

5.5.2021

Attn.: armasuisse [REDACTED]

Cc: ESL [REDACTED]

**Hermes 900 C/E4 HFE UAV D-13 Accident -  
Executives Summary following Final Investigation Report**

Ref.: D-13 Final Investigation Report - DE 951-DE-001168 Rev. C, dated 4.5.2021

The Hermes 900 HFE/CE4 UAV system is under certification process. The system is currently in an advanced phase of flight-testing.

D-13, one of the serial air vehicles to be delivered, performed a flight test on 5<sup>th</sup> August 2020, lost control during the flight and crashed to the ground resulting with a total loss of the air vehicle. There was no additional damage to property, no human injury or loss of life.

The Chief Aviation Investigator in the Israeli Ministry of Transportation has nominated the company (ESL) to perform the investigation. The final Investigation Report was submitted and presented to the Chief Investigator, which approved the report's findings and recommendations.

The investigation, based on detailed flight data from UAV flight computer, additional data sources and complementing analyses, concluded the causes and contributing factors, for the accident, and defined recommendations to ensure the system safety of flight.

The accident occurred during a planned high-speed maneuver. Updated Aero-Elastic and Aero-Servo-Elastic (ASE) analyses, both linear and Non-Linear, showed that, apparently, the aircraft was flying at the vicinity of its symmetric-flutter boundary. It was also found that unintended configuration of Air Brakes and Flaps generated structural vibrations. These vibrations, with the aircraft flying at velocity near its flutter boundary, excited an Aero-Elastic (flutter) phenomenon that caused the aircraft V-Tail control surfaces to oscillate in high frequency and growing amplitude, which eventually created a structural failure of the tail and its detachment from the main body in a very short period and aggressive process.

Based on the Investigation findings and the updated Aero-Elastic analyses, it was found that the above-mentioned Aero-Elastic behavior could be overcome by tail mass calibration update of the tail structure (change of tail surfaces C.G.). This could be achieved without a UAV design change by implementing the De-Icing system in the V-tail leading edge as foreseen by the original design, and is now installed.

Following the implementation, flutter test flights successfully executed, expanding the flight envelope up to the required 120 Knots. Flights effort continue these days, towards certification flights, with no limitations.

Yours Sincerely

A handwritten signature in black ink, appearing to be the name of the sender.

ALPStar Male UAS Program  
Elbit Systems – Aerospace Division