ACCIDENT

Aircraft Type and Registration:	Quest Q-200 UAS
No & Type of Engines:	1 3 phase AXI electric motor - engine
Year of Manufacture:	2015
Date & Time (UTC):	12 July 2017 at 1427 hrs
Location:	Hinkley Point, Somerset
Type of Flight:	Commercial operation
Persons on Board:	Crew - None Passengers - None
Injuries:	Crew - N/A Passengers - N/A
Nature of Damage:	Extensively damaged
Commander's Licence:	Other
Commander's Age:	48 years
Commander's Flying Experience:	24 hours (of which 20 were on type) Last 90 days - 2 hours Last 28 days - 1 hour
Information Source:	Aircraft Accident Report Form submitted by the pilot and further enquies by the AAIB

Synopsis

The unmanned aircraft (UA) was surveying a foreshore close to a construction site using a flight plan of pre-programmed waypoints.

During the flight the UA was affected by a change in the wind that resulted in it flying larger than normal turns. This caused the UA to overshoot its downwind waypoints and fly over the construction site. During one such overshoot the UA began to descend, as programmed, and collided with a crane on the construction site about 250 m inland.

As a result of this accident the operator made several changes to its procedures.

History of the flight

The fixed-wing unmanned aircraft (UA) was being used to survey a foreshore, flying at 35 kt and 200 ft agl, using a flight plan of pre-programmed waypoints. Adjacent to the foreshore was a large construction site which was outside the planned flight area. Prior to the flight the operator carried out pre-flight checks and an on-site risk assessment was completed without any hazards being identified. At the time of planning the weather forecast was fine and the wind was from the east-north-east at 7 to 13 kt. As such the pilot selected a flight plan with tracks running across the wind, ie north to south and vice versa, with into-wind turns. Additionally, as there were two 'jack-up' barges located on the foreshore the pilot modified the flight plan so that the UA would fly at 400 ft agl when in the vicinity of the barges.

After launch, the UA began its pre-programmed route at 200 ft agl. However, the first four downwind turns, at the southerly waypoints, overshot the waypoints by about 125 m. These overshoots were larger than expected, indicating a change in the wind's strength and direction. The UA subsequently climbed to 400 ft, as programmed, for the legs in the vicinity of the barges, but the southern waypoint overshoots increased to about 200 m. During the following turn, the pilot felt that these overshoots were becoming problematic, as they were beginning to encroach over the construction site, and he considered aborting the flight on the subsequent northerly leg. However, during the turn, as the UA began to descend back to 200 ft as planned, it collided with the horizontal beam of a tower crane and fell to the ground. The crane was about 370 m from the pilot and 250 m from the foreshore and the previously overflown waypoint. The UA was extensively damaged but there was no third party damage and no injuries.

Pilot's comments

The pilot commented that the main cause of the accident was poor flight planning. The overshoot and collision could have been prevented by aligning the flight legs east/west instead of north/south and maintaining 400 ft near the construction site. The pilot did not do this because optimum imaging uses crosswind legs, in this case north/south. Also the position of the tower cranes, outside the planned flight area, were not fully considered during the planning stage due to their more remote location. Additionally, the pilot did not intervene and initiate a climb before the collision because the distance and height of the cranes were difficult to perceive.

Safety actions

The operator has made the following procedural changes to minimise the probability of collisions with high obstacles on this and other construction sites:

- Construction site staff will be contacted, prior to launch, to check the height of the highest structure to ensure that sufficient clearance can be met. If this cannot be achieved that part of the site will not be overflown.
- Any flights that have the potential to overfly the construction site will be flown at 400 ft.
- Manual corrective action will be taken to manoeuvre the UA in the event of deviations from the flight plan.