

History of the flight

The 3DR Solo is an unmanned aircraft (UA) with a maximum takeoff weight of 1.8 kg (Figure 1). With its flight controller it forms an unmanned aircraft system (UAS). It was being flown to document a construction site using a Go Pro Hero 4 camera mounted on a gimbal below the aircraft.

The pilot had flown the UA previously at the construction site using a pre-programmed mission profile with four waypoints. All waypoints were programmed to be flown at 400 ft agl, which was above the height of the three cranes at the site. The UA took off from a car park on the north side of the site and started climbing to its first waypoint at the south-western tip of the site (Figure 2). Before it reached 400 ft agl it collided with the jib of a crane. The crane had not been at the site during the previous flight, and from where the pilot was situated in the car park it was difficult for him or his observer to tell that it was about to strike the crane because of a lack of perspective. The UA fell to the ground and was damaged but there was no damage to the construction site.



Figure 1
3DR Solo UAS with Go Pro Hero 4 camera

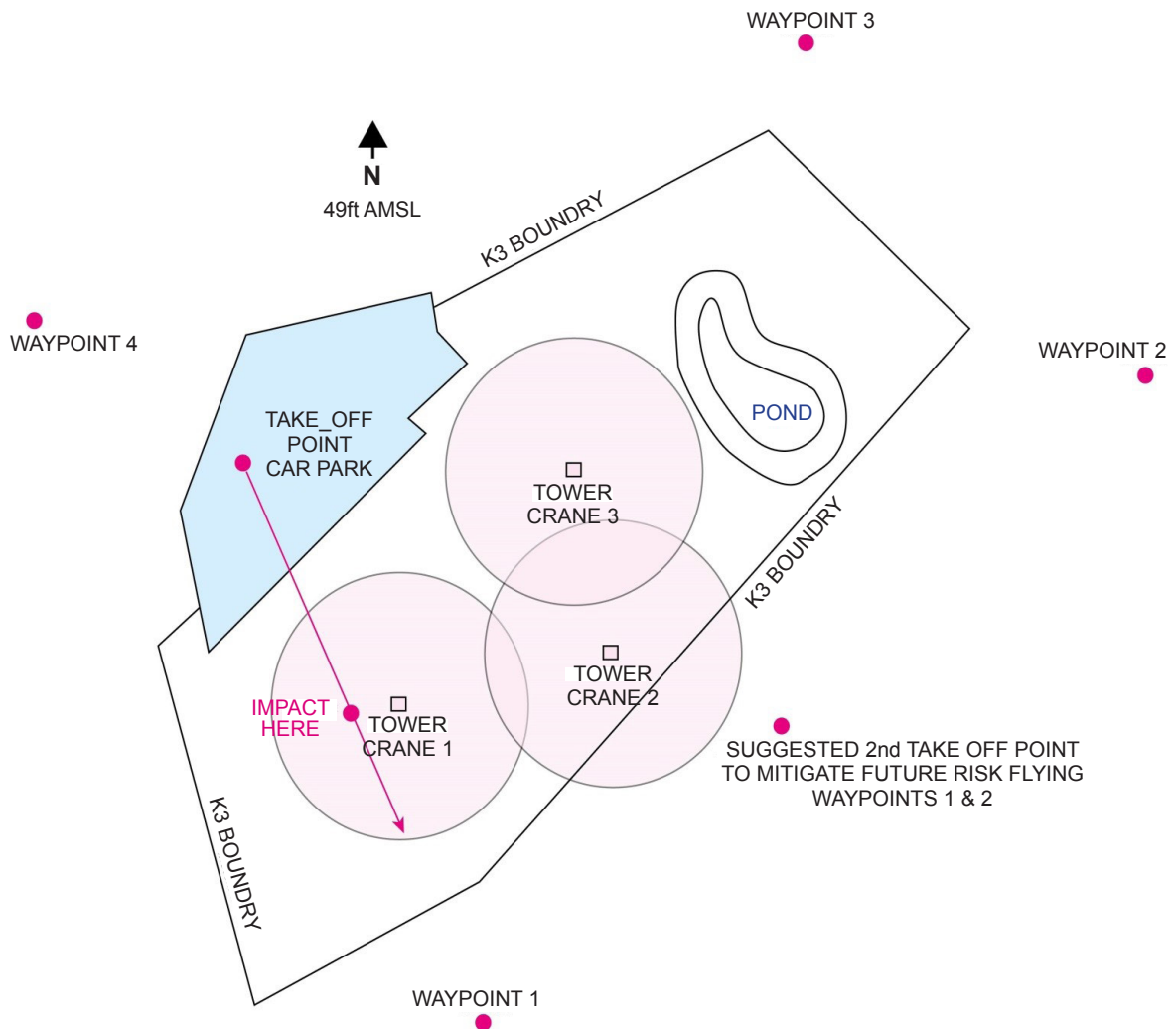


Figure 2
The planned route and location of the collision

Pilot's comments

The pilot stated that the accident was caused by the incorrect programming of the autonomous waypoint mission which had not taken into account the new crane at the site. He stated that future missions would be planned such that the UA ascended vertically to 400 ft shortly after takeoff, in a safe corridor, before surveying the site and would avoid intersecting the working radius of any of the cranes. He also decided to split the mission in two and to survey the southern boundary by taking off from a new position on the south side. This would avoid flying directly across the site and would afford him a better view of the UA's relative location to the cranes.