

Unmanned aircraft went missing

DJI Mavic 2 Enterprise, 30 June 2023⁹

The Pilot In Command (PIC) of the unmanned aircraft system (UAS) received a "low battery level" warning on his remote controller, urging him to land the Unmanned Aircraft (UA). The battery percentage had dropped below 30%, the low level limit that he had set himself. Due to operational needs and pressure to accomplish the mission, the PIC decided to ignore the message and kept the UA in hovering mode in its current position.

Moments later, the PIC received a message on the remote controller, stating that the Return To Home (RTH) function was initiated. This RTH was activated by the Smart Return Home function which determines the minimum battery percentage required to safely return to the 'home' position. The PIC cancelled the RTH function and was aware that the UA might no longer be able to reach the 'home' position and he would have to land the UA on an alternative landing site. Sooner than he expected, the PIC received a "critically low battery" message and the UAS went into the auto land mode. This mode cannot be overruled, however the PIC still had control of the UA's lateral flight path. The PIC was able to direct the UA to an alternative landing site but had to divert due to road traffic nearby this site. The PIC then directed the UA over several trees into an open field at which point, the UAS lost connection with the UA. The UA has not been found.

DJI's User Manual for the Mavic 2 Enterprise series¹⁰ stated that the "low battery" RTH function is triggered when the intelligent flight battery is depleted to the point below which the safe return of the UA may be affected. DJI advises to return home or land the UA immediately when this message is prompted. The UA will then automatically return to the home point if no action is taken within ten seconds. The PIC may choose to override the RTH.

When a "low battery" RTH function is cancelled by the PIC and the flight is continued, the intelligent flight battery may not have enough charge for the UA to land safely at the home point. This potentially leads to a required landing on an unprepared landing site and a higher risk of the UA crashing or being lost.

The thresholds for the battery level warnings are automatically determined based on the UAs current altitude and distance from the home point. The user may define a custom percentage at which these warnings are generated regardless of altitude and distance. In both cases, the UA will perform a forced landing if the current battery level can only support the UA long enough to descend from its current altitude.

From this occurrence it can be learned that if you deliberately cancel the RTH function and continue the flight and the UAS then enters the auto land mode, you can only control the UA laterally to a limited extent.

⁹ The flight was carried out in the context of the detection of offences. Pursuant to Article 57(2)(3) of the Kingdom Act instituting a Safety Investigation Board, the registration of the drone and the location are not included in this report.

¹⁰ DJI, MAVIC 2 ENTERPRISE SERIES, User Manual, v1.8, April 2021.

On 29 August 2023, a similar occurrence took place at the same operator with a similar drone. Given the great similarity between the two occurrences, the Dutch Safety Board did not investigate the latter occurrence further.

Following both occurrences, the operator's advice to other operators is to pay attention to the pressure that pilots may experience to continue flying for their operational purpose if, for example, full batteries are no longer available. In addition, the advice is also: If you, as a pilot, consciously make the choice to continue flying; are you aware that the UA could end up in a forced landing. Prepare for that and think about an alternative landing site.

Classification: Accident

Reference: 2023131