

EXECUTIVE SUMMARY

AIRCRAFT ACCIDENT INVESTIGATION

RQ-1L PREDATOR UAV ACCIDENT

EL MIRAGE, CA

4 OCTOBER 2000

At 1302 on 4 October 2000, Air Vehicle RQ-1L Predator UAV, S/N 94-3005, departed controlled flight and crashed during transition between test points over El Mirage, CA. The test team completed automatic landing (autoland) tests and was reconfiguring the air vehicle and Ground Control Station (GCS) for skyball tracking tests when the air vehicle stopped sending telemetry information to the GCS, the air vehicle stopped responding to pilot inputs, the skyball tracker slewed to an uncommanded position pointing at the left wing, and the tailplanes moved to full trailing edge up. The position of the tailplanes forced the air vehicle into a series of stalls and recoveries, culminating in impact with the ground in a nose high attitude. The air vehicle crashed at N34°38.08' W117°32.07', approximately 2 miles Northeast of the El Mirage airfield. There was no fire or explosion. No damage was sustained to government or private property, other than the air vehicle. The air vehicle was destroyed. Damage to the air vehicle was estimated at \$1.73 million. A news release appeared in local media immediately after the accident, but no activity has been reported recently.

The primary cause of this mishap was the execution of a full trailing edge up instruction issued to the tailplanes by the flight computer. The sequence and timing of the loss of telemetry data, loss of air vehicle response, slewing of the skyball, and tail plane instruction indicate that the lack of commands was caused by a failure in the flight computer. Testing of the hardware and software components of the mishap air vehicle and GCS did not discover an anomaly that could account for the failure of the flight computer.

The FC PWA was equipped with a "watchdog timer" that was not enabled. A watchdog timer is a component on the computer board that will reset a computer processor that has stopped responding. If enabled, it might have allowed recovery of the air vehicle. The watchdog timer was disabled on the mishap air vehicle as part of a planned enhancement to reduce the cost and time of updating air vehicle software installed on the ground. The software instructions to re-enable the watchdog timer before flight were inadvertently left out. The configuration control process failed and, thus, allowed the air vehicle to fly without an enabled watchdog timer.

Under 10 U.S.C. 2254(d), any opinion of the accident investigators as to the cause of, or the factors contributing to, the accident set forth in the accident investigation report may not be considered as evidence in any civil or criminal proceeding arising from an aircraft accident, nor may such information be considered an admission of liability by the United States or by any person referred to in those conclusions or statements.