

EXECUTIVE SUMMARY

AIRCRAFT ACCIDENT INVESTIGATION

**MQ-1B, T/N 04-003133
BALAD AIR BASE, IRAQ
30 JULY 2007**

On 30 July 2007, at 2300 local/1900 Zulu (Z, or Greenwich Mean Time), an MQ-1B Predator, a remotely piloted aircraft, tail number 04-003133, impacted the ground short of runway 32 on final approach to Balad Air Base (AB), Iraq. The Mishap Aircraft (MA) was forward deployed to Balad AB from the 432d Wing, Creech Air Force Base, Nevada, in support of Operation IRAQI FREEDOM. The Mishap Crew (MC) was assigned to the 46th Expeditionary Reconnaissance Squadron as part of the launch and recovery element. Damage to the MA and runway lighting totaled approximately \$2.21M. There were no deaths or injuries associated with this mishap.

The MC, consisting of the Mishap Pilot (MP) and Mishap Sensor Operator, assumed control of the MA for the final 18 minutes of the 20.4 hour sortie. The MC was current and qualified to conduct the mission.

Nine minutes after assuming control, the MC detected engine overheat indications, including fluctuating exhaust gas temperature readings in two of the MA's four cylinders. The MC declared an In-flight Emergency for "Engine Overheat" 15 miles from Balad AB. The MP was issued immediate clearance inbound. During the final 11 minutes of flight, the MA experienced abnormal engine operations that resulted in power losses. The MC applied "Engine Overheat" checklist items and were initially able to maintain glidepath and appropriate airspeed parameters. Approximately one mile from the runway threshold, the MA engine lost power in two cylinders. Approximately 17 seconds later, the final two cylinders lost power, resulting in engine failure. A failing, and ultimately failed, ignition system caused the engine-out condition. This engine failure occurred on short final, a critical phase of flight, and left the aircraft without sufficient energy to glide to the airfield. The loss of power induced a stall and an irrecoverable loss of airspeed. The MA impacted 92 meters short of the runway on the unprepared under-run surface.

The Accident Investigation Board President determined, by clear and convincing evidence, the primary cause of this mishap was the result of a failed Ignition Module (IM). The IM is comprised of two redundant Capacitive Discharge Ignition (CDI) circuits. The first CDI failed due to an improperly manufactured wire-to-wire connection that was not soldered as required. This failure increased the electrical load on the remaining CDI while reducing the IM to a single point of failure. The second CDI failed due to low reliability at higher than normal operating temperatures caused by higher engine settings, increased electrical load, and an IM enclosure design that could not adequately dissipate the resulting heat.

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 the accident, nor may such information be considered an admission of liability of the United States or by any person referred to in those conclusions or statements.