

EXECUTIVE SUMMARY
F-16, S/N 96-5027
LUKE AIR FORCE BASE, ARIZONA
29 MAY 2002

On 29 May 2002 at approximately 1707 MST the mishap aircraft (MA), an F-16CJ, SN96-5027, owned by the Republic of Singapore Air Force and assigned to the 425th Fighter Squadron, Luke Air Force Base, Arizona, crashed approximately 40 nautical miles south of Casa Grande, Arizona. The MA was part of a two-ship flying a basic fighter maneuver, continuation training mission. The mishap instructor pilot (MIP) was a USAF pilot assigned as Chief of Standardization/Evaluation Section, 56th Operations Group.

Shortly before the mishap, the MIP was performing a defensive turn and had reduced the throttle to below military power to counter an offensive move by his wingman. Upon successfully abating the simulated missile threat, he selected full afterburner and continued the hard turn. Almost immediately the aircraft jolted violently as if he had "r[u]n into something underneath the airplane". The MIP heard a high-pitched sound and a couple bangs. He then received a radio transmission from his wingman concerning "flames". The MIP saw his engine revolutions per minute (RPM) rolling back and his engine fire light was illuminated. He then looked over his right shoulder and saw the aft end of his aircraft was engulfed in fire. The MIP cut the throttle in an effort to cut the fuel supply to the fire. However, the fire persisted. The MIP initiated ejection at that time in accordance with flight manual guidance for an in flight fire.

The MIP ejected safely sustaining no apparent injuries at the time. However, the MIP had back problems prior to the ejection and has experienced severe back pain since that time. As a result, he has been DNIF (Duties Not Involving Flying) since shortly after the mishap. The MA was destroyed upon impact with a loss valued at approximately \$19 million. The impact area was uninhabited desert on the Papago Indian Reservation. No cultural artifacts were damaged and damage to natural resources was minimal.

I find clear and convincing evidence that the root cause of the mishap was a combination of manufacture processing imperfections in the #50 blade of the 4th stage turbine of the PW-229 engine. Clear and convincing evidence establishes that due to the reduced strength of the #50 blade, normal operation of the engine resulted in the formation of a fatigue crack. That fatigue crack progressed to the point the blade could no longer withstand the stress of operation. At that time, the #50 blade airfoil snapped.

I find clear and convincing evidence that the liberated airfoil impacted the remaining 4th stage blades causing them to fracture. The engine containment system could not handle the numerous liberated blades. As a result, many exited the engine casing, at least one penetrating the A-1 fuel tank located above the engine and another severing the 16P280 cross feed tube (fuel line) at the bottom of the engine. This resulted in a massive fuel leak. The very hot turbine blades and escaping turbine gases ignited the fuel leak resulting in a raging fire in the aft section of the aircraft. The MIP's attempt to extinguish the fuel source and, in turn, the fire by moving the throttle to off was ineffective due to the massive fuel leak. The fire persisted. At the time of the catastrophic blade failure, the sudden slowing of the turbine created increased "drag" on the engine and caused a torque fracture of the low pressure shaft, rendering the engine useless. The MIP correctly determined the aircraft could not be recovered and ejected.

I find substantial evidence that the current visual inspection process for the 4th stage turbine blades was a factor which indirectly contributed to this mishap in that it is inadequate to detect fatigue cracks which tend to be very tight and, as a result, not visible to the unaided eye.

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.